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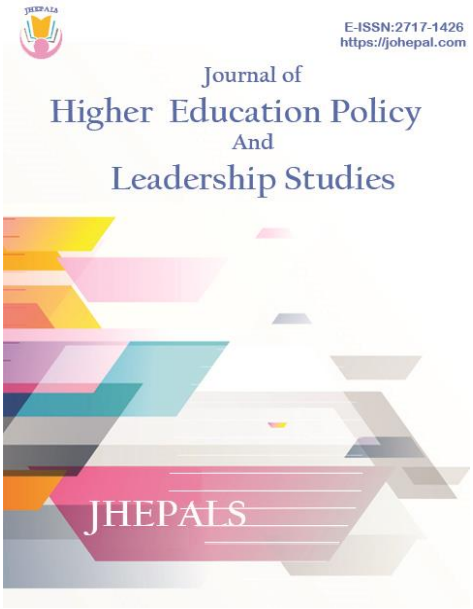
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Preparing Doctoral Students for College Teaching: A Mixed Methods Investigation



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Preparing Doctoral Students for College Teaching: A Mixed Methods Investigation

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Abstract

For doctoral students who desire professorial positions of leadership in higher education, learning opportunities for development of their teaching during their doctoral program is crucial. In this mixed methods study, quantitative data include doctoral students' self-efficacy for college teaching at four different time points. Qualitative data include doctoral students' perceptions of a mentored teaching experience and faculty mentor's perspectives of the learning opportunity. Findings reveal that a semester-long mentored teaching experience served as a pivotal part of an approach to support doctoral student leaders as future teacher educators. All participants reported high self-efficacy for college teaching after the mentored teaching experience. However, self-efficacy waned prior to and after teaching independently, even if the individual had prior experience with teaching the course. Self-efficacy data and shared perspectives clearly illustrate that college teaching is much more than pedagogy and knowledge of content. We discuss specific benefits of the teaching experiences and how our findings have implications for doctoral preparation programming specific to fostering effective teaching by future faculty in higher education.

Keywords: Doctoral Preparation; Teacher Development; Self-Efficacy; College Teaching; Mentor; Teacher Educators

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Introduction

Between 2020 and 2022, almost 165,000 students received their doctoral degree from U.S. colleges and universities (Survey of Earned Doctorates, 2022). With steady increases since 2010, it is more important than ever that doctoral students are well-prepared for their intended career post-graduation, which for many graduates is acquiring a professorial-track position at an Institute of Higher Education (IHE; Survey of Earned Doctorates, 2022). Graduates who acquire IHE positions are expected to (a) conduct research of consequence, (b) be active in service activities, and (c) be an effective teacher of undergraduate and graduate students. This three-prong model is universal, representing expectations from most disciplines in the U.S. and internationally (Bowman Jr et al., 2020; Chen, 2015; Greer et al., 2016).

The Need for Doctoral Students' Preparation for Teaching in IHEs

Over 40% of doctoral students (DS) in Education expect "teaching" to be the primary work activity when employed in an IHE, postgraduation (Survey of Earned Doctorates, 2022). Likewise, Chen's (2015) mixed methods study noted that more than half of an assistant professor's workload is comprised of preparing to teach, teaching, meeting with students, and grading. Participants in Chen's study reported that the bulk of their time was teaching related, then followed by research activities, with service encompassing the least amount of time each week. Additionally, as was fast-tracked due to COVID-19, university instructors devoted more time to learning the evolving pedagogies for the varying modes of teaching, inclusive of face-to-face, hybrid, synchronous, and asynchronous classes (Bishop-Monroe et al., 2021). Even though professorial workloads encompass teaching multiple courses, international doctoral programs in many disciplines including science, technology, engineering, and mathematics (STEM), the social sciences, and business rarely provide or prioritize attention to the teaching prong (Bonner et al., 2020; Chen, 2015). This gap in doctoral preparation is also the case for education DS with or without K-12 or college teaching experiences (Mimirinis & Ahlberg, 2021; Richards et al., 2017). Two decades ago, Tyler (2003) found that of 1,000 special education DS, 71% were unsatisfied with how well they were prepared to teach in higher education. Authors of more recent studies note that education DS find it problematic to translate teaching they received to designing and delivering pedagogical experiences for university students (Mimirinis & Ahlberg, 2021). Although student status may deem DS unable to participate in programmatic development activities and possibly limit them to teaching a selection of undergraduate courses, preparing DS for college teaching can improve their self-efficacy for teaching in higher education. Relevant literature, which is largely outside of education, suggests that mentorship and varied practice-based opportunities improve doctoral student self-efficacy for teaching.

Self-Efficacy

Bandura (1997) defines self-efficacy as peoples' beliefs in their capacity to do those behaviors needed to accomplish relevant achievements. Bandura's social-cognitive theory suggests that perceived self-efficacy correlates with strong performance in a specific task in a specific context. For DS who anticipate careers in higher education, self-efficacy for

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teaching college students forecasts their pedagogical skills. These skills, or competencies, include content expertise, instructional design, and instructional delivery skills (Bonner et al., 2020). Belief in one's capacity to do these skills well is influenced by social interactions, observations of others, actual performances, and sufficient practice leading to mastery experiences (Bandura, 1997). The performance skills can be transmitted and practiced in varied ways such as seminars, courses, and workshops while DS are completing their degree (Bonner et al., 2020; Edwards et al., 2014) and self-efficacy has been used as one indicator of a DS potential teaching performance.

Measures of self-efficacy for college teaching include surveys or inventories for participants to self-rate their capacity to perform specific competencies, and interviews and focus groups (Bowman Jr et al, 2020; Dechenne et al, 2012; Prieto & Altmaier, 1994). For example, Prieto and Altmaier (1994) examined the influence of a Graduate Teaching Assistant (GTA) position on college teaching performance and revealed connections among efficacy, teaching skill behaviors, and student achievement. In their research, using an adapted version of the *Self-Efficacy Toward Teaching Inventory* (SETI) from Tollerud (1990), GTAs from various academic departments who received preparation on teaching or who acquired more and more teaching experiences over time, had significantly higher self-efficacy. In a more recent investigation, a 20-hour workshop for GTAs involving modules, case studies of common teaching situations, and microteaching sessions with feedback significantly increased the teaching self-efficacy of all participants (Meadows et al., 2015). Post training, results from the *Teaching Assistant Self-Efficacy Scale* and focus group data revealed that the GTAs felt better prepared to use a student-centered teaching approach and active learning techniques.

Improving Self-Efficacy for College Teaching

Although there is little empirical work on how and how many doctoral programs ensure DS have acquired a solid foundation of effective teaching, some faculty have incorporated structured plans that support such development and experiences, inclusive of peer feedback (Troop et al., 2015), quality mentorships (Edwards et al., 2014; Meadows et al., 2015), and varied practice opportunities (Regan & King-Sears, 2023; Bowman Jr et al., 2020). Troop et al. (2015) maintained that DS' self-efficacy for teaching can increase when DS are provided practice opportunities that are formative in nature and incorporate peer feedback in training experiences. After multidisciplinary DS in Troop et al. (2015) received two four-hour workshops about learner-centered lectures, self-efficacy was significantly higher. Also, watching others practice, followed by reciprocal peer feedback, was perceived as a valuable experience.

Edwards et al. (2014) note that DS of social work preparing for a career in the professoriate also need quality mentorship while acquiring teaching experience. Edwards et al. describe their model with seminars preceding specific teaching experiences, including what they called a co-teaching experience in which the faculty mentors the DS to plan, instruct, and assess students over two separate 3-hour class sessions. The teaching experiences gradually lengthen over time until the DS act as the instructor-of-record, all with faculty mentoring and support.

Similarly, Bowman Jr et al. (2020) prepared graduate fellows to teach STEM undergraduate courses by providing varied opportunities for them to acquire pedagogical

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competencies and receive feedback from faculty over a 6-week period. After first receiving professional development inclusive of peer feedback, participants were then observed by faculty on three occasions while teaching 50-min introductory undergraduate class sessions. The fellows completed a self-efficacy survey (unnamed) prior to professional development, after professional development, and after the teaching experience. Time three results indicated DS used new teaching and assessment methods, connected to students, and increased their self-efficacy ratings on every question by at least one point on the five-point scale.

Varied opportunities for developing teaching competencies are also described by Regan and King-Sears (2023) in a malleable scaffolded approach for preparing DS for college teaching titled the Continuum of Teaching Experiences (CTE) Model. Because DS enter doctoral programs with diverse college teaching experiences, the authors sought a flexible model that could be individualized for each DS to begin teaching experiences in different ways and progress at different paces. For example, DS with minimal university teaching backgrounds may begin with planning a brief portion of a class session or partnering with a DS peer to design and deliver a lecture. The CTE model also provides DS with opportunities to embed additional pedagogical experiences, such as providing professional development and conference presentations.

The Current Study

National and international IHEs are aware that preparing DS to teach is an ongoing underdelivered goal in doctoral programs (Chen, 2015; Mimirinis & Ahlberg, 2021). Bonner et al. (2020) describe it as an "institutionalized deficiency" (p 437). Although the current study was informed by studies inclusive of DS outside of the education discipline who are preparing for university teaching, this study focused on preparing DS of special education because self-efficacy is highly contextualized and there is little research focused on doctoral preparation in special education (McCorkle et al., 2023). Also, DS of special education will be preparing preservice or inservice teachers in K-12 settings to provide high quality instruction for youth receiving special education services. Their development as teacher educators directly impacts the quality of undergraduate education for future special education teachers and the students they will teach. Apart from guidelines for preparing DS (deBettencourt et al., 2016), no empirical research to date has provided evidence to verify specific pedagogical experiences which improve the preparation of DS of special education for teaching in higher education.

Study Purpose

Using a mixed-methods approach for this longitudinal study, DS rated their self-efficacy for college teaching before and after two types of teaching experiences in their PhD preparation program. First, a mentored teaching experience (MTE) occurred as an internship in which a DS was mentored by a faculty member while teaching a course. Faculty mentored the DS throughout an undergraduate or graduate course so that multiple aspects of planning, teaching, and assessing were modeled and discussed. With guidance, the DS gradually engaged in multiple aspects of course instruction, after which mentors provided feedback. Second, the DS completed independent teaching experiences of face-to-face undergraduate courses (ineligible for graduate courses) during which the DS were the instructor of record.

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Consultative support from faculty was available, if needed. This second experience is hereon referred to as independent teaching with faculty support (ITFS). This study was designed to answer the following questions:

- RQ #1 (Quantitative): How do two teaching experiences in a PhD preparation program impact a doctoral students' self-efficacy for college teaching?
- RQ #2 (Qualitative): How do faculty mentors and doctoral student mentees perceive a mentored teaching experience as part of a PhD preparation program?
- RQ #3 (MM): To what extent does participation in two teaching experiences in a PhD preparation program impact doctoral students' self-efficacy for college teaching and support doctoral students who aspire to teach in university faculty positions?

Research Methodology

Research Design

A convergent mixed methods research design was used to examine how two teaching experiences impacted DS development as teacher educators (Creswell & Clark, 2018). Qualitative and quantitative data were concurrently gathered over three years, analyzed separately to compare, then merged for interpretation. The research team consisted of two special education faculty and two graduate research assistants (GRA).

Authors' Positionality

The lead research team members of this study are white female teacher educators at a large research-intensive university who each have more than 20 years of experience in special education and college teaching. As full professors, we have mentored doctoral students in all phases of their dissertation studies and taught courses at the undergraduate, graduate, and doctoral levels. Prior to the study, the authors had individually facilitated college teaching internships for former doctoral students, and the lead author has served in the faculty mentor role for doctoral students of special education during their college teaching internship on ten occasions over the last decade. The authors came together for this work because of a shared commitment to prepare DS with high quality, versatile teaching opportunities while in the doctoral preparation program. When collaboratively conceptualizing this study, the authors hoped to operationalize the mentor teaching experience and determine how both teaching experiences impacted doctoral students' beliefs in their ability to teach in higher education.

Setting

The study took place in a School of Education (SOE) within a university located in the northeast of the U.S. The university was a mid-sized, public, Research 1 institution. The PhD program in the university's SOE had been active for over two decades and included 15 specialization areas. Each specialization was individualized, and DS developed their own programs of study. There were required courses in the PhD education degree as well as courses to select across specializations. At the time of the study, there were approximately 17 full-time and 24 part-time DS with a special education specialization.

In the special education specialization, DS did not take a formal course related to college teaching, but they had opportunities to complete a mentored teaching experience (MTE) prior to independent teaching with faculty support (ITFS). The course for the MTE

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used face-to-face, asynchronous, synchronous, or hybrid delivery modes (see Table 1). However, in this study, async courses were not considered an ITFS because it limits an instructor to only facilitate or grade, rather than engage students, plan, and modify content.

Participants

There were two groups of participants: (a) DS completing teaching experiences, and (b) faculty mentors of the DS for the MTE.

Doctoral Student Participants

A purposive sampling of DS included full-time or part-time DS enrolled in the *special educatio*n PhD specialization. DS were included in the study if they had (a) an intent to teach university courses during or after acquiring their doctoral degree and (b) at least three or more semesters left of coursework in the PhD program. After an approval from the university Institutional Review Board, recruitment began with an email introducing the project sent to 41 DS. Among the 41 DS, three DS did not meet the inclusion criteria, 12 students did not reply to the invitation, three were not interested in participating, one student withdrew from the program, and one was a part of the research team rendering her ineligible to participate.

The pool of 21 DS signed informed consent and provided their curriculum vita to the research team. The final sample included 15 DS who were able to engage in one or both of the teaching experiences (MTE and ITFS) over the course of three years. At the start of the study, their curriculum vita was used to determine their previous experiences relative to college teaching. All DS had master's degrees (a requirement for PhD program entry), and the majority of DS held one or more of the following teaching certifications: special education, general education, English as a second language, reading specialist. DS had a mean of 8 years of K-12 teaching experience (range = 3 to 27) in public school settings, with one participant who primarily taught children in correctional or home-based facilities. One doctoral student had no K-12 teaching experience, and two had independently or co-taught a college course prior to the doctoral program. Eleven of the 15 DS had provided at least one guest lecture in a university course prior to data collection. Table 1 has additional characteristics.

Faculty Mentor Participants

A purposive sampling of faculty mentor (FM) participants included full-time or part-time faculty who were hired to teach a special education university course. Inclusion criteria were (a) being the instructor of record for a special education course, and (b) agreeing to provide mentorship to the DS for the duration of the course. Each FM signed informed consent. During the study, 13 full-time and 2 part-time faculty who taught undergraduate or graduate special education courses served as faculty mentors for the mentored teaching experience (MTE).

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Table 1.
DS Participants

DS	Age	G	Race	Mentored Teaching Experience (MTE)	Mode	Independent Teaching w faculty support (ITFS)	Mode
1[a]	25-30	F	AA	Consultation and Collaboration	F2F	Technology Specialized Instruction	Hybrid
2[b]	31-39	F	W	Characteristics of Students w disabilities	F2F	Characteristics of Students w disabilities	F2F
3[a]	31-39	F	W	Characteristics of Students w disabilities	F2F	Behvr Mgmt & Positive Supports	F2F
4	31-39	M	W	Individualized Behavior Supports	F2F	Individualized Behavior Supports	F2F
5	31-39	F	W	Strategies for Reading & Writing	Hybrid	Language and Reading &Writing	F2F
6	40-50	F	W	Language Development & Reading	F2F	Introduction to SPED[c]	Async
7	25-30	F	W	Autism across the Lifespan	Async	Intro to Special Education[c]	Async
8	31-39	F	W	Language Development & Reading	Sync	Assessment (co-taught w/ faculty)	F2F
9	50+	F	W	Language and Reading & Writing	F2F	N/A	N/A
10	31-39	F	W	Introduction to Early Childhood SPED	Async	Introduction to SPED[c]	Async
11	25-30	F	W	Consultation and Collaboration	F2F	N/A	N/A
12	25-30	F	A	Instructional Strategies for Math	F2F	N/A	N/A
13	25-30	F	W	Research in SPED	Async	Introduction to SPED[c]	Async
14	31-39	F	W	Language Literacy Severe Disabilities	Sync	N/A	N/A
15	25-30	M	W	Introduction to SPED	Async	N/A	N/A

Note. DS = doctoral student; G= Gender; F= Female; M= Male; A=Asian; AA= Arab American, W = White; F2F = face-to-face; Async = asynchronous; Sync = synchronous.
[a]DS had two MTEs, but data represents F2F version. [b]This mentorship was a DS teaching independently with *e*Coaching from a faculty member (see Regan and King-Sears, 2023). [c]This Async course was independently taught by the DS but was not considered an ITFS in this study.

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Data Sources

There were four data sources used in this mixed method study.

College Teaching Self-Efficacy Scale-Doctoral Students (CTSES-DS) Survey

Development of the CTSES-DS consisted of four phases guided by best processes for designing credible surveys (Gehlbach & Brinkworth, 2011). Phase 1 included review of literature and any existing instruments. Four surveys were found to be aligned with the purpose of the study. The surveys ranged from 15 to 44 items, and their reliability ranged from .92 to .97.

1. The *College Teaching Self-Efficacy Scale*; 44 items; Prieto, 2005; α = .94
2. The *GTA Self-Efficacy Scale*; 15 items; DeChenne & Enochs, 2010; α = .96
3. *Teaching Assistant Self-Efficacy Scale*; 18 items; DeChenne et al., 2012; α = .92
4. The *College Teaching Self-Efficacy Scale - Adjunct*; 39 items; Tyndall, 2017; α = .97

Since no instrument fit the current study, individual items from the four surveys were consolidated and prepared for review in Phase 2. During Phase 3, the research team examined items for clarity, redundancy, and relevance to college teaching. After discussions, the researchers reworded items (items 1, 7, 9 in Table 2) and retained 45 items. Also, the researchers decided to use 7-point response anchors to provide more response options as recommended by some investigators (Gehlbach & Bringworth, 2011).

Finally, an expert review to establish content validity and a pilot of the modified instrument were conducted in Phase 4. The expert reviewers were two senior faculty members at the same institution who were recipients of university teaching awards. They provided feedback on clarity or word choice, redundancy, and construct relevance of each item. After revisions, the final instrument included 32 items on a 7-point scale. Each question stem began as *What is my self-efficacy regarding my capacity to…*?. Overall, 14 items were specific to *instructional skills,*15 items to *creating a positive environment,* and three items to *assessing student learning*. A doctoral student of special education at the end of the program and thus, not participating in the study, piloted the instrument. Qualtrics survey software was used to display the directions and 32 items, and we requested feedback relative to ease of item interpretation, appropriateness, and validity. The student provided minor edits (e.g., define self-efficacy).

DS Interview

Former research investigating DS experiences was used to inform the development of a semi-structured interview protocol (Bowman Jr et al., 2020; Troop et al., 2015). The interview protocol consisted of five questions to verify the MTE (semester, course name) and 13 open-ended questions specific to DS experiences (i.e. Please describe the context of when you came on board for the mentor teaching experience? How satisfied were you with the level of guidance, mentorship, or supervision you were provided during the MTE?).

Faculty Mentor Questionnaire

The Faculty Mentor Questionnaire (FMQ) was a researcher-developed series of queries about how FM characterized the experience and performance of the DS when the MTE was completed. Mentors were asked to input course information (title, course delivery mode) and select among a list of activities that the DS engaged in during the mentorship

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experience. There was an opportunity to add activities, if needed. Another item asked the FM to select how the DS received feedback during the MTE (e.g., rubric ratings; reflection). In addition, the FM provided a score on a 5-point likert scale reflecting the perceived knowledge (depth and accuracy) exhibited by the DS. The FM also selected from a list compiled from researcher's previous experiences and the literature (Simonson et al., 2022), areas of DS' strength and areas to be prioritized for further development (e.g., enthusiasm, pacing). The FMQ was developed in Qualtrics and emailed a week after the MTE ended.

Teaching Course Evaluations

At the end of every course, students complete a standardized, electronic, anonymous teaching course evaluation. It provides numeric feedback to instructors from students' perspectives about their learning. Students rate 14 items on a 0 (strongly disagree) to 5 (Strongly Agree) scale. The items represent the following categories: Student Participation, Learning Outcomes, Course Environment/ Experiences, and Instructor Preparation and Course Organization. Students can also add comments. Feedback is shared with the instructor-of-record electronically about a month after the course ends. The mean score across items was used in this study to compare how student perceptions merge or diverge with DS' self-efficacy of teaching.

Procedures

There were four time points for the DS to complete the self-efficacy scale.

Controlling for Response Shift Bias

Because DS used a self-rating scale, it was important to control for their response shift bias. Sibthorp et al. (2017) describe response shift bias as that which occurs when study participants' ratings shift as a result of the intervention. Individuals tend to self-rate higher initially prior to an intervention than they do subsequently after the intervention due to their increasing knowledge about items' meanings (Drennan & Hyde, 2008). A solution is for participants to complete a retrospective pretest (the current study's Time 1) and posttest (the current study's Time 2) at the same time to eliminate response shift bias (Sibthorp et al., 2017).

Timeline

After providing consent, students completed an MTE. To control for response shift bias, DS responded for the first two occasions (Time 1 and Time 2) concurrently one week after the MTE (avoiding any self-rating prior to MTE). It took about 15 min. to complete each self-rating. DS interviews took place during the semester immediately following MTE and were conducted by an experienced graduate research assistant. Each 1:1 interview lasted an average of 30 min., was recorded via Zoom, and transcribed. Thirteen of 15 DS were interviewed. At the same time, data were collected via Faculty Mentor Questionnaires emailed to 15 participating faculty mentors. FMQ took about 15 min. to complete.

After the MTE, nine DS participated in the ITFS. However, the survey data were collected for only five DS who were able to teach in face-to-face format. Four DS who taught an Async course were excluded from the ITFS portion of the study given that this format did not allow instructors to engage, plan, and modify content. Five DS completed Time 3 self-rating two weeks prior to ITFS, and Time 4 self-rating two weeks after ITFS. In addition, they

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shared their teaching evaluations with the research team at the end of the course. Upon completion of all research activities, five DS who participated in MTE and ITFS received a $100 Amazon e-card.

Data Analysis

Quantitative Data

CTSES-DS data to answer RQ1were first entered into Excel and then entered into SPSS, Version 22.0. After meeting assumptions, Cronbach's alpha was used to determine the reliability of the CTSES-DS survey. Internal consistency of the *instructional skills* (α = .95), *creating a positive environment* (α = .93), and *assessing student learning* (α = .96) items were excellent, as indicated by an overall Cronbach's α of .97 (George & Mallory, 2003). Descriptive statistics of each survey item included means, standard deviations, mode and max/min scores at all four time points. The overall mean was also calculated for each participant at all applicable time points. In addition to the descriptive statistics for each time point, a paired samples *t*-test was subsequently used to determine significance in the change of self-efficacy for teaching in higher education before (Time 1) and after the MTE (Time 2).

Qualitative Data

The DS interview data and the faculty mentor questionnaire (FMQ) data were used to answer RQ2. For the qualitative analysis, the research team used Braun and Clarke's (2006; 2019) reflexive thematic analysis approach when examining content from the 13 DS semi-structured interviews. First, the third author checked the DS interview transcripts for accuracy and formatted the data to facilitate analysis. Members of the research team read each interview transcript several times to acclimate to the data. Then, the third author developed inductive coding procedures, using the raw data to manually identify codes and subcodes. The third author then used a recursive process to organize the codes and subcodes in broader groups to show patterns across participants' interview data.

Once all of the interviews were completed, the first and third author conducted a broader level of analysis. Following discussions about the relationships between the codes, the initial nine categories supporting the data were refined or collapsed into seven, meaningful categories. Next, the first author independently reviewed each transcript once more, guided by the apriori categories. The purpose of the independent review was to identify any inconsistencies, confirm that the patterns were fully captured and that the categories aligned with the corresponding RQ. The categories were redefined and enveloped into three overarching themes.

For analysis of the 15 FMQ responses, data were first extracted from Qualtrics as an Excel file. Then, the first six items were manually cross referenced with the DS interview data to verify the MTE experience. For the remaining questions, descriptive statistics were used such as frequencies of activities and the means of mentor ratings about DS performance. The open-ended responses were used to confirm, enhance, or refine conclusions drawn from the interview data.

Data Integration

In order to answer RQ3, both quantitative and qualitative data were merged to determine where the data sets cohered. The first author selected data or representative quotes from participant interviews and the FMQ that also aligned with items on the CTSES-DS. This joint

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display of data was used to show the interrelatedness among DS ratings from the CTSES-DS, excerpts from the DS interview data, and the FMQ data (Fetters et al., 2013). For example, items rated with the lowest or highest average at Time 1 were targeted and then any qualitative data referring to these topics were merged. Similarly, when interview data revealed DS reflections of future practice, researchers directed the analysis to relevant items about reflection from the CTSES-DS. We also included descriptive statistics (mean and range) and the open-ended responses from the teaching course evaluations provided by those five DS who completed an ITFS experience to inform RQ3. In addition, we integrated the quantitative and qualitative data to better understand how the efficacious skills perceived by DS may have shifted at times.

Trustworthiness

Brantlinger et al.'s (2005) and Leko et al.'s (2023) quality indicators guided the methods and systematic analysis. Having the graduate research assistant who was a doctoral student conduct the DS interviews allowed for more honest and authentic answers to be shared with a peer. Also, a summary of each DS interview with select quotes was provided to each DS via email as a first level member check. Further, multiple researcher perspectives and data sources were triangulated to establish trustworthiness. Finally, the qualitative data was integrated with the self-efficacy data during analysis to build legitimation (Leko et al., 2023).

Results

RQ1: Impact on self-efficacy (Quantitative)

Self-ratings on the CTSES-DS were aligned with terms to depict a relative interpretation: 1 = Very Low to 7 = Very High. In retrospect, prior to the MTE (Time 1), the average self-efficacy score for each DS ranged from 3.97 (moderately low) to 6.59 (high) with a mode of 5 (moderately high) (see Table 2). After the MTE (Time 2), the average self-efficacy score for each DS ranged from 4.81 (approaching moderately high) to 7.0 (very high). There was an increase from Time 1 to Time 2 for each of the 15 participants (see Table 2). A one-tailed paired samples *t* test revealed that DS in this sample were significantly less self-efficacious before the MTE (M = 5.369, SD = .819) compared to self-efficacy ratings reported after the MTE (M = 6.206, SD = .687), $t(14) = -5.677$, $p<.001$).

Table 2 presents the average per item on the CTSES-DS across all 15 DS before the MTE (Time 1) and after the MTE (Time 2). DS collectively rated the following survey items with the highest efficacy before the MTE (Time 1): items 15, 22, 26, and 27 (see Table 2). Lower ratings of efficacy prior to the MTE (Time 1) were the following three items: items 11, 17, and 32. Following the MTE (Time 2), averages per item across DS participants showed the greatest gains of self-efficacy to be items 17 and 32. The lowest ratings of efficacy after the MTE (Time 2) were items 23 and 25.

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Table 2.
CTSES-DS average self-efficacy score per item at Time 1 and 2

CTSES-DS item	T1 *M*(*SD*)	T2 *M*(*SD*)
1. Actively engage students via learning activities during class time?	5.27 (1.22)	6.00 (1.00)
2. Create a positive classroom climate for learning?	5.73 (1.16)	6.33 (.98)
3. Reflect on my teaching practice with the aim of making appropriate improvements?	5.53 (1.06)	6.33 (.82)
4. Promote student participation in my classes?	5.00 (1.19)	5.93[a] (1.16)
5. Use different evaluation methods?	5.07 (1.16)	6.07 (.80)
6. Prepare the teaching materials I will use?	5.13 (1.40)	6.13 (.74)
7. Recommend supports that my students can access to alleviate or resolve their learning difficulties?	5.00 (1.07)	5.93[a](1.22)
8. Promote a positive attitude towards learning in my students?	5.60 (0.91)	6.40 (.83)
9. Adapt my teaching practices in response to students' verbal and non-verbal feedback during instruction?	5.33 (1.11)	6.27 (.88)
10. Give my students feedback about their progress?	5.40 (.83)	6.27 (.59)
11. Clearly identify my course objectives?	4.80[b](1.26)	6.00 (.85)
12. Maintain high academic expectations?	5.33 (1.23)	6.13 (.74)
13. Use information derived from my own self-reflection to improve my teaching?	5.73 (1.03)	6.33 (.82)
14. Adapt to the needs of my students (motivation, interest, prior knowledge, etc.) when planning my courses?	5.13 (1.24)	6.40 (.83)
15. Provide support and encouragement to students who are having difficulty learning?	5.87[a](.92)	6.33 (.82)
16. Update my knowledge of the subject/content I am teaching?	5.67 (1.11)	6.20 (.78)
17. Provide my students with detailed feedback about the academic progress?	4.80[b] (.86)	6.13 (.74)
18. Calmly handle any problems that may arise in the classroom?	5.33 (1.23)	6.27 (.96)
19. Develop my teaching skills using various means (attending conferences, reading about pedagogy, talking to other professionals)?	5.53 (1.06)	6.47 (.74)
20. Use formative assessment to gather information about my students' academic progress?	5.27 (1.03)	6.13 (.74)
21. Encourage my students to ask questions during class?	5.60 (1.06)	6.00 (1.07)
22. Promote positive relationships with students?	6.07[a] (.88)	6.47 (.64)
23. Evaluate the degree to which my course objectives have been met?	4.87 (1.19)	5.87[b] (.92)
24. Design the structure and plan the content of each class?	5.0 (1.19)	6.20 (.94)
25. Promote students taking initiative for their own learning?	4.87 (1.13)	5.80[b] (1.01)
26. Show my students respect through my actions?	6.66[a] (.63)	6.67[a] (.49)
27. Be flexible in my teaching even if I must alter my plans?	6.07[a](1.10)	6.53[a] (.64)
28. Make students aware of the relevance of what they are learning?	5.40 (1.50)	6.53[a] (.64)
29. Promote my students' confidence in themselves?	5.73 (.96)	6.13 (.99)
30. Promote that my students realize their academic success is due to their own efforts?	5.27 (1.03)	6.00 (1.19)
31. Allotting the time necessary to plan my classes?	4.87 (.99)	6.07 (.96)
32. Select the appropriate materials for each class?	4.80[b](1.37)	6.27 (.80)

Note. T1 = Time 1, before mentor teaching experience; T2 = Time 2, after mentor teaching experience
[a]Ratings with the highest average [b]Ratings with the lowest average

Five DS who participated in the ITFS provided self-efficacy ratings before (Time 3) and after (Time 4) the experience. Table 3 presents descriptive statistics for CTSES-DS data at these time points with a self-efficacy average of all scored items per DS participant. Before the ITFS (Time 3), the average self-efficacy score for each DS ranged from 5.50 (moderately high) to 6.90 (high). DS1's data, shown in the first row of Table 3, approached a very high (6.90) average before the ITFS (Time 3), while ratings for others was lower than at Time 2, yet still moderately high. Average self-efficacy for DS4 dropped the most from very high (7.0) to moderately high (5.56) before the ITFS (Time 3). After the ITFS (Time 4), self-efficacy scores for each DS varied between moderately high (5.75) to very high (7.0). Table 3 indicates that the average self-efficacy score increased for four of the DS at Time 4 and the

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average self-efficacy score for DS5 dropped slightly from high (6.0) to moderately high (5.75).

Table 3.
CTSES-DS Outcomes per DS at Times 1, 2, 3, and 4

DS	T1 Min	T1 Max	T1 Mo	T1 *M*(*SD*)	T2 Min	T2 Max	T2 Mo	T2 *M*(*SD*)	T3 Min	T3 Max	T3 Mo	T3 *M*(*SD*)	T4 Min	T4 Max	T4 Mo	T4 *M*(*SD*)
1	3	7	5	5.03(.90)	7	7	7	7.00(.00)	6	7	7	6.90(.30)	7	7	7	7.00(0.0)
2	5	7	5	5.88(.91)	5	7	7	6.09(.82)	5	7	5	5.50(.57)	5	7	6	6.38(.55)
3	5	7	5	5.93(.95)	6	7	7	6.78(.42)	5	7	6	6.03(.74)	6	7	7	6.91(.30)
4	4	7	7	6.28(1.02)	7	7	7	7.00(.00)	3	7	6	5.56(1.27)	3	7	6	5.88(.79)
5	4	7	6	5.34(.94)	5	7	6	6.19(.47)	5	7	6	6.00(.36)	5	7	6	5.75(.51)
6	5	7	6	6.34(.60)	6	7	7	6.94(.25)	-	-	-	-	-	-	-	-
7	3	7	4	4.72(1.08)	4	7	5	5.53(.72)	-	-	-	-	-	-	-	-
8	2	6	4	3.97(.90)	4	5	5	5.06(.50)	-	-	-	-	-	-	-	-
9	5	7	7	6.59(.56)	6	7	7	6.78(.42)	-	-	-	-	-	-	-	-
10	4	7	5	5.38(.61)	3	7	7	5.84(1.3)	-	-	-	-	-	-	-	-
11	4	7	5	5.38(.83)	5	7	7	6.50(.56)	-	-	-	-	-	-	-	-
12	6	6	6	6.00(.00)	6	6	6	6.00(.00)	-	-	-	-	-	-	-	-
13	3	5	4	4.00(.76)	4	6	5	4.81(.54)	-	-	-	-	-	-	-	-
14	2	7	5	4.53(1.4)	5	7	7	6.56(.67)	-	-	-	-	-	-	-	-
15	5	7	5	5.16(.37)	6	6	6	6.00(.00)	-	-	-	-	-	-	-	-

Note. Mo = mode; *M* = mean; *SD* = standard deviation; 1 = very low, 2 = low, 3 = moderately low, 4 = unsure, 5 = Moderately High, 6 = High, 7 = Very High

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RQ2: Perceptions of a Mentored Teaching Experience (Qualitative):

The DS interviews were the primary data source to inform RQ2. Data from FMQ were used to corroborate findings. The three identified themes are addressed next.

Theme 1:

A positive mentor/mentee relationship supports one's self-efficacy for college teaching.

All DS and FM depicted a positive mentor-mentee relationship. DS used descriptors such as "open communication," "mutual respect," and "trust." DS described faculty mentors as "approachable" and "professional." FMQ data indicated that each DS had an (a) *Openness to learning* and showed (b) *Enthusiasm/Positivity*. DS14 shared that her FM provided "meaningful feedback" and others described the MTE as "a perfect balance of guidance and independence."

Several DS attributed a successful MTE to the quality of the mentor-mentee match. For example, DS3 valued having "…independence [for] choosing who you want to work with" and others expressed appreciation for a trusting relationship with good communication. Similarly, a response in the FMQ data stated, "constant communication throughout the week was key to feedback and planning."

Four DS reported that the MTE was a requirement for their program of study while others reported that the MTE evolved from conversations with their doctoral committee. For most DS, the course content of the MTE was aligned with their area of research or former K-12 teaching experiences (except DS1 and DS7). DS1 and DS3 acquired two mentored teaching experiences over the study duration to expand their skills (the first MTE is reflected in the data). Because each DS was entering the experience with different backgrounds, the MTE was individually designed with the FM and DS identifying specific activities (see Table 4) needed to meet learning objectives. FMQ data corroborated these experiences. FMs reported that they oriented DS to class readings and materials before the semester began and had weekly meetings thereon. Those with a fall semester experience used the summer as a jumpstart. During the MTE, the pairs communicated in person, but also via email, phone, virtually, and via shared platforms.

Table 4.
Reported Activities Experienced during the MTE and Suggestions by Doctoral Students

Activities in Mentored Teaching Experience	
• Observed class sessions	• Provided feedback on student assignments
• Attended or facilitated weekly office hours for grad or undergrad students	• Updated syllabus and developed PowerPoints
• Observed correspondences between students and mentor	• Built out asynchronous modules; verified links were active
• Developed case studies	• Designed and delivered class content
• Conducted literature searches for learning or providing up-to-date evidence for a practice	• Navigated sensitive student issues (e.g., not turning in assignments, personal concerns, unprofessional interactions)
• Graded within the learning management system	• Incorporated/shared relevant personal experiences into the lessons
• Created/developed video recordings (e.g., content, assignments)	• Collaboratively developed class policies (e.g., extensions for assignments)
• Organized, updated materials on learning management system	• Designed interactive activities to support or complement the content
• Responded to student emails	• Developed and applied rubrics to assignments for grading
• Co-planned lessons	• Met weekly with mentor

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Suggestions for Enhancing the Mentored Teaching Experience	
• Encourage fall and spring mentor teaching experiences more so; summer sessions are limited to 5 to 6 weeks only.	• Observe a session of the course the semester before the mentor teaching experience.
• Access the textbook(s) well in advance of the mentor teaching experience.	• Regularly meet with a community/cohort of doctoral peers who are experiencing a mentor teaching experience.
• Complete multiple MTEs in order to teach in more than one delivery model (asynchronous, synchronous, face-to-face learning) and with diverse learners (undergraduates, cohorts, graduates).	• Maintain a notebook throughout the mentor teaching experience to share ideas you can remind yourself of later; maintain an interactive notebook with the faculty mentor.
• Provide guiding questions at start of experience to support reflection.	• Create your own student feedback evaluation form to gather feedback.
• Complete a teaching opportunity with faculty (as instructor of record) prior to an independent experience.	• Work with enrolled students in more than one class including a field-based clinical setting.

Faculty mentors provided DS with feedback and opportunities for teaching and reflection throughout the semester. For example, at the end of the semester, there was a culminating feedback session between each FM and DS. Additionally, ten DS solicited feedback from enrolled students. Four FMs had the DS provide them with a written reflection of the experience including a digital "journal" shared by DS1. DS described the structure of the MTE as informal, and more than half described the mentoring approach as a gradual release of responsibility. An FM described this approach as the DS "observing for two weeks" and "designing some of the activities and taking over parts of sessions." DS were satisfied or highly satisfied with the MTE.

Theme 2:
Doctoral mentees brought value to the class and had suggestions to further enhance the mentored teaching experience.

DS expressed the value they brought to the college students' learning and provided suggestions to further enhance the MTE. Six DS emphasized the practical knowledge and skills they brought to the MTE. DS3 described:

> I would bring…fresh perspectives or ideas, or you know, research strategies into the conversations, and I could really…relate when responding to some of the struggles the teachers were going through because I was freshly out of the classroom.

DS6 spoke of the unique resources she shared from the school district where she was employed. DS9 described how she infused authentic personal classroom experiences in a lesson for the course, stating, "I combined details from [former K12] students I knew from the past with varied backgrounds into the class [discussion]." Similarly, DS4 found that he was able to generate practical examples based on his experiences with students with disabilities. Targeted knowledge areas like applied behavior analysis and technology were mentioned as valuable additions which enhanced student learning.

These perceptions were congruous with FMQ data. The FMs overall rating of the DS was *great* or *outstanding* on the 5 point scale (2=Developing; 3= Satisfactory; 4 = Great; 5 = Outstanding). Eleven DSs were rated as *outstanding* or adding to the instructor's knowledge or extending the contributions of the FM in some way. An overall score of *great*, for the remaining DS (n = 4), indicated that the depth or accuracy of content knowledge and

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confidence should be prioritized for further development. Although no DS expressed a perceived lack of content knowledge, they did provide suggestions as to how to improve the learning experience and further enhance college teaching skills (see Table 4).

Theme 3:

Doctoral mentees experienced a new understanding about university student learners, including those dealing with challenges, and sharpened how to provide verbal and written feedback to students.

DS identified new understandings about university student learners because of the MTE. Seven DS described specific events, patterns, or observations of the college students, then reflected on how these insights would inform their future practice(s) as a teacher educator. For example, DS15 observed limited writing skills among students and expressed the need to provide future students with adequate supports for written assignments. DS14 empathized with the graduate students who were inservice teachers completing their coursework for licensure while trying to meet everyday demands within their job at school.

DS10 and DS12 mentioned an overwhelming number of graduate students who did not turn in assignments. DS4 had to learn how to navigate this unexpected circumstance realizing "…this course may not be their ultimate priority they have…A lot of students have families and jobs and other responsibilities." Similarly, the linguistic diversity of undergraduates was recognized by DS9 whose MTE was in a course that prepared individuals to assess and teach students with disabilities to read. She described how undergraduates' cultural or linguistic backgrounds matter in a language and reading course, as they may or may not have been provided a foundation in phonics instruction when learning English as a second language. DS14 shared that she planned to re-evaluate her assumptions about what [the undergraduates] knew or did not know and DS10 shared how she would think about students when designing a future course, asking "Is this accessible to students who…English is not their first language? Is this accessible to our students who have significant family responsibilities?"

When sharing what they did and how they perceived the MTE, nine DS emphasized how they learned to sharpen verbal and written feedback to students. One circumstance was a course delivered asynchronously in which some enrolled students did not turn in assignments. In this case, DS15 discovered how to address learners given limited interactions in a course and no face-to-face interactions. DS3 recalled how she shared a student's entry in a discussion board with her FM and, although DS3's initial reaction was to respond with critical judgement of the student's perspective, through dialogue with her FM, she was able to re-evaluate the written feedback and guide the student in a more productive and reflective manner. Another case shared by DS14 described a student facing a mental health crisis. During this heightened event with a student who was using "aggressive type language" in class, the DS and FM followed university protocol to address the escalating concern for the student together:

> She [the FM] helped me with drafting the language in the emails that went to the student and she helped when we were communicating back and forth with student academic affairs…also, for the student…ultimately to make sure they were okay.

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Several DS reported that their FM provided them with advice on their written feedback to students, including email responses. Four DS emphasized the value of seeing the FM enact grading policies, evaluate with rubrics, and provide written feedback on student assignments efficiently. DS15 remarked on what he looked for to inform his own learning: "She's [the FM] seen this… multiple times. How is she answering this question that the students have, particularly with regard to email? How does she respond to students?" Finally, DS7 appreciated the chance to observe how her FM provided tactful feedback to students. The DS referred to microskills of the FM, describing her selected words as empathetic and sensitive: "…her ongoing communication with the students, her thoughtful responses to their discussion boards. She always thanked them for sharing …[and] really respecting their privacy."

RQ3: Self-Efficacy and Perceptions (Mixed Methods):

Qualitative and quantitative data indicate that when DS engage in behaviors necessary for college teaching, they become more efficacious for independently performing the task. DS interviews and FMQ data revealed the types of teaching actions included in a semester long MTE and the average self-efficacy scores for teaching were significantly higher after the MTE. The joint display in Table 5 shows a sample of data convergence among associated self-efficacy item(s), DS interview data, and FMQ data.

Table 5.
A Sample of a Joint Display of CTSES-DS Question, DS Interview, and FMQ Data

CTSES-DS Question	DS Interview Data	Faculty Mentor Questionnaire
Provide my students with detailed feedback about their academic progress? (Q17)	"…learning how to construct the feedback so that it was positive …learning to give appropriate feedback so that it was instructional, constructive and not too demeaning..." (DS4)	5 FMs identified DS grading and being concise as Developing or Satisfactory.
Items on "creating a positive environment" scale were rated the highest before the MTE.	"I felt like I was able to relate to the students very well… it was nice, just kind of building some of those relationships." (DS12)	"[The DS] was definitely in the excellent category for…connecting with students."
Use info derived from my own self-reflection to improve teaching? (Q13)	"Understanding how much support undergraduates need...3 English learners, 3 students with…disabilities, and 1 student who was nonbinary… (DS9)	"[DS] kept a log of curricular improvements... that could be added to the course for next time."

For RQ3, we examined aspects of a contextualized variation of the teaching experiences which impacted self-efficacy among DS – the delivery mode of the course, specifically. This central phenomenon was a part of the DS interview data, and we ascertained how the quantitative data was associated, as well. To integrate the data, we identified DS whose CTSES-DS scores after the MTE (Time 2) were above average and those whose scores fell below average across all DS (m = 6.20, SD = .687). The 6.20 average represented a high self-efficacy. Seven DS had a self-efficacy score at or above 6.20: Six of them completed face-to-face mentorships (DS 1, 3, 4, 6, 9, 11) and DS14 completed a synchronous experience. For the remaining eight participants, the average self-efficacy

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score after the MTE (Time 2) fell below 6.20 (range of 6.19 to 4.81). One anomaly was DS12 who experienced a face-to-face MTE and maintained the same average self-efficacy rating of 6.0 (high; and each item score) at Time 1 and Time 2. DS5 experienced a hybrid MTE, DS8 a synchronous MTE, and DS2 did not have a traditional MTE, but received intermittent *e*Coaching following informal observations of her teaching. The remaining four DS (DS 7, 10, 13, 15) with scores below the average, including DS13 with one of the lowest self-efficacy averages of 4.81 (falling between unsure (4) and moderately high (5)), completed an asynchronous MTE. This pattern suggests that the varied course delivery modes of the MTE influenced DS self-efficacy for college teaching. Further, the only "4" ratings (unsure) on the scale at Time 2 were those provided by DS who had an asynchronous MTE. DS13 and DS10 indicated at Time 2 that they were "unsure" about their capacity to actively engage (item 1) and promote student participation (item 4), such as asking questions (item 21). Also, DS were unsure how to promote students to realize that their success is due to their own efforts (item 30) and that they should take initiative for their learning (item 25). DS15 described an asynchronous MTE:

> Reaching out to students and checking in with students in grading things can be a little different when you are not [in person] when you don't see your students ever. I…learned about people through their emails and through their assignments.

DS8, who completed a synchronous experience, also indicated uncertainty, rating items related to student participation and recommending supports to resolve learning difficulties as a "4".

Another variation observed was that two DS had multiple MTE in different semesters, involving different delivery modes. DS1 completed an initial MTE for a course via a face-to-face mode and then in a different semester, had a second MTE for the same course, via hybrid mode. DS3 completed an initial MTE for a course delivered asynchronously and then another MTE for a different course via a face-to-face mode. All data reflected the face-to-face MTE for both DS. DS3 shared, "having the two was super important… the dual mentorship was totally necessary." Although these DS with two mentored teaching experiences had the highest self-efficacy ratings at Time 3 and Time 4, more data is needed to verify if one or multiple MTE enhance self-efficacy for college teaching. Also, having multiple MTEs was suggested by DS (see Table 4).

To further inform RQ3, we triangulated data to better understand why self-efficacy outcomes before the ITFS experience (Time 3) decreased for almost all DS and why the scores after the ITFS varied (Time 4). Since preparation of a new course may influence outcomes, the researchers compared the course taught for the MTE with the course taught for the ITFS. DS1, 2, and 4 taught the same course for both experiences while DS3 and DS5 taught a different course for the two experiences. The pattern suggests that for DS in this study, self-efficacy for college teaching wanes when teaching independently for the first time, even if the DS has experience with that specific course.

Finally, undergraduate's perspectives of the DS teaching performance, captured by course evaluation data, aligns with the varied, but high self-efficacy ratings reported from CTSES-DS data after the ITFS (Time 4). Evaluations revealed that courses for the ITFS experience ranged from 7-24 students with a 31% to 88% response rate. Evaluation items

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specific to the instructor's performance were averaged and all five DS earned above a 4.0 on a 5-point scale (range = 4.32 – 4.68). Individual item ratings were above the average reported for university faculty and undergraduates provided numerous positive comments.

Discussion

For doctoral students who desire professorial positions in higher education, opportunities for development as teacher educators during their doctoral preparation program is critical. However, we know very little about what these opportunities currently look like or the effects of the methods used to support DS who will be teaching future special education teachers (McCorkle et al., 2023). The current study's analysis of DS' perceptions and reported self-efficacy about their capacity to teach in higher education brings needed attention to an overlooked area of doctoral student preparation programming.

In contrast to investigations among disciplines outside of special education which have reported an improved self-efficacy for college teaching among graduate teaching assistants following a training or bootcamp, this mixed methods study tracked 15 DS participants' self-efficacy for college teaching at four different time points over multiple years. We also pursued a more complete understanding of DS development of college teaching by interviewing each DS after the mentored teaching experience or MTE. The MTE was a teaching opportunity structured as a gradual release of responsibility similarly depicted by doctoral students of social work in Edwards et al. (2014).

Results suggest that for all 15 DS, the MTE, as described in this study, served as a pivotal part of an approach to support their development as teacher educators. Doctoral students in this study demonstrated an overall high or moderately high self-efficacy for college teaching after the MTE, which is consistent with our research hypothesis and previous research involving comparable experiences (DeChenne et al., 2012; Edwards et al., 2014). The statistically significant difference in beliefs before and after the MTE suggests that actually performing those pedagogical skills and closely interacting with and observing others with content expertise teach in higher education is beneficial for DS preparation (Bandura, 1997).

In addition, the self-efficacy data and the examples shared during the interviews clearly illustrate that college teaching is much more than pedagogy and knowledge of content. For example, after the MTE, doctoral students expressed relatively less confidence for some of the survey items specific to creating a positive environment such as promoting students taking initiative of their own learning; providing supports for learners; and promoting student participation. DS in this study had to thoughtfully consider how to address students who were verbally aggressive, less motivated, or overwhelmed with work related responsibilities while taking classes. The students in the courses for the first experience, the MTE, also varied from undergraduates who were engaging in college for the first time versus graduate students who typically had families of their own while teaching in schools during the day and attending courses at night. How to adopt an inclusive and equitable mindset responsive to students' unique backgrounds was an unexpected component of DS learning beyond those traditional skills described by Bonner et al. (2020) of course management and instructional design. For example, DS shared observations of their mentor's professional disposition, via the verbal and written feedback they used to communicate, as a model to emulate. Also, several DS described situations in which they

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observed the FM provide students with guidance and support. Although institutional resources and procedures are a part of the syllabi, the MTE may be the first time DS are exposed to recommending university resources and wellness supports for students and knowing who to contact when a student's behavior does not meet policy expectations. A clear benefit of participating in an MTE during doctoral preparation is that it allows for these unique and potentially challenging situations to be experienced with the oversight of a faculty mentor to debrief and reflect on these implicit aspects of college teaching (Greer et al., 2016).

Another point of discussion is the influential variable underscored in the quantitative and qualitative results: the course delivery modes. After the MTE, self-efficacy scores that fell below average were from those who completed an asynchronous MTE. DS perceived limited rapport and student participation in the asynchronous or synchronous MTEs. Despite established mechanisms for welcoming and engaging students in online communities, which we assume were modeled by the faculty mentors, DS were less certain or not sure about their capacity to create a positive online environment. This may be because DS were given an asynchronous course to teach, so minimal design or preparation was needed. Improving DS' knowledge and skills for teaching online with further training may augment the perceptions and self-efficacy for teaching in these settings, as done for faculty who had to suddenly shift and deliver instruction during the COVID-19 pandemic using unfamiliar online tools (Bishop-Monroe et al., 2021). Course delivery formats continue to vary with students wanting flexibility. Faculty roles are expanding to both online and blended learning environments. In the current study, DS who had multiple MTEs believed the varying instructional deliveries of each MTE was advantageous.

In addition to recommending more MTEs of varying formats, DS also recommended longer mentorships. Nine of fifteen DS participants successfully completed one MTE and then independently taught. Five of those nine taught face-to-face undergraduate courses for the ITFS experience and course evaluations reflected a very strong performance. However, our analysis of DS' self-efficacy before and after teaching an ITFS experience revealed that even if the individual had prior experience teaching the course, self-efficacy waned either before or after teaching independently. This could be a case of insecurities when performing something new or a response to the isolation sometimes experienced when teaching in higher education. Moreover, these results are also a reminder that when preparing future teacher educators, DS are learning the foundation of college teaching and there is no expectation of perceived mastery.

Implications for DS Preparation

To date, there is no empirical study that has examined how DS are prepared to teach prospective special education teachers. Our study provides some guidelines to consider when developing supports or structures around the teaching prong in a DS preparation program. First, the number of mentor teaching experiences and opportunities for engaging in varying types of teaching modalities may be levers for improving the quality of DS preparation. Second, drawing from the recommendations proposed by the DS in this study, doctoral preparation programs should establish a collegial culture where DS who are teaching in a given semester can share insights, provide each other feedback, and reflect on their teaching experiences together, perhaps without faculty or mentor presence (Troop et

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al., 2015). Although not a feature of the current study, doctoral programs outside of special education have developed a network of student peers, allowing DS who are learning to teach in higher education to collaborate formally and informally and socially and academically, preventing isolation (Richards et al., 2017). Sometimes this collegiality among DS occurs organically, but in some cases, facilitating these networks intentionally for DS is warranted (Anderson & Anderson, 2012). Third, universities should consider explicit ways for DS to acquire online teaching competencies. More research is needed to address what this professional development looks like across institutions and how doctoral students can acquire the needed skills (Bishop-Monroe et al., 2021).

Conclusion

Universities preparing doctoral students for careers that involve teaching as well as research hopefully have experiences within their programs which support the teaching skills of the next generation of special education faculty. Such components can help the DS to compete successfully for faculty positions and ensure that their first instructional experiences are not after they are employed in a professorial role. Our hope is that results from this study can be used to inform and support the preparation of effective future teacher educators.

Limitations and Directions for Future Research

Results are limited to one doctoral preparation program at one public institution of higher education in a suburban area of the U.S. The sample was small and did not statistically allow for a t-test with T3 and T4 results. Also, the participants were possibly from similar socioeconomic backgrounds, although this information was not available. Related research with a larger and more diverse sample of participants across universities is needed. Another procedural limitation is the absence of an interview with DS after the independent teaching experience with faculty support (ITFS). An interview may have provided an opportunity to better understand those less efficacious items on the CTSES-DS before or after the ITFS (Time 3 and Time 4). Also, knowing what aspects of independently teaching for the first time were most challenging would help direct an effective onboarding of new instructors. A final limitation is that we do not know what the faculty support entailed for each DS before or during the ITFS. Future research should examine the onboarding and support given to DS when they are hired as the instructor of record. Additionally, differences between in-person and online doctoral programs and the resources available through university teaching and learning centers are areas to explore in future research.

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All procedures followed in this study were approved by the Institutional Review Board (1761854-1). Informed consent for participation was obtained from all participants involved in this study.

Originality Note

The authors confirm that the article is the author's original work including its conceptualization, data collection and analysis, and writing of the results.

Use of Generative AI/ AI-assisted Technologies Statement

The authors claimed that there is "No Use of Generative AI/ AI-assisted Technologies" in preparing this research.

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Dr. Kelley Regan is a Professor in the Division of Special Education and Disability Research at George Mason University. Her scholarship focuses on improving the reading and writing outcomes of students with learning and behavioral disabilities. Specifically, Dr. Regan and colleagues have developed a technology-based writing intervention package developed for and with students, teachers, and parents to improve writing outcomes for students in grades 3 through 12. In addition, Dr. Regan's research has explored coaching and mentoring practices to ensure that special educators acquire the knowledge and skills needed to effectively implement evidence-based instruction.

Dr. Margaret (Peggy) King-Sears is a Professor Emerita in the Division of Special Education and Disability Research at George Mason University. Peggy King-Sears' research interests include effective interventions that are responsive to the needs of students with and without disabilities. Dr. King-Sears and colleagues have investigated the learning outcomes of students in co-taught and non-co-taught settings via meta-synthesis and meta-analyses. An additional topic is examination of achievement when universal design for learning (UDL)-based techniques are used. Her focus is on both what teachers can do via effective teaching behaviors and what students can learn to do for themselves via learning self-management skills that can promote generalization and independence.

Ms. Kelly Durso is the Principal of Oak Hill Elementary School and a doctoral candidate in the Division of Special Education and Disability Research at George Mason University (GMU). Her academic pursuits focus on Special Education and Educational Leadership. Ms. Durso's career has been dedicated to school administration and special education. She holds a Master of Education in Special Education from William Paterson University and a Master of Education in Administration and Supervision from GMU. Her research interests and professional practice are aligned with school-based administrator support as a critical working condition for special education teachers.

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