

Preparing Doctoral Students to Teach in an Increasingly Virtual World: A Response to COVID-19 and Beyond

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Abstract

The recent global pandemic revealed just how unprepared faculty and doctoral students at many U.S. colleges and universities were to teach online. In this study, we investigate the extent to which current and recently graduated doctoral students are prepared to teach online, how they are rewarded for those online teaching skills, and how they could be more effectively prepared. To answer these questions, we surveyed the beliefs of doctoral students and recently graduated faculty members from a Midwestern private university and a Southeastern state university regarding online teaching preparedness compared with those of faculty, department chairs, and deans. We also used data from a summer teaching pilot program to explore best practices for improving doctoral students' preparation to teach online. Findings suggest that educating doctoral students to teach in a virtual world can increase students' confidence and ability to teach in this mode and can be cost effective if offered across disciplines. However, while doctoral students believe that online competency is important in hiring and tenure decisions, deans and department chairs do not necessarily agree, and few schools provide meaningful preparation for online teaching to their doctoral students.

Keywords: online teaching preparedness, online teaching, online learning, doctoral student education, COVID-19

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Preparing Doctoral Students to Teach in an Increasingly Virtual World: A Response to COVID-19 and Beyond

The recent global pandemic revealed just how unprepared faculty and doctoral students at many U.S. colleges and universities were to teach online. As recently as two years ago, in a National Council of Graduate Schools-commissioned thought paper on preparing doctoral students to teach, online skills were not specifically mentioned (Winter et al., 2018). Thus, when universities suddenly went “virtual” over the two-week spring break of April 2020, many scrambled to get up to speed on the most basic online tools, such as recording and posting online lectures or delivering lectures live using online streaming tools (Kafka, 2020; Jaggars et al, 2020).

Traditionally, doctoral students have learned how to teach through mentorship, serving as teaching assistants for more established faculty (von Hoene & Mintz, 2002). However, because many tenured faculty remain skeptical of the effectiveness of online teaching and have yet to fully embrace it themselves (Hall, 2013), doctoral students are unlikely to be exposed to best practices in online teaching before seeking academic faculty positions. To date, little research exists that addresses how doctoral students acquire online teaching capabilities (Bonner et al., 2020; Marx et al., 2015). Yet, these students are our future professors, and the number of online courses and programs offered by institutions of higher education continues to accelerate, largely as a result of the COVID-19 pandemic. The importance of online teaching skills has increased not only for the careers of doctoral students but also for the careers of the students whom they will teach.

Our research addresses several important issues. First, we assess the online preparedness of current doctoral students who plan to teach, as well as that of recently graduated faculty who taught during the pandemic. Second, we compare current and recent doctoral students’ attitudes and understanding with those of deans and department chairs regarding how online teaching proficiency affects academic hiring, promotion and tenure, and performance decisions. Third, we describe the results of a research-informed pilot program to train doctoral students to teach online and compare the results with research to date on faculty beliefs about online teaching best practices. We close with limitations of our research, implications for doctoral training, and possible directions for future research.

Review of Relevant Literature

In undertaking this research project, we found previous research addressing topics such as why and how universities have embraced online courses and programs (Rhode & Krishnamurthi, 2016; Kipp, 2019; Rhode et al., 2017), why existing faculty discount the value of online teaching and degrees (Allen & Seaman, 2015; Darby, 2020), and how experience with online teaching and learning may overcome faculty resistance (Freeman, 2015). While we found a stream of research that addresses training doctoral students in general (Madhavaram & Laverie, 2010; Fulton, 2018; Bonner et al., 2020; Marx et al., 2015; Borders, 2011; Von Hoene, 2011), we found virtually none that addresses training doctoral students to teach online. One possible explanation for this gap may be that researchers assume that doctoral students mirror faculty attitudes (Jaggars et al., 2020). Given the dearth of published research on our topic of interest, we discuss closely related topics, such as current resources devoted to doctoral student pedagogy in general, faculty and administrators’ attitudes toward online teaching, and best practices of delivering courses in this mode. Our literature review ends with four research questions designed to better understand doctoral students’ readiness to teach online; their beliefs, attitudes, and preferences as compared

to administrators' attitudes regarding the value of being trained to teach online, and possible best practices for online teaching training.

Preparing Doctoral Students to Teach

While past research has focused to some extent on preparing doctoral students to teach, almost no research exists on training doctoral students to teach online, Bourelle (2016) being an exception. However, because existing pedagogical courses and programs provide an opportunity to add online training skills, we review below some of the literature addressing this important topic.

Two decades ago, Austin (2002) and von Hoene & Mintz (2002) called on universities to offer an array of teaching experiences and mentoring so that doctoral students could develop the skills needed to be successful. Further, the top policy recommendation by the President's Council of Advisors on Science and Technology was "to train current and future faculty in evidence-based teaching practices" (Connolly et al., 2018). Yet, post-doctoral scholars strongly expressed a need for teaching training which they had not received in their doctoral institutions. Flaherty provides examples where this training does exist, including but not limited to Georgia Tech's economics department, which requires all graduate instructors to complete a "Tech to Teaching" certificate sequence, and UC-Berkeley, which requires graduate student instructors to attend a daylong teaching conference, complete an online course on ethics in teaching, and enroll in a departmental pedagogy course. Additionally, as early as 2011, Border edited a volume in the *Studies in Graduate and Professional Students Development* series which identified and explored the range of pedagogical training doctoral students were receiving.

However, many universities today continue to ignore their doctoral students' need for pedagogical education, with administrators preferring the "sink or swim" method that faculty also describe (Allgood et al., 2018; Bonner et al., 2020; Marx et al., 2015). Some reasons given for this reticence include the belief that one size does not fit all (i.e. STEM disciplines versus the humanities versus professional programs, reported by von Hoene, 2011); the traditional use of doctoral student mentorship (Schramm & Wright, 2011; von Hoene & Mintz, 2002), despite the fact that more seasoned faculty tend to have had little teaching training themselves (Connolly, et al., 2018) and almost no experience in online course development and teaching (Crozier et al., 2012); the push-back against adding additional requirements to already research content-overloaded programs (York, 2019-20); and the question of who would pay for the added courses (i.e. students, departments/schools, or graduate schools) (York, 2019-20). Additionally, Crozier et al. (2012) and von Hoene & Mintz (2002) cite the lack of institutional support for mentoring doctoral students in teaching. At the same time, Cassuto (2020) reports that some department chairs, especially in the humanities, do encourage their doctoral students to hone their online teaching skills to compete successfully for faculty positions.

Supporting the need for training doctoral students to teach, Chan et al. (2019) found that doctoral instructors from programs requiring formal teaching training were more highly rated by undergraduates taking accounting courses. Madhavaram and Laverie wrote in 2010, "PC [pedagogical competence] can be traced back to doctoral programs" and called for marketing doctoral programs to "evolve from a strict research focus to a research and teaching focus," suggesting that doctoral students complete a year-long seminar course requiring participants to develop lectures, pedagogical approaches, learning goals and outcomes, and assessment techniques. Encountering pushback from some faculty, Shortlidge (2018) found that a tradeoff

between graduate students' research and teaching success did not exist and that positive synergies could be gained by focusing on both, with Fulton (2018) arguing that the main goal of doctoral programs should be to train students to teach as well as to engage in research.

Faculty and Other Stakeholders' Resistance to Online Education

Despite their universities' growing (and post-COVID, required) focus on online teaching (Harris and Martin, 2012), most faculty still react negatively to the idea and are reluctant to convert their courses. Allen and Seaman (2015) found that just 28% of chief academic officers reported that their faculty believed that online education was valuable and legitimate, a percentage that had not changed since 2003. A 2017 *Educause* survey found that "only 9% of academics prefer to teach in a 'completely on-line environment'" (Darby, 2020). Hall (2013) suggests that faculty "buy-in" is the most important element of an effective transition to online education, yet notes that technology phobia, lack of motivation, and inadequate compensation for adapting to the new environment serve as barriers to adoption. Faculty resistance also has been attributed to a lack of university support, assistance, and training; lack of time due to existing workload; lack of student contact; inadequate equipment; slow Internet access; and concern about decreased quality (Allen & Seaman, 2008; Keengwe et al., 2009). These authors note that while faculty have long believed that online course development and teaching is more difficult and takes more time and effort than face-to-face courses (Gerlich, 2005), many university administrators believe that it is up to the faculty to figure out how to teach online. According to one faculty member teaching online, professional development "was all done by me digging and finding things that worked and things that didn't work, after the fact, because I had tried them in a course" (Schmidt et al., 2016).

Additionally, Schell (2004) found that faculty felt the value of developing and teaching online courses was marginal with respect to tenure and promotion decisions and thus were not interested in developing online skills and courses, while Wolcott (2009) reported a negative relationship between online teaching and faculty reward systems. A 2012 study conducted by *Inside Higher Ed* found that 58% of the almost 5,000 faculty members responding to their survey described themselves as "more fearful than excited" about the growth of online education (Kolowich, 2012). Similarly, Betts and Heaston (2014) reported that faculty with no experience teaching online tended to have a more negative attitude toward it, which may be why just 16% of university departments surveyed specifically included the development of quality online courses in their promotion and tenure manual (Bussman et al., 2017).

The COVID transition to online teaching has halted efforts to garner student feedback for online learning, with some experts recommending not only that student evaluations of teaching be disregarded during this time, but also that they be eliminated until teaching conditions return to normal (Lederman, 2020). Chapman (2011) noted that the lack of extrinsic incentives for developing online teaching skills caused tenured faculty to opt-out whenever possible, leaving the job to adjuncts, lecturers, and new tenure track faculty. Interestingly, however, some administrators believe that the COVID-19 transition to all online teaching will make the resistance to online education go away (Lederman, 2020).

Best Practices in Online Teaching and How Faculty Prefer to Learn Them

Schmidt et al. (2016) write that online teaching and especially online communication requires specific skills and competencies, and that faculty should not be expected to know intuitively how to design and deliver effective online courses. Because faculty learn to teach the way that they were taught, few online teaching skills are likely to be passed down through the

teaching assistant/faculty mentoring model. Freeman (2015) writes that learning curves for online course development and teaching tend to flatten as instructors gain more experience with it, and while he found that some professional development opportunities were available to faculty (especially during the spring of 2020), he emphasized that there is more to online teaching than learning how to use technology.

A common theme in surveys of best practices for online teaching is the need for increased communication between instructors and students (Lackey, 2011). In fact, “instructor presence” is a critical factor in maintaining student engagement (Roddy et al., 2017). According to Berry (2019), many students struggle to develop connections in online programs, so reaching out frequently, limiting lecture time, and using video and chat all helped to create a greater sense of belonging. Martin et al.’s 2019 survey of professors who won awards for teaching online suggested that focusing on building learner interaction during the design process contributed to a more successful online teaching experience. But what are the best ways for any instructor to learn these skills?

Schmidt et al. (2016) found that shorter and more targeted professional development opportunities were more helpful than longer, technology-packed, generic sessions. Faculty participants in this study felt that rather than having training delivered by experts in technology, small groups of instructors from the same college, department, or program would have been more helpful because they could address specific course content and design and because participants would feel more comfortable asking questions. They also recommended short technology sessions following department meetings or informal mentoring sessions and preferred hands-on learning opportunities. Lackey (2011) also found that faculty preferred one-on-one assistance and Q&A with colleagues but that they would have liked more pedagogical training and access to an instructional designer. Borup and Evmanova (2019) reported that university administrators specifying the types of online courses they expected faculty to deliver would have been helpful.

In summary, universities should not have been surprised that when called upon to quickly switch to online classes this past spring during the COVID-19 pandemic, most faculty and doctoral students were unprepared. Despite the decades-long calls for placing more emphasis on training doctoral students to teach, little evidence exists that this is being done in the online teaching arena. After reviewing the sparse existing literature relevant to this topic, we decided to explore the following research questions:

Question 1: How prepared did current and recently graduated doctoral students feel to teach online this past spring?

Question 2: Do current and recently graduated doctoral students believe that their ability to successfully teach online affects their ability to compete for tenure track jobs and subsequently their promotion, tenure, and performance reviews?

Question 3: Do university administrators consider online teaching preparation and success a factor in recruiting, promotion and tenure, and performance decisions?

Question 4: What are best practices for designing courses to effectively train doctoral students to teach online?

Sample, Research Design, and Methodologies

Our sample was drawn from currently enrolled and recently graduated faculty (within the past two years) from a private Midwest university enrolling over 7,000 students overall and a

Southeast public university enrolling more than 30,000 students. Both are nationally and regionally accredited. We will refer to these schools as University A and University B, respectively. Participants were notified by email of the survey by the faculty director of the doctoral program at University A and the assistant dean of academic and professional development in the graduate school at University B. In all, a total of 349 doctoral student surveys were emailed with 30 returned, resulting in a response rate of 8.7%. Additionally, 40 recently graduated faculty surveys were emailed with 33 returned, resulting in a response rate of 82.5%. Each school's respective institutional review board (IRB) approved both questionnaires. Survey participant disciplines included business, humanities, STEM (science, technology, engineering, and mathematics), social sciences, health care professional programs and the arts.

To answer our four research questions, we employed a mix of quantitative and qualitative methods. Quantitative data for Q1 and Q2 were taken from the survey responses of 30 currently enrolled doctoral students and 33 recently graduated academic faculty. These surveys were administered anonymously through Qualtrics. Surveys 1 and 2 were reviewed for face validity by three of our co-authors, who had recently graduated from doctoral programs and who were currently teaching in academic faculty positions. Qualitative data for Q3 were retrieved from an IRB-approved open-ended questionnaire used to conduct phone interviews with twelve department chairs and deans from both participating universities. Both quantitative and qualitative data used to answer Question 4 were collected as part of a four-week summer pilot program designed by the authors entitled, "Becoming a Professor: A Hands-on Boot Camp for Teaching Online." The summer pilot was conducted online and included both synchronous and asynchronous elements. Week 1 consisted of a panel of former doctoral students discussing their experiences transitioning to online teaching during the COVID-19 spring semester. Week 2 introduced students to the literature about best practices in online teaching, while Week 3 introduced students to current state-of-the-art online teaching tools. The last week of the pilot featured demonstrations of students incorporating these tools into online teaching in their respective disciplines. The end of course survey used to collect data to answer Question 4 was based on Reichheld's Ultimate Question (2006) and can be found in Gallo et al (2015). Copies of all four survey instruments are available from the authors, as is additional information about the summer pilot program.

Data Analysis and Results

Summarized below are findings that help answer the research questions posed above. Key results are reported in Tables 1 and 2 at the end of this section. Please note that for Likert scale variables, we report means and standard deviations. For binary yes/no questions, we report only percentages.

Question 1: How prepared did current and recently graduated doctoral students feel to teach online this past spring?

Given the fact that 97% of current doctoral students in our sample responded that they planned to seek tenure-track academic positions upon graduation, we felt it important to ask whether they and their recently graduated colleagues felt adequately prepared by their doctoral programs to teach online. Thirty current doctoral students and 33 recently graduated doctoral students with backgrounds including business, art, marine science, psychology, physics, biology, chemistry, nutrition, sociology, health science, math, and journalism responded. Those who had not completed a required online teaching course prior to the summer pilot (62%) were likely to list Learning Management System (LMS) features like grade book, quizzes, assignment submission,

as well as Zoom, Panopto, Webex or Skype as online teaching tools to which they had been exposed. In contrast, those who had completed a required online teaching training program (38%) listed additional and more advanced online technologies such as SLACK, FlipGrid, MyDesk, Teamview, EdPuzzle, Movavi, Screen-Cast-O-Matic, Loom, Ant, YouTube, Wurkr, Sodoco, Teammates, AnyDesk, SnagIt, TikTok, Piazza, Google Hangouts and VoiceThread. Some doctoral students (and all recently graduated faculty) were familiar with online teaching resources through university faculty centers that focused on teaching and learning (74%), university instructional design centers (67%), and faculty mentors (48%). Only 11% said they had no access to online teaching resources.

Our results suggest that only 32% of doctoral students who were *not* required to take courses in online teaching felt confident in their ability to teach online. Fifty-six percent of the recently graduated faculty without prior online teaching training expressed confidence in their ability, possibly because of emergency training offered to them during the COVID-19 2020 spring break. However, 75% of recently graduated faculty who had been required to take courses in online teaching during their doctoral programs expressed confidence in their abilities to teach online. Additionally, when required to quickly transition to all online teaching due to the COVID-19 pandemic, recently graduated faculty who had been required to take an online teaching course felt significantly less anxious than those who had not (a mean of 2.52/standard deviation of 2.79 compared with a mean of 6.00/standard deviation of 3.32). The main reasons listed by recently graduated faculty who were less anxious included having had a required course in their doctoral program dedicated to online teaching best practices and/or having had online training required of new faculty at their current institution prior to the transition to all online teaching during the COVID-19 pandemic. Some reasons given for respondents' citing higher levels of anxiety were that they had only learned to use basic features of the LMS, they were non-tenured faculty and thus not eligible for online teaching training, administrators' belief that teaching would return to face-to-face following the pandemic, and no standards or expectations for online teaching had been communicated to them. Please see Table 1 below for a summary of our findings.

Table 1

New Faculty Anxiety Level and Reports of Adequate Online Teaching Preparation During COVID-19 - Spring 2020 Transition with and Without Required Training in Doctoral Programs

	Online Training Required in Doctoral Program	No Required Online Training in Doctoral Program	Total
N - New Academic Faculty	24	9	33
Anxiety Level Regarding Online Teaching During COVID-19 Spring (Mean/St. Dev.)	2.52/2.79	6.00/3.32	3.50/1.41
Reported Feeling Adequately Prepared for Online Teaching Success (%)	75%	56%	70%
Value of Online Learning vs. Face to Face	5.17/2.06	4.22/1.48	4.91/1.94

Question 2: Do current and recently hired doctoral students believe that their ability to successfully teach online affects their ability to compete for tenure track jobs and subsequently their promotion, tenure, and performance reviews? and

Question 3: Do university administrators consider online teaching preparation and success a factor in recruiting, promotion and tenure, and performance decisions?

(Data and analysis for research questions 2 and 3 are reported together).

A significant majority of doctoral students (97%) and recently graduated faculty (72%) surveyed felt that proficiency in online teaching would help them obtain full-time faculty positions and achieve tenure, promotion, and positive performance reviews. Their responses differed dramatically from those of faculty and deans to the same question. Essentially, no department chairs or deans said that they were currently using or planned to use experience with online course development or training proficiency in future recruiting, promotion, tenure, or performance decisions. While all department chairs currently use teaching evaluations to inform those types of decisions, some were unaware that online course evaluations are typically lower than face-to-face evaluations for the same courses (Kelly et al, 2007) and others argued that there was no difference.

One chair commented, “while I would never say that the COVID-19 spring shutdown was a good thing, we did learn some surprising and useful things going forward, including the effectiveness of online office hours.” For most chairs and deans, it was too early to think about how they might change in the future, as they were still ascertaining how long special COVID-19 responses would be needed and how their universities would continue to cope. Despite some reports suggesting that the COVID-19 pandemic offered an opportunity to rethink higher education as we know it, most chairs and deans expressed the hope that sooner rather than later, things would return to “normal” (meaning face-to-face teaching). However, the deans’ and chairs’ responses tended to vary based on whether the university was private or public. At private University A, faculty were asked to focus their time and effort entirely on teaching, some departments even temporarily *waiving research requirements* for the annual performance reviews. At public University B, faculty were, for the most part, allowed to either disregard *teaching evaluations* for the COVID-19 semesters or given the option to submit them or not, with no penalty with respect to their performance reviews. Please see Table 2 below for a summary of our findings.

Table 2
Doctoral Students/Recently Graduated Faculty Beliefs About Online Teaching

	Doctoral Students	New Faculty
N - Doctoral Students and New Faculty	30	33
Belief That Online Skills Help in Recruiting/Tenure/Performance (%)	97%	72%
Reported Feeling Adequately Prepared for Online Teaching Success (%)	32%	70%
Planned to Seek an Academic Teaching Position	97%	
Value of Online Learning vs. Face to Face	3.60/1.40	4.91/1.94

Question 4: What are best practices for designing courses to effectively train doctoral students to teach online?

Data for answering this question were gathered from online comments made by the 18 participants to faculty and teaching assistants during the four-week summer pilot program and from the post-pilot student evaluation of teaching instrument. Seventy percent of students who completed the optional summer pilot course found it helpful. Even those that did not identified specific areas of learning that they would not have had access to without it. Finally, even though the summer pilot course was voluntary and ungraded, most doctoral students diligently completed specific assignments, even those who chose not to complete it. Please see Table 3 below for a summary of pilot program participant feedback on key pilot program elements.

Table 3

Summer Pilot Program Participant Feedback on Online Best Practices

Topic	Feedback
Virtual Coffee House	Few attended; those that did liked the informal open nature
Online Office Hours	Most liked this idea
Multi-disciplinary Participants	Felt they learned more from different discipline approaches
Length of Course	Most felt the course should have been longer
Best Timing for Required Course	Semester before scheduled to teach or TA
Recently Graduated Faculty Panel	Some felt would be better at end of course
LMS	Needed prior training on the system
SLACK	Felt redundant with LMS and confusing as to which tool should be used for each activity

Discussion

The results of our study are both interesting and surprising, not only because they address issues around training doctoral students to teach online that had not previously been pursued, but also because some findings contradicted key assumptions based on prior research.

With respect to our first research question regarding how prepared doctoral students and recently graduated faculty felt about teaching online, we found that while a majority surveyed believe that online teaching is inferior to face-to-face, the more experience they had, the more highly they rated its effectiveness. These findings closely mirrored those of prior studies of existing faculty attitudes (Allen & Seaman, 2015; Darby, 2020). Thus, we are optimistic that in the future, especially following the COVID-19 spring semester transition to all online teaching, all groups will gain more experience and will become more comfortable with this teaching mode.

Further, prior research suggests that most university faculty and administrators agree that preparing doctoral students to teach is important (Austin, 2002; Connolly et al., 2018), although few institutions of higher education today require such training as part of the doctoral curriculum

(Flaherty, 2019). As a result, a large majority of our sample did not feel adequately prepared to teach, especially online. A bright spot is that nearly three quarters of recently graduated faculty who had completed a required online teaching course as part of their doctoral programs felt confident in their abilities to teach online and shared that even if they had not been using their online teaching skills prior to the COVID-19 transition, they knew how to access online tools on their new campuses.

Moving on to our second and third research questions, one of the most fascinating results of this study revealed the lack of change in department and administrative attitudes toward online teaching and learning and how greatly their attitudes differ from those of current doctoral students and recently graduated faculty. We decided to add research question three after seeing the nearly universal belief among current and recent students that they needed to be proficient in online teaching in order to gain tenure track academic faculty positions and to attain tenure and promotion. We wondered whether administrators agreed, and it turned out that they did not. Most administrators and chairs said that they viewed the COVID-19 spring teaching evaluations as an aberration and were not planning to look at them at all, despite having access to them. Some chairs and administrators were willing to provide a grace period in terms of incorporating online course teaching evaluations into new faculty performance reviews. One chair waived research requirements for the COVID-19 performance review period so that faculty could focus on getting up to speed with online teaching. While this change may have relieved some temporary pressure on faculty, the tenure timeline was not adjusted. Additionally, while almost all department chairs and deans use raw scores from student evaluations of teaching in recruiting, tenure, and promotion decisions and performance reviews (Gallo et al, 2015), they were not aware that reviews of online courses are typically lower than those for the same courses taught face-to-face, even by the same faculty (Kelly et al, 2007). As a result, administrators are probably unwittingly discriminating against faculty who are less proficient in teaching online. Taken together, our findings suggested that the lack of incentives for high-quality online teaching discussed in prior research (Schell, 2004; Wolcott, 2009; Bussman et al., 2017; Chapman, 2011) still exists.

Finally, with respect to our fourth research question regarding best practices, we found that out of several hundred doctoral students notified about the pilot program on online teaching, just 18 registered for the free course and only four students completed it within the four-week period. While our assumption was that summer was an ideal time to offer such a program, that turned out not to be the case. Also, after the first week, most students stopped participating in the discussion group. One student suggested a possible reason: there was no requirement to keep posting after that point. We found this interesting, as the course was not graded. The teaching assistants attempted to intervene, offering informal virtual “coffee/social hour” experiences, and engaging with students in online discussion groups, yet that intervention was not effective. One possible explanation was that five weeks may not have been long enough to create a strong sense of virtual community, especially as students came from a broad range of disciplines from two different universities and thus did not know each other before signing up. However, based on comments students made during the course and in post-course feedback, they indicated that they found the interdisciplinary aspect of the course particularly valuable. We wondered whether the introduction of team assignments early in the pilot was a deterrent to engagement because of the additional virtual coordination costs. Protopsaltis and Baum (2019) found that hybrid (a combination of online and face to face teaching) models of course delivery avoid most of the pitfalls of fully online courses, especially when it comes to engagement, largely because they offer a greater sense of community not only between students and faculty but also among students themselves.

Unlike undergraduate students, who tend to assume that course material is useful simply because it is a required part of the curriculum (Palis & Quiros, 2014; Adams & Corbett, 2010; Ellis, 2019), most summer pilot participants preferred that course material be immediately useful, as evidenced by the fact that most continued in the summer pilot until the fourth week when they were required to design a course element related to their field using the new online technologies. For those not scheduled to teach in the fall, creating an artificial assignment did not seem worth the time. In retrospect, many participants had families and thus had to care for children at home due to COVID, so there were distractions and obligations they would not have had under normal summer conditions. However, another possible explanation for the discontinuation was that even though students may have experienced online learning as students, they were so lacking in online teaching skills that we should have included an additional week at the beginning of the course to orient them to the structure, methods, approaches and tools of the online course.

Limitations, Future Research Directions, and Implications

This research was among the first to focus on doctoral students' attitudes toward online teaching and their readiness to engage in the online teaching mode. A key limitation of our study is its relatively small sample size. Larger sample sizes would allow more fine-grained analysis by such variables as discipline, gender, and ethnic and racial identification. Future research might use databases such as those available through CIRTL (the Center for the Integration of Research, Teaching and Learning), a professional development program for doctoral and post-doctoral students initially funded by the National Science Foundation (NSF), especially now that CIRTL has begun to offer a summer online course development seminar.

Findings from investigating the four research questions in our study provided several interesting implications both for practice and future research. We found that doctoral students are interested in learning online teaching skills, largely because they believe that such skills will be important to their future success as faculty. However, few students are currently receiving this preparation in their doctoral programs. Most graduate schools and departments have rejected offering online teaching courses for their doctoral students because they believe that not only would each department have to offer a disciplinary-specific course to be effective, but also because there is limited room in their current program curricula to require such a course. Our findings suggest that these assumptions are not true. Doctoral students in our summer pilot program specifically mentioned the value of having multiple disciplinary perspectives. Being able to offer cross-disciplinary programs at the graduate school level would allow much more cost-effective online preparation.

In terms of best practices, we found that online training courses should not assume that doctoral students are comfortable with the basic technologies used to deliver online courses. Therefore, instructors should provide a way for them to become familiar with these tools ahead of time. Given the prior call for certificates of completion for courses in doctoral teaching (von Hoene, 2011), we assumed that voluntary workshops such as our summer pilot program would not attract student interest. That was not the case either. While most students offered the online teaching pilot did not take advantage of it, those that did indicated that they were taking the course to gain the information and skills rather than for certification, credit, or a grade. Data from CIRTL courses, which are offered both with and without course credit/certificates, support this finding. However, the lower anxiety, greater comfort level, and feelings of preparedness reported by recently graduated faculty who had taken a required course in online teaching as part of their

doctoral programs suggest that incorporating such courses into the doctoral program curriculum would greatly increase the number of students who could benefit from developing online skills.

Finally, most deans and chairs treated the COVID-19 spring transition to all online teaching as an anomaly, expecting to return to business as usual once the crisis had passed. However, student evaluations of teaching remain central in academic recruiting, tenure and promotion, and performance decisions, and online teaching is unlikely to disappear. One well-respected psychological theory, Ajzen's Theory of Planned Behavior (Ajzen et al, 2011), posits that even knowing that differences exist in online and face-to-face teaching evaluations may not affect department chairs' attitudes, beliefs, and actions. Also, despite their overwhelming belief that online teaching skills matter, doctoral students may still not be ready to devote limited resources to improving these skills, especially if they know how little such skills affect dean and department chair decisions. However, on a hopeful note, the process of discussing these issues seemed to spark dean and department chairs' interest in online teaching research and a willingness to consider how the COVID-19 shift online might affect recruiting, tenure, promotion, and faculty performance assessment in the future.

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