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Abstract

This article describes the third phase of a study which examined the readiness of technology education and career and technical education fields for online and hybrid doctoral degree programs in technical education. In this phase, interviews were conducted with chairs and coordinators of 19 doctoral programs in the US and Canada, creating a snapshot of existing doctoral programs in technical education, to inform those undertaking doctoral program design or revision of the variety of approaches to doctoral education. Findings may also be useful to those pursuing employment as faculty members in institutions such as these, and to those considering doctoral study in the field.

Introduction

The number of doctoral level degrees issued in technical education (herein defined to include technology education and career & technical education (CTE)) has severely declined in recent decades. In an analysis of the 1970 *Industrial Teacher Education Directory*, Volk (1993) found 83 EdDs and PhDs granted in

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Industrial Arts and Technology Education. This number declined to 50 in his analysis of the 1990 edition. Based on this trend and other analyses, Volk (1997) predicted that a collapse of industrial arts teacher education programs would occur by 2005. Volk argued that one factor in this predicted collapse is the lack of new ideas and innovation at the university level. Rogers (2002) further analyzed the number of higher education graduates listed in the *Industrial Teacher Education Directory*, this time in the 2000 edition, and found doctoral degrees granted in technology education were at an all time low with only 19 graduates. While Volk's predicted collapse of the field has not yet occurred, the steady decrease in graduates since 1970 is alarming.

Associated with the decrease in doctorates granted in technical education, Reed (2002) noted a "disturbing trend" (p. 68). There was "a steady decline in graduate research" (p. 68) as evidenced by the number of theses and dissertations in technology education just as this field was evolving from industrial arts, when research would be needed the most. In addition, an alarming shortage of secondary school technology teachers across the nation and an increase in program closures at this level have also been observed (Bruening et al., 2001; Rogers, 2002; Volk, 1997; Wicklein, 1993). Also, a national (US) survey of 359 Career and Technical Education faculty by Bruening et al. (2001) found the average age of CTE faculty to be just over 50, indicating "a flurry of retirements is likely at the end of this decade" (p. 51). If these retirements decrease the net number of higher education faculty, there may be an unmet need for more qualified educators in bachelor's level programs. Furthermore, it seems logical to expect a decrease in the number of researchers, and therefore in innovation in the field.

A summation of the previous findings leads to a distressing picture of the possible future for education and research within the field of technical education. A lack of qualified professors at bachelor's-granting institutions leads to a lack of qualified secondary school technology teachers. This ailing professional pipeline could further aggravate technology program closures in middle and high

schools. With fewer technology programs in secondary schools, fewer new teachers would be required. This could lead to technology education program closures at the bachelor's level, which decreases the demand for doctoral educated faculty in technical education. A decline in the number of doctoral educated researchers in technical education could lead to a decrease in innovation within the field (Volk, 1997). This is a problem because there is a "need to further identify the working theories and concepts of technology education…in order for the field to move forward as a legitimate academic discipline" (Wicklein, 1993, p. 70). Only through innovative change can this field hope to re-energize and begin to grow again.

In order to better understand the decline in the number of technical education doctoral graduates, one must look at the factors that make up doctoral level education in the field. Paige, Dugger, and Wolansky (1996) identified essential components of doctoral level education in industrial technology education in order to, "determine how doctoral programs may be redirected to meet contemporary needs of both students and the profession" (p. 19). They discovered a field, "grappling with inconsistencies in mission statements and desired outcomes" (p. 20). But that study occurred over a decade before the present study, and in light of developments over that time (e.g., Standards for Technological Literacy, a growth in online education) questions are raised as to the present applicability of that past data in describing the field.

The present study is the third phase of a larger investigation to inform the field on factors impacting the decision to offer online and hybrid doctoral degree programs. The first phase looked at the perceived need for new hires and hiring attitudes towards those who earned their doctoral degree online (Flowers & Baltzer, 2006a). The second phase looked at the perceived demand for an online or hybrid doctoral program in technical education (Flowers & Baltzer, 2006b). This third phase, as mentioned, examines the status of current doctoral programs in technical education. This snapshot of the current state of doctoral programs in the field, taken eleven years after the study by Paige, et al. (1996) addresses some of the same goals by providing information that may help those with the task of

deciding the future of doctoral education meet the changing needs of students and faculty.

Methods

Considering the relatively small number of doctoral programs, the intimacy each program coordinator or department chair has with their program, and the likelihood of gathering unanticipated information or information that leads to a re-direct of a question, telephone interviewing with program coordinators and chairs was used to gather information not provided on program websites. The sample for this study included chairs and coordinators of PhD or EdD programs in technical education and related fields. These programs were found using the following resources: the *Industrial Teacher Education Directory* for 2005-2006 (Schmidt & Custer, 2005), and online searches at www.petersons.com and www.gradschools.com. Twenty-three programs were then verified to have these degrees and the chairs and coordinators of the programs were identified at the institution's website. The chair or doctoral program coordinator at 19 (82.6%) of these institutions agreed to participate (Table 1), though some declined to respond to one or more specific interview question, resulting in a lower number than 19 responses for several items. Two of the institutions were in Canada, and the rest were located in the United States. The investigators only encountered one institution that had multiple programs of interest with different coordinators listed. In this case, the contact from the field more closely related to technical education was identified as more appropriate.

Table 1
Participating Doctoral Programs (n = 19)

Clemson University
PhD and EdD in Workforce Education and Development
http://www.ed.psu.edu/wfed/prospective/index/index_ind.asp
Indiana State University
PhD in Technology Management
http://www.indstate.edu/consortphd/

Table 1 (continued)

North Carolina State University
EdD in Technology Education
http://ced.ncsu.edu/mste/tech_programs/tedd.html
Oklahoma State University
PhD in Education with option in Occupational Education Studies
http://www.okstate.edu/education/graduatestudies/phd.htm
Old Dominion University
PhD in Education with a concentration in Occupational and Technical Studies
http://education.odu.edu/ots/academics/grad/phd.shtml
Purdue University
PhD in Curriculum & Instruction with a concentration in Career & Technical Education
http://www.edci.purdue.edu/grad_studies/degrees.html#PhD
Southern Illinois University Carbondale
PhD in Education with a concentration in Workforce Education
http://wed.siu.edu/Public/graduate/phd/
The Ohio State University
PhD in Integrated Mathematics, Science, and Technology Education
http://msat.coe.ohio-state.edu/integ/iDegrees.html
University of British Columbia
PhD and EdD in Curriculum Studies with a concentration in Technology
http://www.cust.educ.ubc.ca/gradinfo/admissions/doctor.html
University of Georgia
PhD and EdD in Workforce Education
http://www.coe.uga.edu/welsf/occstudies/programs/grad.html
University of Manitoba
PhD in Education with an area in Technology or Technology Education
http://umanitoba.ca/graduate_studies/programs/phd/education/index.htm
University of Minnesota
PhD and EdD in Work & Human Resource Education
http://education.umn.edu/WHRE/program/doctor.html

Table 1 (continued)

University of Nevada-Las Vegas
PhD Higher Education, Workforce Education and Development
http://educationalleadership.unlv.edu/new_design/highered/doctoral/index.html

University of North Texas
PhD and EdD in Applied Technology and Performance Improvement
http://www.coe.unt.edu/LT/ATTD/api_dr.php

University of South Florida
PhD in Curriculum & Instruction with a concentration in Career and Workforce Ed.
http://www.coedu.usf.edu/main/programs.html

Utah State University
PhD and EdD in Education (Curr. & Instr.), emphasis in Engineering and Technology Ed.
http://www.engineering.usu.edu/ete/graduate.htm

Valdosta State University
EdD in Adult & Career Education
http://www.valdosta.edu/coe/edd/COE_Doctoral_Programs/COEDoctoralPrograms.shtml

Virginia Polytechnic Institute and State University
PhD and EdD in Curriculum & Instruction with a concentration in Technology Education
http://teched.vt.edu/TE/HTML/gradDocPlan.html

Western Michigan University
PhD in Educational Leadership (CTE Concentration)
http://www.wmich.edu/coe/fcs/cte/doctoral/index.htm

Data collection was by telephone interviews between the subject and one of two interviewers in 2006 and 2007. This was deemed the most appropriate method due to the depth of information being sought and the desire by the investigators to attain both anonymous and non-anonymous information. An interview script was developed and pilot tested with the goal of identifying program characteristics, vacancies, involvement with distance education, and obstacles/solutions associated with each doctoral program. Interviews generally followed the script, although each interview

was a unique dialog that often included unscripted discussions. Following human subjects protocol approval, an invitation to participate was sent to the subjects to ask for participation and to verify contact information.

All data was entered into a Microsoft Access database during the phone interview. The data was later organized in a Microsoft Excel spreadsheet for analysis. Descriptive statistics were calculated for quantitative data to characterize the field. Since the data was from telephone interviews and often based on opinion, inferential statistics were not calculated. Qualitative data was analyzed by first identifying themes for items asking about obstacles, solutions, opportunities and recommendations. This was done independently by at least two researchers. Keywords and phrases were used to obtain an initial list of themes; these were collapsed to a smaller number. For examples, several respondents noted insufficient faculty size was an obstacle for their program, some wording this in terms of funding, some in terms of administrative support for more faculty, and some in terms of the inadequacy of the number of faculty given their number of students. This was collapsed into the category, "Too few faculty and staff; too many students," realizing that some information is lost during this collapse. The identification of initial themes, final themes, and the association of a response with a theme were compared between researchers and discussed until consensus was reached. Qualitative data was coded in Microsoft Excel with numerical identifiers that labeled the themes. Frequency counts of the themes were tabulated and interesting or important comments were quoted and presented.

Results and Discussion

The data from this study is divided into four main types of information that are related but distinct. First, program characteristics and future directions of the programs are summarized. This is followed by a section dealing with current and future vacancies and hiring trends. Third, the amount of current and predicted incorporation of distance delivery elements into the

program is discussed. Last, there is a section characterizing historic and current obstacles, possible solutions and other opportunities.

Program Characteristics

Of the 19 institutions represented in this sample, ten had PhD programs only, two had EdD programs only, and seven had both a PhD and an EdD program in technical education (Table 1). One was a consortium program where doctoral students engaged in coursework at multiple consortium-member universities. Some statistical calculations in this study excluded data from that consortium, as indicated later, because it characterized multiple universities. The mean number of full time doctoral students was 45.1 (SD = 41.2, n = 15). After removing consortium data, the mean was 37.4 (SD. = 27.4, n = 14, range = 5 to 82). The mean number of doctoral faculty was 10.9 (SD = 11.1, n = 15, range = 1 to 40). This is a ratio of 3.4 full time doctoral students per faculty, although this overlooks other faculty assignments. Lastly, seven respondents reported that their doctoral enrollment was growing, eight reported their enrollment was stable, and three reported their enrollment was shrinking.

Themes and Future Directions

Respondents were asked to characterize the theme of their program (see Table 2). The most common theme of educational studies included items such as curriculum, instruction, and educational leadership. In spite of the requirement of a dissertation, only three of the respondents specifically mentioned research as a theme of their doctoral program (which may be troubling in light of the need for more research and researchers (Paige, et al., 1996; Reed, 2002; Volk, 1997).

Deal, Ndahi, Reed, and Ritz (2006) surveyed technology education programs at universities and identified themes for student research, a topic not addressed in the current study. Themes they uncovered included, “engineering education, effects of technology, action research—technology education, technological literacy, value

of technology, [and] cognition & teacher education." While themes for student research and themes for doctoral programs are clearly distinct, it is interesting to see that engineering education, research, and teacher education can be seen in both studies.

Table 2
"What is the primary theme, or what sets apart the respondents doctoral program?" (n=17, multiple responses were possible)

Educational Studies	6
Research	3
STEM integration	2
Private Sector	2
Technical/industrial	2
Student-centered program	2
Technology and Society	1

Respondents were asked how their program is evolving and what new directions the program is pursuing (Table 3). While 17 of 19 respondents to this item indicated that change is occurring, five remarked that their program was currently undergoing major overall changes. The most prominent new directions were Science, Technology, Engineering, Mathematics (STEM) integration and an increased emphasis on research (e.g., "More rigorous research." "Increasing research requirements, specifically adding qualitative research."). However, the low numbers even for these areas indicate a great diversity in the direction various doctoral programs are taking. If most respondents indicated the same theme for their program evolution (such as STEM or addressing new national standards), a picture would have emerged of a more unified and less fragmented state of doctoral education in the field. Interestingly, several respondents indicated their program was changing from an EdD to a PhD program, with one indicating their change was motivated by a lack of credibility for an EdD outside the United States.

Table 3
How is the respondent's program evolving or what new directions is the program taking? (n = 17, multiple responses were possible)

STEM	4
Research	4
Introducing online elements	3
Improving quality of teaching and curriculum	3
Attracting international students	3
Changing from an EdD to a PhD	3
Workforce training	2
Leadership	1

Faculty Vacancies and Hiring Criteria

The average number of current full-time faculty vacancies per department was 1.2 (*SD* = 1.3, *n* = 15). The average for contract faculty was 0.5 (*SD* = 1.2, *n* = 12). These results are consistent with a previous study done by these investigators that surveyed programs in technical education with only masters or bachelors level programs; that survey asked about tenure versus non-tenure track positions and found the current average tenure track vacancies to be 1.0 and non-tenure track vacancies to be 0.22 (Flowers & Baltzer, 2006a).

The predicted number of vacancies for full time faculty over the next 5 years ranged from 0 to 30, with an average of 5.0 (*SD* = 7.2, *n* = 15), or 1.0 per year. For contract faculty over the next five years the average was 3.3 (*SD* = 3.6, *n* = 9), or .72 per year. The survey previously mentioned (Flowers & Baltzer, 2006a) also asked about anticipated vacancies for tenure and non-tenure track faculty. However, the 2006 survey asked the respondents to estimate vacancies for the next three years. The results were an average of 2.0 tenure track vacancies (.67 per year) and an average of 0.7 non-tenure track vacancies (.23 per year). These results seem to indicate more projected vacancies per department for doctoral institutions

than for those that offer only bachelor's or master's degrees. However, the large standard deviations found in the present study indicate a great deal of variability within doctoral institutions for both current and projected vacancies. Hiring criteria were also found to vary among doctoral institutions (Table 4). The most frequently cited criterion concerned research and publications, which is not surprising considering the sample was doctoral programs.

Table 4
Main Hiring Criteria for a Tenure Track Position (n = 16, multiple responses were possible)

Research and publications	11
Holds a terminal degree	6
Teaching experience or formal teaching preparation	5
Industry experience	5
Personality and fit	3
Specifically public school teaching experience	3
Service	2
Grants and funding	2
Enthusiasm and dedication	2
Knowledge of distance education technologies	1
Knowledge of state educational law and mandates	1
Good recommendations	1

A potential hire, while being concerned with the hiring criteria, may also be concerned with expectations for their performance. Traditionally, teaching load and the balance among research, teaching, and service activities are considered by a prospective faculty member prior to accepting a position. For this reason, more specific items were asked to uncover the variety among these factors at doctoral institutions in the field. The teaching load varied from 1.5 to 4 three-credit courses per semester with a mean of 2.56. The reported teaching load was two courses per semester at eight institutions in this sample, but it was higher at the six institutions reporting three courses per semester, and the two that reported four courses per semester (Table 5). As noted in a previous phase of this

study (Flowers & Baltzer, 2006a), those seeking faculty positions should be aware of the large difference in teaching loads across institutions.

Table 5
Faculty Load Reported as Number of Three Credit Hour Courses Per Semester (n = 18, Mean = 2.56).

Courses	Programs
1.0	0
1.5	1
2.0	8
2.5	1
3.0	6
3.5	0
4.0	2

The respondents were asked to provide approximate percentages for the emphasis placed on research, teaching, and service for a new faculty member. The means were 45.5% (*SD* = 17.0), 36.1% (*SD* = 14.0), and 18.2% (*SD* = 10.9), respectively (*n* = 14) (Figure 1). One interesting finding is the range of responses. The value for research ranged from 25% to 80%. There is also evidence that an institution may present one set of percentages to new hires but in practice use a different set, as noted by one respondent, "33, 33, 33, is what some are told, but it is really 10, 80, 10" for teaching, research, and service. In the previously mentioned phase of this research dealing with bachelor's and master's programs, the investigators found research, teaching, and service criteria means to be 25%, 54%, and 21%, respectively (Flowers & Baltzer, 2006a). This shows an understandably greater emphasis on research at doctoral institutions.

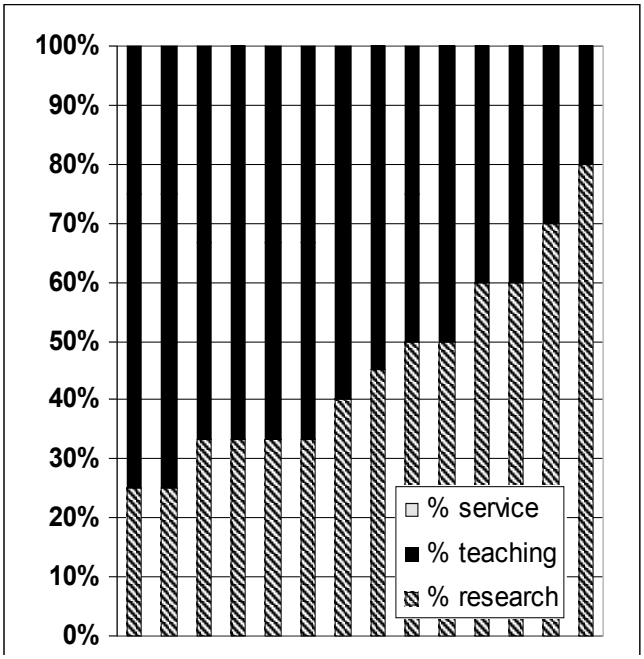

Figure 1. Reported percentage of emphasis placed on teaching, research and service for a new hire by respondent (n = 14).

Next, items were included to uncover hiring preferences in relation to the method of delivery for a faculty applicant's terminal degree. Previous studies uncovered a hiring preference for faculty applicants who earned a doctoral degree face-to-face over those who earned one online across fields (Adams & DeFleur, 2005), and within technical education at institutions offering bachelor's and master's degrees (Flowers & Baltzer, 2006a). In the present study, the respondents were asked if they were directly involved with decisions to hire new faculty in their department. Those who indicated "yes" (n = 15) were further asked their preference for face-to-face or hybrid/online doctoral education when considering a faculty candidate's doctorate. Corroborating previous findings, 11 of 15 reportedly preferred a candidate with a face-to-face degree. Four had no preference based on delivery method, instead mentioning

concern with the quality of any degree granting institution as the critical factor. Of those who identified a top preference for a candidate with a face-to-face doctorate, the majority would rank a candidate with a degree from a hybrid program at a brick-and-mortar institution second, and a candidate with a degree from a hybrid program at an online institution last.

Online Elements

Despite hiring preferences against those with online doctorates, online education has been growing with doctoral institutions having witnessed higher online program growth than seen at other institution types (Allen & Seaman, 2005). Questions were included to characterize the extent of online education in doctoral programs in technical education using a few key indicators. Eleven out of 17 respondents in the present study reported that their program had utilized faculty-at-a-distance at least once. Eleven of 18 respondents (61%) reported that at least one graduate course was offered through distance education in their program (see Figure 2). Seven of 16 respondents (44%) reported that their program was planning to add more online courses at the graduate level. Of the nine that were not planning to add more online courses, one indicated that 99% of the degree was already online, and another indicated they already had ten graduate courses online. Not included in these was the doctoral program at Old Dominion University that was planned to be offered through distance education beginning in fall 2006, after the interview took place.

Offering an entire degree program through distance education may become more common in the near future. Davis (2007) released preliminary results on a survey of distance learning in technology teacher education. That survey was used to inquire about the anticipated change in the number of distance learning programs and in the number of distance courses in each of three fields: technology education, industrial technology, and engineering education. In all cases where the item was applicable, respondents indicated anticipated growth in each of these more frequently than anticipated decrease or no anticipated change.

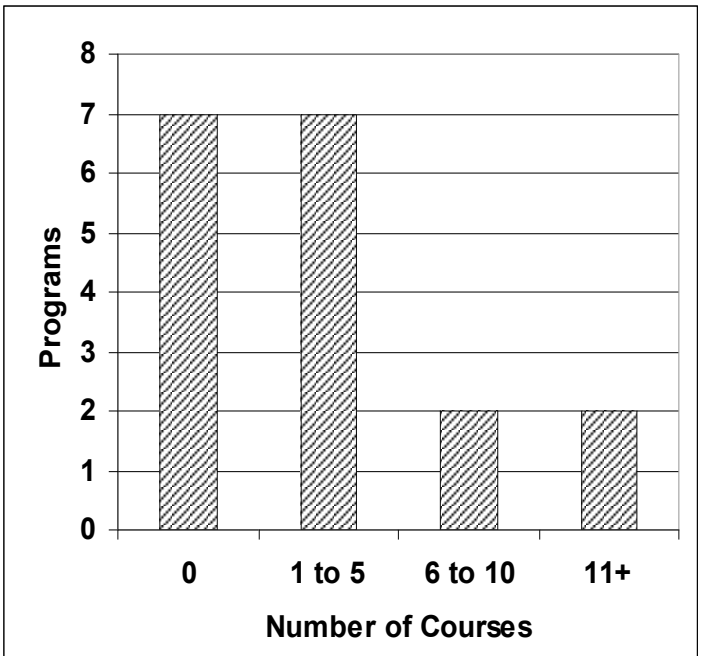

Figure 2. Number of graduate courses offered online Reported for each program (n = 18).

With the growing popularity of online education, it is possible that institutions offering online courses may evolve to offer online doctoral programs. In the present study, seven of 16 respondents (44%) reported that their program could be transitioned to an online or nearly online model, while six reported their program could not and three others indicated that their programs already had the extent of online elements that they intended to incorporate (one is already completely online, another is half online, and the third is a consortium of several institutions). However, with the acceptance of distance doctoral education in question, research related to the perceived need for these degrees from those most closely associated with doctoral education in the field was of interest. All respondents were asked how much an online doctoral degree is needed by the

field of technical education, responding on a scale of 1 (i.e., not at all) to 10 (extremely). The mean was 4.2 (SD = 3.0, n = 15). Thus, in the views of these respondents, who are specialists in doctoral education in the field, an online doctoral program in technical education is not greatly needed. One reason for this may include perceived weaknesses of online education as evidenced by their comments to a question that asked, "What recommendations would you have for those considering offering an online doctoral program in this or a related field?"

> *"Don't. Try to figure out a hybrid design. You've got to get people on campus. Even the informal things that happen are priceless, discussions over coffee, for example..."*
>
> *"Don't promise more than what you can deliver. Be honest about what an online degree will actually do for them. If a person wants a doctorate degree to get a pay raise at the secondary level, an online degree is good. If they want to get a doctorate degree to go to the next level in their career an online degree will not get that for them…"*

Obstacles, Solutions and Opportunities

The respondents were asked to name some of the obstacles their program has faced since its inception and in the present. Emerging themes were identified and tabulated (Table 6). The most commonly cited obstacle was not having enough faculty, both historically and in the present. A lack of administrative support and a lack of funding were also commonly cited.

The respondents were then asked to identify methods used to address historic obstacles, and to suggest methods to alleviate present obstacles (Table 7). Most of the solutions mentioned centered on increasing funding and resources, or improved allocation of funding and resources. However, many responses were of a specific rather than general nature, pointing to specific interventions, grants, or partnerships at that institution as having some success in alleviating obstacles. For example, in some cases, it was not a general increased emphasis on funding, but specific work on one particular grant application that was said to have made a difference.

Table 6

Major Program Obstacles ($n_{Historic} = 16$, $n_{Present} = 14$, multiple responses were possible)

	Historic	Present
Too few staff & faculty; too many students	9	8
Lack of administrative support	6	5
Lack of funding for students	2	3
Lack of organization	1	3
University requirements outside department		2
Broaden course offerings		2
Increasing student costs		1
Lack of program philosophy		1
Changing field	2	
Attrition	2	
Disagreement within faculty	1	
Losing organizational history	1	

Table 7

Reported Solutions ($n_{Historic} = 9$, $n_{Present} = 10$, multiple responses were possible)

	Historic	Present
Fundamental change in the program	2	4
More funding	1	4
Increase faculty or limit number of students	4	2
Change in administration		2
Add alternative course delivery	1	1
More funding for students		1
Increase course offerings		1
Ways of better meeting student needs	1	
Revise course cancellation requirements	1	
More research	1	

Respondents were asked to report major opportunities for their program over the years. The most commonly cited opportunities related to funding and grants (See Table 8). Increased collaborative opportunities were among others commonly cited, again, with specific initiatives mentioned by some respondents rather than a generalized approach to increasing collaboration. Collaborative grants may come to mind here, but it is important to also consider collaborative educational ventures as well. Davis (2007) found the majority of responding institutions reported participation in joint distance education initiatives with other institutions or corporations.

Table 8
"What were some of the major opportunities that presented themselves to the program?" (n = 15, multiple responses were possible)

Funding and grants	11
Fundamental change in program itself	4
Partnering with other universities or programs	3
Increase the number of students	3
Ways of better meeting student needs	2
Partnering with state agencies	1
Increase admission selectivity	1
Attract and accommodate international students	1
Funding for distance elements	1

Respondents' Recommendations

Respondents were asked what their recommendations would be for a new face-to-face doctoral program in technical education as it tries to become established (Table 9). A typical comment in support of the most commonly cited recommendation for more research is

> *"We have to prepare doctoral students to be future researchers. We have a pitiful research database. They have to be articulate, they have to communicate well, and their research has to be respected. Otherwise we are dead, and should be."*

However, recommendations were varied, as indicated by the following:

> *"You have to have a commitment from the administration for financial support. We have more programs than we know what to do with and no infrastructure has changed. You need support staff, travel funds, graduate assistants. Just more faculty doesn't help. Promotion of the program is important and funds need to be allocated for it."*

This speaks not just to the need for faculty in number, but for the need for other forms of support and promotion beyond faculty lines in order for a program to flourish. One telling example of the need for better meeting the needs of the student is

> *"Be open to different audiences, people have different purposes and you should be flexible to allow them to pursue their goals."*

Table 9
Recommendations for newly forming face-to-face doctoral programs in technical education. (n = 15, multiple responses were possible)

More research	6
Administration support and funding	3
Focus on college faculty preparation	3
Ways of better meeting student needs	2
Increase online elements	2
Better allocation of resources	2
Emphasize leadership	1
Shift to regional institutions	1
Better marketing	1
Increase admission selectivity	1
Attract international students	1

The respondents were also asked to provide recommendations to those who might be considering creating a new online doctoral program in technical education (Table 10). The most frequent recommendation from this sample was to consider hybrid programs or consortiums with other institutions:

"*It requires solid interaction with a faculty. Split the experience between campus and online."*

A telling response alludes to the demand for quality, especially in online programs:

"*I don't like it. Don't compromise quality."*

Table 10
Recommendations for newly forming online doctoral programs in technical education. (n = 16, multiple responses were possible)

Consider hybrid, blended or consortiums	6
Bad Idea	3
Use various and appropriate instructional technologies	3
Must have quality assurances	3
Provide meaningful interactions	3
Rigorous admissions requirements	2
Be honest about hiring bias	2
Provide many student resources	1
Base degree on research and scholarship	1
Must have program support	1
Student-centered education	1
Must have high quality professors	1

Conclusions and Recommendations

The field of doctoral education in technical education is varied, as Paige, et al. (1996) had noted over a decade earlier. Doctoral programs can be found not only with different admissions criteria and program requirements, but with a variety of themes, directions, and modes of delivery, as found in the present study. Colleges and departments that house these programs also vary, as do the expectations for faculty and new hires within those departments. These investigators suggest that the variety among doctoral programs is a sign of the field's intellectual health.

The professionals interviewed for this study are not representative of the population of technical education professionals.

Rather, they are specialists in doctoral education in the field. Most of these specialists reported a marked preference for face-to-face doctoral education over online education for new hires, and were ambivalent about how much an online doctoral program is needed in technical education. This would indicate that completely online doctoral degrees would presently command little respect from most of those administering competing face-to-face programs in the field. Therefore, applicants may face resistance if their doctorate had been earned online when applying for faculty positions in doctoral programs in technical education. However, there are pockets of acceptance; 44% of those interviewed reported plans to offer more online classes. These pockets may grow as more online offerings become available, as online education becomes more common, and as technological advances in educational technology improve the capabilities of the online environment.

> *"Right now face to face will trump everything else. Probably will change down the road. If you did it online from a major place it will not matter much. If they did it from an online school without a reputation it would be problematic for the applicant."*

Faculty teaching load was found to vary from 1.5 to four courses per semester. Likewise, while there is an expected overall emphasis on research in doctoral programs, there is also a large range in the magnitude of that emphasis (25% to 80%) over teaching and service. There was also evidence to suggest that in some cases, the official ratio of research, teaching, and service may not be the same as the actual application of these criteria for evaluating faculty. Those seeking faculty positions should evaluate the characteristics of many institutions and positions before committing to one.

Despite dire predications for the demise of the field (Volk, 1997), only three doctoral programs reported shrinking enrollments. Funding and other resource issues have been chief among the obstacles faced in these doctoral programs. Grants and partnerships were most commonly cited as strategies to alleviate resource problems. Those administering doctoral programs may find it useful to apply solutions found to be effective at other programs to challenges in their own programs.

This study suggests several avenues for future research. Given the growth of online education, and the changing attitudes that may accompany this growth, later studies may investigate the evolution of the field of doctoral technical education, including program trends, changing student populations, and hiring attitudes and practices. Future research may also investigate the barriers to progress in the field, looking both at internal and external obstacles, and strategies to surmount those barriers.

Acknowledgments

CTTE Research Incentive Grant Program, Pilot Testers, and Survey Respondents

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