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Exploring the Impact of a Professional Practice Education Doctorate in Educational Environments

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Abstract

This article presents one approach to assessing the impact of an online professional practice doctorate in education on participants' work environments. It is unique in that it explored impact during the doctoral program, before participants began their dissertation research, and it focused on how participants apply learning from the program within their practice and how they grow professionally in ways that make contributions to their organizations and their profession. The data are based on participant interviews, participants' curriculum vitae submitted during qualifying exams, and professional websites. The findings indicate that an online professional program embedded in practice can have powerful impact within a short period of time on students' own practice, their local organizations, and their colleagues at regional, state, and national levels and spur their professional momentum.

Keywords: educational technology, continuing education, impact factors, professional doctorate, online program, practitioner education

The nature of the doctorate and the impact of doctoral education has been the focus of discussions in recent years (Gilbert et al., 2004; Kot & Hendel, 2010; Mowbray & Halse, 2010; Tennant, 2004). Much debate has surrounded the definition of doctoral impact and its measurement, which ranges from measurable publications and state funded grants to epistemological and ontological changes in doctoral candidates (Halse & Mowbray, 2011). In recent years, there has also been an increase in professional doctorate awards in the United States, United Kingdom and Australia, accompanied by studies and discourse about their design and impact (Boud & Tennant, 2006; Bourner, Bouden & Lang, 2001; Kot & Hendel, 2010). Professional doctorates are designed in many ways and are offered as pre-service or in-service degrees. They range from doctorates that structure coursework and a discipline-specific dissertation to doctorates that are designed in collaboration with employers and include research that is conducted in the workplace and supervised by university faculty. The impact of a professional practice doctorate in education that encompasses discipline-based coursework and scholarship as well as practice-embedded research is presented and discussed in this article, in the context of the larger debate surrounding the definition and measurement of doctoral impact and the value of professional doctorates. Particularly, this paper highlights the value of online professional degrees that enable doctoral students to remain in their professional contexts. We believe this article will be of particular interest to educators engaged in the development of professional doctorates and online professional practice programs.

Studying Impact in Professional Doctorates

A review of research and discussion around doctoral or research impact in the past reflects multiple approaches - studies have focused on employment, employability and career choices of graduates from doctoral programs; the number of patents, publications and

innovations; epistemology or ontology; students' knowledge and personal growth; and economic impact in organizations (Halse & Mowbray, 2011). Instead of focusing on *either* the doctoral process *or* the end result of a doctorate, Halse and Mowbray (2011) call for the conceptualization of "the doctorate as *both* a process and a product, and that attends to the diversity of individuals, organizations and institutions participating in various phases of the doctorate" (p. 514). They also call for the definition of impact as well as the metrics that can be used to measure that impact.

In the context of professional doctorates, impact has previously been defined as impact for the learner and for the organization (Lester & Costley, 2010), because research during a professional doctorate often takes place in a professional organization where the doctoral candidate is employed, and is aimed at contributing or improving some aspect of practice. Research in professional practice has been viewed as an intersection of the profession, workplace, and the university (Lee, Green & Brennan, 2000), where knowledge is produced within a context of application. Morley and Priest (1998) define applied research in professional practice as "concerned to contribute to the development of professional practice, rather than to the advancement of purely theoretical knowledge" (in Maxwell, 2003, p. 282). In contrast, Tennant (2004) argues that knowledge "formed and performed" during doctoral education need not necessarily be visible and measurable, and that the doctoral student can be viewed as an "enterprising self" that both acquires and generates knowledge (p. 431). Learners have claimed personal growth in terms of increased expertise, skills, confidence, and reflection, and professional growth such as increased recognition, responsibility, and stature in their workplace as a result of participation in professional graduate programs (Costley & Stephenson, 2008; Lester & Costley, 2010; Nixon et al., 2008; Rhodes & Shiel, 2007). Moreover, the doctoral

process can contribute to the development of problem-solving skills and habits of mind that apply to other contexts beyond professional practice (Costa & Kallick, 2008; Reilly, 2007). Lester and Costley (2010) summarize the impact of such programs for organizations as the knowledge creation and changes resulting from work-based projects, the “increased professionalism and motivation” (p. 568) of learners, organizational changes, and professional changes for learners. The study described in this paper explores impact not only after but *during* a professional doctoral program, before students began their dissertation research, and focuses on both the impact for learners and their application of learning in their professional contexts.

This study is situated in an institution that participated in the Carnegie Project on the Education Doctorate (CPED). CPED seeks to define the professional practice doctorate in education (Ed.D.) and create experiences for practitioners that are different from the Ph.D. in education that traditionally prepares students for academic and research-focused settings (CPED, 2010; Perry & Imig, 2008, Shulman et al., 2006). The main goal of the professional practice doctorate in education is to prepare stewards of practice (Perry & Imig, 2008) “from principals to curriculum specialists, to teacher-educators, to educators...who will creatively generate new knowledge, critically conserve valuable and useful ideas and responsibly transform those understandings through writing, teaching, and application” (Shulman, Golde, Conklin, Bueschel, & Garabedian, 2006, p. 26-27). Similar to the impact reported in the literature reviewed on professional doctorates, CPED (2010) proposes that outcomes of the professional practice doctorate in education are changes in participant learning and behavior and changes in the participants’ organization and/or profession. This study therefore aimed to assess if and how students in a professional practice doctoral degree in Curriculum and Instruction with an emphasis in Educational Technology (a) apply learning from the program within their practice

and (b) grow professionally in ways that make contributions to their organizations and the profession.

Design of the Ed.D. Program

The professional Ed.D. program researched here aims to prepare practitioner scholars who can identify educational problems, apply theory and research to problems of practice, and be “agents of change” in the lives of individuals, families, schools, and communities (CPED, 2010). Consequently, the relevance of instructional content and its applicability to real-world environments plays a decisive role in the learning experiences of adult learners in this program (Butterfield & Nelson, 1989; Knowles, 1984). Instruction is designed such that Ed.D. students can solve practical problems with resources that they would use in practice, and can produce artifacts that are relevant and useful in the original contexts of identified problems (Brown, Collins & Duguid, 1989). To facilitate transformational learning, students are required to negotiate their own purposes or values rather than act according to external or imposed purposes and values in the program. They are exposed to diverse perspectives, and engage in both reflection and reflective discourse (Daloiz, 2000; Graham, Rhodes, & Shiel, 2006; Mezirow, 2000). Opportunities are provided for practice-embedded activities and learner autonomy that can contribute to autonomous thinking and the attainment of internal authority to make judgments (Kegan, 2000; Mezirow, 2000).

The program can be completed part-time by working professionals and is structured as two years of online coursework and program activities followed by small-group and individual supervision of practice-embedded research for a minimum of three semesters. To facilitate transformational, reflective, and practice-embedded learning that combines scholarship in the discipline and practice, the online program is cohort-based. No collaborations with employers or

specific organizations exist and research projects are defined by participant interests in the context of problems within their practice. This paper presents data collected with the first cohort during the second year, therefore the design description in this section focuses on online coursework and other cohort activities during the first two years of the program. Due to the interdisciplinary nature of educational technology, students in the program come from various disciplines and do not always have prior degrees in educational technology or education. Required courses during the first year in the program include an orientation to doctoral studies in educational technology and provide students with an overview of theories and research essential to the field. Courses during the second year comprise quantitative and qualitative research and instructional design. Students simultaneously take electives in their area of specialization (e.g. online teaching and learning, educational gaming). At the end of the second year, students prepare for qualifying exams and begin work on their individual research (Dawson, Cavanaugh, Sessums, Black, & Kumar, 2011).

Here is an example of how educational technology theory, research, and application in practice are woven through multiple courses and activities in the program: Students reflect on their professional practice and attempt to identify their areas of specialization in the orientation course in the fall semester of the first year. In the spring semester, they examine different approaches to research in that area of specialization and work on an annotated bibliography based on their readings. In the summer seminar, they complete a detailed bibliography and identify potential projects in their area of specialization that can be implemented in their professional practice. The instructional design course in the summer facilitates the design of instruction or innovation in students' practice and research courses in the second year guide them in the research design and implementation of the projects.

The constructivist and collaborative Community of Inquiry (COI) framework (Garrison, Anderson & Archer, 2001) used in online learning informed the design of online interactions in the program. Teaching presence as defined in the framework is strong because all faculty members have prior experience in instructional design, online teaching, and graduate student mentoring. Cognitive and social presence is facilitated through synchronous and asynchronous interactions with content, instructors, and peers. These interactions are explicitly included in the design of online courses and other program activities outside of courses, during which learners solve authentic problems that they identified in their practice and share their learning with their peers. Monthly online synchronous sessions and a one-week on-campus seminar during the summer contribute to the building of community and social presence among cohort members (Kumar, Dawson, Black, Cavanaugh, & Sessums, 2011).

During the first two years of the Ed.D. program, the core courses and other key synchronous and asynchronous online interactions serve as developmental scaffolds leading students to strengthen their habits of mind as leaders. These habits include being learners, being involved in their worlds, valuing innovation, and having high standards (Reilly, 2007). These habits are demonstrated most explicitly at the qualifying and capstone stages of the program. In keeping with the applied nature of the professional education doctorate, the program's qualifying exams require each student to design, develop and present job-embedded artifacts in a manner commensurate with doctoral level work. The qualifying exams represent the student's opportunity to demonstrate synthesis of knowledge in four key areas: Area of specialization; Knowledge of research methods; Current educational issues; and Historical perspectives about educational issues (Dawson et al., 2011). Students work on these artifacts during their second year in the program, and take oral exams on-campus during the summer.

Methodology

In order to assess whether students were (a) applying learning from the program within their practice and (b) growing professionally in ways that make contributions to their organizations and the profession, student interviews were conducted during the second year by a new faculty member who had not been involved in the initial design of the program, and who had not taught the participating students. Following the analysis of interview data, an analysis of students' curriculum vitae and professional websites was conducted to corroborate students' assertions during interviews and to triangulate the data.

Data Collection: Student interviews

Nineteen students participated in 20-40 minute semi-structured interviews on the phone or in-person about their application of Ed.D. knowledge to their professional practice and its impact. Interview questions were open-ended, for example, "Have you applied what you are learning in the Ed.D. program to your practice? If so, can you provide some concrete examples?" Care was taken to probe for knowledge and application that was both "formed and performed" (Tennant, 2004, p. 431). The interviewer probed for both tacit and visible impact for the students and their professional contexts. Mindful of students' professional expertise when they entered the program, interview questions emphasized the application of learning from the Ed.D. program. For example, these were follow-up questions used during the interviews: "was this an initiative you had already planned before you began the Ed.D. or one you would have developed regardless of your participation in the program?", "had you presented at similar conferences before 200X?" and "how did your participation in the Ed.D. help you with the professional development you just described?" Questions were also posed about students' professional growth as a result of the program, their perceived impact of their application of the program to

their work environment, and any other areas that students chose to highlight as program impact.

Data Collection: Students' curriculum vitae and online presence

In order to triangulate the visible or measurable components of the application or impact mentioned by students, the curriculum vitae submitted by the same 19 students as part of their qualifying exam at the end of the second year were analyzed for professional activities and changes in job roles since they entered the program. These data were entered into an Excel spreadsheet. Achievements and activities during the first semester of the program were excluded as students might have initiated these before entering the program. All students had professional websites in the public domain that also documented their achievements and professional activity. Additional data that were not present on CVs but on students' websites were also added to the spreadsheet.

Data Analysis

Twenty-six students (28% Male, 72% female) enrolled in the program during fall 2008. In response to an email invitation, 19 of 26 (73%) students participated in interviews during their second year. Of the 19 participants, 14 worked in K-12 environments, four in higher education and one in corporate education. An inductive and interpretive approach (Hatch, 2002) was adopted for analysis where participants' description of specific actions was coded and their explanations, e.g. of feelings of confidence or success, used to make inferences and attach significance. The data from CVs and websites were used to triangulate and corroborate students' statements in the codes. The codes were then consolidated to identify major themes related to the application and impact of the Ed.D. program in students' professional practice. Excerpts from interviews that were representative of major themes were then used to conduct member checks (Merriam, 1988; Miles & Huberman, 1994) and ensure that the theme accurately represented

students' experiences or views. In case of professional activities and achievements from the CVs or websites where it was unclear that students had applied learning from the program, follow-up emails with questions were sent to ensure the validity of the data.

Findings

The data from student interviews, students' curriculum vitae and students' websites indicated that all 19 participants demonstrated (a) Application of Research-based knowledge in Professional Practice and (b) Professional Growth and Integration in the Discipline. Details of these two broad themes are described in this section

Application of Research-based knowledge in Professional Practice

The participants had applied learning and knowledge of research from the program to their work environment in the following ways during the Ed.D. program: Innovations using new technologies in practice (n=19); Data-driven decision-making and research in practice (n=7); and Formal and informal dissemination of knowledge in professional practice (n=19).

Innovations using new technologies in practice

All 19 students who were interviewed reported innovative uses of new technologies in their teaching, organization or district; the development of new curriculum (courses, modules, and programs); and leadership and design of online or blended professional development in their organization as a result of participation in the program. The exposure to new technologies during courses in the Ed. D. program, the ways in which technology was used by faculty to teach online, and the research on educational technology that they had read led participants to use more technology, reflect on how they used it, and apply it in different ways. Several of these students emphasized that their innovative use of new technologies was "research-based" or "based on the literature."

For example, two high school teachers, impressed with the learning management system used in the program, implemented it in their school and district respectively. Similarly, a school leader introduced the use of social media in his school and district, a high school teacher created an online community using social media in her district and an elementary school teacher used social media to communicate with the parents of her students. Three teachers created online materials and online modules for high school and middle school science curriculum and middle school 21st century skills. An instructional librarian created online modules for information literacy instruction. Other teachers reported the use of new technologies such as simulations, Smartboards, and Web 2.0 tools in high school science and math, middle school social studies, and elementary classrooms. Two teachers applied for technology grants and used the money to buy and implement technology in their classrooms. One student reported that she was chosen for a technology grant by her school district due to her participation in the Ed.D. program.

The following vignette provides an example of how students changed their approach to technology use as a result of the program:

Attending a presentation by Dr. F [faculty member] introduced me to the potential of gaming in the classroom. I brought gaming to my school, I wrote it into a grant. It was a large geographical grant, my piece was \$5600. I am pretty confident with technology, but that said, I had no confidence in taking it to people. Earlier I would have used it in my own classroom but not college-wide. The [Ed.D.] program gave me the confidence to take it to other people, I have the education behind me, the knowledge that I am right, understanding of both the producer and consumer side of technology, so I have shared it all up and down my campus. – Curriculum Developer and Instructor

Students also reported a change in the way they reflect on why technology should be used and how it could be used appropriately as evidenced here:

I think a lot more about it –the theories behind what I am doing and why I am doing it. Activities that I did with the kids before that using technology were interesting and cool, I think now I think a lot more about learning theories and what is behind it, I can also justify it with colleagues and parents. I can tell them why we are doing certain things and

which theories back it up. – Middle school teacher

I think it either validates what we're already doing or it makes us question it and say, why are we doing it? For me at least, all of the theory and stuff, I've learned a lot more of current research. I just didn't know why I was doing what I was doing. I was applying technology without realizing...I feel like I do a good job, but now it's more of a reflective process. This [the Ed.D. process] is helping me to work backwards and think, okay, now I know exactly why this is working, because I am doing it based on these theories. So that has really helped. I guess in just making me reflect a whole lot more and more formally, so, in my practice. – Elementary school teacher

Data-driven decision-making and research in practice

Seven of 19 students stated that exposure to research and articles during coursework had led them to adopt a new data-driven approach to decision-making, to introduce new evaluation methods in their organization and in general, increased their confidence to discuss research in their practice. For example, a college science instructor, a virtual school teacher, and a college administrator proposed and implemented innovative ideas based on the research they had read or conducted. A middle school administrator evaluated a new blended learning program in order to gather data for improvement and a school leader implemented new methodologies for assessment in courses in his school. An instructional technology specialist introduced and implemented action research with the teachers in her school. An instructional designer implemented an evaluation framework to gather data that would improve the instructional design of a program.

The following vignettes provide examples of how students used data and research as a result of the program

I'm on the leadership team of a metric driven and yet business driven organization. So one of the things that I've been able to do just in the past year and a half is I will be that voice in those conversations that says what is the literature saying in higher education for X Y or Z problem? I will actually dig up research articles. I will interpret them for our leadership, and I'll make copies, and I'll say, look at this, and I'll highlight the paragraph or two that they need to see...And then they'll say, that's a compelling argument, let's move in this direction...An example is a common course assessment methodology for our

technology courses. One of the things is the whole idea of doing the research and digging into the literature. That's been an eye-opening piece. But being able to use research methodologies and be metric driven, metric based, when I'm having discussions about why things need to change... – College Administrator

I created revisions to an instructor-led course in cooperative learning, introducing a new evaluation method for assessing how participants were applying what they learned in the field. Rather than simply collecting information at the end of the course, the method I introduced assessed the participants 90 days after the course at Kirkpatrick's level 3. I was able to take what I have learned here [Ed.D. program] about learning theory and Kirkpatrick and apply it to redesign the way we evaluated an existing course. We now use this new evaluation method to collect better data to make decisions about the design of the course and trends in implementation of the course. The information helps to ensure that if we say we are designing courseware at a specific level of interactivity, we are actually doing so as well as measuring it. I wouldn't have been aware of Kirkpatrick, met him, or gotten his ok to send him my survey questions if not for this program. – Instructional Designer

Formal and Informal Dissemination of knowledge

Using the knowledge and skills gained during the Ed.D. program, twelve students implemented professional development and seven students made presentations at the school, county, and district level to share their own use of technology in their teaching, their knowledge of technology integration, and pedagogical strategies with colleagues, teachers, and administrators in the following ways. For example, three teachers in middle and high school made county-level presentations about their integration of technology in their classrooms. One elementary, one middle school and two high school teachers modeled their use of specific technologies for other teachers in their schools and mentored other teachers interested in integrating those technologies. A business educator developed a blended learning program for K-12 teachers while an instructional technology specialist developed online professional development for teachers where she shared research about technology integration. An instructional designer conducted brown bag lunch sessions for her colleagues about literature in instructional design and evaluation.

The following vignette provides an example of how students disseminated knowledge as a result of the program:

I teach middle school social studies. I went to my principal and said, I'm in this [Ed.D.] program, this is what I am learning, and I would like to be given the opportunity to share, and that's when they created the position that I took on the role...it's called Technology Instruction Research Teacher. So instead of just focusing on social studies in my classroom, I took the tools that I started learning, and implemented them into all content areas with my teachers. - Middle School teacher

One of the students in our [Ed.D.] cohort gave me a set of response systems and I used it in my high school math classroom all year, and it went really well. In fact, a lot of teachers were coming in and asking me, what are you doing, where did you get those, what are you finding? And administrators came in, and they were just like, we've never seen so many kids actively engaged. And so it was kind of nice. And originally, they thought I could do some training and be like a model classroom...they brought in beginning teachers to my classes. And I had some big classes, 37 or 38 [students] sometimes. And it really worked well in all classes. So I do think it [the Ed.D. program] helped me, because I probably would not have got the clickers and not adapted and been that comfortable using it with different classes. - High school teacher

Students' Professional Growth and Integration in the discipline

As evidenced by students' comments in the previous section, their application of knowledge in their practice often stemmed from increased confidence in their knowledge of research and the field. This increased confidence and growth also led to visible professional growth in terms of integration into the field of educational technology, and contributions to their profession or organization as a result of the Ed.D. program. Two related themes emerged in student interviews and curriculum vitae: Professional growth as evidenced through integration in the field of Educational Technology (n=18); and Changes in professional roles (n=15).

New involvement in the field of educational technology

Students in educational technology graduate programs come from different disciplines and backgrounds, therefore integration into the field of educational technology was crucial to

their understanding of the field, their development of habits of mind as scholars, and their ability to leverage resources and a network to conduct research and effect change in their professional practice. In addition to existing discipline-specific organizations of which participants were already members, ten participants became members of educational technology professional organizations, and several reflected on the value of their interactions with experts in the field. For example, an instructional designer was able to meet the author of the evaluation framework that she had decided to use in her organization, and a high school business education teacher interacted with business educators in other parts of the United States using a professional social network (a Ning).

Fifteen students made presentations at national and international conferences (e.g. Sloan-C online learning conference, International Society for Technology in Education, Campus Technology, Virtual School Symposium) or at regional conferences (e.g. Florida Educational Technology conference, Georgia Educational Technology conference) about projects from their coursework in the program or their implementation of technology in practice. Students reflected that their participation in the Ed.D. program had given them increased confidence to do so. A high school English teacher reflected on her conference participation, "I did not have the confidence or knowledge before I began this [Ed.D.] program. I knew it was possible, but wouldn't have put myself out there without the program." Similarly, another high school teacher attributed her conference participation to the reflective practices in coursework in the program. She said, "I am forced to sit and write about an experience or something that I worked on, it allows for reflection and revision, and I then am motivated to present that at conferences." Four students published their work in scholarly journals or teacher journals in the field of educational

technology, and emphasized their program participation as giving them the confidence in sharing their knowledge with peers in the discipline.

Changes in professional role

Participants' increased knowledge and confidence empowered them to propose solutions and articulate their opinions during meetings, leading to ten of 19 participants taking on leadership roles in their respective institutions within one to one and a half years of joining the program. Teachers were more involved in communications with the School Board, with their principal, with technology advising at the school and district-level and decisions related to technology professional development. One high school teacher assumed the role of advisor on technology purchases at the district level while an elementary teacher became a member of the elementary education advisory committee at her local university. Students made comments such as "It opened a whole new set of doors for me professionally," and "I interact a lot more around the district." A high school teacher stated, "I began looking at long-term techniques that I could use in my work environment. It has turned out that I have made a little niche for myself at work, I've had opportunities open up that would not have opened up so quickly."

Four teachers accepted new positions within their institutions, for instance, that of an instructional technology coordinator and of a regional liaison and traditional K-12 teacher moved to working in a virtual school. Four of the five students attributed their new position to their knowledge of technology integration or online and virtual education acquired during the program. The following vignette provides an example of how one student changed professional roles as a result of the program:

I knew I would grow professionally. I don't think even then I realized that the impact where I worked would be so great, because I'm very shy and timid. But I see myself as a leader big time now, and it's [Ed.D. program] helped me to do that in my school, and I've done conferences and stuff, too. I didn't realize how it

would affect my encouraging others to change their practices. But now it really is - how many kids can I impact? Because I feel like I can now, where before I didn't realize I could really make a big difference out of just my classroom, and now I see that I can. Even a year ago, I never would have done that. So I have a leadership role in the school and leadership role outside of the school as well. And I don't know, it's just evolved...- Elementary School teacher

One of the course assignments was to go to a virtual school and conduct an interview with one of their leaders. So originally they did not want to meet with me...I promised it wouldn't take more than 10 minutes, they said, okay. So I went over, and when we did the interview, it ended up going for an hour and a half, and they were asking me questions. And so we just went back and forth. Then they told me a position would be opening soon and to keep my eye out. And then they let me know when it came open, and so I submitted my resume along with a lot of other people, and then I was one of the three that were selected for the interview, and then I got the job. I wouldn't have if I hadn't done that interview. - High School teacher

Limitations

There are several limitations to the research presented in this paper. The data are based on students' self-reports during interviews, on their submitted curriculum vitae during qualifying exams, and on their professional websites. Students' colleagues or employers in their immediate work environment were not included in the data collection to verify students' reports; this will take place when students complete the program. The data were also collected over four months during the second year of the Ed.D. program due to difficulties scheduling interviews with the online students in the program, all of whom are working professionals. Thus, some students were interviewed when they were further along in the program than others. Finally, all of the participants lived in the Southeastern United States and seventy-four percent of participants worked in the K-12 environment. Nevertheless, the findings of this study suggest that professional practice doctorates contribute to students' growth as individuals and professionals, and also have the potential to influence local practice and transform the professional roles of students.

Discussion

Distinctions between disciplinary knowledge production and the imperatives of practice (Lee, Green & Brennan, 2000) blur when studying impact in professional doctorates. Research on doctoral impact in professional doctorates should focus on “the emergence of new forms of knowledge” and inquiry into “the relationships between knowledge and practice” (Lee, Brennan & Green, 2009, 282). This study sought to identify the impact of a professional practice Ed.D. during the second year of an online doctoral program in education that requires students to complete two years of online coursework and pass qualifying examinations before they can begin their research.

Students in this study were from diverse backgrounds. However, they almost uniformly reported that their enrollment in the program led to increased confidence, increased reflection before taking action, increased responsibility in their work environment and improved employment as a result of knowledge gained in the Ed.D. program. Additionally, students also reported an increased dependence on research and increased critical thinking in their professional practice. Our findings are discussed in this section in the context of (1) the online and job-embedded nature of the program, which was unique, and (2) the importance of flexibility when defining, interpreting, and assessing impact in a doctoral program.

Online and job-embedded programs can have powerful impact

The one year of online coursework that students completed prior to this study emphasized disciplinary content knowledge, the articulation of professional goals, reflection on professional practice, and course assignments and projects relevant to practice. The program was consciously structured for part-time students working full-time and coursework was offered online. The online, part-time nature of the program enabled students to remain in their professional practice

context and facilitate change in those environments. Many participants in this study noted that this resulted in transformative and reflective learning. Some of these results are similar to other studies that measured the impact of professional doctoral degrees after completion (Costley & Stephenson, 2008; Lester & Costley, 2010; Nixon et al., 2008; Rhodes & Shiel, 2007). This study indicates that an online professional program embedded in practice can have powerful impact within a short period of time on students' own practice, their local organizations, and their colleagues at regional, state, and national levels. While there will be a learning curve for institutions and faculty wishing to offer professional programs that include online coursework or mentoring (Dawson et. al., 2011), the potential of online education that provides enrollment opportunities for students outside a university's geographical reach and the powerful impact of online programs that facilitate linkages between university studies and professional practice should not be overlooked.

Flexibility is key when defining and assessing impact

Unlike prior research that focused on impact after the completion of a doctorate (Halse & Mowbray, 2011), this research focused on students' growth and professional application during the first two years of coursework in a professional doctorate. During the first two years of the doctoral program, problems of practice drove students' interests, and exposure to theory and research led to students adopting a data-driven or informed research approach to decision-making, teaching, and evaluation. This synergy between research and theory learned in the program and students' professional practice highlights the importance of assessing impact *during* as well as *at the end of* a professional doctorate. Our results reinforce Halse and Mowbray's (2011) call for measuring impact during various phases of the doctorate. Impact during different phases might take different forms and the identification of impact (or lack thereof) can be used to

improve structure, supervision, and other aspects of a doctoral program. In the case of the professional practice program in this study, impact will be assessed formatively at regular intervals.

The definitions and types of impact identified by prior researchers in doctoral degrees in general and in professional doctorates in particular were reviewed at the beginning of this study. The metrics used to measure impact in prior studies provided us with valuable perspective, but we struggled to define impact that could capture the diversity of our students, their professional practice, and the uniqueness of our professional doctoral program in our discipline. We thus adopted an open-ended approach to the definition and identification of impact. Using the broad categories defined in the research as impact for the learner and impact in professional practice, we developed an open-ended interview protocol to identify doctoral students' perceptions of impact and to account for "the diversity of individuals, organizations and institutions participating in various phases of the doctorate" (Halse & Mowbray, 2011, p. 514). This approach provided insights that would have inevitably been missing if impact metrics had been pre-defined. External pressures such as required program reports and institutional mandates about impact definitions are often realities in institutions of higher education. However, while it is important to define outcomes, it is crucial to explore changes and impact as perceived by the participants in a professional doctorate, and to record these in a formative manner instead of only at the end of a program, as these might be different during different phases of the doctorate. Furthermore, impact can be context-, discipline-, and profession-specific. Investigating and comparing student perceptions of tacit and measurable impact within a variety of professional doctoral programs will further refine what is meant by impact and how programs can be structured to facilitate those types of impact beneficial for a certain profession, context or

discipline. Further examination is also needed of entry characteristics and perceptions of students to determine both student-related and context-related success factors for a program. A method similar to the one described in this study, with multiple points at which impact is studied, may be a model for other leaders of professional doctoral programs.

Conclusion

The results of this research could be useful to others engaged in the preparation of leaders in educational technology, in the development of professional doctorates, and in the measurement of impact of professional doctorates. In the specific context of the education doctorate, the documentation of the impact of professional practice Ed.D. programs on students' scholarship of practice (Shulman et al., 2006) can support the redefinition of the education doctorate and can contribute to the identification of doctoral experiences that serve the needs of professional practitioners. In the larger context of professional doctorates, exploring multiple definitions of impact, impact as perceived by students, impact during all phases of a program, and impact that corresponds to the goals or operationalization of a program can contribute to our knowledge and thinking about professional doctorates. This study takes a step in that direction by examining students' application of learning from an online professional doctorate within their practice and their professional growth. It highlights the importance of online professional degrees, the methods used by researchers to define and interpret impact and the importance of formative impact assessment in doctoral degrees.

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