Quality Considerations in the Design and Implementation of an Online Doctoral Program

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Abstract

This article presents one approach to the design and implementation of a quality online doctoral program in which students engage in a community of inquiry to connect theory, research, and practice. Based on research in an online professional doctorate in education, faculty presence, social presence, cognitive presence, and learning presence (Garrison, Anderson, & Archer, 2001), online doctoral environments are discussed along with other considerations such as the provision of support for information literacy support, research preparation, and faculty mentoring. The discussion of online doctoral program quality and design is applicable to online doctoral programs and professional doctorates in all disciplines.

Keywords: online doctoral program, online program quality, quality online education, community of inquiry, online program design

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Introduction

The growth of online education in the US has been accompanied by the emergence of online programs in various disciplines as universities attempt to meet the needs of millions of students looking for opportunities to learn online. Doctoral programs that traditionally used an apprenticeship model are also being offered in hybrid or online formats. Since 2008 in educational technology and related fields, for instance, six new doctoral programs have emerged in the US that are offered in hybrid or online format by not-for-profit, brick-and-mortar universities. Despite online program offerings and the number of students taking online courses (Allen & Seaman, 2013), the rigor and quality of online programs remain a concern as online degrees—whether bachelor's, master's, or doctorate—continue to be viewed skeptically by academics and employers. Some of these concerns are justified due to the relative newness of online doctoral programs and the scarcity of data about them. Online doctoral programs encompass varying degrees of quality, similar to traditional doctoral programs that provide a wide range of learning experiences for students and succeed to

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different extents at preparing students for the academe or professional leadership. The main difference, however, is traditional doctoral programs that have been in existence for many years might not be able to innovate or change in a short period of time due to institutional culture or administrative processes. A department or college creating a new online doctoral program has the opportunity to use lessons learned from successful on-campus doctorates, existing online doctorates, and prior research in distance education to conceptualize an innovative online offering that provides excellent learning experiences for students.

This article presents one approach to designing a quality online doctoral program based on the Community of Inquiry (COI) (Garrison, Anderson & Archer, 2001), a leading framework used to conceptualize online teaching and learning. It integrates prior research in distance education, which is not a new phenomenon, and lessons learned from the design, implementation, and evaluation of an online doctoral program in education with a specialization in educational technology at the University of Florida (University of Florida EdD EdTech) (Kumar, 2014). The University of Florida EdD EdTech is a professional doctorate offered since 2008 that is based on Carnegie Project on the Education Doctorate (CPED, 2010) guidelines and has graduated 23 students at the time of writing this article. Faculty who led a successful PhD program and were experts in online teaching and learning designed an innovative and rigorous online degree for professionals aiming to be educational technology leaders (Dawson, Cavanaugh, Sessums, Black & Kumar, 2011). The degree is designed as two years of online coursework culminating in qualifying exams and followed by the dissertation. Asynchronous and synchronous online interactions, yearly on-campus meetings, and a strong focus on community-building and the connections between theory, research, and practice characterize the program.

Although this article focuses on the professional doctorate in education and the doctoral model common in the United States—coursework followed by the dissertation—the design proposed and discussed is relevant to all online doctoral programs in education, whether PhD or EdD, and to professional doctorates in other disciplines. The following sections detail the theoretical foundations of program design, the design of online teaching and learning in doctoral programs, and additional design considerations in online doctoral programs.

Theoretical Foundations of Program Design

Learning within each discipline is defined and bounded by its language, epistemology and context (Bransford, Brown & Cocking, 1999). Regardless of discipline, online programs make it possible for students to remain in their work or family contexts and pursue higher studies. In the case of a professional doctorate such as the University of Florida EdD EdTech, online students are able to continue working in their professional contexts in the discipline, pursue areas of specialization in their discipline under the guidance of a faculty advisor or mentor, and interact anytime with faculty or peers using Internet and communication technologies. Their embeddedness in professional contexts presents students with opportunities to connect theories and prior research in their discipline or research

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area to their professional context, apply what they learn in academic programs to practice, and engage in dialog with others in similar contexts around the world.

Different programs in education, whether the traditional PhD or the professional doctorate, have distinct goals and underlying theoretical foundations that inform their design. Given the adult professionals who engage in professional doctoral endeavors, doctoral curriculum and activities in the University of Florida EdD EdTech program aim to be transformational (Mezirow, 2000), situated (Lave & Wenger, 1991), and relevant (Knowles, 1984). Working professionals enter professional doctorates with significant work experience and attitudes about their fields that have been formed by prior learning and work experiences. Their meaning perspectives, or the "structure of cultural and psychological assumptions within which our past experience assimilates and transforms new experience" (Mezirow, 1985, p. 21), can be transformed through critical reflection on content, process, premises, and assumptions. Doctoral program curriculum and activities that are learner-centered can facilitate reflection on new content and perspectives to which students are exposed in the context of their existing assumptions and professional experiences. A community-centered approach (Bransford, Brown, & Cocking, 1999) that exposes students to different perspectives, consistent communication with others, the discussion of opposing points of view, and attainment of common understanding can lead to transformations in frames of reference, habits of mind, and points of view (Mezirow, 2000). The design of the University of Florida EdD EdTech program is grounded in the above principles and operationalized using the Community of Inquiry framework for online teaching and learning (Garrison, Anderson, & Archer, 2001).

Designing Online Teaching and Learning in Doctoral Programs

The Community of Inquiry framework is a leading model used to guide research and practice in online learning. Despite discussions of its conceptual foundations and the inadequacy of existing research on the relationships between its components (Jézégou, 2010; Garrison & Arbaugh, 2007), it provides a useful structure for conceptualizing online teaching and learning. Teaching presence, social presence, and cognitive presence in the COI framework informed online teaching and learning in the University of Florida EdD EdTech program. Research with the first cohort revealed that in an online doctoral program, faculty presence, social presence, and cognitive presence play a substantial role (Kumar & Ritzhaupt, 2014). Further, the fourth dimension of learner presence proposed by Shea and Bidjerano (2010) was also found to influence student success and completion of dissertations. The following sections detail the ways in which these four dimensions of the framework can inform the design of an online doctoral program that aims to facilitate transformational learning. Examples from the design of the University of Florida EdD EdTEch and research conducted in the program are provided for each dimension to illustrate how these areas can be operationalized in an online doctoral program during both stages: online coursework and the dissertation process.

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Faculty Presence

Anderson, Rourke, Garrison, and Archer (2001) defined teaching presence as "the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (p. 5). Instructional design and organization, facilitation of student interactions and discourse, direct instruction, and the provision of effective and immediate feedback (Anderson et al., 2001) can influence student learning and satisfaction in online courses where students do not see the instructor in a classroom. Research with the first cohort of students in the University of Florida EdD EdTech program led us to propose that teaching presence in an online doctoral program is more representative of faculty presence, where multiple faculty members teach, support, mentor, and advise online doctoral students in multiple virtual environments about research and professional goals (Kumar et al., 2011). Faculty presence in an online doctoral program also encompasses consistent communication about program requirements, research, composite mentoring of students, and the management of the online environment, support structures for online students, and administrative procedures at the institution (Kumar et al., 2011). Doctoral students require research and writing support as well as program planning and mentoring to leverage the opportunities presented by professional organizations, conferences, grant projects, and networking in their chosen field. In an online doctoral program, faculty presence includes not only instructional design, direct instruction, and facilitation of program coursework, but also direct instruction and the facilitation of program interactions about topics that develop habits of mind in that profession or discipline.

In doctoral programs, students' relationships with faculty mentors or supervisors are an important factor in their completion of dissertations. Academic mentors shape students' research skills, professional identity, and career. Models of mentoring in higher education coalesce around educational development, professional development, and psychosocial development to develop students academically, professionally, and personally (Hayes & Koro-Ljungberg, 2011; Lechuga, 2011). In the online environment, mentoring includes all the above but faculty also have to advise, encourage, and model disciplinary thinking and develop mutual trust in the absence of face-to-face communication (Bierema & Merriam, 2002). A learner-centered approach that uses multiple formats of communication, including activities that foster learner progress, and provides clear, consistent, and constructive feedback is advocated in the literature on online mentoring (Schichtel, 2010).

In the University of Florida EdD EdTech program, online doctoral students first complete two years of structured coursework before they work one-on-one with faculty members to conduct research and write their dissertation. Students submit written work to faculty via e-mail during the dissertation process and receive feedback in documents, e-mails, and phone and Skype conversations. Students reported that synchronous conversations were particularly helpful when they struggled to understand what a mentor or committee member suggested in terms of changes or revisions. Timelines and

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expectations for submission and feedback, adherence to deadlines, faculty availability and flexibility, and candid and timely feedback from faculty were appreciated by students in the program (Kumar, Johnson, & Hardemon, 2013).

Social Presence

The ubiquity of social media and communication technologies today make it possible for students in online courses or programs to interact regularly with each other and their professors. Social presence or the way in which online learners portray themselves as "real people" in their online interactions (Garrison et al., 2000, p. 89) can influence learning outcomes, students' cognitive presence, purposeful communication, and group cohesion in online courses (Hughes, Ventura & Dando, 2007; Shea et al., 2010). Multiple communication media (asynchronous and synchronous) are used in online programs to help students stay connected with peers and faculty. In addition to discussion forums and virtual classroom sessions within courses and group projects, several asynchronous and synchronous interactions extraneous to coursework are integrated into the University of Florida EdD EdTech program where cohorts share and discuss resources, academic and professional events, their professional growth, and problems of practice. Monthly real-time synchronous sessions with faculty provide additional opportunities for connecting theory, research, and practice (Dawson et al., 2011).

Notwithstanding the value of different types of online interactions, the importance of face-to-face meetings for social presence and the building of community have been consistently reflected in research conducted in the University of Florida EdD EdTech program. Students in the first two cohorts rated on-campus meetings higher than online asynchronous or synchronous meetings for social presence (Kumar et al., 2011; Kumar & Ritzhaupt, 2014). To this effect, an on-campus orientation was added to the program design based on feedback from the first cohort. This orientation has been cited by the third cohort as most important for getting to know each other and faculty members, and for "bonding." If an on-campus orientation is not possible due to travel constraints, an online synchronous orientation could be considered by program designers. While faculty can purposefully build these asynchronous and synchronous interactions inside and outside of courses to ensure social presence and productive scholarly dialogue, social presence in an online program where students have common goals and research interests can also be strengthened in informal and formal spaces where students socialize (Kenney, Kumar, & Hart, 2013). In the University of Florida EdD EdTech program, these include a Facebook group, Twitter, Google Hangouts, professional activities (e.g. conferences, webinars), and professional organizations in the field. Additionally, program participants often interact with external experts suggested by faculty members as well as those they seek out in their disciplines. These interactions about academic content, research, and professional application of their learning take place on social media and in students' professional contexts. These experiences are consequently shared with peers in the doctoral program. In the second cohort, the Facebook group (M=4.5, SD=0.96) was rated a close second to the face-to-face session (M=4.88, SD=0.34) on a Likert scale of 1 to 5 in terms of

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value for building community (Kumar & Ritzhaupt, 2014). Student ratings for learning from the Facebook group (*M*=4.37, *SD*=1.025) were also rated only second to the face-to-face session (*M*=4.94, *SD*=0.25). Students use of a platform or technology that is already a part of their lives, such as Facebook, and a bottom-up approach that addresses individual as well as group needs has been most successful for building community in the University of Florida EdD EdTech program (Kenney, Kumar, & Hart, 2013).

Doctoral students who succeed in completing their programs undergo three stages: transition and adjustment, candidacy, and the dissertation (Tinto, 1993). While students might successfully complete online courses due to their familiarity with the format used when pursuing their master's degrees, the dissertation process is especially difficult in the online environment due to the newness of the structure and a sense of isolation (Burnett, 1999; Kluever, 1997). The use of a cohort model and the building of social presence in the first stage of the program can help students get through the second and third stages, thus improving student retention. Research in the University of Florida EdD EdTech program revealed interactions and course activities in all modalities during the first two years of the program significantly contributed to students' persistence at the dissertation stage. Students asked peers for advice, met online regularly, read drafts for each other, provided feedback, and motivated each other in their Facebook group (Kumar, Johnson, & Hardemon, 2013). Students' acknowledgements in their dissertations often referred to the support of their cohort as instrumental in helping them graduate.

Cognitive Presence

The extent to which students construct and apply meaning using sustained reflection and discourse in an online environment is termed cognitive presence (Garrison, Anderson, & Archer, 2001). Cognitive presence is developed in four stages: the identification of a problem, the exploration of the problem individually and collectively through discourse, the integration or construction of meaning through exploration, and the resolution or application of meaning to new contexts (Garrison, 2003). In a professional doctorate, especially one that encourages students to connect theory and research to their practice, cognitive presence transcends online course discussions and is also developed during interactions with other professors, peers, colleagues, and experts in students' professional contexts or discipline. These might occur online via e-mail, webinars, and social media, or face-to-face during conferences, professional activities and on-campus sessions (Kumar et al., 2011). The development of cognitive presence thus takes place in multiple modalities and environments in online programs compared to online courses, and students' interactions in formal and informal environments blur as they begin to interact in non-university-specific learning spaces (Kumar et al., 2011; Kumar & Ritzhaupt, 2014).

In the design of the University of Florida EdD EdTech program, problem definition, exploration, and reflection were facilitated using asynchronous and synchronous interactions, and all program activities provided students with opportunities to apply knowledge and skills from the program in their practices. For example, students identify problems in their practices, explore literature

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related to the problems, and synthesize it to inform interventions and proposed research (Kumar & Antonenko, In Press). This process is scaffolded and completed in various courses in the program, with students sharing their progress with peers and faculty at every stage through collaborative documents, shared bibliographic tools, discussion forums, and a Facebook group. They also worked in small groups of students with similar interests that researched specific topics or areas in depth. Research using an adapted COI survey (Arbaugh et al., 2008) at the end of the first year revealed high cognitive presence in the first and second cohorts. On a Likert scale of strongly disagree to strongly agree (1 to 5), the item "Courses and program activities in Year 1 have improved my understanding of research" had a mean and standard deviation of *M=4.69* and *SD=0.60* for the second cohort. Likewise, the item "Year 1 of the EdD program has contributed to my professional growth" was rated positively by the first (*M= 4.31, SD= 1.07*) and second (*M=4.62, SD= 0.62*) cohorts (Kumar et al., 2011; Kumar & Ritzhaupt, 2014). At the doctoral level, students' self-direction, reflection, and effort contribute to cognitive presence almost as much as the design of program activities and scaffolds. Furthermore, the dissertation is a culmination of the process and a product of students' professional and scholarly growth.

The specific goals of an online program that correspond to cognitive presence should be considered in the instructional design, which in the University of Florida EdD EdTech program was students' professional growth and the adoption of a research-based approach as scholars in professional practice. Students were expected to acquire foundational knowledge in educational technology, specialized knowledge in areas relevant to their professional contexts, and the ability to conduct research to address problems of practice (Dawson et al, 2011). They completed dissertations that used research methods appropriate to their research problems and were informed by both graduate school guidelines and the guiding principles formulated by program faculty (Dawson & Kumar, In Press).

Learning presence

Despite strong faculty presence, social presence and cognitive presence can only develop if learners in an online COI have a capacity for self-direction (Garrison, 2003; Jézégou, 2010). Jézégou (2010) argues each learner in the group has to be sufficiently motivated and should be capable of regulating the socio-effective, emotional, and cognitive aspects of interactions in order for a COI to be successful. More recently, Shea and Bidjerano (2010) proposed the extension of the initial three constructs comprising the COI to a fourth construct, "learning presence," which they defined as representing online learner self-regulation, self-efficacy, and attendant effort. They found a positive correlation between learning and cognitive presence (Shea & Bidjerano, 2012), reiterating the importance of learners' self-regulation or planning, acting, monitoring, self-reflecting, and self-assessing (Zimmerman, 2001) in the online environment. In the case of online doctoral students in a professional doctorate that presumes reflection and metacognition for transformational learning, learning presence is essential to students' progress and completion of the doctorate.

As discussed earlier, activities in an online

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doctoral program can be purposefully designed to facilitate student reflection on existing assumptions, prior experiences, and professional goals. In the University of Florida EdD EdTech program, students plan their professional trajectory and in-program and out-of-program experiences, and explore the types of research that would supplement their professional goals. Given the interdisciplinary nature of educational technology and the diverse disciplines in which they work, students are expected to take charge of their professional growth and the opportunities provided by the program. This is largely true of all doctoral endeavors, but in the online environment, scaffolds for reflection and metacognition have to be built into both coursework and dissertation mentoring. Furthermore, the importance of self-direction and self-regulation has to be emphasized to online doctoral students. Data collected in the University of Florida EdD EdTech program revealed that strong faculty presence accompanied by opportunities for the development of social presence is insufficient if students are not willing to engage in dialogue and do not realize the importance of learning presence (Kumar & Dawson, 2012a). Bachelor's and master's programs with mandatory course requirements do not prepare students for doctoral programs where their success depends largely on setting their own goals and deadlines, writing to improve instead of achieve a grade, monitoring their own progress, and reflecting on the research process.

In the University of Florida EdD EdTech program, data collected from earlier cohorts as well as interactions with graduates who recommend strategies for "getting done" help greatly in highlighting the importance of learning presence in the first year of the program. Additionally, the value of building social presence early in the program and the professional community is emphasized. Initial graduates of the program indicated their strategies for self-direction and self-regulation were instrumental in their finishing earlier than others while later graduates praised the program components that guided them to be self-directed and self-regulated as significantly contributing to their completion of the program (Kumar, Johnson, & Hardemon, 2013). Adult professionals enter professional doctorates with prior experiences and preconceptions of online learning from their academic and professional experiences, both formal and informal. In the event they do not know how to be successful online learners, existing literature and advice from previous cohorts can help them adopt strategies for success.

Additional Design Considerations in Online Doctoral programs

Online students' perception of connectedness to the institution in which they are enrolled contributes to their completion of courses and satisfaction with an online program (Cain & Lockee, 2002; Tait & Mills, 2003). Therefore, various forms of support at the institutional, program, and course level are helpful in retaining students and providing a quality experience. Institutions of higher education often offer excellent on-campus student services, but unfortunately seldom create online student services of the same quality except technical support and student orientations for learning management systems. At the doctoral level, students need intensive advising on program

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planning, opportunities similar to those for on-campus doctoral students (e.g., graduate student association activities, awareness of scholarships, and conference travel funds), and access to research resources and ethics processes. While this applies to all online graduate programs, these are crucial at the doctoral level to provide an experience that inculcates scholarly habits of mind, provides exposure to university scholars and critical thinking, and widens students' horizons beyond their immediate context to scholarship in the discipline. Support of this nature can be supplied at the program level to a limited extent but should be part of the overall online learning strategy of an institution for the provision of such services to be sustainable and cost-effective.

The following sections highlight four additional areas that contribute to quality online doctoral program design: information literacy support, preparation and support for the research process, faculty online mentoring competence and responsibilities, and the evaluation and maintenance of program quality.

Information Literacy Support

An important area for online doctoral student support is information literacy, or "the ability to locate, evaluate, and use effectively the needed information" (ALA, 1989, para. 3). Doctoral students' information literacy skills, whether online or face-to-face, are largely overestimated by students as well as their faculty (Green, 2010). Despite being professionals in other fields, doctoral students returning to school after many years might be unfamiliar with library databases and processes for finding scholarly information. In the University of Florida EdD EdTech program, a pre-program survey revealed that entering online doctoral students had high technical and searching abilities but were unfamiliar with the databases in the field, the concept of peer-reviewed literature, citation styles, and bibliographic software (Kumar, Ochoa & Edwards, 2012). Given the importance of finding prior research in their areas of interest, connecting those to practice, and becoming familiar with conversations in the field before framing their own research questions, information literacy instruction for online doctoral students is essential to their success. Low self-efficacy and "library anxiety" (Collins & Veal, 2004, p. 12) can prevent them from finding, evaluating, and using appropriate resources in literature reviews and their dissertations (Onwuegbuzie, 1997).

Higher education librarians use synchronous and asynchronous communication (e.g., chat, email, virtual classroom meetings) and various forms of media such as videos, pathfinders, and written documentation to deliver online information literacy instruction**.** Notwithstanding the value of all types of library instruction (e.g., a standalone session on a specific topic), program-integrated and course-integrated information literacy instruction has been found to be most successful in the University of Florida EdD EdTech program (Kumar & Ochoa, 2012). The integration of information literacy instruction into required coursework in a program following systematic instructional design principles ensures such instruction is not *additional* but *integral* to program curriculum. Furthermore, online students have immediate opportunities to apply the content of library instruction to imminent assignments (Bordonaro & Richardson, 2004). A

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needs assessment of online students' information literacy skills when entering a doctoral program helps to plan the content and format of information literacy instruction that is topically relevant, discipline-specific, and skill-appropriate for that specific group of learners (Kumar, Ochoa, & Edwards, 2012). Notwithstanding the generic research skills needed by all students at the doctoral level, discipline-specific information literacy instruction contributes greatly to their progress and familiarity with accepted scholarship in their field. An instructional design process that designs curriculum based on the gap between students' existing information literacy and target information literacy in the online program can be successful (Higgins, 2010). In this context, collaborations between program faculty and librarians in which librarians assume faculty and social presence in the online program can contribute to student acquisition of information literacy skills and increase self-efficacy (Kumar & Edwards, 2013). A liaison librarian or embedded librarian who specializes in information literacy for a certain discipline can help online doctoral students advance toward degree completion (Macauley & Cavanagh, 2001).

Preparation and Support for the Research Process

All doctoral students struggle to conceptualize research for their dissertation, analyze data, handle criticism of their writing, and stay motivated during the dissertation process. For students who are working professionals, finding time to write and managing work-life balance in the midst of family and work commitments are additional challenges (Burnett, 1999; Kluever, 1997; Kumar, Johnson, & Hardemon, 2013). In the online environment, these challenges are compounded because students have to be familiar with the process, communicate regularly with their mentors online in the absence of course structure, and make progress on their own in the absence of faculty and peers. Research conducted in the University of Florida EdD EdTech program about challenges faced by students revealed research courses that include small projects or the application of methods to problems in students' practice were useful to professional students aiming to conduct research in their practice. Abstract problems in research method courses that did not include active application and the use of current software for analysis led to students in the first cohort perceiving greater difficulties during the dissertation (Kumar & Johnson, 2014). The inclusion of small research projects and online access to SPSS in subsequent cohorts greatly alleviated these problems. On-campus students have access to computers with research software, research faculty, campus writing resources, and campus workshops that, if made available to online doctoral students, can greatly reduce students' frustrations. Knowledge of on-campus resources and processes (e.g., Institutional Review Board, dissertation formatting guidelines) are extremely important to students conducting research and completing dissertations at a distance (Kumar & Johnson, 2014).

Before online doctoral students begin their dissertations, the provision of support in the areas mentioned above helps them build relationships with key campus personnel, processes, and faculty that they can call upon during the dissertation process. Several of these challenges can be overcome if online doctoral students reach out

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and consistently communicate with their faculty mentors, peers, and on-campus personnel when they encounter questions or problems. Online mentoring by faculty mentors and their advice for overcoming process-related challenges played important roles in students' completion of their dissertations in the University of Florida EdD EdTech program. Additionally, students perceived peer support as key to solving many problems faced during the dissertation process (Kumar, Johnson, & Hardemon, 2013).

Faculty Online Mentoring Competence and Responsibilities

In the University of Florida EdD EdTech program, all the faculty members have prior experience in online course design, facilitation, and assessment. Furthermore, they teach and research topics related to multimedia use, technology-enhanced learning environments, and distance education. In other disciplines or in programs where faculty have not taught online before or do not have such expertise, support and professional development in these areas needs to be provided. This is a pressing issue in all online programs in institutions of higher education. However, in an online doctoral program, faculty preparedness for online teaching and mentoring can be crucial to student completion of dissertations and retention in a program. The importance of faculty presence and supervisor-student relationships in the online environment was discussed earlier in this paper. In addition to expertise in the discipline and in research, Schichtel (2010) identified seven competencies that faculty members need to successfully mentor students in the online environment:

1. Online developmental competence to facilitate educational development, professional development, and psychosocial development
2. Social competence to facilitate social presence and overcome online challenges related to distance, time, and lack of social signals
3. Cognitive competence to foster critical analysis and reflective practice
4. Teaching competence
5. Communication competence in various formats and media
6. Managerial competence for the administration and organization of online activities
7. Online technical competence to mentor using relevant virtual environments

The importance of these competencies was reiterated by graduates during research on doctoral mentoring in the University of Florida EdTech EdD program (Kumar, Johnson, & Hardemon, 2013). Online doctoral programs should ensure faculty members possess the above competencies and are supported in their doctoral teaching or advising endeavors. Transitioning to the online environment and working with professional students might be challenging for faculty who are used to working within an apprenticeship model.

Additionally, the time and effort involved in online program development and implementation is challenging for faculty members who have to fulfill their traditional responsibilities of research, teaching, and service plus mentor on-campus doctoral students. In an online doctoral program, all faculty members have to fulfill their teaching responsibilities, but also have to be familiar with existing support structures for online students

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(e.g., information literacy instruction, research support) and be capable of mentoring dissertations at the institution. Our experiences in the University of Florida EdD EdTech program indicated that program leadership by a faculty member who has institutional knowledge, collaborates with administrators, and manages the different types of support ensures consistency and quality in the online program (Kumar, 2014). Nevertheless, regular communication with other faculty, sharing of program procedures and updates at weekly meetings, and agreement on the common goals and standards in a program among all faculty also play a significant role in maintaining program quality and equity in the student experience (Dawson et al., 2011).

Evaluating and Maintaining program quality

Online program quality assurance and maintenance is essential to ensure student satisfaction and the rigor of online learning experiences that might otherwise be questioned. The Sloan Consortium provides institutions with the Quality Matters™ rubric that includes 40 elements synthesized from research on online learning to assess online course quality. Peer reviewers can assess online courses in eight areas: course overview, learning objectives, assessment, learning resources, learner interaction, technology, learner support, and ADA compliance (Moore, 2010). At a program level, the Sloan-C quality framework includes five pillars—learning effectiveness, scale, access, student satisfaction, and faculty satisfaction—along with sample metrics and the Sloan-C quality scorecard that can be used for 360-degree evaluations of online programs (Moore, 2010). In addition to leveraging these excellent resources, an online doctoral program has to define quality based on the theoretical framework and goals that inform its design and collect data from different sources to assure that quality. In the University of Florida EdD EdTech program, systematic research conducted to collect data from each cohort has contributed to changes in program design and the improvement of the program for subsequent cohorts (Kumar, 2014).

Teaching presence, social presence, and cognitive presence have previously been measured using surveys and content analysis of online interactions (Garrison & Arbaugh, 2007). Additionally in the University of Florida EdD EdTech program, the COI survey for online courses (Arbaugh et al., 2008) was adapted to reflect the goals of the online doctoral program and to measure student satisfaction and learning (Kumar & Ritzhaupt, 2014). The collection of qualitative data from doctoral students and analyses of their writing or dissertations are also valuable sources of data in doctoral programs where transformation cannot always be measured using quantitative methods. The impact of professional doctorates where students continue to be embedded in their professional contexts includes increased expertise, skills, reflection, recognition, responsibility, and stature in the workplace (Costley & Stephenson, 2008; Lester & Costley, 2010). Qualitative data collected in the University of Florida EdD Ed Tech program revealed both personal and professional growth for students during their doctoral studies and after they graduated (Kumar & Dawson, 2012b, Kumar & Dawson, In Press). Students applied program content to their professional practice, adopted a more research-based approach,

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participated and embraced leadership roles in the educational technology community, and experienced significant professional advancement (Kumar & Dawson, In Press). Due to the qualitative nature of the data, students were also able to attribute specific impact to courses, activities, and interactions in the doctoral program, making it possible to connect program design to the outcomes. Additionally, an analysis of completed dissertations has provided insight into areas where students need more mentoring or scaffolding during the online doctoral program (Dawson & Kumar, In Press).

Discussion

This article described one approach to designing a quality online doctoral program based on adult learning theory and a leading model of online teaching and learning. The review did not include other models or approaches currently in use in successful online doctoral programs at for-profit and not-for-profit institutions of higher education that can also provide valuable direction. This article is based on the design, implementation, and evaluation of the University of Florida EdD EdTech that is a professional doctorate requiring online coursework and a dissertation. Educational technology is an interdisciplinary field with a demand for educational technology leaders in various educational environments. Therefore, the online doctorate was conceptualized to encompass theory, research, and practice to achieve transformational learning. Other disciplines that aim for outcomes not practice-oriented will need to adapt this design and consider other factors that could make their online doctoral programs successful. Furthermore, doctoral students choosing an online degree in educational technology might be more technology-friendly and familiar with virtual interactions than students in other disciplines, making it imperative that those designing online doctoral programs in other disciplines include technical support and orientations to online learning for both students and faculty.

Despite the above limitations, the description and discussion of faculty presence, social presence, cognitive presence, and learning presence in online doctoral environments in this article can serve as a starting point for online doctoral program design in all disciplines. Likewise, the provision of information literacy support, preparation for the research process, faculty competence and responsibilities, and the evaluation and maintenance of program quality are design considerations that apply to all online doctoral programs in some measure or the other. Figure 1 summarizes the different aspects of online doctoral program design described in this article. Students engage in a community of inquiry facilitated by faculty presence, social presence, cognitive presence, and learning presence to connect theory, research, and practice with implications for their personal growth, professional contexts, and discipline.

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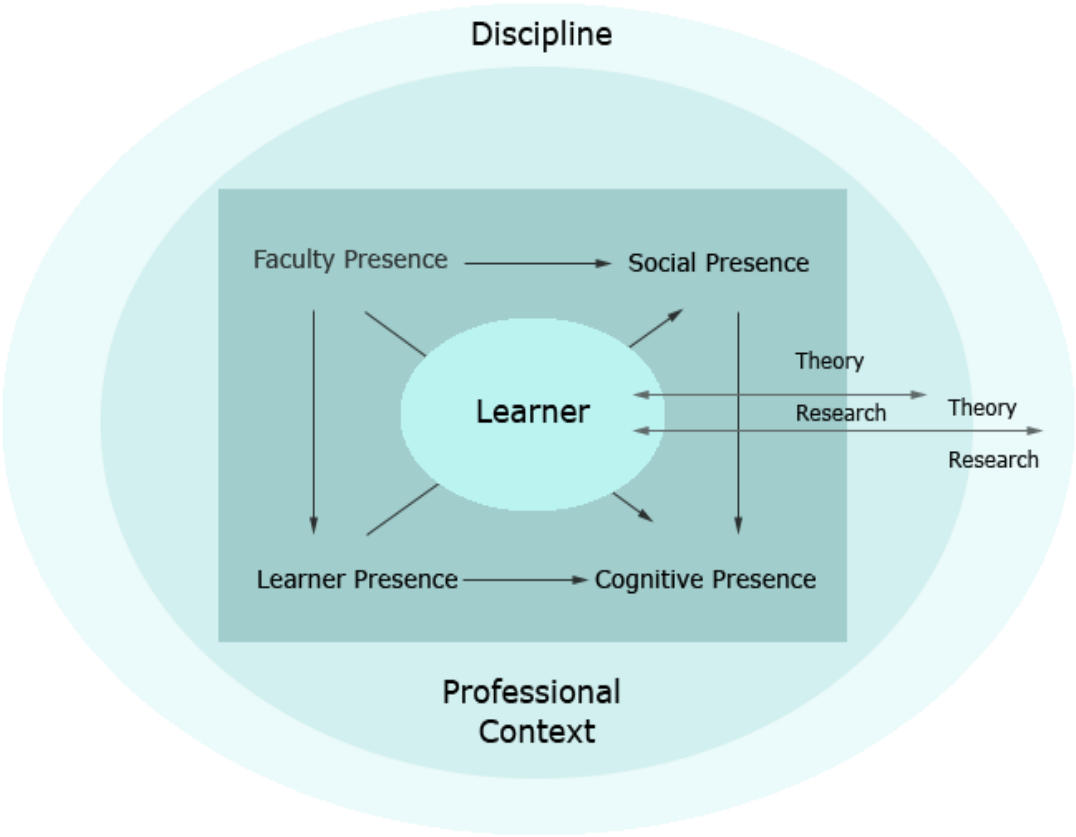
Figure 1. Online doctoral program design



Institutional history and culture, the epistemology and signature pedagogy of the discipline, existing faculty expertise, and the availability of infrastructure and support structures will also play a role in the conceptualization of other online doctoral programs. Regardless of the goals of an online doctoral program, articulation and communication of those goals can be instrumental in recruiting adults whose professional goals mirror those of the program. For example, University of Florida EdTech EdD articles written about the program are provided to prospective students so they might understand program expectations and intended outcomes, and make informed decisions about how their doctoral aims align with program goals. In this regard, documenting program outcomes, the impact of a doctoral program on graduates' practice, and graduates' achievements that can be attributed to the program (Kumar & Dawson, In Press) can also help to document program quality and to recruit prospective students. The impact of the University of Florida EdD EdTech was substantial for the personal and professional growth of students within one year of their beginning the program, and their dissertations led to personal transformation as well as new initiatives in their professional contexts (Kumar & Dawson, 2012b; Kumar & Dawson, In Press). The documentation of such impact as well as the systematic collection of data during an online program is invaluable to

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maintain program quality and to communicate the rigor and quality of a program to administrators and prospective students.

Conclusion

Faculty, administrators, and departments in several institutions of higher education are currently grappling with the design, development, implementation, and assessment of online doctoral programs. The opportunities presented by communication technologies, social media, and mobile devices can be combined with existing research in doctoral education, online teaching and learning, and adult learning to design rigorous online doctoral experiences for the large number of working professionals interested in doctoral studies. Scholarship that reports and discusses design and implementation experiences in online doctoral programs, new doctoral models in response to trends in specific disciplines, and assessments of program quality can build a knowledge base that will be useful to those engaged in the development of new online doctoral programs or the quality assessment of existing online doctoral programs.

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