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# Design, Development, Implementation, and Support (DDIS): Supporting Online Doctoral Candidates

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## Abstract

This paper describes a protocol for an effective response to nontraditional online doctoral candidates based on the development of advanced cognitive processes, academic writing skills, and functional knowledge. The Design, Development, Implementation, and Support (DDIS) protocol is a three-phase protocol that integrates the requisite skills, concepts, and expertise with mentor and candidate response, interactions, technologies, projects, and assessment procedures. The protocol is based on constructivist, sociocultural, and problem-based learning models. The protocol defines productive asynchronous and synchronous interactions that develop the cognitive processes, skills, and knowledge needed to complete the dissertation process. The protocol includes support templates and technologies to facilitate the work of online doctoral candidates. The protocol provides guidelines for supporting and empowering online nontraditional doctoral students to promote the graduation of these students and reduce attrition rates.

## Introduction

The purpose of this paper is to describe and justify a protocol for the design, development, implementation, and support of nontraditional online doctoral students. As more nontraditional students earn doctoral degrees online, there is a need to define the guidelines for supporting these students as they respond to the conventional procedures for designing, developing, and implementing research and obtaining a doctoral degree. Nontraditional students account for more than 71% of students enrolled in all of higher education (NCES, 2016). In the for-profit sector alone, nontraditional students account for an average of 78% of those enrolled (Arbeit & Horn, 2017). Nontraditional students are over 25 years old, attend school part-time, work full-time, may be a veteran, have children, or be a first-generation student (NODA, 2017).

Unlike traditional doctoral programs that require students to devote full-time study to their degree programs and to participate in teaching and research apprenticeships, nontraditional doctoral programs include working professionals that cannot study full-time in person or on campus (Archbald, 2011). Offerman (2011) found that the nontraditional online doctoral student is likely to be a married woman with children and a career who is studying part-time and is funding her education either through her current income or by borrowing. Programs supporting these diverse online students need to be similarly unique and responsive to meet the nontraditional student's needs.

Research has found that there are specific issues for these students culturally and academically that results in the student leaving the doctoral program. Protivnak and Foss (2009), in a study of doctoral counseling students, identified the personal issues, the department's culture, and problems with the mentoring process and support were difficulties for these students. Hoskins and Goldberg (2005) found that a lack of student connection with the doctoral faculty members as a major challenge for doctoral students. Erichsen, Bolliger, and Halupa (2014) identified the lack of positive relationships with mentors was a difficulty for online doctoral students. As a result, of the identification of the needs of these online learners in doctoral programs, there is a need to define the type and quality of support and interactions that will benefit these nontraditional students.

The online dissertation process is conceptualized in the Design, Development, Implementation and Support

(DDIS) protocol as an open-ended problem space. In this space the mentees are tasked with the design, the development, and the implementation of their doctoral study. They are further required to align and justify all the design, development, and implementation procedures for their research based on the assessment parameters established by the university and school.

Finally, they must evaluate the efficacy of all decisions before, during, and after their study is implemented based on ethical guidelines established by the Institutional Review Board (IRB) of the university. Navigating these requirements and ensuring the development of the requisite skills can be a complex challenge for both doctoral candidates and guiding faculty. The DDIS protocol defines this open-ended problem space into three phases, Design, Development, and Implementation, with the Support strategies that are central to all three phases.

### **Design, Development, Implementation, and Support (DDIS) Protocol**

The design of the DDIS protocol is based on theories of learning and andragogical as well as heutagogical design parameters. Anderson (2008) argued that taking a theoretical perspective on online design and practice enables the practitioner to gain a broader perspective that permits the development of techniques and approaches that can be transferred from one context to another. The DDIS protocol is based on constructivist, sociocultural, and problem-based learning procedures.

### **Constructivist Philosophy of Learning**

The doctoral learning environment is inherently constructivist (Bruner, 1990; Wilson, 1996) and must be purposefully designed to develop advanced critical thinking processes (Mezirow, 1990). Research of constructivist learning environments suggests that instructional design grounded in constructivist principles engages students in purposeful activity as the students attempt to respond to a complex problem (von Glasersfeld, 1998). Also, instructional design based on constructivist learning principles allows students to apply their knowledge more effectively under appropriate conditions supporting the efficient development of the required skills and knowledge (Brown, Collins, & Duguid, 1989).

### **Sociocultural Learning Theory**

The DDIS protocol design is also informed by sociocultural learning theory (Vygotsky, 1978). Sociocultural learning theory focuses on the principles of inter and intrapersonal dynamics, the scaffolding of learning, and the interactions with a more knowledgeable other to develop the learner's zone of proximal development. The intent is to create a learning environment that leverages a learner's zone of proximal development to foster the advanced cognitive abilities, requisite skills, and content knowledge needed for doctoral success (Russell, 2008). Research has shown that learners can develop higher levels of awareness and knowledge as a result of their dialog and interactions in an online environment (Russell, 2005a). In this case, both the asynchronous and synchronous interactions are designed to develop the types and qualities of learning needed for online doctoral students to be successful in the design, development, and implementation of their research.

### **Heutagogy**

Heutagogy has relevance when considering how doctoral candidates are supported during the design, development, and implementation of their dissertation study. Heutagogy is a set of beliefs that considers the learner to be independent, and self-motivated (Blaschke, L. M. (2012). Heutagogy is based on the premises of pedagogy, the methods and practice of teaching, and andragogy, the methods and practice of adult learning. Heutagogy is focused on the development of advanced knowledge in an increasingly complex world. Currently, heutagogy has been explicitly used as a design model for adult learning in online environments. The primary consideration in this protocol is the focus on independent work designed to develop advanced knowledge and abilities. The engagement of the learners in each phase of this protocol is critical to developing individualized levels of engagement and productivity (Narayan, Herrington, & Cochrane, 2019). In this protocol, heutagogy is a design consideration of how the integration of online technologies and forums can support the development of individual cognitive processes, learning outcomes, and projects necessary for online doctoral candidates to be successful graduates. This design consideration is included in the problem-based learning design model at the core of the DDIS.

## **Problem-Based Learning Design**

Doctoral candidates are required to develop advanced problem-solving capabilities (Savery & Duffy, 1996) as they generate ideas and responsive research designs based on the parameters of their study (Jonassen, 2000; Russell, 2005a). As a result, the DDIS protocol is designed around the principles of problem-based learning. Problem-based learning (PBL) is a model for developing advanced cognitive processes, knowledge, and skills as learners respond to a complex, open-ended problem space (Russell, 2005b). Examples of cognitive processes embedded in a PBL design include (a) confronting ill-structuredness and novelty, (b) active search for information, (c) proactive immersion in task, (d) conscious and subconscious investment of time on task, (e) motivation to solve the problem, (f) need for meaning and explanation, (g) a learning goal orientation, and (h) a requirement of generative thinking, analytical thinking, divergent thinking and synthesis (Tan, 2003).

The three-phase design of the DDIS protocol is based on the development of these advanced cognitive processes, the knowledge, and the skills required for the success of online doctoral students. These cognitive theories emphasize how the design of the learning environment impacts the cognitive development of learners through dialogic processes. The problem-space for online learners is the design problem of designing, developing, and implementing a research study with the ability to write the proposal and final dissertation. The DDIS protocol is designed to provide opportunities for online doctoral students to complete their dissertation process by emphasizing their responses as problem-based learning.

Each phase of the protocol addresses learning outcomes, interactions, integration of technologies, projects, and the assessments of the projects. The inclusion of technologies is designed to support the development of both the skills and knowledge required for the creation of the project. The meetings and collaborations are intended to provide both the concepts and personal attributes needed to complete each phase (Russell, 2016).

### **Design Phase**

The first phase of the protocol is the design phase. It is during this phase that the mentor and mentee design a viable study and develop the initial overview document required by the university. The focus of this phase of the protocol is to develop the types and qualities of cognitive processes, skills, and knowledge through synchronous and asynchronous interactions that provide opportunities for the mentee to oversee the design of their study (Russell, 2008). The design phase focuses on the development of the initial research plan. This project focuses the candidate and mentor on the design of their study and the alignment with the core concepts required in the assessment rubric including identification of the (a) problem; (b) topic; (c) conceptual framework; (d) significance; (e) gap; (f); core studies to define the problem space, and; (g) methodologies and methods.

The mentee participates in these meetings, identifies the design parameters of the proposed study, and completes the project, including university approval of the study design. The mentor provides support and recommends appropriate resources and technologies, including writing support, Grammarly, and search procedures. The project created by the candidates is the approved research plan. The assessments include a rubric used by mentor and committee members to evaluate the research plan and a checklist of weekly activities to help keep the mentee on track.

**Interactions.** During this phase, the mentor engages in weekly design meetings and provides design templates for the mentee. The purpose of the design phase interactions is to allow the mentee to design their study's overview principles with the support of the mentor's expertise. The mentor and mentee have a series of weekly design meetings that are conducted live via web conferencing or phone calls. Web conferences are preferable as this medium allows mentor and mentee to share their screens and actively review and revise a document. This active collaboration experience is an effective and efficient way to proceed through the design meetings and contributes to the mentor and mentee, developing a shared vision and lays the groundwork for their collaboration throughout the doctoral process.

During the Design phase, the mentor engages in live dialogs to engage the mentee's expertise and concepts to design their study. The design meeting the mentor asks:

1. What is your area of expertise?
2. What are the issues or problems occurring in this field?
3. What are you interested in understanding about this problem?
4. What would be a context for studying this problem?
5. What are the questions you would like to understand?
6. How do you perceive your interactions in the field to respond to these questions?
7. What are the ideas inherent in this concept that are important to understand to respond to these questions?

The purpose of these questions is to draw out ideas about the potential study. These meetings are a chance to define the problem space (Russell, 2004). When the problem space is defined, the mentor and mentee can develop their research plan. This is an opportunity to ensure the mentee can conceptualize the study as it might occur in the field. This means that the mentee changes the way he/she conceptualizes his/her role as an unbiased observer and not a practitioner. These discussions are essential to moving the mentee toward an orientation toward the process of research.

### **Development Phase**

The development phase encompasses all procedures associated with preparing the proposal, constructing the Institutional Review Board (IRB) application, and the defense of the proposal presentation. The outcomes associated with this phase include the ability to (a) communicate coherently and concisely based on academic writing style; (b) justify proposed study-based concepts, including the alignment of problem, gap and significance; and (c) synthesize ethical issues into a viable study.

During this phase, where writing up the proposal chapters is the primary focus, the mentor provides ongoing feedback to the writing process with the emphasis on mentees submitting weekly documents for review, with a promised turnaround of a few days. Requiring these documents before meeting allows the mentee to gauge the mentee's writing progress, prepare feedback and guidance, and anticipate a schedule for completion in consultation with the mentee. Discussions with mentees expand to encompass their writing process, including where they write and when and their reading practices, including progress and ideas. These interactions are designed to develop mentee self-efficacy (Bandura, 1993; Dunlap, 2006) as they complete the very challenging task of developing their academic voice as they write their proposal.

**Interactions.** During the development phase, interactions include either weekly meetings or ad hoc meetings with the mentee. During this phase, the mentee is writing chapters 1, 2, and 3 of their dissertation. Mentors and mentees agree on a meeting schedule and times with a goal towards matching mentee writing style, availability, and comfort levels for this process. This collaborative planning approach helps to develop the rapport necessary to help foster advanced problem-based skills required at this level, such as critical analysis (Russell, 2009).

During live meetings, the mentor and mentee discuss the topics and subtopics chapter 2 as the mentee defines the critical topics to understand this research topic. The questions asked during this development phase include:

1. What are the ideas that you think influence the activities of participants in this research context? Why?
2. How do the interactions in this context influence the topic of the study? Why?
3. What are the factors outside of the ideas and interactions that influence the context? Why?

In response to these questions, the mentee and mentor can develop the topics to understand and to respond to the research questions.

Often it is necessary to provide mentees with suggestions for resources and technology support as they work on their literature searches and write up their proposal. During this phase, technologies for supporting online doctoral students include online data management tools, writing technologies, citation management apps, and APA formatting technologies. In each case, actively demonstrating the technology online in video conferencing meetings and providing support helps mentees to understand how to navigate the new tool and to see its potential.

**Ethical Review.** Another important focus during the development phase is discussing the ethical review of their study, as purposefulness of ethical review is a significant aspect of preparing their proposal. It helps mentees to have an understanding of why and how ethical reviews are conducted by the university/institution. This discussion of the implementation procedures generally includes defining (a) recruitment; (b) sampling; (c) gaining informed consent; (d) secure data collection; (e) de-identification of participants; (f) protecting the confidentiality of the site; (g) secure data analysis procedures; (h) secure data storage procedures and; (i) secure data destruction.

At this time, to further clarify each ethical aspect of the implementation of the proposed study, it can help to develop a table for interactions and data security procedures. I use standard guidelines for IRB to the mentee to use to create a schedule of the study. In these discussions, the mentee and I discuss the recruitment procedures, the participants, the details of data collection, and how to gain IRB approval. The mentee is building decision-making skills and problem-solving skills throughout this phase (Russell, 2016).

### **Implementation Phase**

The final phase of the DDIS protocol is the implementation of the study and writing the dissertation. The projects completed are the dissertation report and the dissertation presentation. During this phase, the interactions are guided by the critical times needed for feedback and ensuring timely response to essential research implementation issues, analysis, and interpretation questions. Anticipated questions and potential guidance can emerge (a) during the recruitment phase, to track the schedule of recruitment; (b) pre and post interviews, to answer questions about the interview process; (c) preparing for data analysis, discussion of analysis strategies and using an online data management system preferably available to both mentee and mentor for shared review; (d) recording findings during implementation; and (e) anticipating writing of chapter 4 by drafting key sections throughout the implementation of the study.

**Interactions.** When an online doctoral candidate is in the field implementing his or her study, interactions, even if a brief phone call, are essential to ensure that the study is implemented ethically and promptly. Early on, providing adequate data sources and, in qualitative research, effective participant recruitment can be particularly important. During the writing of chapters 4 and 5, weekly reviews of writing using live web conferencing can prove particularly useful to ensure that these chapters are completed in a timely manner.

In the live meetings during this phase, the mentee and mentor discuss the progress of each step of the study. It is important to provide timely live support, web conferencing, phone calls, or texts, to ensure that the mentee is moving forward in their study. Also, consider the IRB approval throughout the implementation. Questions asked during this time include:

1. How is the recruitment process proceeding?

Before the first interview:

1. Can you practice the interview?
2. Do you have all the equipment needed for the interview?
3. Have you tested it?

During Data Structuring

1. How is transcription going?
2. What are your initial codes? Why?
3. What are your patterns? Why?
4. Are you memoing? What are the topics of your memos?

During the implementation of the study, mentees can memo and write up the narratives of their study's progress using the writing template.

During this phase, the technologies support the recruitment process. The use of social media to recruit online,

the development of online surveys with recruitment panels, transcription apps, online data management programs, and advanced writing editors such as Grammarly are used to facilitate the implementation, the data structuring, and the write up of the data analysis and findings.

## **Support**

The final aspect of this protocol is the supporting tools for the mentee. The purpose of the support aspect of this protocol is to identify and integrate guided access to the most useful resources and technologies to support the mentee during each phase. In the case of online doctoral students, the integration of online technologies to support recruitment, transcription, writing, data collection, and data management technologies can make a critical difference in the ability of the mentee to complete their study promptly. Rogers' (1995) concept of inclusion of technologies describes the attributes that technologies must have, including usability, functionality, dependability, and accessibility. In reviewing and recommending technologies, the critical criteria include:

1. Will this technology be approved by committee members, additional institutional reviews, IRB (usability/dependability)?
2. Does the technology provide the type and quality of results that support the mentee's research design (functionality)?
3. What is the cost of this technology to the mentee and the review features for mentor and committee members (accessibility)?

The focus on the integration of technologies includes identifying online recruitment resources such as Qualtrics Panels, SurveyMonkey Audience, and Userinterviews.com. There are new technologies for data collection online, such as VOIP. There are new technologies available to aid in transcription, including apps for the phone that record and transcribe. Also, the use of data structuring programs such as Dedoose, available for a small monthly fee, and NVivo for qualitative studies. Finally, there are multiple tools for developing academic writing abilities needed for writing their proposal and final dissertation report.

Additionally, DDIS includes several templates as guidelines for writing. These templates serve to break apart the proposal and dissertation into sections with guided instructions so the mentee sees both the whole process but also the sections with guided instructions. The templates are based on the university guidelines for dissertations and the assessment model for the university. As a result of multiple interactions, the mentee can create an outline of each chapter with the sections' main topics included under each heading. The writing guide means that the mentee can conceptualize the dissertation process as a series of definitive activities that build to the final project, the completed dissertation report.

Below in Table 1 is a schedule for the DDIS protocol. It includes (a) learning outcomes; (b) mentor activities; (c) mentee activities; (d) assessments; and (e) the projects that end each phase. The DDIS protocol is designed as a guide for mentor and mentee engagement to develop the advanced cognitive process, the conceptual knowledge, and the academic skills needed for the successful graduation of nontraditional online doctoral students.

**Table 1***DDIS Protocol*

<b>Outcomes</b>	<b>Mentor Activities</b>	<b>Mentee Activities</b>	<b>Assessment</b>	<b>Projects</b>
PHASE 1: DESIGN				
<ul style="list-style-type: none"> <li>• Design an actionable research study plan.</li> <li>• Communicate coherently and concisely based on academic writing style.</li> <li>• Justify design based on concepts, problem, gap significance.</li> <li>• Evaluate ethical issues</li> </ul>	Weekly Design Meetings Support for Design Template	Participate in design meetings Identify Design Parameters Complete Design Template	Rubric for study plan Checklist of Weekly Activities	Prospectus
PHASE 2: DEVELOPMENT				
<ul style="list-style-type: none"> <li>• Develop an actionable research proposal.</li> <li>• Communicate coherently and concisely based on academic writing style.</li> <li>• Justify the proposed study based on theoretical concepts, the problem, the gap, and the significance issues.</li> <li>• Synthesis of the ethical issues into a viable study.</li> </ul>	Weekly or ad hoc development meetings Support for Development Template - annotated outline for chapters 1,2,3	Participate in development meetings Write chapters 1,2,3 Write IRB	Weekly or ad hoc web conferences Weekly review of writing and revision	Proposal- Chapters 1, 2, 3 IRB application Defense PPT
PHASE 3: IMPLEMENTATION				
<ul style="list-style-type: none"> <li>• Complete research proposal.</li> <li>• Communicate coherently and concisely based on academic writing style.</li> <li>• Justify the proposed study based on theoretical concepts, the problem, the gap, and the significance issues.</li> <li>• Analysis of data using deductive and inductive logic.</li> <li>• Synthesis of ethical issues to justify study procedures.</li> </ul>	Weekly or ad hoc implementation of study meetings Support for the template for Chapters 4 and 5 Support for study implementation	Participate in weekly or ad hoc meetings Implement the study Write Chapters 4 and 5	Weekly or ad hoc web conferences Weekly review of study progress, review data using an online data management tool	Dissertation Report Defense of Dissertation

**Conclusion**

Online nontraditional doctoral students are unique and diverse, and online doctoral programs should be similarly varied and responsive. While the end product of a practical design, implementation, and write up of a viable research study is the same, nontraditional online doctoral students need different levels and quality of support to be able to create, engage, problem-solve, and synthesize. The DDIS protocol offers doctoral candidates a framework that supports their ability to succeed in designing, developing and implementing a research study.

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