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Grounding Design of Instruction: An exploration of the uses of Scientific-Based Research and Theory in the Design of Online Instruction by Faculty in Higher Education

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GROUNDING DESIGN OF INSTRUCTION: AN EXPLORATION OF THE USES OF SCIENTIFIC-BASED RESEARCH AND THEORY IN THE DESIGN OF ONLINE INSTRUCTION BY FACULTY IN HIGHER EDUCATION

by

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ABSTRACT

This study was conducted to explore the processes educators in higher education used to ground their design of online instruction using scientific-based research and theory. Literature reviewed suggested reasons educators fail to ground the design of instruction were a lack of formal training in instructional methods, skills, support, and research understanding. The rationale for the study was to (a) increase understanding of how educators use scientific research and theory as a basis in decision-making during design and creation of online instruction, (b) identify best practices, and (c) add to the conversation in the instructional design field.

A qualitative case study research design was utilized to interview, review course, and review documents of four participants to capture their viewpoints as to the (a) meaning of; (b) evidence; (c) step by step processes; and (d) problems associated with the processes of grounding the design of online instruction in scientific-based research and theory. Data obtained were analyzed through detailed case description, direct interpretation, cross-case analysis, pattern establishment, and naturalistic generalization. Pedagogy, instructional design, instructional technology, support, and problems emerged as key thematic issues.

Findings suggested that although educators were consistent in defining meaning, followed step-by-step processes, and had evidence to support their decisions, they encountered logistical challenges of time, technology and design in the process of using scientific-based research and theory to ground the design of online instruction. The implications for practice from this research were similar to recommendations of other

researchers. For this process to be smoother, regular training, peer professional interactions, and support must be present.

Special dedication in memory of my late parents, Kirwa & Evalyne Koech,

who understood the meaning and the importance of education

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LIST OF ACRONYMS/ABBREVIATIONS

ADDIE: Analyze, Design, Develop, Implement, and Evaluate.

CDL: Center for Distributed learning at University of Central Florida.

DE: Distance Education

EHS: Educational and Human Sciences.

FCTL: Faculty Center for Teaching and Learning at University of Central Florida.

ID: Instructional Design.

IDL: Interactive Distributive Learning.

IRB: Institutional Review Board.

ISD: Instructional System Design.

IST: Instructional System Technology.

ISTE: International Society for Technology in Education.

LMS: Learning Management System.

OIR: Office of Instructional Resources at University of Central Florida.

SOTL: Scholarship of Teaching and Learning

STLL: School of Teaching Learning and Leadership.

UCF: University of Central Florida.

QM: Quality Matter Rubric.

CHAPTER 1
THE PROBLEM AND ITS CLARIFYING COMPONENTS

Introduction

This study was conducted to explore the decision processes through which faculty educators in higher education grounded their design of online instruction using scientific-based research and theory. This chapter introduces the study background, problem statement, and purpose of the study, research questions and the rationale for research questions. Also addressed are the study design and significance of the study, assumptions, limitations, conceptual framework, qualitative worldview lens, and the definition of terms.

Study Background

Literature in the instructional design field has highlighted the need for faculty educators to ground the design of instruction based on scientific-based research and theories. Authors such as Dick, Carey, & Carey (2005) have stressed that successful learning requires the process where all components of learning, e.g., teachers, learners, instructional material, and learning environment, are taken into consideration in the creation of instructional materials. Other authors have expressed that research for grounding design of instruction includes best practices, achievement of success, and understanding of theory to help mediate deficiency of the instructional design process (Evans, 2009; Winn, 1997). Some authors have also defined grounding design of instruction as the need to allow for a better design of instruction, better informed

educators, and better informed teaching practices (Lowry, 2010; Morphew, 2012; Stanovich & Stanovich, 2003).

Some researchers and authors have viewed and defined instructional design (ID) as a systematic, goal-oriented, and relational approach to the process of planning, designing and production of educational instruction (Dick, Carey, & Carey, 2005; Elen, 1993; McKenney & Reeves, 2012; Pieters & Bergman, 1995). Other authors in the research community have considered the grounding design of instruction as a systematic process of incorporating the findings from reputable, peer-reviewed findings from scientific-based research and theory to inform educators' practices (Gunter, Kenny, & Vick, 2008; Kim & Hannafin, 2007; Morphew, 2012; Stanovich & Stanovich, 2003).

Grounding the design of online instruction is defined as involving the uses of processes and procedures rooted in established theory and research in human learning (Hannafin et al., 1997;Kim & Hannafin, 2007). It requires the location and use of reputable peer and editorially reviewed research to inform teaching practice (Morphew, 2012). Design of instruction is essentially based on scientific research and theory (Hirumi, 2002; Stanovich & Stanovich, 2003). Some of the specific grounding areas suggested have been: psychological, pedagogical, technological, cultural, and pragmatic (Hannafin, Hannafin, Land, & Oliver, 1997; Kim & Hannafin, 2007). Pedagogical content knowledge, proper design of effective tools and support resources, well-designed and tested online tools are other areas suggested being grounded (Downing & Holtz, 2008; Kinshuk & Jeffrey, 2007; Wright, 2010).

This study therefore addressed the processes through which faculty educators in a higher education environment designed instruction informed by scientific-based research and theory. The researcher looked into definitions of grounded design along with the evidence, processes, and the causes of failures associated with the processes. The grounded practice and design framework (Hannafin, Hannafin, Land, & Oliver, 1997; Wang & Hannafin, 2005) contributed to the background of the study by defining the essentials of grounding, the criteria for grounding, and illuminating how grounding practices can be achieved.

Problem Statement

Various reasons have been documented for failure of faculty educators to ground their design of online instruction using scientific-based research and theory such as: (a) lack of formal or inadequate training in instructional methods (Hirumi, 2002; Lowry, 2010; Stuart, Tondora, & Hodge, 2005; Theall, 1999); (b) lack of knowledge, skills, awareness, and understanding (De Miranda, 2004; Gardiner, 1998; Lowry, 2010; Reeves, 2000); (c) lack of resources such as validation, support of conducive conditions, positive rewards, and time (De Miranda, 2004; Hill & Hannafin, 2001; Hirumi, 2002; Theall, 1999); (d) lack of active participation and engagement in research (Hahs-Vaughn & Yanowitz, 2009; Polly, 2010; Wyatt, 2011); (e) frustrating experiences, poor quality of published materials, insufficient and confusing guidance (Kinshuk & Jeffrey, 2007; Reeves, 2000), (f) unique design problems, lack of consideration of design elements, diverse characteristic of learners, mismatched frameworks and methods, and difficulty of

the task (Ehrhardt, 2010; Hannafin et al., 1997; Morrison & Ross, 2007; So, Lim, & Yeo, 2010; Stavredes, 2011); (g) traditions, ungrounded intuitive beliefs, improper epistemological beliefs, influence of academic discipline, and other beliefs (Gardiner, 1998; Stuart et al., 2004; Theall, 1999); (h) difficulty of obtaining consensus from all stakeholders, relationship management between stakeholders and political mode of settling disputes (Solomonson, 2008; Stanovich & Stanovich, 2003; Thormann & Zimmerman, 2012).

The grounded practice and design framework contributed to the problem statement by informing the research study. It assisted the researcher in defining the meaning of grounded practice and design, laying conditions criteria for evaluating the evidence of grounding design of online instructions and specifying foundational root areas in the field through which grounding design can be achieved in practice. This assisted the researcher in narrowing the literature review topics for the study.

The Purpose of the Study

The purpose of this study was to investigate the processes through which faculty educators in a higher education environment used science, research and theory as the bases for decision in designing their online instruction. The rationale for conducting the study was to: (a) add to the conversation in instructional design field by exploring how faculty designed not only online instruction but also other instruction in general, as well as address the paucity of research in the study area as noted by De Miranda (2004); (b) contribute to the research area and identify best practices from the literature and practice

as exemplified in suggestions, views, and perceptions obtained from participant interviews, review of online course, and review of documents of participants' online courses as well as best practices from scholarly literature; (c) address the need for increased understanding as to how faculty educators in a higher education environment grounded their design of online instruction based on scientific-based research and theory by determining how participants incorporated empirical evidence into the design, planning, and production of online instruction.

The grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) underlay the purpose of the study by guiding the the study in addressing processes of grounding, creation of conversations in the field, addressing the paucity of research, and identifying best practices from literature and practice. The literature underscored the importance of uses of empirical evidence from peer-reviewed research and theory on the planning, design, production, implementation, and evaluation of online instruction (Halonen, Dunn, McCarthy, & Baker, 2012; Lajbcygier & Spratt, 2009; Mehrotra & McGahey, 2012).

Research Questions

The following four research questions were designed to collect the views, beliefs, perceptions, experience and the background information of the participants in regard to the processes of grounding design of online instruction using scientific-based research and theory in higher education settings. The specific research questions were:

1. What does it mean for a faculty educator to ground the design of online instruction using scientific-based research and theory?
2. What evidence do faculty provide to demonstrate that their designs of online instruction are grounded in the elements of scientific-based research and theory?
3. What steps do faculty take in order to ground their design of online instruction using scientific-based research and theory?
4. What are the main causes that may prevent faculty from grounding the design of online instruction in scientific-based research and theory?

The grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) informed the research questions by providing four criteria for defining what grounding is as well as providing a connection on which research questions were anchored. Because the research questions on this study focused on the definitions, evidences, process and the causes of failures of grounding, the grounded practice and design framework informed and contributed to the research questions by defining the meaning of what grounded design practices are, providing criteria of grounding the design of instruction. Grounded design practice must (a) be based on a defensible theoretical framework, (b) reflect a close link between empirically verified approaches and those employed in a given learning system, (c) be generalizable so they can be applied more broadly, and (d) be validated iteratively through successful implementations (Hannafin et al., 1997). It was hoped that anchoring the research questions on the criteria from the grounded practice and design framework would guide the researcher in

identifying evidence of grounding practices, pinpoint the causes of problems associated with lack of grounding, and provide processes through which alignment between theory and practice can be achieved.

Rationale for Research Questions

The following provide a rationale for research questions: (a) open-ended, evolving, non-directional questions to elicit views, perspectives and beliefs from the participants; (b) central phenomenon and identification of subtopics for examinations and (c) the use of rich descriptions and identification of exploratory themes or categories in data analysis. These rationales were arrived at based on the grounded and design practice framework, which informed the research rationale by allowing the researcher to incorporate grounded design practices, constructivism and qualitative research methods in the study. As noted in qualitative literature, there are four different types of research questions used in a qualitative design research such as: exploratory, explanatory, descriptive, and emancipatory and according to Creswell (2007, 2009, 2014). These qualitative type questions should be open-ended, evolving, non-directional, few in number (five to seven), posed in various forms, and should start with "what" and "how" instead of "why" (p. 107). The research design approach implemented on this study as recommended by Creswell calls for the reduction of a study research question to a single "overarching" question and several sub-questions (Creswell, 2007, p. 108).

In addition, the researcher also implemented a qualitative research model for conceptualizing sub-questions using "issue questions" which address major concerns and

perplexities to be resolved. The qualitative approach takes the central phenomenon and identifies subtopics for examination, utilizing "topical questions" also called "procedural sub-questions" to mirror the procedures intended for one of the five approaches to qualitative research inquiry addressed by Creswell (2007, p. 110; 2009; 2014). The case study design implemented on this study allowed the researcher to focus the research on the activity of how faculty educators in higher education setting grounds their design of online instructions informed by scientific-based research and theory. Case study design enabled the researcher to collect rich data description and the identification of exploratory themes or categories (Hancock & Algozzine, 2006), as well as answer the how and why using in-depth collected interview description data (Yin, 2011).

Because this case study sought to look into the decision process through which faculty educators in higher educational settings ground their design of online instruction based on scientific-based research and theory, the grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) informed the research questions rationale by allowing the researcher to interwoven the three strands of threads of grounded practice and design constructivism and qualitative research methods based on the following: (a) the use of open-ended, evolving, non-directional, and few in number questions to solicit views and perspectives from participants,; (b) the use of central phenomenon and identifications of subtopics for examinations; and (c) the use of rich descriptions and identification of exploratory themes or categories in data analysis.

Study Design

The design chosen for this study was a case study design with qualitative approach. The case study design was chosen because of: (a) the underlying framework of grounded practice and design and the need for research to explore a clear, identifiable case of how faculty in higher education settings grounds the design of online instruction based on scientific-based research and theory, (b) the need to provide an in-depth understanding and description of each individual faculty case, (c) need to answer how and why questions related to the design process of the faculty, and (d) need to describe the phenomena being studied based on the recommendations from literature researchers (Burton & Bartlett, 2009; Creswell, 2007; Gall, Gall, & Borg, 2009; Hancock & Algozzine, 2006; Yin, 2011).

The case study approach design was used to collect, analyze and describe in-depth how faculty educators grounding the design of online instruction using scientific-based research and theory. Criterion sampling (Creswell, 2012) was used to identify and select participants for the study according to established criteria. This case study was undertaken to elicit views, perspectives and beliefs on: (a) examination of grounding the design of online instructions in theory and scientific-based research; (b) empirical evidence of planning, design, and production of online instruction; (c) the creation of a conversation in the field of instructional design; (d) best practices of grounding the design of online instruction by faculty in higher learning settings (UCF, n.d.)

Several forms of data such as direct interviews, online course and document review were gathered to capture the participant's position from different viewpoint and to

increase research validity (Burton & Bartlett, 2009; Creswell, 2007), such as direct interviews, review of online course, and review of document. Five stages of case analysis in collected data were performed as suggested by Creswell (2007, 2009, 2014) as follows: the researcher performed detailed case description, direct interpretation, cross-case analysis, pattern establishment and naturalistic generalization. In reporting the cases, the researcher strived to convey the meaning of the case that, according to Creswell (2007, 2009, 2014), comes from learning about the processes through which faculty grounds the design of online instruction on scientific-based research and theory, the lessons learned from faculty activities and processes and from the best practices based on findings of this study and from scholarly literature.

The grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) informed the design of this study by emphasizing the importance of grounded practice and the use of systematic processes which gave credence to the study's attributes as follows: (a) qualitative, (b) multi-layered, (c) reality based, (d) mixed-mode method, and (e) interdisciplinary with multi-theoretical leanings (Barab & Squire, 2004: Richey & Klein, 2007; Vrasidas, 2012). The framework was also helpful in designing study collection of diverse data from the participants' settings so as to capture the context in the findings.

Significance of the Study

There were two main significances anticipated from this study such as academic and social significance. In terms of academic significance, the researcher sought to

understand, first and foremost, the decision process through which faculty educators in a higher education setting ground the design of their online instruction based on scientific-based research and theory. It has been noted in the literature that online learning and teaching present a unique design problem (Morrison & Ross, 2007). Research authors in instructional field have noted that online learning requires proper design of effective tools (Wright, 2010). The researcher also anticipated that the results of the research study would be a contribution to the literature in the field of instructional design by providing guidance and also laying the groundwork for future studies and research because various authors, including De Miranda (2004), have observed the paucity of research in this area.

The social significance of this study includes the possibility of using findings from this case study to assist administrators, other decision makers, stakeholders, and faculty educators in their practice. The assistance envisioned could involve the creation of policies that reflect the need to use scientific-based research and theory to ground the design of online instruction. Other areas that may benefit are related to providing necessary resources to faculty educators. Faculty need resources in order to ground their design of online instruction on scientific-based research and theory. Faculty educators need resources to teach effectively in an online environment as well as need to understand the best practices of designing online instructions.

Assumptions

The following assumptions were made by the researcher and were held to be true throughout the investigation conducted to answer the research questions:

1. Chosen participants qualified as experts in the area of research study.
2. The participants were subject matter experts in their own fields.
3. Selected participants represented true online faculty and staff at target University.
4. Participants' responses were honest.
5. Participants' responses focused on the area of interest in the study.
6. Participants' anonymity was maintained as required by the guidelines of the Institutional Review Board (IRB), see Appendix D.
7. The researcher did not influence participants' responses.
8. The instrument used was appropriate to capture participants' viewpoints.
9. Thematic analysis employed captured the true credibility and accuracy of the participants' viewpoints.
10. Final output description of study results based on analyzed data captured accurately the viewpoint of the participants.

Limitations

Following are limitations that were associated with the study:

1. There was a limited ability to generalize the findings of the case study not only because the study was a qualitative design but also because the data collection was limited to only one school in a metropolitan, higher educational setting, located in southeastern United States.

2. The generalizability did not hold because of qualitative nature of researcher (Creswell, 2007, 2009, 2014).
3. The in-depth case presentation limits the value of some case studies (Creswell, 2007, 2009, 2014).
4. The study was limited to the topic of interest as defined in the problem and purpose of the study.
5. The worldview/subjectivity of the researcher could impact the research.
6. Not all course and document review data were availed by all the participants.
7. One participant did not wish to be audio-recorded on the interview and the researcher relied on short hand notes taken during the interview.

Conceptual Framework

As noted by Leshom and Trafford (2007), a conceptual framework serves as a researcher's map of the territory being investigated. Leshom and Trafford encouraged this study's researcher to use the understanding of the conceptual framework to clarify research issues, identify concepts, design research, explain methodology and methods and ground the findings of the research in a conceptual framework of grounded practice and design.

For the conceptual framework, the researcher utilized the grounded practice and design framework of Hannafin et al.(1997) and Wang and Hannafin (2005) to define grounded design for the study as a process of "linking the practices of learning system design with related theory and research" (Hannafin et al., 1997, p. 101).

The researcher chose the grounded practice and design framework because the framework provided theoretical bedrock upon which the study was built, defining the meaning of grounded practice and design, availing four criteria for evaluating evidence of grounded practice, delineated the literature by identifying important topics to be addressed and gave credence and clarity to research design. The grounded practice and design framework also informed the researcher in ascertaining data collection strategies and selecting methods of data analysis, which were then linked to the discussion of findings and recommendations in the study. More information regarding the grounded practice and design conceptual framework, i.e., growth and evolution of grounded design, is presented in the review of the literature contained in Chapter 2 of this dissertation.

Qualitative Worldview Lens

In order to focus and narrow the study appropriately to online instructions, the researcher also grounded the study in the concept of constructivism. The worldview through which the researcher viewed this study was based on Creswell's (2007, 2009, 2014) social constructivism approach to undergirding study design. Social constructivism is a worldview in which individuals seek understanding of the world in which they live and work. This worldview implies that individuals develop subjective meanings of their experiences, which are varied, and multiple. An example of this is the involvement of students who learn from and with each other on computer-mediated collaborative learning communities in online practice (Wright, 2010). The four characteristics of Creswell's (2007, 2009, 2014) social constructivism worldview which informed the part

of qualitative methodology conceptual framework of this case study were that the researcher: (a) used broad and general questions to allow faculty participants to construct the meaning of the grounding design of instructions, (b) addressed the process of interaction among individuals faculty educators, (c) focused on specific contexts in which faculty educators work in designing their online instructions on scientific-based research and theories to understand the historic and cultural settings of the faculty educators participants, and (d) positioned himself in the research to acknowledge how interpretations were influenced by his own personal, cultural and historical experience in a self-declaration.

Definition of Terms

Following are definitions for terms used frequently in this study:

Assessment: Determination of student outcomes (Reeves, 2011).

Case study: An empirical inquiry investigating a contemporary phenomenon in depth, in real-life context, in-depth data collection with multiple sources, and in-depth descriptions, analysis and interpretations (Creswell, 2007; Gall et al., 2009; Yin, 2011).

Blackboard: Web-based server platform software with course management tools that allows integration to university student information system (McHaney, 2011).

Blended learning: The use of a combination of learning environments such as online and classroom (Harasim, 2012).

Constructivism: Theories with principles that individual use to construct understanding of the world around them through reflection and personal experience (Brown, 2006).

Curriculum development: The deliberate planned educational experience (Kern, Thomas, & Hughes, 2010; McKenney & Reeves, 2012).

Design-Based Research: Systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world set- tings, and leading to contextually-sensitive design principles and theories (Wang & Hannafin, 2005).

Design and development research: The systematic study of design, development and evaluation of processes to establish an empirical basis for the creation of instructional products and tools (Richey, 2007).

Distance education: Use of technology and proper design of instruction to reach out to students who are not physically on campus (Mapuva, 2010).

Educators: Instructional designers, distance learning professionals, and other educational professionals (Hirumi & Stapleton, 2010).

E-Learning: The delivery of a technology mediated learning, education, or training, or education conducted by electronic means over the Internet (Haythornthwaite & Andrews, 2011; Mapuva, 2010; Gunter & Gunter, 2015).

Epistemology: Definition of knowledge, theory of knowledge, and the belief of how knowledge is created (Burton & Bartlett, 2009).

Evidence-based research: Use of rigorous research findings to inform decision making (Halonen et al., 2012; Lajbcygier & Spratt, 2009; Mehrotra & McGahey, 2012).

Exploratory research: Studies that relate to topics about which little is known and which tend to be qualitative in nature (Richey, 2007).

Grounded theory: A qualitative research design that generates a general explanation of a process, action, or interaction shaped by the views of a large number of participants, and with derivation of underlying theoretical perspectives from pragmatism and symbolic interactionism (Corbin & Strauss, 1990; Creswell, 2007).

Ground/grounded/grounding: Merriam-Webster's definitions, which relate to the use of these words for this study are as follows: *"ground* – a basis for belief, action, or argument; *grounded* – admirably sensible, realistic, and unpretentious; and, *grounding* - training or instruction in the fundamentals of a field of knowledge" ("Ground," 2012).

Grounded design: The systematic implementation of processes and procedures rooted in established theory and research in human learning, theory-driven and grounded in relevant research, theory and practice, conducted in real-world settings, and studied through design-based research (Feng & Hannafin, 2005; Hannafin et al., 1997; Mehrotra & McGahey, 2012).

Instruction: A set of events, activities structurally presented with end goal in mind using one mode of delivery (Dick et al., 2005).

Instructional design: The systematic, reflective process of translating and developing principles of learning and instruction into plans for instructional materials, activities, informational resources and evaluation, and based on comprehensive, research-based process (Dick & Reiser, 1989; March & Peters, 2008; McKenney & Reeves, 2012; Reeves, 2011; Simonton, 2010).

Instructional technology research: Theory-based research on processes and resources that support learning (Alias & Hashim, 2012).

Learning: An active, constructive, reflective, and iterative process where permanent change in ability level is achieved (LaPointe, 2007; Newby, Stepich, Lehman, & Russell, 2000).

Learning organization: An entity that is in a continuous mode of improvement (Latchem & Jung, 2010).

Learning theories: Philosophical approaches that enable and facilitate learning (McHaney, 2011).

Objectivity: Acknowledgement of self-bias and preconceived notions by the researcher before beginning the research (Alias & Hashim, 2012; Creswell, 2007).

Online learning/education: Distance learning using computers and Internet technology (Harasim, 2012; Mapuva, 2010; Mehrotra & McGahey, 2012).

Paradigm: Shift of perspective to achieve changes in pedagogy, social, managerial, and technical role and responsibilities of educators and students to achieve successful online learning (Berge, 2007; LaPointe, 2007; Shawer, 2010).

Pedagogy: Implementation of planned instructional experience and the strategies of instructional and teaching methods (Hirumi & Stapleton, 2010; Hlebowitsh, 2006; McHaney, 2011).

Quality Matters (QM): Program for evaluating online course design (Crawley, 2012)

Reliability: Repeatability, stability, and accuracy of results from a research instrument (Alias & Hashim, 2012; Burton & Bartlett, 2009).

Rubric: A specialist evaluation, and assessment instrument (Bauer & Cole, 2012; Blood-Siegfried et al., 2008; Penny & Murphy, 2009; Reeves, 2011; Ternus, Palmer, & Faulk, 2007; Thormann & Zimmerman, 2012).

Social constructivism: A worldview in which individuals seek understanding of the world in which they live and work by developing subjective meanings of their experience (Creswell, 2007).

Teacher research: Systematic, intentional, vigorous, and active engagement in research inquiry; evaluation and reflection into their own profession by educators (Hahs-Vaughn & Yanowitz, 2009; Henson, 2001; Kirkwood & Christie, 2006; Stanovich & Stanovich, 2003; Wyatt, 2011).

Theory: Set of principles and a discipline of research, which develops frameworks or uses existing framework to research and help expand current understanding in the field (McKenney & Reeves, 2012).

Triangulation: Calibration of researcher's position from two known locations, i.e., using two different instrument to collect the same data, so as to increase validity of research (Burton & Bartlett, 2009; Creswell, 2007).

Validity: Truthfulness, correctness, accuracy and credibility of research data in describing participants' social reality in qualitative research design (Burton & Bartlett, 2009; Creswell, 2007; Jamtsho et al., 2010; Vrasidas, 2012).

Summary

This study was designed and conducted to investigate processes though which faculty in a higher education environment grounded the design of online instruction based on scientific-based research and theory. There have been various reasons documented in the literature for the failure of faculty to ground their design of online instruction. This research problem was examined using a qualitative case study designed to elicit faculty views, perspectives, and understandings by the use of interviews, course review, and document review to capture faculty's online course design processes and practices. The purpose of the investigation was to discover the evidence and processes of grounding the design of online instruction using scientific-based research and theory in a higher education learning environment.

The researcher has presented an introduction to the study in this chapter. The specific areas addressed in this section included the background of the study, problem statement, purpose of the study, and the research questions and the rationale for research questions. Also discussed in this chapter were issues such as the study design, significance of the study, assumptions, limitations, conceptual framework, qualitative worldview lens, and the definition of terms. Chapter 2 contains a summary of the review of the literature conducted in preparation to conduct the research.

CHAPTER 2
LITERATURE REVIEW

Introduction

This study was conducted to explore the decision processes through which higher education faculty grounded the design of online instruction using scientific-based research and theory. This chapter contains a review of the literature related to the relevant topics of interest in this research study.

Topics that are included in this chapter include an introduction, need for literature review, grounding design, growth and evolution of grounded practice and design, instructional design, teacher research in teaching and learning, teaching professional development and training, learning, educator role, technology, e-learning, online learning, evaluation assessment, rubrics, paradigms, theory, and constructivism. These areas have been included because of their profound impact on teaching and learning and because technology is an area of exponential growth and has its advantages and challenges. Online learning is one of the areas where benefits have been envisioned to revolutionize teaching, learning, and access to education.

Need for Literature Review

The grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) was used as a framework for the study. Specifically, the grounded criteria and the foundation laid the groundwork for the literature to be reviewed and the study. The grounded practice design framework and the theory of social constructivism

served as guides in identifying and delineating topics that needed to be addressed in the literature review to support this research study. The grounded practice and design framework was chosen for this study because it provided a launch pad from which the researcher could examine the processes faculty used to ground the design of their online instruction in scientific-based research and theory. The research was also intended to encourage conversation in the field, address the paucity of empirical evidence in the field and contribute to the discussion of best practices in the field.

Some authors in the field of higher education have stressed the need for doctoral students to perform extensive literature reviews as part of their dissertations. Some of the argument for the need for extensive literature reviews has been to provide an opportunity for doctoral students to showcase their understanding of the literature and demonstrate their capability to conduct research. The literature review served to provide a review of the background and context of the topic of interest along with evaluating the worth of researching the topic (Boote & Beile, 2005; Burton & Bartlett, 2009). Performing a literature review allows the researcher to provide evidence that the research study is grounded and proof that the research is verifiable and investigable (Gall et al., 2009; McKenney & Reeves, 2012). Reviews of literature assisted the researcher in the present study in refining study problems and in providing a rationale for the study as well as positioning the research on existing work in the field of study (Burton & Bartlett, 2009; Creswell, 2007).

Grounding Design

As was highlighted in the definition of terms, some authors have identified grounding as the use of systematic processes, scientific-based research, theory, reputable, and peer-reviewed findings in order to inform educators' practices (Kim & Hannafin, 2007; Morphew, 2012; Stanovich & Stanovich, 2003). Various rationales have been presented in the literature for the need to ground the design of instruction. The list includes the need to comprehend instructional design processes, engagement of context and the environment, and the need to achieve instructional objective goals (Danaher, Hickey, Brown, & Conway, 2007; Gunter et al., 2008; Lowry, 2010).

Other cited needs for grounding the design of instruction have been to cushion against variability of content, learners, or instructors, (Morrison & Ross, 2007). Some have cited the need to increase encouragement of learner-centered approaches, adaptation, and accommodation of modern learning (Wright, 2010). While others have cited the need to improve success variables, and to act as a sound foundation on which educators can build (Kinshuk & Jeffrey, 2007; Kirkwood & Christie, 2006; Mapuva, 2010; Morrison & Ross, 2007; Wright, 2010).

Danaher et al. (2007) and Kim and Hannafin (2007) noted the following foundational root areas for grounding design of instruction: psychological, pedagogical, technological, cultural and pragmatic, social, cognitive, teacher presence. Other foundations for grounding design of instruction noted by authors were pedagogical principles, teaching practice, and research and practice (Downing & Holtz, 2008; Kirkwood & Christie, 2006; Morphew, 2012).

Growth and Evolution of Grounded Practice and Design

The grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) was chosen to guide this research. Hannafin et al. (1997) defined grounded design as "a process that involves linking the practices of learning system design with related theory and research" (p. 110), stressing that, "Grounded design practice requires that the methods employed be true to and consistent with the underlying, and substantiated, epistemological roots attendant to a given learning context" (p. 114).

The grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) put forth four conditions that should exist in the research for appropriate application of a grounded research framework: (a) the practices should be based on a defensible theoretical framework, (b) practices should reflect close links between empirically verified approaches and those employed in a given learning system, (c) the practices should have the potential to be generalized and applied more broadly, and (d) the practices should withstand recursive implementation successfully.

The grounded practice and the design of constructivist learning environment framework of Hannafin et al. (1997) rested on several foundational roots such as:(a) psychological, the belief about how individuals think and learn; (b) pedagogical, representations of knowledge and support; (c) technological, capabilities and limitations of available media to support learning; (d) cultural, contextual values; and (e) pragmatic, practical concerns and the extent to which alternatives can be implemented. Hannafin et al. acknowledged that there have been widespread mismatches of frameworks and methods even though various instructional approaches have been studied and

implemented across educational and training settings. Hannafin et al. also added that vastly different design practices have been proposed that reflect fundamentally different philosophies, beliefs, and biases and may not be aligned with a grounded practice and design framework.

As the field of grounded practice and design has evolved, grown, and matured, a variation of names and concepts have emerged in the literature e.g., design-based research, design experiment, development research, developmental research and formative research as enumerated by Wang and Hannafin (2005). Despite the diversity of names, concepts, and definitions, the core idea of this field has been accepted to be (a) a systematic process of gathering data in real-world setting (Wang & Hannafin, 2005); (b) research activities factoring the social setting in results (Barab & Squire, 2004); and (c) a process of gathering, synthesizing and using empirical data as a building foundation for decision making (Hirumi, 2013).

All these activities and processes are carried out by educators (instructors, instructional designers and researchers) with the goal of improving, and positively influencing processes of educational practices. With the evolution, growth and variations of names and process in the field, there has also been a variation on the looks and characteristic of the field with such ideas noted as being: (a) pragmatic; (b) grounded; (c) interactive, iterative and flexible; (d) integrative; and (e) contextual (Wang & Hannafin, 2005).

Numerous reasons have been documented as to the importance for educators to embrace design-based research in their practice (Hirumi, 2013) such as furthering the

progress of aligning theory to practice and using available empirical data to make informed design decision in the process of improving educational practices. It is also necessary for educators to take on the characteristics of researchers in their practice. In this way, they can implement design-based research to generate data to demonstrate that their practice are based on supporting empirical evidence and on theoretical grounded principles (Ge & Hardré, 2010), as well as sound, effective and can show impact(Hirumi, 2013; Wang & Hannafin, 2005).

Instructional Design

Many researchers in instructional design field have offered various explanations related to the definition of instructional design. These definitions includes designing instructional materials based on approaches that are relational, goal oriented, and systematic (Dick et al., 2005; Elen, 1993; Pieters & Bergman, 1995). Other characterizations have included systematic process, planning of what and how, and uses of research-based principles in educational practice and development of instruction (McKenney & Reeves, 2012; Reeves, 2011; Simonton, 2010). The applied research laboratory at Pennsylvania State University has been credited with developing a four-part definition of instructional design as a process, discipline, science, and reality (Brown, 2006).

The main elements of instructional design include the use of general ideas to solve instructional problems (Pieters & Bergman, 1995) and the use of broad and applicable information and varied theoretical approaches to providing a solution to

learning problems (Bednar, Cunningham, Duffy, & Perry, 1992; Theall, 1999). Other noted elements of instructional design are environmental aspect considerations and the use of well-organized procedures to solve instructional problems (Pieters & Bergman, 1995; Simonton, 2010). Further elements of instructional design found in the literature include the use of empirical and replicable processes to achieve effectiveness and efficiency in the process of teaching and learning (Dick et al., 2005; Morrison & Anglin, 2012; Simonton, 2010).

Given the significance of theory to research and practice, some researchers in the field have called for a more developed theoretical base (Yanchar, South, Williams, & Wilson, 2007). Some researchers, who have called for guidance from a wider range of research and theory, have focused on efficiency and effectiveness (Bednar et al., 1992; Morrison & Anglin, 2012). Other researchers in the field have called for equitability of design and alignment to standards of the instructional design field (Crawley, 2012; Reeves, 2011). Bach, Haynes, and Smith (2007) cautioned that the main point of online learning is not about the "design of content" but that "the most important aspect of design is the creation of a holistic learning" (p. 122).

Teacher Research in Teaching and Learning

Systematic inquiry made public is just one of various descriptions of teacher research in the literature (Kirkwood & Christie, 2006). The underlying framework of each definition of teacher research found in the literature is that the research must be systematic, actively engaged in, intentional, have rigorous inquiry, critical evaluation,

and allow for a reflective engagement process by educators into their own profession (Henson, 2001; Kirkwood & Christie, 2006; Wyatt, 2011).

Hess (2008) indicated that the role research plays is to ensure the decision-making process is informed by facts, insights, and analysis tools provided by science. These research activities, according to Halonen et al. (2012), can be carried out in Scholarship of Teaching and Learning (SoTL) communities where rigorous research findings are relied upon in the decision making process.

The benefit of educators engaging in SoTL in particular, and research in general, is that it allows for the use of grounded ideas based on the literature for design of new courses, renewal of old courses, or teaching strategies (Gurung & Schwartz, 2012). This results in confidence, effectiveness, and implementation of best practices by educators (Smith, 2012).

Some of the benefits of engagement in research highlighted in the literature includes aspects of: awareness of achievement, research skill development, a rewarding sense of accomplishment and engagement in research (Wyatt, 2011). Specifically, engagement in research can be motivating, improve self-confidence, and provide teacher-researchers with a sense of autonomy (Wyatt, 2011). Other known benefits accrued by participating in research include knowledge, critical thinking, professionalism, leadership, engagement, less fear of research (Hahs-Vaughn & Yanowitz, 2009). Additionally, thoughtful reflection, professional judgment, enhanced research literacy, critical research appraisal, grounded research concepts, becoming self-informed in theory and research, systematic gathering and interrogation of evidence, along with sound

professional judgment are all mentioned benefits of participating in research (Kirkwood & Christie, 2006).

Teaching, Professional Development, and Training

Pedagogical content knowledge development has been highlighted in the literature as an area in need of continuous development for practicing educators. Such development has proven to be influential on teachers' approaches to teaching (Annetta, Minogue, Cook, Shymansky, & Turmond, 2011; Downing & Holtz, 2008; Stes, Coertjens, & Van Petegem, 2010).

Henson (2001) addressed the need for transformation of teaching into a profession and called for professional development, self-regulation, improved motivation, and statements of desired outcomes as ways to accomplish this. Hoban (2005), in his consideration of transforming teaching into a profession, called for instruction to be knowledge-based, linked to standards, and grounded in developmental knowledge, assessments, evaluations and teaching strategies. These activities are notable in that they would enable educators to become researchers in their own right, ensuring that decision making processes are influenced by facts, insights, and analyses of tools provided by science (Hess, 2008). As a result, educators' delivery of learning would have more impact than content or structure of instruction (Gardiner, 1998).

Theall (1999) discussed the teaching process as a personalized, individualistic process and technique with strategies and methods. Other writers have called for educators to be well-informed and research-knowledgeable so that they may be critical

analysts and adjudicators of scientific evidence and associated conclusions (Kirkwood & Christie, 2006). For this to be possible, educators need to embrace the concept of scholarship of teaching where identified concepts, principles, and merited ideas are shared through research engagement (Theall, 1999). Such sharing of research and grounded ideas results in educators who possess skills, awareness, enthusiasm, collaboration, and self-efficacy along with professional development that is enabling and filled with vigor (Wyatt, 2011).

Learning

Learning is described as an active, constructive, reflective, iterative process with a capacity to change level of ability and knowledge permanently (LaPointe, 2007; Newby et al., 2000). Actions, technique and technology undertaken toward learning and teaching have impact and consequences on the results of instructional effectiveness, efficiencies and appeal (Newby et al., 2000). Because of the interconnectedness of thinking and learning processes, understanding how people think helps educators understand how people learn (Brown, 2006).

Researchers have found that learning occurs during problem solving and when embedded in practice (Lai & Yung, 2012; Stuart et al., 2004). Additionally, learning is impacted when engagement in hypothetical-predictive behavior necessary for novice-expert cognitive functioning occurs (Downing & Holtz, 2008). According to McHaney (2011), learning should be merged with social spheres of student life so as to influence

their realm. Active learning takes place when responsibility is placed on the learner, and collaborative learning occurs where learners develop social existence (Stavredes, 2011).

There are a myriad of societal outcome expectations of college graduates. They include the following characteristics highlighted by Gardiner (1998): critical thinking, complex problem solving, dependability, ethicalness, respectfulness, the ability to effectively communicate, adaptability and interest in being a life-long learner. Stavredes (2011) added to the attributes, noting that self-guidance, social style, self-concept, experience, readiness, orientation and motivation affected how students learn.

Bach et al. (2007) expressed the belief that:

> Lifelong learning should occur in numerous places in society and throughout the course of one's life. It should include formal and informal learning and different learning methods. It is a holistic approach that is often used by governments to describe the need to learn new skills throughout working life (p. 52).

Educator Role

Various research authors have emphasized that, with the change in teaching and learning environment, both educators' and students' roles have shifted due to the "transforming" power of technology (Shelly, Gunter, & Gunter, 2011, p. 324). Educators have been described as instructional designers, distance learning professionals, and educators by Hirumi and Stapleton (2010). Hoban (2005) described educators as any professionals in the field of education who were grounded in discipline, knowledge, and pedagogy. They understand learners' development and are familiar with assessment,

evaluation and teaching strategies. Although abundant descriptions of teachers exist, Spector (2007) aptly captured the gist of what a teacher is, as defined by his father: "The ear that listens, the eye that reflects, the voice that comforts, the hand that guides, the face that does not turn away" (p. 3).

Role descriptors of teachers found in the literature include: door-openers, guides, adjudicators, curriculum developers, curriculum makers, and curriculum transmitters (McHaney, 2011; Shawer, 2010). Other notable descriptors in the literature have included online instructors as motivators, managers, facilitators, experts, formal authorities, social agents, ego ideals, and compassionates (Bender, 2012; LaPointe, 2007). Conversely, instructional designers' roles have been described as teaching and learning enhancers, service providers, social change agents, drivers of instructional design process and relationship managers with stake holders (Keppell, 2007; Schwier, Campbell, & Kenney, 2007; Solomonson, 2008). Due to a role change from a teacher-centered to a student-centered approach, teachers have become more focused on their teaching presence as pedagogical, social, managerial, technical, climate and environment creators (Berge, 2007; Stavredes, 2011; Weiss & Bordelon, 2012).

Educators are required to use sound judgment, stay current with technology, and be effective, successful, and highly rated experts. They must also be able to teach what they know, cooperatively learn with students, and maintain reflectivity and flexibility in order to remain relevant in changing world (Bird, Morgan, & O'Reilly, 2007; Hahs-Vaughn & Yanowitz, 2009; Kirkwood & Christie, 2006; McHaney, 2011; Theall, 1999). Educators are also expected to ground their instructional practices on scientific research-

based pedagogy, be effective guides, be reflective, dynamic, and understand complexity. They should be capable of multi-level thinking, flexible, technology-literate, knowledgeable, imaginative, resourceful, enthusiastic, and a team-player (Hahs-Vaughn & Yanowitz, 2009; Hoban, 2005; Kirkwood & Christie, 2006; McHaney, 2011). Concerning the role of teaching presence in an online environment, Bach et al. (2007) noted that "There are many facets to being an academic with different roles, from being an education designer and subject expert to that of a social facilitator" (p. 78).

Technology

Technology implemented by the learning organization and embraced by educators' influences and affects learning (Hirumi & Stapleton, 2010; Latchem & Jung, 2010; Mehrotra & McGahey, 2012; Newby et al., 2000). Shelly et al. (2011) suggested that "The best strategy for curriculum integration is to put the technology into the hands of trained teachers, make it easily accessible, and let them decide how best to use it at the point of instruction in their classrooms" (p. 223). Some authors have called for prudent planning, design, and uses so as to transform education, achieve cost effectiveness and meet students' needs (Bates & Sangrà, 2011; Kirkwood & Price, 2012).

Other points of technology interest explored in the literature include (a) the need for clear and coherent governance structures for technology (Bates & Sangrà, 2011); (b) the need for understanding the role of technology in learning advancement (Wang, 2012); (c) the importance of E-leadership as espoused by Berger (2012); (d) the potential of technology to revolutionize teaching and learning noted by Gillespie (1998) and Tabot,

Oyibo, & Hamada (2013); (e) the abundance of opportunities with appropriate use of technology (Theall, 1999); (f) the need for paradigm shifts to avail opportunities for interaction, access, information, and change learning (Gillespie, 1998); and finally, (g) the acknowledgement and awareness of different rates of technology innovation, adoption, and use (Gillespie, 1998; Wang, 2012). Tabot et al. (2013) noted how greatly the societal ways of working, living, thinking, and learning have been impacted by technology and the changes brought by internet.

E-learning

There has been a definite increase in the use of "eLearning environment" to instruct students (Shelly et al., 2011, p. 324). Most authors have agreed that E-learning is complex and that in addition to its being a specific delivery mode, it can extend the reach of learning and transform delivery of learning (Haythornthwaite & Andrews, 2011; Mapuva, 2010). E-learning, according to Gutiérrez-Santos (2011) requires attention to aadministrative, technical and academic issues associated with it.

E-learning has been viewed through a transformational lens because it shifts the learning paradigm to a student-centered approach (Wang, 2008). Though E-learning has been recognized for its ability to capture and awe stakeholders, its learning focus should provide a clear strategy on how learners interact and form social connections when creating and supporting e-Learning communities (Haythornthwaite & Andrews, 2011; Miller, 2010). Tabot et al. (2013) indicated that "By virtually every measure, E-learning is experiencing unprecedented growth and will continue to do so for the foreseeable

future" (p.29). Taylor (2011) mentioned that "E-learning promotes the use of structured learning materials which extend the book based metaphor of chapters, lists and diagrams using markup languages based on Hypertext Markup Language (HTML)" (p. 264).

Lock (2007) addressed the need for educators to pay attention to community as they plan and develop online courses. He proposed five steps or guidelines to which course developers should be attentive: (a) awareness of community and of the sense and the value of learning community, (b) design issues for online courses that support community to be addressed, (c) mechanisms in place to facilitate the collaboration of community, (d) the creation of community within the big picture, and finally (e) ongoing research to provide direction and support for the development of learning communities. Lock was optimistic that with the use of these guidelines, educators would be able to create and sustain a vibrant community of learners online in their instructional courses.

Online Learning

Online learning has been defined as a form of computer-enhanced learning environment delivered over the Internet in distance education (Mapuva, 2010; Mehrotra & McGahey, 2012). Although online learning has not automatically ensured a better mode of teaching, it has been effective in highlighting the progression of technology, teaching, and learning (Bach et al., 2007). Online learning has been recognized for its potential to increase access to learning, provide technology use, and embed instructional strategies in a supportive learning environment (Crawley, 2012; Lowry, 2010; Stavredes, 2011).

Several writers have addressed critical factors in the success of online learning. They include the need to collaboratively support students; understand motivations, expectations, responsibilities, needs and research issues; correctly sequence learning activities and assignments; and to be aware of technology and delivery effects (Crawley, 2012; Mehrotra & McGahey, 2012; Thormann & Zimmerman, 2012; Visser, 2007). Other success factors include the establishment of goals for online learning, learners' prior knowledge, course environment, and course architecture (Mehrotra & McGahey, 2012). Some of the more recent online technology trends include dual course listing, expandable modules, and alternative engagement strategies (Mapuva, 2010).

Phan (2013) noted that "Teaching and learning via online delivery is increasingly becoming a norm for many higher education institutions worldwide. This alternative form of learning is characteristically unique and serves a number of purposes. . . ." (p. 33). Three opportunities brought by technological and online environment change are, according to Bach et al. (2007); adaptation of learning, improvement in teaching, and improvement in the quality of learners' experiences.

Evaluation and Assessment

Some authors have emphasized that evaluation is a disciplinary inquiry with the intent of assessing the significance of educational programs using gathered and analyzed data from both qualitative and quantitative models (Psaromiligkos, Retalis, & Spyridakos, 2012; Vrasidas, 2012). Assessment, on the other hand, has been viewed as a "process and product" determination (Reeves, 2011, p. 103). The intent of both the

assessment and evaluation processes is to improve performance, efficiency, effectiveness, and decision making utilizing constant feedback and analysis of gathered data (Brown, 2006; Downing & Holtz, 2008; Latchem & Jung, 2010; Maslowski & Visscher, 1999; Psaromiligkos et al., 2012; Reeves, 2011). Vrasidas (2012) defined evaluation in the following way:

> Evaluation is disciplined inquiry with the aim of evaluating the value of a program, project or system. As a systemic and systematic process it carefully collects data aim at supporting decision making. There are several kinds of evaluation. Developmental evaluation places the evaluator as part of the development process of the e-learning program. Formative evaluation, places an emphasis on collecting data to improve the program. Whereas, summative evaluation is conducted to make final judgment about the continuation of a program (p. 2).

One of the instruments used for assessment and evaluation is a rubric, a special checklist or set of categories and criteria (Reeves, 2011; Thormann & Zimmerman, 2012). There have been documented studies highlighting the benefits of evaluation in online instruction. Some of the benefits include establishment and improvement of standards, linking evidence, and achievement of outcomes for online instructional courses. The Quality Matters (QM) rubric has been widely recognized in evaluating online instructional programs (Crawley, 2012). Bartley (2006) indicated that "With the increasing adoption of advanced education technologies, such as Internet-based communications, there are greater demands for more effective, flexible, interactive,

customized and just-in-time online instructional and assessment systems" (p. 1). Bartley (2006) identified seven good practices for implementing assessment and evaluation in an online environment, i.e., encouragement of student-faculty contacts, encouragement of meaningful cooperation among students, using active learning techniques, prompt feedback, time on task emphasis, high expectation communication, and respect of diverse talent and ways of learning.

Haythornthwaite and Andrews (2011) suggested three types of assessment (self, diagnosis and summative) that must be taken into consideration in order to create an ideal E-learning assessment. Some advantages of online learning enumerated by Bach et al. (2007) included distance and travel limitations reduction, an enriched experience and the potential of conveniently keeping in touch. Although (Bach et al., 2007) noted that "Ensuring the quality of online teaching and learning is a difficult process" (p. 90), they also added that " The current focus on learning outcomes should be used to encourage a quality process that looks at learning from the students' point of view. It should assist them by providing clarity of the learning task" (p. 90).

Rubrics

One of the instruments for collecting data in this study was a rubric. As such, this section sought to address the definitions of "rubric" because it has wide and varied definition in the literature. Some authors have viewed a rubric as an evaluation instrument template, an evaluation tool, or a qualitative evaluation instrument (Bauer & Cole, 2012; Penny & Murphy, 2009; Ternus et al., 2007). Other authors have defined

rubric as an instrument for assessment used to inform faculty of best practices (Blood-Siegfried et al., 2008). Though some authors have defined rubric as an assessment tool of gradation quality (Andrade, 2005; Hsu & Macias, 2010), others have seen it as a clear and easy-to-use table to evaluate and appraise work (Baya'a, Shehade, & Baya'a, 2009). Regardless, there has been much agreement that evaluation of online learning is very important (Tallent-Runnels et al., 2006), and this has led to some writers advocating the development of an effective rubric for assessing activities in online education (Gaytan & McEwen, 2007). Dunlap (2005) has noted the problems with time consumption in relation to using rubric to provide frequent, timely, and thoughtful feedback.

There are numerous examples of rubrics in scholarly literature available. These include: Rubric for Online Learning developed by University of California-Chico (Sener, 2004); Quality Matters Rubric (Legon, 2006); Quality of Online course rubric (Blood-Siegfried et al., 2008); and Standards Sets for Excellence in distance education (Sener, 2004). Tallent-Runnels et al. (2006) emphasized the importance of using a rubric in the evaluation of online learning, noting that time and effort should be directed to the development of an effective rubric to support assessment activities (Gaytan & McEwen, 2007). Swan, Shen, and Hiltz (2006) have called for the development of an effective approach in assessing online learning.

There are many uses of rubrics in online learning. Some authors sees rubrics as useful in guiding learners and aiding teachers (Hsu & Macias, 2010; Penny & Murphy, 2009). Other authors sees rubric as providing clear guidance, promoting learning, and improving instruction (Bauer & Cole, 2012; Jonsson & Svingby, 2007). Rubrics have

also been credited with the promotion of competence in students and fairness based on learners' ability, ensuring all learners receive the same or equal opportunities to perform (Halonen et al., 2003; Hsu & Macias, 2010).

Paradigm

A need has been identified for online teaching and learning thought processes and practices not only be creative, evolving, and facilitative, but also collaborative, interactive, transformative, and learner-centered (Downing & Holtz, 2008; Hogan, 2010; Latchem & Jung, 2010; Mapuva, 2010; McHaney, 2011). Therefore, this paradigm shift requires changes in pedagogy, and the social, managerial and technical roles of instructors to change (Berge, 2007). It also requires that learners assume more responsibility in order for successful online and e-learning learning to take place (LaPointe, 2007; Shawer, 2010).

It has been indicated by Turoff, Discenza, Discenza, and Howard (2004) that "Designed properly, distance education classes can be at least as effective and, in some ways, even more effective than face-to-face courses. The tools and technologies used for distance education courses facilitate learning opportunities not possible in the face-to-face classroom" (p. 1). Some authors, who have witnessed explosion of growth related to technology, e-learning, the Internet, and the changes brought by those technologies, have stressed that changes in instruction must reflect the changes brought about by technology (Tabot et al., 2013). On the issue of E-learning, Haythornthwaite and Andrews (2011)

indicated “Where e-learning embodies a transformation in learning, it entails more than just a change in delivery mechanism, it changes the way we learn” (p. 2-3).

Theory

In the literature, theory has been generally defined as discipline research. It has been viewed as using an existing principle to frame inquiry. The result is the construction of further elaboration of theoretical understanding (McKenney & Reeves, 2012). Most authors have agreed that theory provides guidance and lays the foundation. Other areas of agreement include the view that theory explains, enables and facilitates learning and understanding of the practicalities of the world phenomena (Burton & Bartlett, 2009; Corbin & Strauss, 1990; Mapuva, 2010; McHaney, 2011; McKenney & Reeves, 2012).

Some researchers have noted the difficulty in linking theory and practice (Yanchar, South, Williams, Allen, & Wilson, 2010), but others have emphasized the importance of linking theory to practice as envisioned by Bednar et al. (1992). Still other researchers have determined a need for reflection and connecting theory and practice (Mann, 2004; Terlouw, 1993). Harasim (2012) defined theory as:

> A Theory is an explanation for why something occurs or how it occurs. Typically theory is generated by a question or by out curiosity, and offers a response to that question, a theory use an explanation that has been scientifically developed by scientists and scholars using state-of-the-art research methods and information of the day (p. 4).

Summary

The exponential growth of technology and online learning has shaped and influenced changes in education. This has resulted in increasing numbers of educators either converting face-to-face courses into online settings or creating fully online courses. Although online learning promises to revolutionize teaching, learning and access of education, it presents challenges to educators. Such challenges are related to designing instructional curriculum to leverage available technology, changing roles of educators, building student communities online, and building and maintaining successful learner interaction online.

The literature review section afforded the researcher an opportunity to refine and provide a context for research in the area of grounding the design of instruction. This literature chapter has highlighted key areas that influence and are part of the design of instruction including: the need for literature review, grounding design, growth and evolution of grounded practice and design, instructional design, teacher research in teaching and learning, teaching professional development and training, learning, educator role, technology, e-learning, online learning, evaluation and assessment, rubrics, paradigm, theory, and constructivism. All of these factors contribute to what makes for successful designing of online instructions grounded on scientific-based research and theory in learning and teaching online in the current mediated technology environment. The following chapter contains a description of the methods and procedures used to conduct the study including a discussion of the design, data collection and analysis.

CHAPTER 3
METHODOLOGY

Introduction

This chapter contains a restatement of the purpose of the study, a discussion of the research questions, research design, the selection of participants and the setting for the research. A discussion of the methods used to conduct the research includes attention to data collection procedures, i.e., instrumentation and interview procedures. The data analysis discussion addresses guidelines used in the analysis of data for overall research study and the guidelines used in the analysis of specific research questions. Other issues addressed in this section included the evaluative processes of validation and verification of credibility, evaluation and stability, as well as ethical issues and other consideration, the researcher's role, biases and reflective practices.

Purpose of the Study

The main purpose of this study was explore the decision processes through which faculty educators in a higher education environment grounded their design of online instruction using scientific-based research and theory. The rationale for conducting the study was to add to the conversation in the field, contribute to research in the topic area and identify best practices observed in the practice and from the literature. The researcher conceptualized and designed the study because of the need for increased understanding as to how faculty ground their design of online instruction at one large, urban university, located in the southeastern United States.

For this study, the definition of grounded design was offered by Hannafin et al. (1997) and indicated a process of linking the practices of learning system design with related theory and research. The grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) provided the foundation for defining the meaning of grounded practice and design. The framework informed and provided criteria for evaluating grounded evidence for this study. Researchers have stressed the need to use empirical evidence from peer-reviewed research and theories as a basis for decisions in the planning, design, production, implementation and evaluation of online instruction (Halonen et al., 2012; Lajbcygier & Spratt, 2009; Mehrotra & McGahey, 2012).

Research Questions

The following four research questions were formulated, designed and deployed to collect the views, beliefs, perceptions and the background information of the respondent in regard to the process of grounding design of online instruction informed by scientific-based research and theory in higher education settings. The specific research questions were:

1. What does it mean for a faculty educator to ground the design of online instruction using scientific-based research and theory?
2. What evidence do faculty provide to demonstrate that their designs of online instruction are grounded in the elements of scientific-based research and theory?

3. What steps do faculty take in order to ground their design of online instruction in scientific-based research and theory?
4. What are the main causes that may prevent faculty from grounding the design of online instruction using scientific-based research and theory?

The research questions in this study were focused on the definitions, evidences, processes and the causes of failures to ground the design of online instruction on scientific-based research and theory. The grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) informed and contributed to the research questions by defining what grounded design practices are, provided criteria for grounding which assisted the researcher in identifying evidence of grounding in the design of instruction. The grounded practice and design framework permitted the identification of possible causes that may have prevented faculty in grounding design of instruction and provided processes through which observation of participants' alignment of a grounded design process could be deduced.

Research Design

The research design chosen for this study was a case study design, a qualitative methodology. The design and study approach was appropriate because researcher sought to answer the question of how and why using in-depth description (Yin, 2011). Using this qualitative approach, the researcher sought to perform in-depth analysis of participants' response in a natural setting with multiple sources of information collections (Hancock and Algozzine, 2006).

The grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) informed the design of the study. The framework emphasized the importance of grounded practice and the use of systematic processes which gave credence to the study's attributes of: (a) qualitative, (b) multi-layered, (c) reality based, (d) mixed-mode method, and (e) interdisciplinary with multi-theoretical leanings (Barab & Squire, 2004: Richey & Klein, 2007; Vrasidas, 2012). The framework was also helpful in formulating the collection of diverse data in participants' settings so as to capture the context in the study findings.

A qualitative methodology design built on the underlying concept of case study approach as defined by Creswell (2007, 2009, 2014) was undertaken. The researcher explored a problem and sought to understand the context and setting of the participants. The problem was viewed through the worldview lens of social constructivism. Questions posed to participants in the case study were designed to be broad and general in nature so as to allow participants to construct meaning from their situation. Additionally, the case study approach allowed the researcher (a) to address interactions among participants, (b) to focus on specific contexts in which people live and work in order to understand the historic and cultural settings of the participants, and (c) to allow the researcher to position himself in the research and to acknowledge how his interpretations flowed from personal, cultural and historical experiences (Creswell, 2007, 2009, 2014).

After careful consideration of literature and design of the research, the researcher selected the case study approach because the approach has proven to be a widely used qualitative research technique, gaining the support of numerous researchers for a number

of reasons such as: (a) the ability to obtain in-depth, natural context, and dual views (Gall et al., 2009); (b) the ability to use criterion sampling allowing identification of participants who have experience the phenomenon under study (Creswell, 2012); (c) the ability to answer how and why questions and provide in-depth descriptions (Yin, 2011); and (d) the ability to clearly identify cases with boundaries and provide for an in-depth understanding of the case (Creswell, 2007,2009, 2014).

According to Creswell's (2007, 2009, 2014) definition, this study met the requirement that the inquirer has clearly identifiable cases with boundaries and seeks to provide an in-depth understanding of the case or comparison of several cases. This type of case study, according to Creswell (2007), has been referred to as "intrinsic" (p. 74). This study involves the processes and activities associated with faculty educators grounding the design of their online instruction on scientific-based research and theory, met the requirements for an intrinsic case study. The focus of this study was on the case itself. It presented an "unusual or unique situation" (Creswell, 2007, p. 74) centered on the activity of faculty educators designing their online instruction based on scientific-based research and theories.

The researcher identified grounding design of instruction as an activity in the individual case, which contributed to a collective case study and involves all online faculty within-site of the research. The seven main queries regarding the case itself were posed to determine the how and the why of faculty grounding their design of online instruction utilizing their current strategies.

Within-site refers to all online instruction, which was housed in the Blackboard Learning Management System (LMS) and Canvas by Instructure Learning Management System at the time of research study, i.e., also identified as Webcourses@UCF). Criterion sampling was undertaken by the researcher to select participants who had been nominated as the best online faculty educators in their area of teaching as online learning ambassador faculty by the Center for Distance Learning (CDL), a flagship online and distance learning department at the target university. The researcher built each case by: (a) examining what was expressed by the participant through interview as captured by the transcribed response, (b) examining supportive documentation and data that were observed and captured through the rubric, (c) reviewing the literature to examine other research conducted in the area of study for themes matching those found by the researcher in the present study and (d) reviewing literature for best practices in the area of online instructions.

Participants

The researcher employed criterion sampling techniques to identify a possible sample of faculty educators. Three overarching criteria were established by the researcher for selecting faculty educators to participate in the study. Educators needed (a) to have had experience teaching in an institution of higher education, or (b) to have taught or be teaching fully online courses or blended courses, or (c) to have had full-time experience designing online courses.

The use of criterion case sampling technique (Creswell, 2012) allowed selection of participants who were educators that had previously been nominated as ambassadors for online learning by the Center for Distributed Learning (CDL) at the target university. The Center for Distributed Learning was a department charged with the responsibilities of coordinating leadership, strategies, and policy planning relating to online education at the target institution. Other additional specific criterion applied in selecting sampling of educators were that each educator must have taught or be teaching an online or blended course within the current available Learning Management System, which was at the time the data collection took place was Blackboard or Canvas by Instructure learning management system.

An email explaining the study and inviting participants to take part in the data collection was drafted by the researcher, approved by dissertation committee chair, and sent to sample participant educators. Six participants who met all the selection criteria were identified and approached for participation. Four individuals (three females and one male) agreed to participate in the study. For ease of reference to each participant and to preserve anonymity, pseudonyms were used as follows: Dr. Jones, participant 1; Dr. Robin, participant 2; Dr. Marion, participant 3; and Dr. Banks, participant 4. The participants were from College of Education-School of Teaching and Learning and Leadership (STLL), College of Art and Humanities, and College of Health and Public Affairs and One Instructional Designer working at The Center for Distributed Learning (CDL) as a faculty professional development staff member.

Setting

The setting for this study was a large, urban, commuter, Higher Education University in southeast United State of America. Within the larger university-wide setting, and as of the time this study was undertaken, the following demographic data were current regarding the target institution known as University of Central Florida. First founded as a technical university in 1963, University of Central Florida began with a student enrollment of 1,948. Data at the time the study was completed showed the institution had 210 programs and degrees, 11,074 employees and 60,810 students. The main campus is located 13 miles east of Orlando, Florida's center, primarily a non-residential, large, four-year research institution. ("Facts About UCF", 2015).

In 2013, the University of Central Florida offered five undergraduate completion programs and one dozen graduate degree and certificate programs via online delivery. In fall of 2011, 27,000 students enrolled in at least one web or video based course; over 6,200 students took online classes; and 914 faculty members had completed a faculty development program for online instruction (IDL 6543) since the inception of the various teaching and learning technology systems at the institution. Learning support systems that were supported at the institution included eCommunity, ePortfolio@UCF, UCF on iTunes U, Kogneato, Obojobo, Tegrity, Webcourses@UCF, along with various course delivery modalities. These include World Wide Web (W), Video Streaming (V), Video Streaming/ Reduced Seat Time (RV), Mixed Mode/ Reduced Seat Time (M), and Face to Face Instruction (P) ("Online@UCF", 2015).

Within the smaller department setting, the particular unit of interest in the study was the Center for Distributed Learning (CDL). With the mission of serving as a central agent for online learning at UCF("Mission Statement," 2015), Center for Distributed Learning provides leadership in distance learning policies, strategies, and practices, and also supported and expanded student access to education through the advanced application of instructional technology, data analysis, policy, and strategic planning for distributed learning programs and courses. According to CDL, it fulfills this mission by collaborating with internal and external partners to investigate, design, deliver, assess and support online learning through faculty development, course productions, and research as these activities have been aligned with institutional goals ("Online@UCF", 2015).

Instrumentation

Structured Interviews Questionnaire Instrument

The interview protocol contained seven structured interview questions for both instructors and for instructional designer. The protocol used to interview the faculty was developed by the researcher following Hancock and Algozzine's (2006) guidelines for planning and conducting the interview process. To develop the protocol, the researcher listed the research questions that were used to guide the study, divided them into researchable sub-questions and, in the final step, arrived at interview questions/topics designed to elicit responses to the research questions. The steps taken in interview

planning are displayed in Appendix A. The interview protocol that was developed, based on the work of Creswell (2007, 2009, 2014) is contained in Appendix B.

Modified Quality of Online Course Rubric Instrument

The Quality of Online course rubric contains five sections as follows: (a) organization and design, with eleven criteria; (b) course content, with nine criteria; (c) Instruction, with eleven criteria, (d) interaction, with thirteen criteria; and (e) evaluation and assessment, with twelve criteria. The researcher modified the Quality of Online course rubric into a checklist by including the column with two checkbox where the research will tick corresponding item if they met or not met the criteria.

The Quality of Online course rubric was modified by the researcher for use as a checklist to collect data for the evaluation of online courses (Blood-Siegfried et al., 2008). The researcher observed online courses as part of the documentation of online artifacts which were evaluated for participating educators who showed the researcher their course during the course review part of the interview process.

Rationale for selecting the Quality of Online course rubric by Blood-Siegfried et al. (2008) was because the rubric was designed to improve the quality of online courses, the rubric was originally developed as an evaluation rubric to measure quality of graduate online courses, and the rubric was reportedly developed after a review of existing rubrics in scholarly literature (Lesh, McMahon, Tabrizi, & Ashcraft, 2003; Roblyer & Ekhaml, 2000; Roblyer & Wiencke, 2003; and Wright, 2004).

Other rationale for rubric selection included the highlights from literature indicating that the Quality of Online course rubric was intended to serve as an indicator of an expected standard of practice as well as a method to establish baselines and benchmarks for specific courses. Blood-Siegfried et al. (2008) have stated that the Quality of Online course rubric was not intended for use as an inflexible document in faculty performance evaluation. The Quality of Online course rubric instrument has been referenced in many studies, some of which include Alice & Donna, 2011; Avery, Cohen, & Walker, 2008; Boateng, Bass, Blaszak, & Farrar, 2009; Gaudine & Moralejo, 2011; Hoehn Anderson & Friedemann, 2010; Hsu & Macias, 2010; and Paulus et al., 2010. The modified Quality of Online course rubric is presented in Appendix C.

Data Collection

Description of Data Collection Process

Data collection for the study included interviews, course review of the design of participants' online course, and analysis of available review of available documents. Prior to beginning the process of collecting data, the following issues, noted by Creswell (2007, 2009, 2014) and Hancock and Algozzine (2006), were addressed by the researcher: (a) selection of key participants whose knowledge and opinion provided insight regarding design of instruction on scientific-based research and theory; (b) development of an interview guide to identify appropriate open-ended interview protocol questions (Appendices A and B); (c) consideration of the interview setting by selecting a

site where educators participant practice and work; (d) development of a means for recording interview data by obtaining good audio recording device; (e) obtaining permission to record from participants ; (f) providing for recording and transcribing recordings; (g) adherence to legal and ethical requirements for research involving people, e.g., not deceiving, maintaining confidentiality, protecting from harm, providing for informed consent, preserving anonymity, observing right to end interviews by submitting and completing IRB application and training, (Appendix D); and (h) debriefing after the research has ended by provision of completed research text to participants.

During data collection and with the guidance of the interview protocol, the researcher conducted interviews using seven open-ended questions and accompanying probes (Appendix B). Interview responses were audio recorded when permitted by the interviewees, and later transcribed. The researcher also observed faculty online course examples as they demonstrated issues highlighted in their responses to interview questions. Course review were completed using the Quality of Online course rubric which was modified to be a checklist. In the review of artifacts, the researcher collected online instructional artifacts, i.e., syllabi, lessons plans, and instructional, assessment and evaluation materials. These were examined and evaluated using the appropriate sections of the modified Quality of Online course rubric as well.

As Leshem and Trafford (2007) noted, the conceptual framework of a study acts as a blueprint guiding the design and collection of data. This study used the grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005). The grounded practice and design framework assisted this study researcher in tracing and

connecting strategies for identifying and determining data collection, and identification as well as collection of diverse data in their natural environment.

Interview Procedures

Using interview protocol, the researcher asked each respondent a series of similar questions to solicit their response to seven interview questions and their response were audiotaped for those participants who agreed to be audiotaped. The researcher initiated the communication process by sending emails to the identified participants to solicit their participation in the study. Once participants accepted the invitation to participate in the research, subsequent email communications were sent to establish the interview date, time and place. All four interviews were conducted at participants' workplace offices.

The same format was used in conducting each of the four interviews. After introductions and exchange of pleasantries, the researcher thanked each individual for agreeing to take part in study, described the study, and shared a copy of the interview protocol and a release statement form with the participants. After all the preliminaries were concluded, the researcher asked the participants for permission to audio tape the interview discussion. Three of the participants (Dr. Jones, Dr. Robin, and Dr. Banks) agreed to be audiotaped. Dr. Marion did not wish to be audio recorded.

When audiotaping was permitted, the researcher started the recording and used the interview protocol sheet as a guide to ask questions and conduct the interview. The researcher also used probes as means of clarification, expansion of understanding, and to elicit additional responses from the participants. The researcher maintained the

conversation and tried to stimulate the conversation by nodding, probing, and seeking clarifications, while at the same time, writing and noting important key points in a notepad journal. At the end of the interview, the audiotaping was stopped. During post-interview conversations, the participants were thanked for giving their time and taking part in the study. They were assured their responses would be kept confidential and requested for follow-up meetings and research document debriefing. After the interviews, the researcher sent each of the participants an email note thanking them for participation in the study.

Following the interview, the following steps were taken by the researcher to prepare interview data for further data analysis. The researcher summarized his interview notes in the notebook journal in order to "capture" main points of reference, to accurately "record" and to "confirm" meaning as suggested by Burton and Bartlett (2009, p. 89). The researcher then began transcription of the recorded interview by importing the audio recording of the interview to the computer, using the computer media player which allows easier control of the play speed. While on slow play, the researcher listened and transcribed the interview, creating a Microsoft Office document. As necessary, play button was stopped and the process was repeated until all the audio was transcribed. Once transcribed, the researcher listened to the audiotape once more, comparing the transcription with audio to ensure accuracy. A final spell check was performed and hard-copy printed. For the interview that was not recorded, the researcher relied on his interview notes, transcribing them and using them in eventually summarizing the substance of the interview in a word document and printing out a hard-copy.

Course Review Procedures

Course review of participants' online courses were performed using the modified Quality of Online rubric checklist. The review was carried out during the interview if the participant provided a course to illustrate their evidence and if they agreed for their online course to be reviewed using the rubric.

During the course review and demonstration part of the interview, the researcher went through the checklist of the rubric and check each of the fifty six criteria items listed in the checklist rubric instrument and compare them with the participants online course whether they meet each criteria listed or not and tick appropriate box in the rubric instrument checklist.

Quality of Online rubric is an evaluation instrument which was originally designed to measure quality of graduate online courses by Blood-Siegfried et al. (2008). The researcher modified the Quality of Online course rubric into a checklist with all the rubric's fifty six criteria items. More information for this instrument is located in instrumentation section or Appendix C.

Document Review Procedures

Course support artifacts such as syllabi, lesson plans, instructional material, assessment and other materials or document provided by the participants were collected to be reviewed using the modified Quality of Online course rubric. The researcher took the collected artifacts and examined them more closely using the checklist of the rubric to allow comparison of items between the participants.

Each artifacts collected was checked against the modified Quality of Online rubric checklist. If the rubric contain the artifacts in its list of criteria, the researcher would read the criteria requirement then compare requirement to the artifacts and if the criteria is met, the researcher would then tick-off the appropriate section of the checklist rubric instruments as "met" or "unmet" within each corresponding field. The researcher's intend to tallying of the rubric criteria against the participants artifacts was to enable the researcher to compare online course artifacts across each participants objectively for better analysis during cross-cases analysis in chapter four. More information for the modified Quality of Online course rubric instrument is located in instrumentation section of methodology section or Appendix C.

Data Analysis

Analysis on the data was performed using the following: detailed case description, direct interpretations, cross-case, pattern establishment (themes) and naturalistic generalization analyses.

Guidelines Used in the Analysis of Data for Overall Research Study

In order to achieve in-depth analysis called for by the framework, the researcher performed five "levels" or "steps" of case analysis as suggested by Creswell (2007, p. 163) as follows:

1. Detailed case description--detailed description of the case, as represented in Chapter 4 case descriptions.

2. Direct interpretation--looking at a single instance and drawing meaning, as represented in Chapter 4 format of case x - analysis of research question x.
3. Cross-case analysis--looking for similarities and difference between the cases, as represented in Chapter 4 cross-case analysis sections.
4. Pattern establishment [Themes]--looking at correspondence between two or more categories, as represented in Chapter 4 four theme analysis sections.
5. Naturalistic generalization-generalization of what was learned from the case, as represented in Chapter 5 discussion and implications.

In regard to the detailed descriptions analysis, the researcher included detailed representative descriptions of the cases, their settings containing descriptive background information, conversation with and voices of participants, descriptions of online course review using a modified Quality of Online course rubric, description of course syllabi, and ancillary documents for each of the participants.

In direct interpretation of data analysis, the analysis consisted of looking at instances using multiple sources of data to determine evidence and draw meaning in answering the research questions for each case and for each participant. In this analysis, the researcher looked at the views from interview data, examined course review data and analyzed document obtained to corroborate meaning in answering the four research questions.

In cross-case analysis, the researcher analyzed the similarities and differences between cases using data from interviews, course and document review in answering Research Questions 1-4 in the cross-case analysis section presented in Chapter 4.

Pattern establishment analysis included the researcher's seeking correspondence between two or more categories (categorical aggregation) of instances in the data to see if issues with relevant meaning emerged, aggregating these into themes. In pattern establishment (theme) analysis, the researcher used a combination of Microsoft Office Word and actual paper-based/note-taking processes. The researcher used the typed transcripts and notes, reading through them, making comments, underlining, and writing in margins to identify key issues. The researcher then compiled all key issues and aggregated them into categories which were then further grouped by emerging themes, once final themes had been determined, the researcher transferred the report of the themes to a Microsoft Office Word document. Themes assisted the researcher in understanding the complexity of the case and in finding assertions/interpretations of the case. Because themes came from aggregation of key issues into categories, possible themes included those key issues found in grounding the design of instruction in the literature such as the effect of technology, training, student online management and time on the success of designing instruction.

Naturalistic generalization occurred as the researcher searched for generalizations of what could be learned from the case or was applicable to the population by looking at the finding against the grounded practice and design framework and against the literature.

In regard to data sources obtained from review of course through the use of modified Quality of Online course rubric, the researcher used direct interpretation analysis to connect evidence obtained as well as a rubric to compare the online course designs across participants.

In regard to analysis of supplementary documents collected, this researcher reviewed documents that were provided by participants, e.g., syllabi, rubrics, and ancillary course content materials using direct interpretations as evidence evaluations to support participant views on extent to which participants had grounded the design of their online instruction on scientific-based research and theory.

The researcher also looked into the syllabus for IDL 6543 for indirect evidence of grounding design of instruction because all online faculty educators were required to take this course in order to be able to teach complete online courses at the target university.

Guidelines Used in the Analysis of Specific Research Questions

The following are the guidelines related to the interpretation of evidence from data to answer each research questions from all data that were collected from participants. The data were analyzed to answer four research questions to show the extent to which participants had grounded the design of their online instruction on scientific-based research and theory.

Research questions on this study focused on four main areas such as:

1. The meaning and definitions of grounding design of instructions as expressed by Research Question 1,
2. The demonstration of evidence of grounding of instructions as expressed by Research Question 2,
3. Steps and processes faculty educators takes in order to ground design of instructions as expressed by Research Question 3, and finally,

4. Issues causing or failures preventing faculty from grounding design of instructions as expressed by Research Question 4.

In regard to Research Question 1, analysis and interpretations, the grounded practice and design framework offered the definition of grounded design, which was defined as a process of linking the practices of learning system design with related theory and research (Hannafin et al., 1997). The researcher of this study used this definition in analyzing the participant's views from interview data and evidence from course and document review data in answering research question one.

Concerning Research Question 2, the four criteria from grounded practice and the design framework (Hannafin et al., 1997) of: (a) practices that are based on a defensible theoretical framework; (b) practices that reflect close links between empirically verified approaches and those employed in a given learning system; (c) the ability to generalize and be applied in more broadly; and (d) ability to be validated iteratively through successful implementations, were used to evaluate views from interview data and supportive evidence from course review and document review data provided by participants in analyzing Research Question 2.

Specific to Research Question 3 analysis and interpretations, two criteria from the grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) (a) practices that are based on a defensible theoretical framework; (b) practices that reflect close links between empirically verified approaches and those employed in a given learning system, plus literature of (McKenney & Reeves, 2012; Richey, 2007) systematic processes that align underlying foundation to corresponding activities as well as uses of

systematic instructional design processes and tools such as ADDIE models, were used to assess processes in evaluating and analyzing participants' views from interview data as well as supporting evidence from course review data and document review in answering research question three. Possible indirect evidence was obtained by looking at the syllabus for IDL 6543 course in gauging the process through which faculty educators used when designing their fully online course project from the course.

In regards to analysis of Research Question 4 of what issues are causing or failures preventing faculty from grounding design of instructions as expressed by research question four, this study researcher focus to use the literature as a canvas for which participants views and evidence are measured and interpreted against. Possible evidence noted in literature included the issues and failures of lack of time, insufficient resources, insufficient training in instructional design, lack of instructional, technological, and administrative support and as well as the political decisions beyond the control of the course designer.

Although the grounded practice and design (Hannafin et al., 1997; Wang & Hannafin, 2005) framework calls for conducting research that is designed-based and in a real-world-setting, the framework does not offer guidelines on how to analyze collected data. In this study, the researcher looked into qualitative procedures for guidelines in analyzing raw data. The sources of data for analysis were data collected from participant interviews, course review of some online courses designed by participants collected using modified Quality of Online course rubric, and analysis of supplementary documents

collected from participants. Ancillary items collected included the syllabi, rubrics, other course supportive materials and course content materials.

Evaluative Processes of Validation and Verification

Credibility

Findings within the literature have emphasized that qualitative researchers must be particularly careful to demonstrate that their studies are credible (Creswell & Miller, 2000). The credibility refers to how accurately an account represents participants' realities of social phenomena and if that account is credible to the actual participants. In order to maintain the credibility of this qualitative study, the researcher implemented Creswell's (2007, 2009, 2014) suggestions regarding design considerations, data generation, analysis and validation strategies. They are explained as they were applied in the present study of grounding design of online instruction on scientific-based research and theory:

- Triangulation. The researcher used multiple and different sources of data collection such as interviews, course review data and review of documents obtained from the participant using a case study.
- Peer review/peer debriefing. The researcher requested research peers to review the analysis and interpretations of study data to verify this study researcher's reporting.

- Clarification of research bias. The researcher documented his past experiences, biases, prejudices, and orientations that likely shaped his interpretation and approach to the study from the outset of the research. This was conducted to ensure that readers understood the researcher's position and any biases or assumptions that may have impacted the inquiry.
- Member checking. Given that this study resulted in a dissertation, the dissertation committee members acted as external auditors by examining both the process and product to verify that the findings, interpretations and conclusions were supported by the data.
- Thick rich description. The dissertation writing process provided an opportunity to write detailed accounts of participant interviews, course review, document review and settings in which the case occurred.
- External audits. The researcher provided a draft to external editor who critiqued the document and offered suggestions.

Evaluation

In regard to evaluations, it has been noted that, though validation is an aspect of evaluation and has sometimes been used to evaluate the quality of a study, other criteria also serve that purpose, according to Creswell (2007, 2009, 2014). Following are evaluation strategies suggested by Creswell (2007, 2009, 2014) which were adopted by the researcher in order to maintain high quality of evaluation in this case study: (a) clear identification of the case in the study, (b) use of the case to understand a research issue,

(c) clear description of the case, (d) identification of themes for the case, (e) assertions and generalizations made from the case analysis, (f) reflexivity and self-disclosure about the position of the researcher in the study through expounding on potential biases and past experiences likely to have shaped the assumptions of the study, and (e) uses of clear five-step process to analyze and represent data and answer research questions, i.e., detailed description of the case, direct interpretations, cross-case analysis, pattern establishment (themes) and naturalistic generalizations.

Stability

Creswell (2007, 2009 2014) wrote that the reliability of a case study is the stability of responses and interpretation of data analysis. To enhance the stability of this study, the researcher obtained three different sources of data types, i.e., interviews, course and document review, employed a reliable instrument for recording interviews, transcribed interviews shared detailed notes with a peer reviewer, external member as well as an editor for accuracy and finally for stability of study interpretations, grounded the study on the framework found in scholar literature.

Ethical Issues and Other Considerations

Because of the potential harm that may affect those taking part in research, it has been emphasized in the qualitative literature that ethics should be a cornerstone concern for educational researchers (Burton & Bartlett, 2009). Prior to initiating any aspect of the research, the proposal was submitted to and approved by the university's Institutional

Review Board (IRB), including completion of protecting human research participants course from National Institute of Health (NIH), see Appendix D for more information. In this regard, this study researcher followed adherence to legal and ethical requirements for research involving people. These included not deceiving, protecting from harm, providing informed consent information for interviewees, and ensuring participants' anonymity. The researcher was also careful to address issues related to maintaining participant information, confidentiality, openness, access to findings and avoiding harm before and throughout the research as well as debriefing after research ended (Burton & Bartlett, 2009; Creswell, 2007, 2009, 2014).

Researcher's Reflection on Role and Biases on Methodology Section

Qualitative researchers have been encouraged to self-reflect, reflect with other researchers, reflect on participants and on the theoretical framework of what they already know from previous research and to relate to literature, according to suggestions of Jones, Torres & Arminio (2006). There are varied roles a research can take in a qualitative study and as such, this researcher undertook and active facilitator role in order to manage interview process to enable participant express their thoughts, feelings, views, experience (Ritchie & Lewis, 2003). The researcher also took an opportunity to self-declare/self-reflect so as to clarify any research biases, past experience, prejudices and orientation in the area of instructional technology. Four specific areas addressed were: (a) Reflections of this study researcher's reflective practices, (b) Reflection on individual sections of the study, (c) Researcher's self-declarations and (d) personal researcher emotional and

thought processes during the study research. A complete reflexive practices section is located in Appendix E.

Summary

The methodology section focused on discussion of methods, procedures and techniques for obtaining and analyzing data. Specifically, the purpose of the study, research questions, research design, participants, setting, instrumentations, and data collection procedures used in interviews, course review, and document review. Data analysis procedures were detailed. Guidelines used in the analysis of data for the overall research study were presented along with guidelines used in the analysis of specific research questions. Evaluative processes of validation and verification (i.e., credibility, evaluation, and stability), ethical issues and other considerations were also presented. The final section of this chapter provided for a brief statement regarding the importance of the researcher's reflection on roles and biases in regard to the methodology of the study. Chapter 4 contains the findings of the study including detailed descriptions of the cases, analysis of each case organized around the four research questions, cross-case analysis, and identification of themes.

CHAPTER 4
FINDINGS

Introduction

This study was conducted to explore the decision processes through which higher education faculty educators grounds their design of online instruction using scientific-based research and theory. This chapter contains the findings of the research. Findings have been organized around the four cases, providing a background description of each participant, a detailed report of the conversation with and voice of each participant, descriptions of course review captured using Quality of Online course rubric, course syllabi as well as other ancillary document obtained from each of the participants. Analysis of research questions for each case, cross-cases analysis, theme analysis, and the researcher's reflections on data analysis are also addressed.

As was highlighted in the methodology chapter, criterion sampling was used to identify sample participants for this study. The main rationale for this study was to showcase various perspectives, views and processes faculty in different departments used to ground their design of online instruction on scientific-based research and theory. A total of four participants agreed to take part in this research study. The three females and one male who agreed to be interviewed were from four different colleges and departments within the university. At the time of the interviews, three of the participants indicated they were teaching fully online or hybrid courses.

Findings from Participants Background

Before the findings are addressed, the researcher took this section to described in-depth backgrounds, setting and description of the participants to enable and set the tone for the reader to appreciate findings. In describing the case(s), the researcher used the suggestions of Stenius et al. (2008), describing the case systematically and including snippets of raw data for illustrations throughout the case description, the findings, analysis, and discussion sections. In order to maintain the confidentiality of the participants (Kaiser, 2010), the researcher also employed the use of pseudonyms for the participants: Participant 1 was referred to as Dr. Jones; Participant 2, Dr. Robin; Participant 3, Dr. Marion; Participant 4, Dr. Banks. The researcher strived to maintain a balance between in-depth descriptions and maintenance of confidentiality. The researcher's main goal was to obtain participants' views and perspectives on the processes of grounding the design of online instruction in scientific-based research and theories. The participants interviewed met the selection criteria of having previously taught both online and blended courses and were currently teaching a fully online course in a higher education environment. The participants also met the listed criteria, having been nominated by the online distance education department at the target university as an ambassador of online learning at the university. Ambassadors of online learning were faculty who were selected by the online distance-learning department as the best faculty in their area of expertise because they previously had a successful experience teaching online at the target university.

At the time of the interview, Dr. Jones was an associate professor in her college department, has published in research journals, was recipient of numerous research and training grants, and had conducted various conference presentations. Dr. Jones started teaching online courses in 1995 in her previous university before moving to the target university and had been teaching online since then. Dr. Robin, has been teaching online since 2004. At the time of interview, he had migrated all his online courses to the new Learning Management System (LMS) platform known as Canvas by Instructure. At the time of the interview, Dr. Marion was a chair and associate professor in her department; Dr. Banks was an instructional designer/faculty developer in her department.

Case 1: Dr. Jones

Background Description of Dr. Jones

Once Dr. Jones accepted the invitation to participate in the interview for the study, the researcher carried out the subsequent email communications with her to establish the interview date, time, and place. Dr. Jones had agreed to be interviewed in her office on Thursday September 13th, 2012 at 2:29 pm. The researcher proceeded to the agreed location with writing materials, audio recording device, hard copies of the printed interview protocol sheet, and a release statement.

After introductions and exchange of pleasantries, the researcher thanked Dr. Jones for agreeing to be interviewed for the study, briefly described the study, shared how the interview would be carried out, and shared a hard-copy of the interview protocol sheet

and a release statement form with her. After all the preliminaries were concluded, the researcher asked Dr. Jones' permission to audio record the interview. She granted permission, and the researcher proceeded to turn on the audio recording device and used the interview protocol sheet as a guide to ask questions and conduct the interview. The researcher also used probing questions during the interview as a means of clarification, expansion of understanding, and to elicit additional responses from Dr. Jones.

The researcher tried to stimulate the conversation by nodding, probing with follow-up questions, and seeking clarification while at the same time, writing and noting important key points in a journal. During the interview, Dr. Jones appeared jovial, effusive, displaying a sense of humor and laughing. She demonstrated how she worked on her course, discussed key issues, and provided explanations to showcase the design of her particular course and during this process the researcher noted course review on the modified quality of online course rubric (See Appendix C).

At the end of the interview, the researcher stopped the audio recording device, thanked Dr. Jones for giving her time to the study and taking part in the interview. The researcher assured Dr. Jones that her responses would be kept confidential. After the interview, the researcher sent her an email note thanking her again for participation in the interview for the study and to see if there was anything else she might have forgotten to mention or wished to add to the study.

After the interview, the researcher summarized interview notes in the journal in order to "capture" main points of reference and to accurately "record" and "confirm" meaning, as suggested by Burton and Bartlett (2009, p. 89). The researcher then

transcribed the recorded interview by importing audio media of the interview to the computer media player that allows easier control of the play speed. While on slow play, the researcher listened and transcribed the interview using Microsoft Office Word, stopping the play as necessary. This process was repeated until all the audio was transcribed. A final run-through was performed to make sure the printed transcription matched the audio transcript, and a final spell check was performed. This same process was employed in the transcription of data for all participants who agreed to have their interviews recorded.

Conversation With and Voice of Dr. Jones

The interview protocol was used by the researcher as an instrument to elicit the views and perspectives of Dr. Jones in regard to how she grounded the design of online learning in scientific-based research and theory. Key excerpts of the conversation with Dr. Jones are contained in the following paragraphs. This is by no means a transcript of the conversation. Rather, it is a description of the conversation, highlighting key areas of interest in the study. This is intended to highlight Dr. Jones' voice, her perspective, and her views with respect to the interview questions.

In response to the first interview question, "Tell me about the process you go through in designing your online course," Dr. Jones described the process she used in designing her online course. She reported that, as a faculty member, she participated in and completed an IDL 6543 course required for all faculty who design and teach online courses. Dr. Jones added that, as part of the course requirement, she planned and

produced a complete course as a project for the IDL training course. She was very happy to have an assigned instructional designer for consultation who worked with her in the creation of course materials and the process of designing instruction following the ADDIE model of instructional design. The researcher also probed further and learned that the created project course was a fully online course.

The researcher posed the second interview question as follows: "How do you define the process of anchoring/grounding the design of online instructions? Some people call it evidence-based practice--is there a word or term you use in your area?" Dr. Jones confirmed that similar terminology exists in her field too. The following vignette provides Dr. Jones' definition of the process of anchoring/grounding the design of online instruction using evidence-based practice.

> I try to follow the sound instructional design principles in terms of having clear objectives, content, reflective of objectives and assessments that can determine whether these objectives were met. But in addition, I try to have an interactive collaborative process built into each of the modules in a course so that there is scaffolding that occurs.
>
> . . . I am able to give the kind of feedback to students as they are developing conceptual understanding of the course content, so that they can actually interact with each other, and I devise activities online that require them to discuss, debate, collaborate. I believe that the courses that I teach online embody both aspects of a theoretical or evidence-based/research based approach in having

both a clear, solid design that is based on instructional design principles and to have a constructivist approach in terms of the interactions.

In responding to the second interview question regarding defining the process of anchoring/grounding the design of online instruction, Dr. Jones touched on the third question as to how her teaching philosophies and epistemologies affected the design of her online instruction. She discussed various implications and background such as the growth of the ADDIE model, her progression from a behaviorist to a constructivist perspective and the effect of designing and teaching online courses. As an example, she highlighted her online philosophy as follows:

> I always felt from beginning, and I try to embody this in how I design my courses, that interaction was really critical, and that, there has to be something more than individual having access to contents, absorbing that content and taking a test to see if they have acquire that content.

Dr. Jones also expressed that because of her own personal convictions it is essential that when she teaches a course she is not just depositing information in the minds of students, but that all are collaborating together to make sense of something that she happens to relate to the topic being taught. The following comment highlighted her responses regarding the implications of her teaching philosophy and epistemology on her instruction.

> I happen to have the greatest amount of expertise, knowledge and skills to be able to act as sort of a conductor of an orchestra, but the richness of being in the course is that you are in a community of learners.

She further elaborated, expressing that in all of the online courses that she teaches, she tries to find a way to bring in some kind of interaction and connection so as to optimize the experience for each student. However, she noted that this aspect of collaborative and interactive experience also has its downside, especially as it concerns group projects, assignments, and other graded activities that require group participation. She explained:

> I used to have more group projects that they would turn in for a grade that would be given to everybody. I have changed all of that because of students' unhappiness with some of the collaboration aspects in the course. Now, I try to make collaboration facilitative of individual achievement, individual products but not group products or group efforts.

To achieve this goal, Dr. Jones reported that she revised the course, changing all mandated group projects to individual or group or individual pairs or group and to allow students to make choices. She found out that one-third of her students chose individual assignments. The researcher, using a fourth question, queried Dr. Jones about specific research-based evidence indicating her grounding of the design of her online course. She mentioned three examples of specific research-based evidence that she used to ground her design and delivery of her course: the ADDIE model, the SLOAN principles, and the ISTE principles. Dr. Jones also recalled that during the design of her IDL course project, she had been exposed to national standards based on literature such as online learning, adult learning, and Scholarship of Teaching and Learning (SoTL).

The fifth question posed to Dr. Jones by the researcher was, "What problems and issues have you encountered when designing your online courses?" Dr. Jones described the technical problems she has encountered because of her use of videos in her course. She specified problems such as plugins that need to be updated constantly in order to view videos and that this constant need to update can cause problems for students and faculty. The other problem she faced was the conversion of video format from one Real© format to Flash© format. As an example, she described having to convert 87 video clips and the time and resources required to accomplish the task. She described a third problem related to the difficulty of simulating face-to-face experiences for online students in the following way:

> I really holdfast to the principle that the experience cannot be a lesser experience for them than it would be if we met face-to-face because it is online. Although I cannot make it identical, I can attempt to create experiences for them that are as close to a real time face-to-face situation as I can.

Although Dr. Jones acknowledged she could not replicate the experience of face-to-face to online environment, she described other actions she has taken to enhance online learning experiences for her students such as providing extra resource links and threaded discussions. This is helpful because online learning is not limited by time, as it would be if the course was face-to-face. Although these resources contribute to student learning, she also acknowledged that this would double the amount of work and create other issues. This was apparent in her reflection touching on the challenges and benefits of online courses versus face-to-face courses.

> That doubles the amount of work they would do, so, I think these are all things that as the courses are being designed; these are problems or issues that you have to think through and really question yourself. Are they losing anything by taking an online course versus if we were doing these together in a creative way that I can get them to engage to these materials?. . . and a deep way that might be identical to how they would do in face-to-face? Would that be equivalent or a second best approach or would I do a course online if I felt like it couldn't accomplishes the same thing?

A further probe by the researcher regarding problems and issues concerned who made decisions on whether the courses would be totally online versus face-to-face or mixed-mode. Dr. Jones replied that faculty make the decisions as to whether the course is online, face-to-face or mixed mode/hybrid. She illustrated this in discussing the fact that her course would be the least expected course to be taken fully online because of the methods of teaching that had been used. She decided, however, to offer it online in collaboration with other colleagues, because it opens the world to both faculty and students, allowing people teaching English in any part of the world to take the course and achieve a certificate online.

Next, Dr. Jones was queried about resources that were available to her when designing a course, such as the IDL course mentioned earlier. Dr. Jones praised the support and the quality provided by the University. She explained that because of her experience teaching online and the fact that she received a prestigious award the first time it was offered in her previous University, she initially resented the policy, which required

all faculty to take the IDL course in order to teach online. But her attitude changed quickly as illustrated by their following comments:

> I kind of resented it, but, I went ahead with taking the course because there was no way around it. I was very happy that I took it because it was a quality experience to have the whole team of support and to be made aware of everything that University offers to faculty, and I have become a big consumer of the services.

In concluding the interview, Dr. Jones was asked if she had any suggestions that might be of assistance to the researcher in completing the research study. First, she encouraged the researcher to go to faculty center for teaching and learning at University, because the center has boundless resources of literature in this specific field of research. Second, she cautioned the researcher not to exclude information that is outside post-secondary education because such literature of information has an impact on higher education. Finally, she observed that some faculty might not be able to articulate precisely in the language needed, i.e., grounding design of instruction, but that if the researcher looked at the big picture, he would likely be able to see how the courses faculty have designed do meet their own philosophy of learning.

Description of and Findings of Course Review for Dr. Jones

As part of the course review process for the researcher and for the purpose of triangulation of the data collected for the study, the interviewer requested that Dr. Jones reference a specific course for the purposes of the discussion. During the interview, Dr.

Jones shared information about her course design, showing the researcher the design and flow of the course. She also took time to respond to the questions posed during the interview as they related to the course. The course project she completed in the IDL training course was a graduate online course that is available for all language speakers to take as part of obtaining a certificate to teach the language.

Course content took the form of videotape clips of instructors, student and teachers teaching in classrooms in K-12 elementary, middle and high schools. These video clips are used to showcase teaching techniques. At the time of interview and course review, which was fall semester 2012, Dr. Jones' one course was housed in Blackboard Vista Learning Management System.

From the course review using the modified Quality of Online course rubric, all 11 items under organization and design criteria categories met the criteria of availability during the review of the course. Following are a few examples of the 11 elements under the organization and design category that were met: each course includes an introduction and/or cyber tour to introduce the student to the course; course is visually and functionally consistent, including consistent navigation; and units of instruction are subdivided in subunits, with headings and subheadings that are logically linked. The nine elements of the course content category were all met, including such examples as Element 1, the course description, goals, objectives, content, and assessment are consistent; and Element 2, content links are current and functional.

The 11 elements in the instruction category were all met including the example of Element 1, demonstrates multi-modal teaching strategies such as visual, textual,

interactive, and/or auditory activities to enhance diverse learning styles and needs of adult learners. The 13 elements in the interaction category were all present including the example of Element 2, as a facilitator rather than a provider of content, instructor generates questions to stimulate thought, test ideas, and promote critical thinking. Finally the six elements in the evaluation and assessment category were all met including the example of Element 2, a variety of content-relevant assignments or evaluative exercises are provided.

Description and Findings of Dr. Jones' Course Syllabus and Ancillary Documents

As part of the researcher's effort to triangulate the data, the researcher also collected ancillary document such as syllabus Dr. Jones. At the end of the interview, Dr. Jones was kind enough to offer to e-mail the researcher the course syllabus which proved to be a very detailed 12-page document containing the following information: instructor contacts, course information, course descriptions, course objectives, required and supplemental texts, missed assignments/make-ups, evaluation and grading, assignment points and choices, and academic honesty. The syllabus also contained a course schedule indicating when and what activities needed to be completed, and an assignment section where student could choose among activities and assignments. The format of assignments and other pertinent information such as submission title, name, and grading criteria were also included.

The researcher reviewed the syllabus document using the modified Quality of Online course rubric. The researcher went through each criterion element of the rubric to

see if it was applicable to the syllabus and checked "met" criteria if item was present. Following are the findings: in the organization and design category, all the applicable criterion was met. As an illustration of this, Criterion 3, R*equired course elements are clearly delineated from supplemental elements,* was clearly met as seen in Dr. Jones syllabus, p. 2; in the course content category, Criterion 2, *Learning outcomes, performance objectives and student expectations for assignments, discussion, participation and projects are clearly explained,* was clearly met as seen in Dr. Jones syllabus, pp. 2-4; in the instruction category, Criterion 5, *Clear and concise instructions and expectations are provided, including those for collaborative or team-based learning activities.* Dr. Jones' syllabus clearly articulated the what activities, how to be done, when (schedule), expectations (evaluations and grading), this criterion is used as an example that the criteria under this category were met; in the interaction category, Criterion 1, *Expectations for communication, collaboration, accountability, and peer coaching among students and between students and faculty are defined and established,* is one of criterion applicable to syllabus and was clearly met when looking at Dr. Jones' syllabus; Finally, in the evaluation and assessment category, Criterion 1, *Detailed step-by-step instructions are provided with each exercise, including guidelines for submitting assignments,* was applicable to syllabus. In examining Dr. Jones' syllabus, it was clearly met with description of each activities, instructions on how to be carried out, expectations, grading, what to expect if it is missed or submitted late, how to rename files and hints to assist students.

Analysis of Research Questions for Case 1: Dr. Jones

Research Question 1

What does it mean for a faculty educator to ground the design of online instruction in scientific-based research and theory?

The grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) offered the definition of grounded design as a process of linking the practices of learning system design with related theory and research (Hannafin et al., 1997). The researcher used this definition in analyzing the participant's views from interview data and evidence from course review and document review data in answering Research Question 1.

In addressing Research Question 1, the researcher looked at Dr. Jones' definition of terms and processes of grounding the design of online instruction. Dr. Jones did not offer a defined meaning of grounded/grounding the design of instructions; however, it was evidenced from interviews that she knew what it was. For example, she mentioned that: "I try to follow the sound instructional design principles in terms of having clear objectives, contents, reflective of objectives and assessments that can determine whether those objectives were met"

Dr. Jones continued to mention key issues in grounding the design of instruction such as the use of ADDIE model as a benchmark process to design online courses, the use of behavioral objectives to design course modules that enable students to meet those objectives in demonstrable ways that can be assessed and confirm that they met those

objectives. Dr. Jones summarized the extent to which she believed her courses were grounded in theory and evidence-based research:

> I believe that the courses that I teach online embody both aspects of a theoretical or evidence-based/research-based approach in having both clear, solid, design that is based on instructional design principles so as to have a constructivist approach in terms of the interaction of students.

In order to answer the overall meaning of Research Question 1 to Dr. Jones, i.e., the implications, the researcher was specifically interested in three key issues related to grounded design: (a) the definition; (b) the processes of designing online instruction; and (c) the epistemological beliefs of the faculty as they related to grounding the design of online instruction. Dr. Jones mentioned numerous implications of teaching philosophies and epistemologies as affecting the grounding design of online instruction. These included a paradigm shift affecting the approach to providing instruction, the design of the courses and changes as to what to focus on. As one example, Dr. Jones mentioned the importance of being true to her personal convictions and collaborating with students in the classroom:

> Through my own personal convictions, I try, and it is essential that what I teach in a course is not just depositing information in the minds of students, but that it is all of us collaborating together to make sense of something.

She elaborated further as to how her philosophy could also affect the design of her online courses:

> I always felt from beginning and try to embody this in how I design my courses that interactions were really critical and there has to be something more than the individual having access to content, absorbing that content, and taking a test to see if they've acquired that content.

Although it was not possible to answer first part of Research Question 1 (definition of grounded design) using course review data directly, it was evidenced from the review of syllabi, Quality of Online course rubric that the course objectives were aligned to course activities to instructional strategies and to student assessment.

Research Question 2

What evidence do faculty provide to demonstrate that their designs of online instruction are grounded in the elements of scientific-based research and theory?

The four criteria from grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) of: (a) practices that are based on a defensible theoretical framework; (b) practices that reflect close links between empirically verified approaches and those employed in a given learning system; (c) the ability to generalize and be applied in more broadly; and (d) ability to be validated iteratively through successful implementations, were used to evaluate views from interview data and supportive evidence from course and document review data provided by participants in analyzing evidence provided by the participants to demonstrate grounding elements of their courses.

In posing Research Question 2, the researcher sought to identify specific issues highlighted by the framework's four criteria. These issues included instances where

scientific-based evidence, standards, theories, grounded instructional strategies, and instructional models identified in the literature were used in designing course instruction. Specific scientific-based research mentioned by Dr. Jones included the use of ADDIE model, The SLOAN principles, ISTE principles, National Standards guidelines, online learning principles, and adult learning principles among others. The following excerpt from Dr. Jones' interview highlights key issues she discussed:

> I remember that when I took the IDL course that we were exposed to standards that existed nationally that help guide faculty; and those standards are based on the literature, not only on online learning but also adult learning and scholarship of teaching and learning, and I think that that provides a solid grounding to design and deliver courses.

From rereading the background information and interview conversation with Dr. Jones, the researcher gained a sense that Dr. Jones' teaching experience, both face-to-face and online, and the research in the field had served Dr. Jones well. As indicated in the following quotation, Dr. Jones has presented evidence in the interview of solid grounding in the design of her online course and her course delivery based on instructional models and reflection on her prior experience and her interest in helping students learn:

> I believe that the courses that I teach online embody both aspects of a theoretical or evidence-based research-based approach in having both clear and solid design that is based on instructional design principles and [allows me] to have a constructivist approach in terms of the interactions.

Although course review data obtained using the Quality of Online rubric and analysis of course syllabi do not tell us or show evidence of what grounded design processes were used when designing Dr. Jones' course, the indirect evidence were available through IDL 6543. Dr. Jones had indicated that the observed course was a project from IDL 6543; therefore, in looking at syllabi and other IDL 6543 ancillary document and web information, it was evidenced/indicated that research-based (grounded processes) issues such as instructional design, pedagogy, and best practices were addressed and used during construction of Dr. Jones' online course.

Research Question 3

What steps do faculty take in order to ground their designs of online instruction in scientific-based research and theory?

Two criteria from the grounded practice and design (Hannafin et al., 1997; Wang & Hannafin, 2005) framework of (a) practices that are based on a defensible theoretical framework; (b) practices that reflect close links between empirically verified approaches and those employed in a given learning system, plus literature of (McKenney & Reeves, 2012; Richey, 2007) uses of systematic processes that align underlying foundation to corresponding activities as well as uses of systematic instructional design processes were used to assess processes in evaluating and analyzing participants' views from interview data as well as supporting evidence from course review data and document review in answering this research question.

Based on the interview with Dr. Jones, the following remarks were made regarding her processes and efforts to ground the design of online instruction in scientific-based research and theory. Dr. Jones indicated in her interview that she used the ADDIE process when designing her online course. The ADDIE model is the acronym standing for Analyze, Design, Develop, Implement and Evaluate and is a process used in creating courses. Dr. Jones also indicated that she followed sound instructional design principles in having clear objectives and content, noting that she reflects on objectives and assessment when designing her instruction. Other steps taken by Dr. Jones in the design process included building interactive collaborative activities into each module to provide scaffolding; devising online activities requiring students to discuss, debate and collaborate; and finally while teaching, Dr. Jones interacts with students, providing them with feedback as they develop conceptual understanding of the course content.

Given that the course review data obtained using Quality of Online rubric did not reveal how the course was designed, the researcher looked into the ancillary documents of IDL 6543 because Dr. Jones had indicated her course was designed as a project of IDL course. Looking at the IDL syllabi and other documents, it was revealed that the ADDIE model was followed in designing the instruction. It was also apparent that course objectives were grounded in Bloom's taxonomy. Other grounded design frameworks, instructional system design models, processes, and grounded instruction strategies were addressed and used.

Research Question 4

What are the main causes that may prevent faculty from grounding the design of online instruction in scientific-based research and theory?

In responding to this question, the researcher focused on items that were problematic in the design of online instruction based on the literature review and that emerged as a result of the individual interviews conducted. Items frequently mentioned as presenting barriers to the grounding of instruction were: lack of time; resources; training; lack of instructional, technological, and administrative support; and political decisions beyond the control of the course designer.

Dr. Jones mentioned several specific problems and issues she encountered. One of the problems was the difficulty of aligning teaching strategies using available technologies as indicated in the following comment: "So what I have done is collected video clips and created video clips of myself, students and teachers in real classrooms, demonstrating the different techniques and such, an sometimes that can be problematic." The problem, as explained by Dr. Jones, was that because she was teaching an online course that had practical components related to teaching, students need to see "teaching in action" and watch demonstrations of teaching.

Another problem mentioned by Dr. Jones was technological resulting from a change in the video format during the upgrade of the Learning Management System. Because of this, she had to convert 87 videos from Real© format to Flash© and accommodate the need to constantly upgrade the video plugins in order to watch flash videos. Another problem or issue mentioned by Dr. Jones was the difficulty in changing

the expectations of the students from independent work to collaboration in order to provide them with an optimal online experience. Her comment, in this regard, follows:

> Sometimes it has been in conflict with some of the students who have expectations that they want to work independently. They read this stuff, they take the test, they click on the next, and I have to rethink some of that, because I want the experiences to be optimal and for each student.

Dr. Jones elaborated on the issue of student dissatisfaction with graded group activities because group members can adversely affect other group members' grades. To alleviate the dissatisfaction and resolve the issue, Dr. Jones described the following action she took:

> I used to have more group projects that they would turn in for a grade that would be given to everybody, and I have changed all of that because of students' unhappiness with some of the collaboration aspects in the course; and I try now to make collaboration facilitative of individual achievement, individual products but not group.

Data from course review and from document review was not helpful in answering Research Question 4. Dr. Jones mentioned problem issues, however. She noted the difficulty of aligning instructional strategies, similar to the mismatch problems mentioned in the grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) as well as evidence noted in literature that included the issues and failures of lack of time, insufficient resources, insufficient training in instructional design,

lack of instructional, technological, and administrative support and as well as the political decisions beyond the control of the course designer.

Case 2: Dr. Robin

Background Description of Dr. Robin

Dr. Robin was contacted through email and agreed to be interviewed for the study. Further communication and exchange of information pertaining to the interview led to establishing Monday, September 17 at 2 p.m. as the time for the interview, which was conducted in the instructor's office. The researcher briefed Dr. Robin as to his purpose and how he would carry out the interview and also shared the consent forms and the interview protocol.

After the initial pleasantries, the researcher requested permission to record the interview. Dr. Robin assented, and the researcher began the formal portion of the interview using the interview protocol, which contained seven questions as a guide. The researcher also used additional probes and follow- up questions to focus each question or clarify issues.

Conversation With and Voice of Dr. Robin

The interview protocol was used by the researcher as an instrument to elicit the views and perspectives of Dr. Robin in regard to how he grounded the design of online learning in scientific-based research and theory. It should be noted that Dr. Robin had been teaching online since 2004, and all of his current courses had been migrated to the

new Learning Management System called Canvas by Instructure at the time of the interview. Key excerpts of the conversation with Dr. Robin are contained in the following paragraphs. The description of the conversation was intended to highlight Dr. Robin's voice, his perspective, and his views with respect to the interview questions.

The first interview question posed to the participant was, "What process do you go through in designing your online courses?" Dr. Robin indicated that the process depended on two scenarios. In the first scenario regarding a previously taught face-to-face course, Dr. Robin described the process as seamless, noting that he would take existing courses and translate them to his own online environment (LMS) as follows:

> I try to translate exactly what I do in the classroom to the online and I have a number of writing assignments that I will have if I had prepped the class already; what I usual tend to do is record video lectures to cover what would have been done in classroom and so. . . the classes are essentially built.

In the second scenario where a course had not been taught previously and must be created, Dr. Robin shared his process:

> I usually sit down and design an online course, I have to think about where I want the course, how I want the course to build from lesson to lesson and what sort of things I can do for each component of the course to essentially go, from one assignment or module to another.

Dr. Robin elaborated on his process of designing a new course, reporting that he plans so as to incorporate a mixture of activities including videos, reading, primary documents, quizzes, writing assignments and exams throughout the entire class. He

thinks about how students start from "point A" to get to "point Z." He creates an outline and a blue print and then populates the course with content. In response to a follow-up question as to who made the decision about online vs. face-to face, Dr. Robin replied that it was the instructor's decision based on the judgment/needs of the instructor.

The second interview question was, "How do you define the process actually of anchoring the design of your online instructions on scientific-based evidence or grounded strategies?" Dr. Robin responded that he reflected on the process he used rather than seeking to understand it at the beginning stages of his course design:

> Once I design a course I'll go search the pedagogy and use it to understand what I did and why I did it but I don't do it at the design phase. Usually, I am asked to evaluate what I do online and it is part of evaluation process to understand what I did in pedagogical sense. At that point, it usually inspires me to look at what pedagogical definition is for what I did, but I am usually not prompted to do that in the design phase.

The third question posed was, "What implication do the teaching philosophies and epistemologies you hold have for the design of your online instruction?" Dr. Robin responded to this question at length. In his response, he shared his teaching philosophy and the epistemology upon which he relies in his online instruction:

> I am very much interested in a few things, one being, I expect students to be engaged in some sort of epistemological questions, so when I design lessons or when I design modules, I tend to design open-ended so there isn't an answer. Instead, I give [students] paths of different theories or possibilities and they are on

> their own to explore different theories and possibilities and come to the one that makes the most sense to them and to argue that case--so in effect, [they] come to critical self-understanding of the topic.

In summary, regarding the third interview question, Dr. Robin indicated that he expects students to engage in epistemological activities where the design is open-ended and that he provides students with paths of different possibilities, allowing them to make sense of their own and argue their own understanding about the issues being discussed. With the exception of quizzes and examinations, where factual knowledge is required, the design of the rest of student activities is open-ended. This allows students to engage in community-based learning where they deal with localized problem and solutions, engaged with local content/materials. This permits student understanding at a micro-level and enables students to engage in their own community as they learn.

The next question posed was, "What problems or issues have you encountered when designing your online courses?" Dr. Robin specified some of the related problems and issues he encountered when designing online courses in the following statement:

> One of the problems in designing an online course is creating assignments that achieve the same objectives as a synchronous discussion or Q & A. I know there are discussion features in an online courses; however, not having everybody in the same room at the same time diminishes the outcome or the significance of doing discussion online versus doing discussion in classroom with a captivated audience because in a classroom setting where students are inside and in front of you, they

can't be distracted, they can't go anywhere, and they can't engage in outwardly cynical practice.

I have found that when you try to moderate a discussion in a discussion feature in online LMS, that because of the anonymity of being a student online, a majority of students sort of fall back on sort of a cynical take in their online discussion. They do it as just kind of like they're filling out a checkbox, and they say, "Ok, I am done with this, and I don't have to worry about it anymore."

Dr. Robin also revealed that other problems he has run into are associated with group online activities. These include students' tendencies to do the bare minimum to meet the requirement, students behaving as if the exercises are meaningless, and the inability to replicate outcomes of classroom discussion in an online environment where group consensus is required. In contrast, however, Dr. Robin determined that an online environment is better suited for attention to individuals, and it requires that he work with individual students online as opposed to large groups of students.

Specific technical problems or issues identified by Dr. Robin while designing online courses include the following: All systems (LMS) do not function identically, and there is a lack of universality of best features. The features an instructor might assume to be on all LMS are not there, and the same features perform differently on different LMS. LMS upgrades can force instructors to change their instruction. Dr. Robin stressed the importance of thoroughly knowing the LMS before using it and realizing that the course had to adjust to an LMS as opposed to LMS conforming to the course.

The final interview question posed by the researcher to Dr. Robin was, "What resources are available to you when you're working on online courses?" Dr. Robin identified four resources that are available when designing online courses that he had used previously: (a) consultations with instructional designers from CDL, (b) resources available from Faculty Center for Teaching and Learning, (c) resources from OIR such as video lecture capture support and software tests, and (d) the support from the department level with issues such as purchases and other resources.

Description and Findings of Course Review for Dr. Robin

As part of course review for the researcher and for the purpose of triangulation of the data collected for the study, the interviewer requested that Dr. Robin reference a specific course for the purposes of the discussion. During the interview, Dr. Robin shared information about one specific course design, showing the researcher the design and flow of the course. He also took time to respond to the questions posed during the interview as they related to the course.

The course was located in the new Learning Management System (LMS) called Canvas by Instructure that was being rolled out incrementally at the time the interview took place. Dr. Robin's course met all the criteria on the checklist for the Quality of Online Rubric (Modified) in all five categories (organization and design, course content, instruction, interaction, and the evaluation and assessment). The rubric can be reviewed in Appendix C.

Because the Quality of Online course rubric contains fifty-six item criterion, the researcher selected and highlighted one criterion from each section of the rubric to illustrate the findings from Dr. Robin's course review. In the Organization and Design section of rubric, the criterion number five, *Units of instruction are subdivided in subunits, with headings and subheadings that are logically linked,* the course had modules and submodules with logical linked heading and subheadings; in Course Content category, all the criteria under this section were met, and for illustrations, the criterion number eight, *Courses are comparable in rigor to on-campus courses,* as Dr. Robin explained in the interview, content from this course were created from face-to-face content.

In the Instruction category of the rubric, all the criteria under this category were met and criterion number one, *Demonstrates multi-modal teaching strategies such as visual, textual, interactive, and/or auditory activities to enhance diverse learning styles and needs of adult learners,* clearly this criteria was also met because Dr. Robin had diverse media contents such as videos, text, images and audio as instructional contents; in the Interaction category, all the criteria were met and criterion number two, *As a facilitator rather than a provider of content, instructor generates questions to stimulate thought, test ideas, and promote critical thinking,* were evident during the interview and can be seen in the course where instructor design open ended activities to allow student construct their own knowledge, be critical thinkers and stimulate their thoughts and ideas; and finally, in the Evaluation and Assessment category, all the criteria were met and criterion number two is used here as illustration, *A variety of content-relevant*

assignments or evaluative exercises are provided, Dr. Robin's courses has diverse assignment and exercise such as quiz, writing, discussions, which clearly meets the criterion.

Description and Findings of Dr. Robin's Course Syllabus and Ancillary Documents

The syllabus for the course which Dr. Robin used to demonstrate the design aspect of grounding design of online instruction during the interview was four printed pages in length and was also available online in an HTML format with links that could be accessed for further information. The syllabus had a personalized design touch, complete with graphical images appropriate to the theme of the content.

The syllabus contained basic contact information for the instructor including email addresses, faculty web page URL, address, office number, office phone number, and social handle names for chats and instant messages. This basic information was followed by a course description, purpose of the course descriptions, required text list, specific course objectives for the students, course requirement instructions, rules for writing assignments, an examination, and quiz section, grading scale, attendance policy list, academic honesty statement, and portfolio descriptions including links to department requirements.

The syllabus also contained course due dates and a schedule in tabular format of assignment/topic due-dates. It was followed by a class protocol and list of instructions for email and discussion and assignments and quizzes. The syllabus was concluded with a tabular display of dates, days, details and due dates, all noting "Due by 11:59 pm".

Although all criteria applicable to syllabus were checked as met, the researcher included one criteria from each section of the rubric to illustrate the findings. In the organization and design category, for example, Criterion 2, *A list of standardized online course expectations is provided for all learners,* was met in Dr. Robin's course with the listings of course expectations such as rules for writing activities and the provision of class protocols. In the course content category of the rubric, Criterion 1, *Learning outcomes, performance objectives and student expectations for assignments, discussion, participation and projects are clearly explained,* was met because the syllabus for Dr. Robin's class contains clear descriptions of learning outcome, performance objectives and student activities expectations.

In the instruction category of the rubric, all the criteria applicable to the syllabus were met Criterion 3, *Learning activities are logically sequenced,* was used as illustration and in this, activities of the course are logically arranged based on topic flow of the content. In the interaction category of the rubric, all the criteria applicable to syllabus under this category were met. Criterion 1, *Expectations for communication, collaboration, accountability, and peer coaching among students and between students and faculty are defined and established,* was used as illustration. It evident from Dr. Robin's syllabus that the communication expectations and activities are clearly defined and established with the use and provision of class protocol and uses of class activities rules. Finally, in the evaluation and assessment category of the rubric, the applicable criteria for the syllabus were all met, and specifically Criterion 1, *Detailed step-by-step instructions are provided with each exercise, including guidelines for submitting*

assignments, was used to illustrate the findings. In Dr. Robin's course syllabus, clear step-by-step instructions are provided for learning activities (class rules) and course interactions (Class protocol).

Analysis of Research Questions for Case 2: Dr. Robin

Research Question 1

What does it means for a faculty educator to ground the design of online instruction on scientific-based research and theory?

The grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) defined grounded as a process of linking the practices of learning system design with related theory and research. The researcher in the present study used this definition in analyzing the participants' views from interview data and evidence from course review and document review data in answering Research Question 1. In analyzing the data to respond to Research Question 1, the researcher reviewed the interview conversation, analyzing terminology that would link grounding the design of online instruction. Although few instructional design terms and definitions were mentioned by Dr. Robin in arriving at his design, he noted that community-based-learning, blue print, micro-level understanding, and the concept of searching scholarly literature were used after having designed a course to understand what has been designed or to evaluate already created instruction.

During the interview, Dr. Robin demonstrated his understanding of grounded design to some extent in his: (a) searching and reviewing scholarly literature after the course is designed and created to understand the pedagogy employed, (b) using scholarly literature to support what has already been created for the course evaluation process and, (c) using specific grounded instructional strategies such as open-ended activities design to improve students' epistemological understanding, uses of community-based learning to allow students to scaffold understanding to a micro-level and allow students to understand local problems and possible solutions to those problems.

Although Dr. Robin did not explicitly address the meaning of grounded instructional design, he gave evidence of understanding and demonstrating the core concept of the grounded design process through his experience driven design process. In this process, he mentioned converting the instructional content from old courses to new and using a blue-print technique to design and visualize his final product before creating new instructional content from scratch as shown by the following comment regarding creating and reusing content from old courses:

> I try to translate exactly what I do in the classroom to the online, and I have a number of writing assignments that I will have if I had prepped the class already. What I usually tend to do is record video lectures to cover what I would have done in a classroom. . . and so the classes are essentially built.

This comment was in contrast to the careful process of creating a new course as explained in the following quotation:

> I usually sit down and design an online course, and I have to think about where I want the course, how I want the course to build from lesson to lesson and what sort of things I can do for each component of the course to go essentially from one assignment or module to another.

Data from course review and document review was not useful in illuminating Dr. Robin's grounded design nor in assisting the researcher to understand how Dr. Robin grounds his design of instruction in scientific-based research and theory.

Research Question 2

What evidence do faculty provide to demonstrate that their designs of online instruction are grounded in the elements of scientific-based research and theory?

Four criteria from the grounded design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) were used to evaluate views from interview data and supportive evidence from course review and document review data that were provided by participants to demonstrate grounding elements in their courses: (a) practices that are based on a defensible theoretical framework; (b) practices that reflect close links between empirically verified approaches and those employed in a given learning system; (c) the ability to generalize and be applied in more broadly; and (d) ability to be validated iteratively through successful implementations.

In analyzing interview data to respond to Research Question 2, the researcher sought to identify specific issues highlighted by the framework. These issues included

instances where scientific-based evidence, standards, theories, grounded instructional strategies, and instructional models identified in the literature were used.

Dr. Robin mentioned numerous instances of elements of scientific-based research and theory. These included the use of grounded design strategies such as community based learning, open-ended activities design, evaluation of courses by searching scholarly literature after course production for pedagogical understanding or evaluation. Other instances included the epistemological course design to allow students to scaffold understanding to local knowledge, ideas, problems and solutions.

In analyzing course review data as well as document review data, instances observed included different types of instructional content such as videos, reading materials, primary documents, quizzes, writing assignments and examinations in his course as well as the incorporation of interactive online activities, e.g., discussions and other group activities. These provided evidence that Dr. Robin's instruction was grounded on scientific-based research and theory based on a comparison with the parallel analysis of grounded design using the four framework criteria.

Research Question 3

What steps do faculty take in order to ground their designs of online instruction in scientific-based research and theory?

Two criteria from the grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) are: (a) practices that are based on a defensible theoretical framework; (b) practices that reflect close links between empirically verified

approaches and those employed in a given learning system. These criteria plus literature on the uses of systematic processes that align underlying foundations to corresponding activities as well as uses of systematic instructional design processes (McKenney & Reeves, 2012; Richey, 2007) were used to assess processes in evaluating and analyzing participants' views from interview data. They also provided supporting evidence from course review data and document review in answering this research question. Based on the interview data from Dr. Robin, the following comments are made regarding his efforts to ground his design of instructional on scientific-based research and theory.

Dr. Robin provided some good examples of steps an instructor can take in grounding the design of online courses in scientific-based research and theory. These included the translation of traditional content already taught in a face-to-face class to content meeting instructional goals that was appropriate for reuse in an online course. Other steps included the planning and designing of an outline for a new course which required addressing all aspects of the course. This included decisions as to where the course would take place, how each lesson was built, what needed to be done for each module and how diverse types of activities and content could be incorporated.

Because no data were observed during the design process, course review and document review data obtained could not illuminate the "how process" of grounding design of instruction for Dr. Robin. Because Dr. Robin did not mentioned using IDL 6543 process, the connection to IDL processes could not be established.

Research Question 4

What are the main causes that may prevent faculty from grounding the design of online instruction in scientific-based research and theory?

In responding to Research Question 4, the researcher focused on items that were problematic in the design of online instruction based on the literature review and that emerged as a result of the individual interviews conducted. Items frequently mentioned as presenting barriers to the grounding of instruction were: lack of time; resources; training; lack of instructional, technological, and administrative support; and political decisions beyond the control of the course designer.

Dr. Robin mentioned two causes that sometimes prevented him from grounding the design of instruction: (a) time constraints and (b) technological issues. He emphasized that the challenges in an online environment were almost all technical in nature.

Other noted difficulties and challenges of online instruction included the difficulty of designing and creating an online course with an outcome equal to that of a face-to-face course. Finally, another challenge Dr. Robin highlighted included the asynchronous nature of online discussions that are significantly more difficult to manage than those in face-to-face classes.

Case 3: Dr. Marion

Background Description of Dr. Marion

The report of Case 3 differs from that of the other three cases for several reasons: First, although Dr. Marion agreed to be interviewed, she did not wish to be audio-recorded; thus, no transcriptions were made, and the reporting for the case has been completed based on the researcher's notes and recall of Dr. Marion's words. Second, unlike other participants who discussed their online experience from a course-level perspective, Dr. Marion focused on the program level in her responses to the researcher's questions. Because of this, the discussion necessarily was concentrated on the program level. Also, because no specific course was addressed, it was not possible to discuss a syllabus or report on any course review or the use of a rubric.

Dr. Marion discussed program evaluation and specifically how a master's degree program was grounded in scientific-based evidence. The program, implemented by the target university in 2004, is a fully online master's program in which a group of students progress through online course work as a group, i.e., a cohort.

In reviewing the program's public website, the researcher learned that the program is completely online and offers opportunities for students to prepare for employment or advance their careers as administrators in the nonprofit sectors or with those organizations that partner with the nonprofit sector. Graduates of the mentioned program are equipped with the nonprofit management knowledge and analytic skills needed for a successful career in this rapidly growing sector.

Documentation related to the program made available to the researcher by Dr. Marion indicated that the program contains five main core competencies across the following areas: nonprofit organizations, volunteer management, nonprofit resource development, grants and contract management, nonprofit administration, public program evaluation, nonprofit financial management, human resource management and strategic planning.

The five core competencies are as follows:

1. Ability to lead and manage in a dynamic, mission driven, nonprofit sector.
2. Ability to analyze, synthesize, think critically, solve problems and make decisions for the purpose of strengthening nonprofit organizations, the nonprofit sector, and society at large.
3. Ability to communicate and interact productively with a diverse and changing workforce and citizenry.
4. Ability to articulate and apply a public service perspective emphasizing the role of civic society in democratic governance.
5. Ability to articulate and apply the values of honesty, stewardship, service, civic engagement, and social justice while functioning in the nonprofit sector.

Within these competencies are further sub-objectives for each of the core competencies.

Conversation With and Voice of Dr. Marion.

Once Dr. Marion accepted the invitation to participate in the research study, email communications were used to establish the interview date, time and place. The interview

was conducted in Dr. Marion's office on September 18th and lasted approximately 40 minutes. The researcher proceeded to the agreed location with writing materials, the printed interview protocol sheet, and a release statement. The interview began shortly after 2 p.m.

As has been noted, Dr. Marion did not agree to be audio-recorded. Thus, the following report of the interview was not a verbatim report but was constructed using (a) handwritten notes taken as the interviewer recorded key words and phrases of Dr. Marion's responses to the standard interview questions; (b) the use of other documents that Dr. Marion provided for review during the interview; and (c) other publicly available information obtained from the program's website.

In response to the first interview question, "How do you define the process of anchoring or grounding the design of online instruction in scientific-based evidence?" Dr. Marion responded that the program was based on professional skills and competencies from the organizations and from the literature. She noted that other sources of core competencies were developed based on standards of accreditation and other large organization bodies such as the Nonprofit Academic Centers Council (NACC), National Association of Student Personnel Administrators (NASPA), from industry best practices, and from best practices discussed in scholarly literature.

For the second question, "What implication do the teaching or learning philosophies and epistemologies you hold affect the design of online instruction?", Dr. Marion indicated that the entire online program had been built on the service learning method of teaching which is an applied model, enhances knowledge, and is a strong point

of the program at the target university. Service learning is defined as a teaching and learning strategy that integrates meaningful community service with instruction and reflection to enrich the learning experience, teach civic responsibility, and strengthen communities (Service Learning, 2012).

For the third question, "What specific research-based evidence do you base your study design on?" Dr. Marion cited the following four sources of specific research-based evidence. They were: (a) competency-based curriculum, (b) scholarly literature for best practices in the specialization, and (c) industry competencies, and (d) skills based on best practice standards.

The fourth question posed was "What process do you go through in designing your master's degree online course?" In response, Dr. Marion shared the various requirements of her program that must be adhered to by faculty in the process of online course design: (a) all faculty who are going to teach online take IDL6543 provided by the CDL and (b) individual faculty design their own classes with the help of instructional designers and teach with adjuncts. On the program level, (a) teams of faculty design and review the competencies, and (b) there is a team approach for the design and review of courses and creation of a template to allow for standardization or uniformity of competencies throughout the program. Dr. Marion also added that the team approach allows for the design and development of consistent competencies, evaluations, and leads to institutional effectiveness.

In responding to the fifth interview question, "What problems or issues have you encountered when designing your online courses?" Dr. Marion shared the following list

of management problems and issues she had personally experienced related to online courses:

- Difficulty of gauging, providing and assessing manageable online assignments.
- Difficulty of providing, creating and giving feedback using rubrics. This allows clear communication and expectation for and from students.

- The need to response to online posts regularly and at intervals; and to avoid constantly being online or leaving grading undone which results in grading backup and accumulation of activities needed to be completed.
- The difficulty and the need to clearly communicate to students in regard to their expectations, reminding them of due dates and follow-ups.
- Difficulty of and the needs to maintain consistency in communication, contacts, and expectations.
- The need for and the difficulty of designing "doable" assignments.
- Doubling or even tripling time required teaching online courses because of nuances with and management of students.
- The need to manage, and the difficulty of managing students online.
- Constant technical and technological problems such as changes in technology and Learning Management Systems (LMS).
- Technology disruption from when unplanned service interrupts and downtime occurrences.

Dr. Marion's response to the sixth interview question, "What resources are available to you when designing your online courses?" focused on the Center for Distributed Learning and the resources that are available to faculty for online course design through the CDL. These include, according to Dr. Marion, (a) one-on-one support by CDL instructional designers, (b) provision of two instructional designers during the design of course, (c) in-service and support, (d) troubleshooting of online issues once class is online, and (e) merging of classes.

Other resources mentioned by Dr. Marion were the support for the provision of embedded librarians at the satellite XYZ campus to an online course for training, remote access, quizzes and tutorials, teaching, writing and review of literature, discussions and tips on resources available, assistance, co-teaching, training module and availability. Dr. Marion emphasized how helpful instructional designers, librarians, and technology support such as tech-rangers were as resources available at the target university.

The last question posed was, "Is there anything you might add that would help this research?" Dr. Marion expressed that the main concern in an online environment was the need to learn how to develop community and camaraderie within the cohort, within online courses, strategies to create a community of learners in an online environment and how to enhance that community. She emphasized the importance of connecting with students and helping students connect to peers in an online learning environment, expressing hope that the researcher's work may be helpful in resolving some of the issues and challenges facing online teaching and learning.

Description of Dr. Marion's Syllabus and Ancillary Documents

Dr. Marion did not provide the course to be observed, therefore, there was no syllabi, no content to be observed using Quality of Online neither rubric nor ancillary materials for document review. The researcher did follow-up on ancillary material provided by Dr. Marion and located some material on the website, but all those materials were related to program information (not course information), and this was not very helpful in examining the course designed by the participant.

Analysis of Research Questions for Case 3: Dr. Marion

Research Question 1

What does it means for a faculty educator to ground the design of online instruction in scientific-based research and theory?

The grounded practice and design framework is defined as a process of linking the practices of learning system design with related theory and research (Hannafin et al., 1997; Wang & Hannafin, 2005). The researcher used this definition in analyzing the participant's views from interview data and evidence from course review and document review data in answering research question one. Dr. Marion provided a number of examples of how her program (not a course) design were grounded in scientific-based research and theory that were useful in responding to Research Question 1. She referenced areas such as the scholarly literature, best practices, accreditation organizations and other professional organizations where the competencies and skills are

developed, benchmarked, and grounded. Also, she noted that the use of a service-learning model, a model type that has been explored and investigated by various theorists and researchers, is another good example of grounding the design processes on evidence-based theory.

Because Dr. Marion did not reference or provide a course to be observed, no data were collected using the Quality of Online rubric for course review. All the document review content collected and reviewed were related to program level.

Research Question 2

What evidence do faculty provide to demonstrate that their designs of online instruction are grounded in the elements of scientific-based research and theory?

The following four criteria from grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) were used to evaluate interview data and supportive evidence from course review and document review data: (a) practices that are based on a defensible theoretical framework; (b) practices that reflect close links between empirically verified approaches and those employed in a given learning system; (c) the ability to generalize and be applied in more broadly; and (d) ability to be validated iteratively through successful implementations. These data provided by the participants, demonstrated the grounding elements of their courses.

In analyzing data for Research Question 2, the researcher sought to identify specific issues highlighted by the four criteria of grounded practice and design framework. These issues included instances where scientific-based evidence, standards,

theories, grounded instructional strategies, and instructional models identified in the literature were used. Specific evidence highlighted by Dr. Marion included the use of a competency-based curriculum, the use of scholarly literature, best practices in the area, and the use of industry standards and best practices in developing and grounding the skills and competencies in an online program.

Research Question 3

What steps do faculty take in order to ground their design of online instruction in scientific-based research and theory?

Two criteria from grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) are: (a) practices that are based on a defensible theoretical framework; (b) practices that reflect close links between empirically verified approaches and those employed in a given learning system. These criteria plus literature on the uses of systematic processes that align underlying foundations to corresponding activities as well as uses of systematic instructional design processes (McKenney & Reeves, 2012; Richey, 2007) were used to assess processes in evaluating and analyzing participants' views from interview data. They also provided supporting evidence from course review data and document review in answering this research question.

In evaluating the views and evidence against the framework criteria, the researcher used the grounded practice and design framework, instructional system design models, processes, and grounded instruction strategies as a template in examining participants' responses as they related to Research Question 3. Based on the interview

with Dr. Marion, the following course review were made regarding grounding at the individual faculty and the program levels:

- All faculty who are going to teach online complete the IDL 6543 course provided by the CDL. IDL 6543 is a professional faculty development course for faculty who are going to design and teach online course at the target university.
- Individual faculty design their own classes with the help of an instructional designer their own classes and teach with adjuncts.
- On the program level, teams of faculty design, review, and evaluate the competencies, skills and curriculum.
- There is a team approach for the design, review, and evaluation of courses. A template is created to allow for standardization or uniformity of competencies throughout the program.
- A team approach is implemented to allow for consistency in competencies throughout courses.

Research Question 4

What are the main causes that may prevent faculty from grounding the design of online instruction in scientific-based research and theory?

To analyze the data relevant to Research Question 4, the researcher focused on items that were problematic in the design of online instruction based on the literature review and that emerged as a result of the individual interviews conducted. Items

frequently mentioned as presenting barriers to the grounding of instruction were: lack of time; resources; training; lack of instructional, technological, and administrative support; and political decisions beyond the control of the course designer.

Of the problems or issues encountered in course/program design, the biggest one, according to Dr. Marion, was related to online course/program management. She was specific in mentioning the following:

- The difficulty of gauging, providing and assessing manageable online assignments.
- The struggle of providing, creating and giving feedback using rubrics. This allows clear communication and expectation for and from students.
- The need to response to online posts regularly and at intervals; and to avoid constantly being online or leaving grading undone which results in grading backup and accumulation of other activities that need to be completed.
- The effort and the need to clearly communicate to students in regard to their expectations, reminding them of due dates and follow-ups.
- The strain and the needs to maintain consistency in communication, contacts, and expectations.
- The need and the difficulty of designing “doable” assignments.
- The need to double time required for teaching online courses for faculty because of nuances with teaching online.
- The need to manage, and the difficulty of managing students online.

- The constant technical and technological problems such as changes in technology and Learning Management Systems (LMS).
- The issues related to technology disruption when unplanned service interrupts and downtime occurs.

Case 4: Dr. Banks

Background Description of Dr. Banks.

The publicly available online profile for the fourth participant, Dr. Banks, revealed that she had joined the Center for Distributed Learning (CDL) at the target university as an assistant instructional designer in 2004 and had become a full-time instructional designer in 2007. She earned a Ph.D. with a specialization in instructional system design, and her research interest focused on using instructional strategies in online teaching and learning, professional development for teaching online, and applications of emerging technologies in education. The profile also indicated that Dr. Banks had presented at various professional research associations, conferences, and events and was an active member of various professional organization in the field of education.

Conversation With and Voice of Dr. Banks.

The researcher's primary purpose in interviewing Dr. Banks was to gain an understanding of the instructional design process faculty engage in when they complete the required IDL6543 course. At the time of interview, Dr. Banks was part of the team

teaching the IDL6543 course and assisting faculty in their professional development as well as serving as an instructional design consultant for faculty after course completion.

The first interview question posed to Dr. Banks was, "What process did you go through in designing your IDL course?" Dr. Banks provided the researcher with some background information, noting that the IDL 6543 course was originally developed in the 1990s, thus having a long history. Two years ago, the CDL decided to redesign the IDL course. In doing so, the following steps were taken to initiate the redesign:

> In that process we followed the generic ADDIE model, so we did the analysis first, we interviewed different faculty members who had graduated from IDL to get their feedback on what they really like, what they don't like, and also went to two universities and asked them about their professional development programs just to see what they have and what other people are doing.

As described by Dr. Banks, once the data were gathered, recommendations were made which included the use of a redesign team that began work on one module:

> Afterwards we made some recommendations based on our analysis, and then we had a redesign team and the redesign team was formed to looking at one module, so they started to redesign one module as the example of IDL. We had one example, then we followed suit and finished the rest of the design.

Dr. Banks discussed the process further. In her comments, she emphasized the importance of evaluation throughout the entire process:

> Throughout the whole process, we did (and do) a lot of evaluations. For instance, in every, during every phase of design development, we present the blueprint to

other stakeholders including faculty members and also the executives here at CDL. So, they give us feedback on what to do and what to revise, and we also give them the prototype every time we have something new.

Dr. Banks elaborated on the extensive feedback process that had been employed over a period of three semesters:

> After the content was developed and after we finished the redesign, we facilitated, I think, three semesters; and each semester we collected the feedback from faculty participants, and I think, three surveys every semester, we give them a survey, ask them what they think about it. Also, we went back to look at the course analytics to see what happened before the redesign and what happened after redesign. We tried to compare whether the course has been improved in terms of faculty engagement and faculty satisfaction.

The second interview question asked was, "What support and resources do faculty receive from CDL apart from the faculty development training? Are there any other resources that are available to them?" Dr. Banks responded that faculty members have different access to resources at targeted university and provided the following examples:

> If they go through IDL6543, they have a higher level of resources available for them, so if they go through IDL6543 training they will have a designated instructional designer to work with, so every time they have a new course that they want to design and develop they can always come back to us and we talk with them.

Other resources available for faculty highlighted by Dr. Banks were the video services, graphics services, and multimedia services. The emphasis here was that if the faculty need to use those resources even after completion of the IDL course, they could take advantage of them anytime.

The follow-up probe to the question was, "Where do they [the faculty] get the training?" Dr. Banks' response follows:

> For the new faculty members, we have different trainings, and we have a training course essential mainly talking about the services that CDL provides and technical training, so that is the course that anybody can take. Of course, in IDL or in ADL or the other training, they also have technical part where they go into their development, and they would develop different elements of the accounts.
>
> Also faculty online support provides training. They have open labs and if you have any technical issue with the Web-courses they can help you. They also have, I think, Adobe Connect trainings offered online, so is recording online. They [faculty] can choose to watch it like screencast videos, working through different processes of how to upload documents and how to add a teaching assistant, so [there are] different tutorials that they can see.

The researcher queried Dr. Banks as to "What issues, it can be general or teaching IDL courses, are the general issues that you encounter?" In responding, Dr. Banks chose to speak specifically to online instruction. She reported, "The biggest issues I have now are probably working with professors in computer science, in engineering, in statistics because they have different kinds of course content, and it is more challenging for you to

put those course contents online." Dr. Banks contrasted working with social science faculty, noting that "For social science, we have a lot of discussion activities, group activities, and you can have just online reading." She elaborated as follows:

> For engineering and science, they have a lot of abstract concepts, a lot of problem-solving processes that students really don't get it, just reading textbooks or just doing some discussions, so it is very challenging and time consuming for faculty members to put that content online.

Finally the last interview question that was posed by the researcher to Dr. Banks was "Is there anything else that you might add that would help or inform this study?" The respondent indicated that:

> I think that one purpose of doing a professional development program was we were trying to do research with the faculty members. We try to work together on evidence-based best practices, and we have a lot of those best practices integrated now in faculty development curriculum.
>
> If you go online to the website (we have a new website we just created called topr.online.ucf.edu and that is a website we gather pedagogical and repository and a lot of evidence-based pedagogies for online teaching), so there you can see different kinds of strategies for online teaching, group discussions, discussion protocols, course evaluations and peer review activities.
>
> Within that pedagogy you would see not just examples of the best practices. We also have scholarly reference support for those that we call best practices. I think that is all. Also, another website is teach.ucf.edu, and that is our

interface where our faculty members can go there and look for various information.

Description and Findings of Dr. Banks' Syllabus for IDL 6543 and Ancillary Documents

Dr. Banks was part of the team that redesigned the Interactive Distributive Learning (IDL) course. At the time of the interview, she was providing support for instructional design consultation with faculty when this specific course was being taught. Faculty participants in this research all identified IDL6543 as a focal point where faculty instructors are exposed to formal instructional design processes. For this reason, the researcher decided to include the description of the IDL course. IDL6543, at the time of interview, was a 10-week mandatory course offered by the Center for Distributed Learning at the target University as a means of faculty development for those faculty members intending to teach a fully online course.

The IDL6543 course consists of (a) a face-to-face component where faculty meet with course instructors, (b) an online component where faculty work alone, and (c) a component where faculty consult with an instructional designer. The following is an outline of activities extracted from the syllabus for the 10-week period of the course:

- Week 0: Online component with Instructional designer consultation on topic, Getting started: content with introduction to the course, preliminary information about new online course and establishment of expectations for department and participant.

- Week 1: a face-to-face meeting on topic of navigating the online environment: introduction to online environment concerning faculty and student perspectives, special considerations for online and establishment of small groups and creation of trust.
- Week 2: an online component on topic, content in the online environment: specific topics addressed include: legal issues for online courses, the universal design, and introduction to online library and the first steps to designing their online course.
- Week 3: an online component and also instructional design consultation on topic, designing interactive course activities: the specific issues addressed in this module include the review of Bloom's taxonomy and objectives, use of objectives to build course, types of interaction, online collaboration and group work, and online instructional strategies.
- Week 4: an online component on topic, effective online assessments: specific issues addressed include effective online assessments, the academic integrity and honesty, and outlining and designing a complete online module.
- Week 5: a face-to-face component meeting on topic, enhancing course with CDL services: A specific objective for this module includes the overview of services available at UCF for online courses and feedback on course design.
- Week 6: an online component and instructional design consultation component on topic, designing with social media in mind: specific issue

addressed in this module include the third party tools available for online courses.

- Week 7: an online component on topic, managing your online course: specific issues addressed by this module include the continuation of building the course, and the online course management strategies.
- Week 8: face-to-face component and an instructional design consultation on the topic, technical support, scholarship & peer review: specific objectives for this module include online support issues, faculty research opportunities, and peer reviews.
- Week 9: an online component on topic, production week: a specific objective for this module is an implementation of peer review feedback.
- Week 10: a face-to-face meeting component on topic, IDL showcase: specific objective for this module is the presentation and showcasing of participant course development. After the showcase, there is face-to-face component discussing the issue of preparation for course delivery.

Because Dr. Banks did not provide a course to be reviewed, it was difficult to judge the extent and specificity of the course syllabus in the online form. The syllabus available and written on this section is a modular, precise and brief document indicating the content under each week the meeting format (face-to-face/online), the online content, the Build your course project (BYCP) and the consultation (ID) explanations.

On the organization and design category of the rubric, the criterion number one which states, e*ach course includes an introduction and/or cyber tour to introduce the*

student to the course, appear to be met with description of syllabus week 0 module, the getting started which pointed to introduction module with cyber tour and establishment of expectations. In the course content category of the rubric, Criterion 1, *Course description, goals, objectives, content, and assessment are consistent,* appeared to be met because there was consistency between topics under review to learning activities to be performed on that particular week. In the instruction category of the rubric, Criterion 10, *Learners are told which activities must be performed synchronously and which may be performed asynchronously*, was met because there was a clear distinction on which assignments are carried out during the face-to-face and which activities are carried out online.

In the interaction category of the rubric, Criterion 12, *Students incorporate course content and assigned readings into discussion and class activities,* was clearly met with the build your course project (BYCP) noted on the syllabus where students complete projects based on what they have learn that week. Finally in the evaluation and assessment category of the rubric, Criterion 2, *A variety of content-relevant assignments or evaluative exercises are provided*, was met given the description of different assignment and exercise student perform such as quiz, self-assessment, discussions and projects.

Analysis of Research Questions for Case 4: Dr. Banks

Research Question 1

What does it means for a faculty educator to ground the design of online instruction in scientific-based research and theory?

The grounded practice and design framework is defined as a process of linking the practices of learning system design with related theory and research (Hannafin et al., 1997; Wang & Hannafin, 2005). The researcher of this study used this definition in analyzing participants' views from interview data and evidence from course review and document review data in answering Research Question 1.

In analyzing the data gathered from Dr. Banks to respond to Research Question 1, the researcher not only looked for the definition but for corroborative evidence of definition. The researcher noted references not only in the use of such issues as instructional design model processes such as ADDIE but also in reference to the use of scholarly, evidence-based pedagogy and curriculum materials and best practices which serve to ground course design. As an instructional designer and professional faculty developer, Dr. Banks works frequently with faculty through the IDL courses, one-on-one consultations, and through the design and support provided in walk-in sessions. Evidenced also were the resources she and other instructional designers at CDL have developed and made available to faculty through the online services and webpages such as topr.online.ucf.edu and teach.ucf.edu where faculty can access resources, teaching materials, guides, and best practices among other scholarly resources.

Research Question 2

What evidence do faculty provide to demonstrate that their designs of online instruction are grounded in the elements of scientific-based research and theory?

The following four criteria from grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) were used to evaluate data obtained in interviews and supportive evidence from course review and document review provided by participants to demonstrate grounding elements of their courses: (a) practices that are based on a defensible theoretical framework; (b) practices that reflect close links between empirically verified approaches and those employed in a given learning system; (c) the ability to generalize and be applied in more broadly; and (d) ability to be validated iteratively through successful implementations, were used to evaluate views from interview data

In answering Research Question 2, the researcher also sought to identify specific issues highlighted by the framework. These issues included instances where scientific-based evidence, standards, theories, grounded instructional strategies, and instructional models identified in the literature were used.

Dr. Banks and other instructional designers at CDL adopted an elaborate and comprehensive process when they redesigned the IDL course. The use of processes found in scholarly literature such as ADDIE for designing and producing instructional content was evident. The use of built-in evaluation at every stage of the design process to elicit feedback and evaluate not only during the design but also after the course was completed was another excellent example of the use of scientific-based research resulting in

grounded design. The collection of feedback from stakeholders helped designers to revise the design as needed while feedback from IDL participants measured course satisfaction. Other evidence provided included the use of course analytics and comparison satisfaction feedback to assess whether objectives, assessments and results were achieved.

Research Question 3

What steps do faculty take in order to ground their design of online instruction in scientific-based research and theory?

Two criteria from the grounded practice and design framework of Hannafin et al. (1997) and Wang and Hannafin (2005) are: (a) practices that are based on a defensible theoretical framework; (b) practices that reflect close links between empirically verified approaches and those employed in a given learning system. These criteria plus literature on the uses of systematic processes that align underlying foundations to corresponding activities as well as uses of systematic instructional design processes (McKenney & Reeves, 2012; Richey, 2007) were used to assess processes in evaluating and analyzing participants' views from interview data. They also provided supporting evidence from course review data and document review in answering this research question.

Dr. Banks indicated that the processes such as analyzing the need, development of blue-prints, the search for and uses of benchmarks and best practices, the incorporation of evaluation and feedback into the development phase, and the incorporation of a feedback mechanism into the production of instructional content led to the design of courses grounded in practice and developed in a constructivist learning environment. This was

further exemplified by the evaluation of every phase of the process, provision of feedback on the new content and comparison to old content and results. There was a definite effort made to use best practices found in the literature and integrate those practices along with feedback and evaluation for improvement in the course design and development process.

Research Question 4

What are the main causes that may prevent faculty from grounding the design of online instruction on scientific-based research and theory?

In responding to Research Question 4, the researcher focused on items that were problematic in the design of online instruction based on the literature review and that emerged as a result of the individual interviews conducted. Items frequently mentioned as presenting barriers to the grounding of instruction were: lack of time, resources, training, lack of instructional, technological, and administrative support, and political decisions beyond the control of the course designer.

Dr. Banks highlighted some of the challenges she faced that hampered the instructional design process and may result in preventing her from grounding the design of online instruction such as the challenges of designing courses where the content was new to her and not in her area of expertise,(i.e., STEM subjects: engineering, computer science, science, and mathematics). She attributed the difficulty, in part, to the abstract content and concepts associated with these subjects that were difficult to capture and put online, particularly given time constraints. She also observed that these subjects were

often difficult for students to process and require more than just reading text and discussion.

Cross-case Analysis

Similarities Between Cases

Research Question 1 stated: "What does it means for a faculty educator to ground the design of online instruction in scientific-based research and theory?" In reviewing the interview transcripts, observed data and collected artifacts, Drs. Jones, Robin, Marion, and Bank were in agreement in many respects regarding the grounding of the design process. All agreed that the process requires (a) the incorporation of scholarly literature, whether best practices, curriculum, or pedagogies; (b) the use of some form of instructional guide, plan, or template such as the use of instructional system design model of ADDIE to assist faculty in designing and creating instructional content; (c) the use of or incorporation of standards, principles, models and industry best practices such as SLOAN, ISTE, adult learning and scholarship of teaching and learning in the design and delivery of instructional contents; (d) the importance and necessity of designing and building interactions, collaborations, and engaging students in a community of learners; and (e) the building of a feedback mechanism not only into the design and production of the course but also through feedback from students/participants and other constituents.

Whereas participants were very clear in their definitions related to grounding the design of online instruction, the data showed that they were less clear in their response to

Research Question 2, “What evidence do faculty provide to demonstrate that their designs of online instruction are grounded in the elements of scientific-based research and theory?” Interviews, observed and collected data analyzed revealed that participants did not show many specific examples of grounded practice within the courses itself or did not offer examples of design decisions during the interviews. The researcher was able to observe visible examples appearing in the syllabi of most participants that pertained to (a) the use of certain instructional strategies, (b) the use of engagement and student collaboration, (c) the utilization of online technology, and (d) the use of instructional methods such as combining videos, text content, and audio-visual content within the courses in learning management systems (LMS).

In regard to Research Question 3 which stated: “What steps do faculty take in order to ground their design of online instruction in scientific-based research and theory?” the researcher was able to observe and discern from all the data some similarities in steps taken by the four participants, particularly in the use of the ADDIE instructional design model in designing and creating instruction. Two participants, Drs. Robin and Marion, referred to templates or checklists, which had been designed by the department. Dr. Banks and Dr. Jones were very familiar with the ADDIE process of designing instructions and strictly adhered to it. Those who had taken the IDL 6543 course were very familiar with the specific template/plan that had been used in designing their project course.

For Research Question 4, which stated: “What are the main causes that may prevent faculty from grounding the design of online instruction in scientific-based

research and theory?" the researcher was able to document similarities in participants' responses. Technical issues were viewed as a primary problem by all of the participants. These issues included the difficulties of learning and mastering the massive learning management system (LMS) features, the ever changing technology, and problems associated with updating plugins, programming or editing web content. The downtime associated with technical disruptions caused by the learning management system was also a perceived problem as was the need to update, convert or change content in the learning management system. Online classroom management issues noted by all participants were the difficulty of engaging students, communication difficulties, the increased workload in an online environment, and the difficulty of translating strategies from face-to-face to an online environment. All participants, to some extent, spoke of the difficulty in determining the best teaching approach for their online courses and the difficulty of planning, designing and producing instructional content for the course that would engage students in the same way they were engaged in face-to-face instruction.

Differences Between Cases

In analyzing the data from the interview, course review and document review, the researcher was able to differentiate between the participants in regard to Research Question 1, "What does it means for a faculty educator to ground the design of online instruction in scientific-based research and theory?"

The biggest difference in regard to this question was noted in the opinion of Dr. Robin. Although all participants seemed to agree that grounding was accomplished, in

part, by reviewing scholarly literature to inform their design and practice, Dr. Robin reported using the literature to confirm or evaluate instruction that had already been designed and created.

Data were analyzed to discern participants' differences regarding Research Question 2, which stated: "What evidence do faculty provide to demonstrate that their designs of online instruction are grounded in the elements of scientific-based research and theory?" The researcher documented the difference in participants' designs and implementation within the online environment. For example, Dr. Jones noted that she believed that interaction was critical and required students to collaborate online through group work. Students were, however, graded individually by their contributions to the group. Dr. Robin, on the other hand, displayed the view that the online environment should be open ended and community based. He discussed scaffolding from the macro level to micro level to local level. This, he explained, was to allow his students to explore different paths of learning, make their own sense and argue their own case, possibly arriving at different outcomes. Another difference noted was by Dr. Marion who had implemented a service-learning model in her course that allowed her students to learn from and make a contribution to their community through service.

Differences were also noted in interviews, course review and document review data in responding to Research Question 3, "What steps do faculty take in order to ground their design of online instruction in scientific-based research and theory?" The researcher discerned a number of differences related to the participants' steps in implementation of their design in grounding their instruction. For example, Dr. Jones mentioned the use of

the ADDIE instructional design model to guide her in designing and producing the content for her course. She also mentioned in her interview the identification of theoretical and evidence-based instructional strategies such as a constructivist approach that guided her in building grounded instructional strategies, e.g., interactive and collaborative group activities, within her courses and incorporation of sound instructional media such as videos and other media in her course. In contrast, Dr. Robin designed his courses first and then used literature review as a confirmation of the correctness of his choice of pedagogical design and also as a form of course evaluation. Dr. Marion pointed to her uses of best practices from scholarly literature, the use of guidelines and competencies of accreditation agencies and the use of professional organizations guidelines information to inform her design decision when creating her online courses.

Differences were extensive for Dr. Banks who, as an instructional designer, indicated that she implemented the ADDIE model and built in a feedback mechanism in all phases of her course redesign: the creation of content, benchmarking, comparison of best practices, and analysis and use of recommendations. She reported using evaluation and reflection during every step of the redesign of the IDL course project which included presenting a blue-print to stakeholders, collecting feedback from participants, analyzing and comparing course satisfaction, with revision occurring as necessary to ensure that objectives, assessments, and results were achieved.

Data were also reviewed to discern the differences between participants in regard to Research Question 4, “What are the main causes that may prevent faculty from grounding the design of online instruction on scientific-based research and theory?” The

researcher, in reviewing the data, identified some issues that were unique to each participant in answering this research question. For example, in Dr. Jones' case, the unique answer was the issue of the difficulty of achieving the equivalency of experience from a face-to-face experience to the online experience. For Dr. Robin, a noted difference in answering the question was the difficulty in reaching out to and engaging students in online discussions without their displaying a cynical attitude and minimal interest in their online discussion performance. Dr. Marion expressed the difficulty of developing, creating, connecting, and enhancing a community of students online. Finally, Dr. Banks highlighted difficulty in and the challenges of designing and creating content for abstract concepts in STEM (science, technology, engineering and mathematics) courses.

Identification of Themes

In identifying themes, the researcher arrived at five general themes based on the analysis and aggregation of data acquired from participants' interviews, course review and document review. Creswell's (2007) qualitative study design served as a model in this process whereby the researcher was looking at correspondence between two or more categories (categorical aggregation) of instances from data to see if issue relevant meaning emerged that could be aggregated into themes. The researcher also considered and used the following suggestions of Hancock & Algozzine (2006): (a) reflect the purpose of the research and respond to question under investigations, (b) allow themes to evolve from saturation of the collected information, (c) develop themes representing

distinct and separate categories of findings, (d) aggregate until specific and explanatory themes emerge that have (e) comparable flexibility.

The five key categories or themes, which emerged, were: (a) pedagogy, (b) instructional design, (c) instructional technology, (d) support, and (e) problems. The following section contains expanded description of each individual theme and how key issues were aggregated to form categories from which themes emerged.

Pedagogy

The pedagogical theme emerged from the analysis of participant interviews, course review and document review data. The pedagogy theme originated from participants' emphasis (mentioned, addressed or was observed) on key issues such as the uses of:(a) best practices; (b) literature in their areas and online learning; (c) accreditation bodies in the design of program core competencies; (d) identified skills and competencies from employers and other related area organizations in the design of programs; and (e) embedding models such as community based learning and service learning in designing and teaching online courses. All the above key issues were morphed into one distinct category of pedagogy.

Instructional Design

Themes related to instructional design were a conglomeration of key issues noted in interviews, course review, and document review where participants identified, addressed, mentioned, or were observed and were noted by the researcher. Key issues

leading to this theme were found in uses of constructivism to take advantage of structural aspects of online learning, teaching in very demonstrable ways, planning for interactive-collaborative processes learning and teaching processes, critical interaction, community of learning, changing role of instructor, collaborative facilitative learning environment, epistemological open activities, and scaffolding engagement of learning activities, definition, implications, and evidence. Other issues included (a) the processes where team design was used along with templates, collaboration with colleagues, uses of different technology to complement conversion and reuse during design processes; (b) matching objectives to outcome achievement and the design of better online discussion and engagement of online students in a responsive environment. Finally, other issues contributing to this theme included the discussion of a broad discipline base for faculty, looking at the bigger picture and alternatively considering a non-instructional design background and equivalency of experience and not a lesser experience in online design and learning. The researcher determined that all of these issues were integral to grounding instructional design, hence the instructional design theme.

Instructional Technology

The instructional technology theme emerged from aggregation of key issues mentioned, addressed, emphasized, or observed and noted by the researcher based on data obtained from participants' interviews, course review and document review data. The specific key issues included the use of instructional design models such as the ADDIE as a step-by-step process to analyze, design, develop, implement and evaluate

course instructions. Other issues included (a) the use of feedback throughout the design process to solicit input from various stakeholders and accommodate an evaluation mechanism, (b) the use of benchmarking, facilitation and course analytics to inform the design processes and development of instruction, (c) use of models as step-by-step process, (d) standardization and uniformity, (e) support of instructional designers, and (f) analysis and outline of new courses. All these key issues were aggregated to form the instructional technology theme.

Support

The support theme emerged from aggregation of the key issues from data from participants' interviews, course review and document review where the participant mentioned, addressed, emphasized or was observed and noted by the researcher. The specific key issues related to support included the following: (a) IDL6543 training, technical and technology issues, policies regarding online issues such as training; (b) the resources and support of resources from CDL, library and technology, support from designated instructional designers, support from multimedia and technology, online documentation and training information, phone and walk-in support; (c) technical resolution, IDL 5000 courses essential for new faculty training, IDL/CDL courses, proposal of projected related to courses after IDL courses;, and (d) quality of support and knowledge of staff and departments offering support such as CDL, OIR, Departmental and Faculty Center for Teaching and Learning. All these key issues were examples of the broad category leading to the support theme

Problems

The problems theme emerged from the aggregation of key issues from the participants' interviews, course review and document review data where the participants mentioned, addressed, emphasized, or were observed and noted by the researcher. These key issues included technical and non-technical problems associated with online learning that were identified by all of the participants. Problems mentioned ranged from class management and communication issues to workload/redoubling of time required for online versus face-to-face classes and time taken to produce online instructional materials in science, mathematics, and engineering courses due to their abstractness and the inability to use only reading and discussion to successfully convey content to students. Also problematic were issues related to changes in technology and the steep learning curve to adapt to new technologies used in course production and learning management systems. The lack of articulation of instructional principles by faculty without a background in instructional design background faculty was also noted. Finally, issues such as those noted by Dr. Marion regarding the need to create an online learning community were worthy of consideration. These issues all presented challenges in the design of online programs and as such were combined to form the problems theme.

Researcher Reflections on Data Analysis

The researcher concurs with Padgett (2012) who stated that "Writing up a qualitative study takes a good deal of effort--it is a craft to be learned and honed over time" (p. 221). As with other aspects of this study, I found the data analysis to be difficult

due, in part, to my inexperience. Brown and Walker (2011) acknowledged the challenges posed during the processes associated with coding, summarizing, and interpreting qualitative data. Every day I worked on this research study, I gained new appreciation for the opportunity to acquire one or two additional skill sets. Now, more than ever, I value the competencies noted by Yin (2011b) required to be a qualitative researcher. These include: listening, asking good questions, knowing about the topic of study, caring about the data, completing parallel tasks, and persevering. Yin expressed it well when he said, "Doing qualitative research is difficult. You need to have a sharp mind and maintain a consistent demeanor about your work" (Yin, 2011b, p. 25). An elaborated researcher's reflection and self-declaration is located in Appendix E.

Summary

This chapter contains the detailed reports of four case studies which included the background description of each participant, the summary of the conversations with and voices of each of the participants, descriptions of course review and document provided, and the data analysis of each research question for each case. A cross-case analysis was focused on similarities and differences in the cases. Five themes were identified: pedagogy, instructional design, instructional technology, support, and problems. Chapter 5 contains a summary and discussion of the findings along with implications for practice and recommendations for future research.

CHAPTER 5
SUMMARY, DISCUSSION, AND RECOMMENDATIONS

Introduction

This chapter has been organized around the four research questions that guided this study. It contains a summary, discussion, and interpretation of the findings for each of the questions, clarifying, explaining, and discussing an understanding of grounding the design of online instruction based on scientific-based research and theory by faculty in higher education settings. The chapter also is comprised of a discussion of the five themes that emerged from interviews, course review and document review. Ancillary research issues, which arose in the research, are also discussed, and implications for policy, practice and recommendations for future research are offered.

The researcher used the grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) to ground and inform this study. The grounded practice and design framework defined the meaning of grounded design as a process of linking the practices of learning system design with related theory and research.

The grounded practice and design framework was chosen because it provided theoretical bedrock on which the study was built. The framework was used in delineating the literature by identifying important topics to be addressed in this study in the literature review. Grounded practice and design framework gave credence and clarity to research design, helping to ascertain data collection and analysis methods, and linking understanding in the analysis of data presented in Chapter 4 to the themes that emerged.

As Leshom & Trafford (2007) noted, a conceptual framework shapes conclusions by emphasizing the theoretical or conceptual significance of evidence and provides theoretical cohesion to evidence and conclusions emerging from the research. Therefore, using a similar concept, the researcher in the present study used the grounded practice and design framework as a useful tool in the discussion of results of the study in relation to understanding the extent to which participants grounded their design of online instruction based on scientific-based research and theory.

Summary and Discussion of Findings

The four criteria from the grounded practice and designs framework provided a foundation on which the research questions were anchored. The research questions focused on the definitions, evidence, processes and the causes of failures to grounding design of online instruction based on scientific-based research and theory by faculty in higher education learning environment. The grounded practice and design framework informed and contributed to the design of the research, calling for collection of diverse data from participants in a natural environment in responding to four research questions. The grounded practice and design framework provided the definition of the meaning of grounded design as well as offered four criteria for grounding. This assisted the researcher in arriving at definitions, providing evidence of grounding, and identifying the causes of problems or the failures to ground based on analysis of interviews, course review, and document review.

Research Question 1

What does it mean for a faculty educator to ground the design of online instruction on scientific-based research and theory?

The grounded practice and design framework defined grounded design as a process of linking the practices of learning system design with related theory and research (Hannafin et al., 1997; Wang & Hannafin, 2005), and this definition served as the basis for answering the first research question. Based on the interviews, course review, and document review, there were diverse instances and illustrations of the concept of grounding design of instruction on scientific-based research and theories among the participants. Table 1 contains a summary of the findings for Research Question 1.

Table 1

Summary of Findings: Research Question 1

Descriptor	Dr. Jones	Dr. Robin	Dr. Marion	Dr. Banks
Definition	Described	Described	Described	Described
ID process	Provided (ADDIE)	Provided (Personal)	Provided (ADDIE)	ADDIE
Epistemological belief	Provided (Constructivism)	Alluded to	Alluded to	Evidence points to constructivism

Although participants' definitions of grounded design were not explicitly expressed, they all exhibited concepts similar and related to the framework's definition. The thread running across all participants' responses was the observed evidence of

anchoring the design of instruction on evidence-based/best practices found in the literature. The following are examples of evidence given by the participants as to what it meant for them to ground the design of instruction on scientific-based and theory. For Dr. Jones, the uses of the ADDIE model as a benchmarking process contributed to her systematically designing her online courses, uses of demonstrable objectives, sound instructional design principles, interactive collaborative processes within each course for scaffolding, courses design with student interaction activities in mind, and regular feedback were offered as evidence of what it meant for Dr. Jones to ground her online courses based on scientific-based research and theory

Dr. Robins cited some evidence of what it meant for his courses to be grounded on scientific-based research and theory. The evidence offered included: uses of new paradigms, designing courses for structural aspects of learning such as uses of community-based learning, scaffolding level of understanding, teaching in demonstrable ways in order to take advantage of new technologies, as well as use of a blue-print technique to visualize and construct his online courses.

The use of scholarly literature and best practices to develop online programs, benchmarked practices from industry to develop competencies and skills, and a grounded model were some of the examples offered by Dr. Marion. These practices provided evidence of what defined grounded design and what it meant to her in demonstrating the idea that her courses were grounded based on scientific-based research and theory. Dr. Banks cited the use of instructional design model processes such as ADDIE to design and develop her online instruction. She provided scholarly and evidence-based literature to

develop pedagogy, best practices, curriculum as evidence of what it meant for her to ground design principles in her online instruction which was based on scientific-based research and theory.

In summary, most participants (through interviews, course review, and document review) offered evidence of what it meant to them to ground design of their online instruction based on scientific-based research and theory such as: use of methodologies found in the literature, use of instructional design models such as the ADDIE model, implementation of the community-based learning and service-learning models found in the scholarly literature and research. Participants also cited the use of benchmarks and the incorporation of competencies from scholarly literature, national and industry standards in the design and development of programs of study and curricula.

It was imperative to compare the definition of grounding design of the participants to the scholarly literature as well as to the grounded practice and design framework to see if they match. Researchers have generally reached a consensus as to the definition of grounding design of online instruction on scientific-based research and theory as follows: (a) comprehensive, research-based process and use of best practice methods (March & Peters, 2008); (b) many years of research in learning process (Dick et al., 2005); (c) acquisition and implementation of the understanding of concepts, strategies, models, and theories in instructional design and learning (Lowry, 2010); and (d) offering evidence of the success of one's work (Ehrhardt, 2010).

The grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) defined grounded design as, (a) the process of linking the practices of

learning system design with related theory and research (Hannafin et al., 1997; Wang & Hannafin, 2005); (b) a systematic process rooted in theory (Kim & Hannafin, 2007); (c) research in human learning, research, theory and practice carried out in real world settings (Feng & Hannafin, 2005), and (d) a systematic and reflective process (Dick & Reiser, 1989).

The evidence offered by participants' in illustrating the definitions and in demonstrating what it meant for them to ground design of instructions that, there were similarities to the definition of the grounded practice and design framework, as well as, to the definition of the scholarly literature. This implies that these participants were aware, were knowledgeable, and may be expert in this area in offering evidence supporting that their online course design was grounded based on scientific-based research and theory.

Research Question 2

What evidence do faculty provide to demonstrate that their designs of online instruction are grounded in the elements of scientific-based research and theory?

To respond to this question, the researcher used the four criteria of grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) which included the following: (a) practices that are based on a defensible theoretical framework; (b) practices that reflect close links between empirically verified approaches and those employed in a given learning system; (c) the ability to generalize and be applied in more broadly; and (d) ability to be validated iteratively through successful implementations to interpret participants' finding and reach conclusions. Evidence from interviews, course

review and document review that faculty provided demonstrating that the design of instruction was grounded on the elements of scientific-based research and design were abundant. The participants provided many examples of their efforts to ground their designs of online instruction. Table 2 contains a summary of the evidence provided regarding the findings for Research Question 2.

Table 2

Summary of Findings: Research Question 2

Evidence were:	Dr. Jones	Dr. Robin	Dr. Marion	Dr. Banks
Defensible	Yes	Yes	Yes	Yes
Verifiable	Yes	Yes	Yes	Yes
Generalizable	Yes	Yes	Yes	Yes
Iteratively Validated	Yes	Yes	Yes	Yes

Specific scientific-based research provided by Dr. Jones included:

- The use of the ADDIE model
- The SLOAN principles
- ISTE principles and standards
- National standards guidelines
- Online learning principles
- Adult learning principles

Dr. Robins also cited the use of grounded design strategies such as community-based learning; open-ended activities design; evaluation of courses by searching scholarly

literature after course production for pedagogical understanding or evaluation. The course was designed to allow students to scaffold understanding to past knowledge, ideas, problems and solutions. The incorporation of different types of instructional content such as videos, reading materials, primary documents, quizzes, writing assignments and examinations; and incorporation of interactive online activities showed following best practices. All were evidence that Dr. Robin's design of instruction was grounded in scientific-based research and theory.

There were many examples offered such as the uses of a competency-based curriculum, scholarly literature, best practices, template design, industry standards, skills and competencies developed from literature and industry as a supportive evidence discussed in the interview by Dr. Marion. For Dr. Banks, the comprehensive course redesign process which was clearly observable in course syllabus and the uses of processes and tools found in scholarly literature such as ADDIE Model, pedagogy, andragogy, and curriculum were evidence offered to support the practice where design decisions based on empirical evidence are carried out as exemplified by the grounded practice and design framework.

The support of evidenced offered in interviews, as well as from course review and the review of documents by the participants, in their defense of the grounded design practice, that they met the four criteria for grounded design practice from the framework. The grounded practice and design framework criteria call for any scientific-based research and theory used to ground the design of instructions to (a) focus on research, (b)

support or extend its application, (c) be generalizable, and (d) be adaptable (Hannafin et al., 1997; Wang & Hannafin, 2005).

The body of scholarly literature reviewed for this study supported the evidence of faculty regarding grounding the design of instruction such as that of Stanovich et al. (2003) who emphasized that skills to discern scientific-based practices are the cornerstone of educators' being professional, effective and powerful. The importance of the use of evidence-based practices was also aptly summarized by De Miranda (2004) who stressed that strong understanding of research theories of learning and instruction can improve educators' online experience and provide support in their teaching strategies.

The evidence offered by the participants such as the use of the ADDIE model and other instructional designs were confirmation that not only were the participants using theoretical foundations to ground their alignment of goals, activities, assessment in their practice, but that they were also using empirical data supported by the grounded practice and design framework to facilitate their online course design decisions.

Research Question 3

What steps do faculty take in order to ground their design of online instruction in scientific based research and theory?

Two criteria from the grounded practice and design framework (Hannafin et al., 1997; Wang & Hannafin, 2005) are: (a) practices that are based on a defensible theoretical framework; (b) practices that reflect close links between empirically verified

approaches and those employed in a given learning system. Table 3 displays the findings for Research Question 3.

Table 3

Summary of Findings: Research Question 3

Criteria	Dr. Jones	Dr. Robin	Dr. Marion	Dr. Banks
Defensible	Yes	Yes	Yes	Yes
Verifiable	Yes	Undetermined	Yes	Yes

These criteria plus literature on the use of systematic processes that align underlying foundations to corresponding activities as well as uses of systematic instructional design processes (McKenney & Reeves, 2012; Richey, 2007) and tools such as ADDIE models were used to assess evidence offered in support of processes in evaluating and analyzing participants' views from interviews, course review and document review data.

The specific examples provided by participants indicated steps taken by faculty to ground the design of instruction on scientific-based research and theory varied among the participants. In general, however, the steps and processes involved in the creation of online courses reported were similar. For example, Dr. Marion indicated that, after making the decision to create an online course, her department typically drafts competencies based on several standards, requirements, skills, and industry standards. Using competencies, objectives for each course or program are established; and a faculty or staff member is then appointed to teach the course. Once the objectives are formed, the

faculty or staff member is given some latitude in the design, flow, assessment, and content of the course. For a fully online course, the faculty member is required to take the flagship course for faculty development, IDL6543.

Dr. Banks indicated that faculty, working with instructional designers at the Center for Distributed Learning (CDL), followed a systematic process to developing courses, usually the ADDIE Model, to design a course project. This includes analysis, design, development, implementation, and the evaluation phase to create a full course for online learning. The review of Dr. Banks' syllabus was also indicative of this process, highlighting that the participant was knowledgeable about grounded design practice and used empirical data as well as a theoretical foundation to ground and align her instructional activities and practices.

Dr. Jones, indicated that she used the ADDIE Model's process when designing her online course. She reported following sound instructional design principles in having clear objectives and content, noting that she reflects on objectives and assessment when designing her instruction. Other steps taken by Dr. Jones in the design process included building interactive collaborative activities into each module to provide scaffolding; devising online activities requiring students to discuss, debate and collaborate; and finally extensive design for the provision of feedback to students.

Dr. Robin provided examples of steps that he took as an instructor to ground the design of online courses in scientific-based research and theory. These included restructuring content already taught in a face-to-face class to content meeting instructional goals appropriate for reuse in an online course; planning and designing of an

outline for a new course addressing all aspects of the course including decisions as to where the course would take place, how each lesson was built, what needed to be done for each module and how diverse types of activities and content could be incorporated.

The researcher felt this was apparent, based on examination of the interviews, course review and document review that participants took supporting steps to ground design of their online instructions on scientific-based research and theory. They did so with the use of grounded design processes such as instructional methods of the ADDIE model as a step-by-step process to design and ground their courses. They met the two criteria of (a) establishing their practices on a defensible theoretical framework and (b) aligning their instructional practices with those that use an empirical verifiable approach, as offered by grounded practice and design framework.

The scholarly literature reviewed clearly supported the use of systematic processes or steps in grounding the design of instruction as evidence by the examples provided by the participants above. The scholarly literature supported issues such as the correct use of the instructional process for effective learning and systematic process of applying research-based principles to education practice (Simonton, 2010), uses of systematic process for developing instruction (McKinney, 2012), planning what and how to learn (Reeves, 2011), and the selection of principles and techniques from varied theoretical approaches and guidance from a wide array of research and theory (Bednar, 1992).

Research Question 4

What are the main causes that may prevent faculty from grounding the design of online instruction in scientific-based research and theory?

In regard to analysis of Research Question 4, the researcher used the literature as a canvas against which participants' views and evidence could be measured and interpreted. Table 4 contains a summary of the findings for Research Question 4.

Table 4

Summary of Findings: Research Question 4

Barriers	Dr. Jones	Dr. Robin	Dr. Marion	Dr. Banks
Lack of time	Yes	Yes	Yes	Yes
Lack of resources	Yes	Yes	Yes	Yes
Lack of training	Technology	Technology	Technology	Pedagogy Curriculum
Other	Alignment Strategies Classroom management	Interactions Cynicism in online discussion	Classroom management Develop and enhance community	Designing abstract concepts in STEM field

The researcher looked to the literature for guidance in interpreting the main causes that may prevent faculty from grounding the design of instruction. Hannafin et al. (1997) and Wang and Hannafin (2005) acknowledged that there has been a widespread mismatch of framework and methods, adding that this has occurred despite the fact that (a) various instructional approaches have been studied and implemented across

educational and training settings and (b) vastly different design practices have been proposed that reflect fundamentally different philosophies, beliefs and biases.

The researcher compressed findings of primary issues that participants shared that impacted their ability to ground the design of instruction on scientific-based research and theory. These issues included time, technology, and design logistics.

Regarding time, all participants were emphatic in stating that the time required to create, administer, and teach courses online was double, if not triple, the time required to teach face-to-face courses. The constant changes in technology, along with the high pace in the learning management system (LMS), create a steep learning curve with new nuances and other challenges for faculty. The researcher was fortunate to witness changes in the learning management system (LMS), from Blackboard Vista (UCF Web courses) to a new LMS, Canvas by Instructure, during the study period. The challenges of design logistics mentioned by participants included an inability to replicate or recreate successful collaborations, develop meaningful discussions, facilitations, and interactions in online courses as compared to the success in these areas achieved in face-to-face courses.

Therefore, it is clear that even though the faculty may have had the correct understanding of grounded design and the desire to ground their design of instruction, other factors may affect, prevent or make it impossible to ground the design of instruction based on scientific-based research and theory. The research supports, it is imperative to know these factors so as to address them and to assist faculty by providing necessary

support and resources in order for them to attain the grounded design in their online courses.

Researchers have supported some of the issues and challenges of time, technology, and design logistics encountered and numerated by the participants in this study. Such issues include: barriers such as perceived lack of time, poor technical support, outdated technologies and time constraints (Kenny & Gunter, 2011); defaulting the design of instruction based on past experience because of insufficiency of time, training or resources (Hirumi, 2002); problems associated with political resolution rather than scientific resolution (Stanovich et al., 2003); lack of formal training in instructional design and learning theories (Lowry, 2010; Stuart et al., 2004); adoption of habits, thoughts, acculturation and affiliations (Theall, 1999); and the use of traditional lecture as a basic instructional strategy (Gardiner, 1998). This is the evidence that the barriers and challenges mentioned by participants did indeed exist and that contingent planning needs to address these issues in creating online learning.

Discussion of Themes

As noted in Chapter 4, the research revealed five general themes such as pedagogy, instructional design, instructional technology, support, and problems themes based on the analysis and aggregation of data acquired in participant interviews, course review and document review. Creswell's (2007) qualitative study design served as a model in this process whereby the researcher was looking at correspondence between two or more categories (categorical aggregation) of instances from data to see if issue-

relevant meaning emerged that could be aggregated into themes. The five key categories or themes that emerged were: (a) pedagogy, (b) instructional design, (c) instructional technology, (d) support, and (e) problems. The resulting themes are discussed in more in-depth below.

Pedagogy

As noted in Chapter 4, the pedagogical theme emerged from the analysis of participants' interviews, course review and review of documents where participants emphasized, mentioned or addressed the issues of: (a) best practices; (b) literature in their areas and online learning; (c) accreditation bodies in the design of program core competencies; (d) identified skills and competencies from employers and other related area organizations in the design of programs; and (e) embedding models such as community based learning and service learning in designing and teaching online courses.

Therefore it was, necessary to look at literature for the definition of pedagogy, which was defined as implementation of planned instructional experience and the strategies of instructional and teaching methods (Hirumi & Stapleton, 2010; Hlebowitsh, 2006; McHaney, 2011). Clearly, the aggregated issues of the pedagogy theme do relate to instructional planned experience, strategies and teaching methods processes during the design and creation of instructional material. It was also evidenced from the reflection of these pedagogical issues that they were fairly distributed between all four research questions indicating the commonality and similarities of issues to all four participants.

The biggest problems encountered in terms of pedagogy were the rethinking and questioning of teaching approaches in an online setting. This involved understanding how to create, develop, enhance, and connect a community of students online; how to look at broader knowledge-based rather than evidence-based resources only; the availability of repositories of literature for best practices, pedagogies, and scholarly reference; and, examples of integration of online resources into online courses.

All of these pedagogical issues appeared they could be facilitated by the colleges accrediting organizations standards and Center for Distributed Learning at the target university. Good examples were the course design, training, and professional development resources at www.teach.ucf.edu and the pedagogical repository resources available at http://topr.online.ucf.edu, all provided and supported by the Center for Distributed Learning.

Instructional Design

The theme related to instructional design emerged from issues that were touched on by participants in their interviews, the review of course materials, and review of ancillary documents. These issues included (a) use of constructivism, demonstrable teaching, interactive-collaborative learning and teaching processes and other related issues; (b) the team design process and approach, uses of templates, collaboration with colleagues, uses of different technology to complement and conversion and reuse during design processes; (c) matching objectives to outcome achievement, design for better online discussion and engagement of online student in responsive environment; (d) the

discussion of broad discipline based for faculty, big picture, alternative look at non-instructional design background and equivalency of experience and not a lesser experience in online design and learning.

By way of review, instructional design has been defined as systematic process for developing instruction (McKenney, 2012), applying research-based principles to educational practice (Simonton, 2010), and planning what and how to learn (Reeves, 2011). For participants, the implications related to instructional design were that interaction was critical in online courses. Being a facilitator of learning was viewed as essential versus simply passing along information to students. This involved: facilitative teaching to the community of learners; changing the teaching strategy from collaborative learning to individual grading and assessment; designing open-ended epistemological activities to allow students to explore different paths; allowing students flexibility to make their own decisions and to argue their case; designing assessments that allow expectations of different outcomes for each individual; and, engagement of different levels of scaffolding.

Instructional Technology

Issues that merged into the instructional technology theme consisted of the use of a variety of technology-related activities. Morrison, Ross, Kalman & Kemp (2013) has a two definition of instructional technology as a "resources (e.g., machines and materials) used for instructions" and also "A process of systematic instructional planning" (pg. 436). The second definition of instructional technology in this instance is utilized to include:

The (a) the uses of systematic instructional process planning instructional design models such as the ADDIE as a step by step process to analyze, design, develop, implement and evaluate media and technology for course instructions; (b) building of feedback in design process to solicit inputs and evaluation from various stakeholders in regard to the use of media and technology in a course, (c) feedback and evaluation mechanisms throughout design processes, (d) benchmarking, facilitation and course analysis to inform the design processes and development and uses of technology, media and computers,(e) models as a step-by-step process, standardization and uniformity, designing instruction with an instructional designer, and analysis and outlining of technology structures and appropriate use of media in the new courses.

The definition of instructional technology as it relates to online learning is seen as a theory-based practical solution to solve instructional problems with emphasis on the processes and resources that support learning (Alia & Hashim, 2012). Therefore, it is important to note that the issues concerning technology such as online support, resources and training be addressed. In this way, the conditions needed for grounding the design of instruction based on scientific-based research and theory processes can be optimized or the difficulties relating to technology can be minimized. Technology implemented by educators does influence learning (Hirumi & Stapleton, 2010) and proper planning, design, use should be undertaken to transform education, achieved cost effectiveness and gather for student needs (Bates & Sangra, 2011; Kirkwood & Price, 2012).

Support

Support theme emerged as a point of assistance where resources are available to support educators in accomplishing their process of designing, creation, and implementation of course contents as well as teaching their online and blended courses. The support theme underlie all other themes as illustrated by the following findings from the study: (a) IDL6543, as a support for training new faculty educators on how to systematically analyze, design, create and implement instructional material based on best practices found in scientific research field; (b) Center for Distributed Learning (CDL) for instructional design, online, video and graphic support and resources; (c) identification of other campus-wide support resources available to educators such as library for print and digital resources, Center for Teaching and Learning (FCTL) for teaching, learning and professional support resources, Helpdesk for technology and computer support; (d) Department support such as funding, time release and other provision of departmental resources and support.

Therefore, it is importance to provide support for faculty so as to enable them: (a) perform their duties efficiently and effectively for successful online and blended teaching (Hogan, 2010); (b) reduce frustrations with the design process, uses of technology and classroom management so as to enable educators design proper planning, organization, and instructions for effective online and blended learning (Simonton, 2010); (c) enable educators to have more time for professional training, and involvement in Scholarship of Teaching and Learning (SoTL) activities to increase and build their learning skills as educators (Stavredes, 2010); and (d) Providing the support to the educators in all the

areas mentioned to enable faculty balance control, resources and reaction for successful execution of their duties (Anomneze, 2010)

Problems

Issues that led to the category and theme of problems included the following: (a) non-technical and technical problems associated with online learning, class management and communication, workload/redoubling of time, time taken to produce materials in STEM courses; (b) continuous changes in technology and a steep technology learning curve; (c) lack of instructional design principle articulation by non-instructional design background faculty; and (e) concern with creation of an online learning community worthy of consideration. Lock's (2007) guidelines encouraged educators to be aware of their community needs and to facilitate interactive collaboration and a larger learning community beyond the classroom. Following Lock's guidelines, Dr. Marion's hope was that educators would be able to create and sustain a vibrant community of learners online in their instructional courses.

Discussion of Ancillary Research Issues

Other research issues related to grounding the design of instruction in scientific-based research and theory mentioned by the participants and observed by the researcher included the use of rubrics. Rubrics are important, whether used as feedback in a student activity or used as an assessment instrument in evaluating a program.

Dr. Jones indicated the desire to design her courses using sound instructional design principles. Indirect evidence was available when faculty were enrolled in the course, IDL 6543 where the faculty had to use identified rubric to evaluate their design course project. Other sound instructional design principles included the reflective uses of assessment tools including rubrics. It was evidenced, from review of the course and analysis of ancillary material, that Dr. Jones made further use of the rubrics as a form of feedback and assessment. Although mentioned as one of the difficult issues encountered, it was clear in the interview with Dr. Marion that she also considered the use of rubrics as a form of evaluation that permit clear communication and expectations for students.

As was highlighted in the literature, evaluation and assessment are major ways of improving online instruction. Important within evaluation and assessment is the use of a rubric which has been viewed as an evaluation instrument template by some authors (Ternus et al., 2007). Others (Penny & Murphy, 2009) have regarded rubrics as evaluation tools. Some authors believe that rubrics enable a qualitative evaluation and are instruments for assessment (Bauer & Cole, 2012). As noted by one author, rubrics have been used to inform faculty of best practices (Blood-Siegfried et al., 2008). Andrade (2005) and Baya'a et al. (2009) viewed rubrics as assessment tools of gradation quality which make it clear and easy to use tables to evaluate and appraise work.

As some authors have emphasized, evaluation of online learning is a very important aspect of creating instruction (Tallent-Runnels et al., 2006). Other authors have indicated that the development of effective rubrics for assessing activities should be stressed, even though frequent, timely and thoughtful feedback consumes time (Dunlap,

2005; Gaytan & McEwen, 2007). Therefore, it is imperative that faculty educators use a grounded principles when creating rubrics during the design of online courses so as to evaluate themselves and ensure that grounded scientific-based research and theory are used during the design phase of their courses.

Implications for Policy and Practice

Implications for Research Question 1

What does it mean for a faculty educator to ground the design of instruction on scientific-based research and theory?

Grounded design practice requires educators to use scientific-based research and theory information to inform and guide the design, production and teaching of online courses. Thus, the implication is that it is imperative for educators to be able to clearly express their definition of grounded design as well as offer evidence that supports their definition. This clear articulation, however, does not necessarily mean the expression should be in instructional design language or jargon but that educators should be able to communicate their understanding.

Although there was diversity in how each participant defined and offered illustrations as to what it meant to them to ground the design of online instruction in scientific-based research and theory, their definitions and illustrations were all related to the use of pedagogies, instructional design tools, and best practices found in the scholarly

literature. Participants' definitions closely matched the definitions of grounding the design of instruction found in the literature.

It was apparent that the participants were knowledgeable in this area because they were able to define the concept under investigation as well as offer supported evidence. the implication for policy, practice and administration is that, although no changes or interventions were required in regard to the outcome of Research Question 1 for the specific participants interviewed here, the ability to for the educators to defined as well as offer evidence to support one's position in regards to grounding design of instruction based on scientific-based research and theory in order to align their teaching practices to underlying theory and improve student outcomes is very important.

The literature supported the participants' views that (a) the use of evidence-based practices ensures educators' decisions and are informed by facts, insights, and tools that science provides (Hess, 2008); (b) the use of scientific-based research provides for effective teaching practice and optimized student learning (Halonen et al., 2012; Lajbcygier & Spratt, 2009; Mehrotra & McGahey, 2012); and finally (c) the concurrent realization that lack of evidence of grounding of any instructional activities increases the risk of not attaining the intended instructional objectives (Gunter, 2007).

From the analyst of the data, clearly participants knew how to define grounded design, were knowledgeable in providing evidence to support the claims that their online courses were grounded on scientific-based research and theory. Although there did not appear to be a need to implement any changes in terms of policy, practice and administration resulting from findings for Research Question 1, day-to-day faculty

support issues such as faculty training and development and sharing support activities are encouraged and recommended.

Implications for Research Question 2

What evidence do faculty provide to demonstrate that their designs of online instruction are grounded in the elements of scientific-based research and theory?

As part of educators' demonstrating their comprehension of grounded design practice concept, the educators should be able to offer evidence or proof within their courses demonstrating that scientific-based research and theory informed their decision for the design, creation and teaching of online courses.

In demonstrating that their designs of online instruction were grounded in scientific-based research and theory, all four participants' referred to the utilization of scholarly tools and resources found in the literature. This was also detected based on course review and discussions about or review of documents available. Examples included, the use of epistemological course design by Dr. Jones, the use of industry best practices and the literature benchmark to design course curriculum by Dr. Marion, the use of scholarly literature as evaluation after design by Dr. Robin, and the benchmark and uses of instructional design best practices, pedagogy and andragogy by Dr. Banks. All of the participants were very conversant in this area in demonstrating that their online courses were grounded in practice based on scientific-research and theory.

The implication for practice, policy, and administration resulting from the findings was that no changes or interventions were necessary for the participants. Still, it

is essential for educators to offer demonstrable evidence that their teaching practices not only are grounded on decisions based on scientific-based research. The intent is to maximize effectiveness, optimization and enhancement of student learning but also to use student-learning outcomes as empirical evidence supporting their teaching practices. Evidence from the literature seems to support educators providing examples demonstrating the grounding, e.g., such as the need for instructional alignment, final outcome as a first concern, effective use of peer-reviewed research for decision making, and a clear vision of teaching approach (Joeckel et al., 2010; Latchem & Jung, 2010; Morphew, 2012; Thormann & Zimmerman, 2012).

Evidence offered by the participants demonstrated that their online courses were grounded and met the four criteria of grounded practice and design framework including: (a) practices that are based on a defensible theoretical framework, (b) reflection and use of empirical and verifiable approaches, (c) use of generalization and broad application evidence, and (d) use of evidence that are iteratively validated through successive implementations. Therefore, the implication is that participants were knowledgeable and had skills in the area of grounded design and could be relied upon to ground their course design in scientific-based research and theory.

Implications for Research Question 3

What steps do faculty take in order to ground their design of online instruction in scientific based research and theory?

Not only is it necessary for educators to demonstrate that they know the meaning of grounding design and offer evidence showing that scientific-based research and theory informed their decisions for designing, creating and teaching online courses. Equally important that they can show that they follow a systematic process such as a plan or blueprint during the design, creation and evaluation process of creating online courses. Using a systematic process enables educators to factor all evidence, align and match their teaching activities to adopted underlying principles guided by scientific-based research and theory.

The steps faculty took to ground their instructional design on scientific-based research and theory were fairly similar. Three participants (Drs. Jones, Marion, and Banks) highlighted the use of the systematic instructional design model of ADDIE as a benchmark and a step-by-step process to analyze, design, develop, implement, and evaluate online instruction for their courses. This process was supported by all four criteria of the grounded practice and design framework. Although the fourth participant, Dr. Robin, did not explicitly use the ADDIE model, he developed his own process of translating face-to-face content to online, outline planning, blue-print design, content population and finally reviewing the literature to evaluate his online courses. Because participants did not express any difficulty with this process and because it appears they are expert in the area, there are no suggested recommendations offered for changing or altering practices or policies. However, educators should be knowledgeable in the use of systematic processes rooted in scientific-based research and theory in order to align their underlying theory to their practice when designing effective instruction.

Literature was supportive of the participants' mentioned uses of empirical and replicable processes (Dick & Carey, 2005) to solve instructional problems effectively (Pieters & Bergman, 1995) and efficiently (Simonton, 2010; Morrison, 2012). Clearly the evidences offered by the participants in answering Research Question 3 met the two grounded practice and design framework criteria of (a) use of a defensible framework and (b) implementation of practices reflecting empirical verifiable approaches. The implication for policy, practice and administration is that the step-by-step process followed by the faculty in grounding their design of instruction based on scientific-based research and theory were appropriate and should be encouraged and shared with other online instructors.

Implications for Research Question 4

What are the main causes that may prevent faculty from grounding the design of online instruction in scientific-based research and theory?

The implication in regard to causes preventing the grounding of the design of online instruction is that educators should either have or gain knowledge of barriers that may present themselves in the process of designing online courses before they begin the process. Showing it is important that they be knowledgeable ahead of time either through personal experience or through lesson learned from others about possible barriers to design, creation, and the teaching of online courses. Being knowledgeable about these barriers will enable educators to avoid pitfalls, surprises, and seek support and resources for anticipated barriers.

In looking at the implications regarding for the main causes that may prevent faculty from grounding the design of online instruction in scientific-based research and theory, three aggregate main issues of time, technology, and design logistic were identified. All four participants were very vocal in expressing their thoughts about these issues that they cited as possibly preventing them from grounding the design of their online courses based on scientific-based research and theory.

All four participants were generally in agreement that the time it took to create, administer, and teach online courses was double or even triple the time it took to perform the same actions for a face-to-face course. They also noted that the constant rate of change in technology created a barrier and a steep learning curve for course designers. Their third concern was related to the challenges of designing logistics, which were compounded by previous issues of time and changes in technology, making it difficult to create a successful online environment for student interaction.

Through the analysis of findings and the review of the literature, the researcher was able to identify various implications for practice on the issue of main causes that may prevent faculty from grounding design of online instruction on scientific-based research and theory. These are discussed in the following paragraphs.

There is a need for educators who are used to working in face-to-face environments to shift their mindset (paradigm shift) from face-to-face to online when designing online courses. Drs. Jones and Banks both reported improved student interactions and motivation in students when they designed their online courses from the "ground up" as opposed to converting face-to-face courses to online courses. To some

extent, this implication was supported by David (2012) and Piorier and Feldman (2012) in their recommendation that more focus should be placed on quality and the design of teaching than on the technology. This point is clearly articulated and expressed in the grounded practice and design framework criteria: practices that are used should be empirically verifiable, aligned with the implemented approach and the instructional strategies.

Time spent reasoning through the design will yield better use of time, technologies incorporated into the learning and content, and strengthen the design aspect of a course. As reported by all the participants, mapping what needs to be incorporated into the online course can make a difference later when teaching. This was supported by literature which states that the best practices advanced related to the design of online instruction are those based on empirical evidence, leveraging, adapting, using technology as tools to facilitate good teaching practices, and requiring authentic course work with innovative and empowering technology to enhance learning (Downing & Holtz, 2008; McHaney, 2011; Mehrotra & McGahey, 2012; Smith, 2012; Wang, 2012). The grounded practice and design framework supports use of scientific-based research and theory ideas to informed design resolution as well as aligning underlying approaches with instructional strategies during the design process in order to maximize the effectiveness of online courses

Based on interviews and course and document reviews, participants largely relied on experience to try to resolve and address the three major issues of time, technology and design; thus, the implication for practice is that educators should develop the use of

lessons learned strategies, incorporating feedback and conversation with colleagues and scholar communities in addressing these issues. Literature on this issue indicated that educators can learn from seeing other exemplary courses and presentations and from reflecting on their own mistakes, thereby improving their capability to improve their own design of instructions (Latchem & Jung, 2010; Stavredes, 2011).

According to Polly (2010) and Wyatt (2011), faculty need to be active participants during learning and training. The implication for this study is that rather than being left to learn independently, the use of mentoring and feedback should be strengthened. The need for time and space to participate in extensive research projects or course design may require support through lighter teaching loads. (Polly, 2010; Wyatt, 2011). This can assist in sustaining learner motivation and engagement as part of the design for online courses (McHaney, 2011; Stavredes, 2011).

Implications for departmental policies and administration on the issues of time, technology and design issues include the need for support and encouragement in the use of team-based redesign, the uses of template design department-wide, and incorporation of resources from other departments such as library, technology office support. This could reduce parallel production and duplication, increase reuse and reduce time to produce content for online courses. The literature reviewed supported such actions, recommending solutions for online educators to include the collaborative application of a constructivist environment and student support (Crawley, 2012; Ehrhardt, 2010), and the transformation and blending of interactions and balancing resources (Crawley, 2012; Malik, 2010; Phan, 2013).

There is also a need for departmental encouragement of faculty to design and develop courses early by making available resources for them to seek training designs, share experiences and discuss the design of courses based on empirical evidence as supported by grounded practice and design framework. Unfortunately, this is a dilemma when faculty many times do not get their course assignments until close to a semester beginning. Numerous researchers (Downing & Holtz, 2008; McHaney, 2011; Mehrotra & McGahey, 2012; Smith, 2012; Wang, 2012) have suggested the importance of leveraging, adapting, and using technology as a tool to facilitate good teaching practices, and uses of authentic course work with innovative and empowering technology as enhancements to learning online.

Implications for Themes

Five general themes emerged from aggregation of data collected from participants' interviews, course review, and document review. The data analysis was based on Creswell's (2007) qualitative study model whereby the researcher was looking at correspondence between two or more categories (categorical aggregation) of instances from data to see if issue relevant meaning emerged that could be aggregated into themes. The five key categories or themes that emerged were: (a) pedagogy, (b) instructional design, (c) instructional technology, (d) support, and (e) problems.

In reviewing the emergent themes, the issues were fairly evenly distributed among the four research question areas of interest. This implied that these issues were integral to faculty decisions related to the grounding of design of online instruction based on

scientific-based research and theory. These themes provide another view of what factors affect faculty in higher education settings related to the grounding of designs of online instruction based on scientific-based research and theory. Failure of administrators or educators to address the issues raised here may possibly result in design and creation of an online course whose goals, activities and assessment are not properly aligned. Such a mismatch of theory and practice could ultimately manifest in student dissatisfaction with the online courses. Student dissatisfaction could lead to attrition and retention issues such as: lack of social presence, feeling of isolation and lack of interactions (Gunter, 2007).

Recommendations for Future Research

Based on the grounded practice and design framework, feedback from the participants, and findings from the study, the following are recommendations for future research and investigation in the area of instructional design and grounded design. These issues emerged as participants expressed their concerns and difficulty in dealing with them during the design of their online instruction.

1. Further research should be carried out to follow-up on strategies for how to design for, create, and sustain successful online communities of students (Palloff & Pratt, 2007; Thormann & Zimmerman, 2012).
2. Further research should be conducted into finding online best practices and designing meaningful ways to engage learners and structure collaborative online learning environments (So, Lim, & Yeo, 2010).

3. Further studies need to be conducted to learn more about how to design and implement structures that will improve communication and understanding for students in online courses (Thormann & Zimmerman, 2012).
4. Further investigation should be conducted to identify best practices to design and implement the establishment of personal connections, immediacy, relationships, interactions, and technologies added to online courses that could contribute to strengthening online communities (Gunter, 2007; Phan, 2013; Rath, 2012; Thormann & Zimmerman, 2012).
5. Conduct a study to explore how best to assist online instructors with the various designs in collaborative and collaborative learning with technology in a community of online learners (Lock, 2007).
6. Their needs to be further research conducted on the quality assurance of online courses developed by faculty.
7. There needs to be further research conducted on the credentialing of faculty to develop and teach online.
8. There needs to be further research on the developing and matching of and learning standards of the rubrics used in the online environments.

Researcher Reflections of Case Reporting

In regard to qualitative reporting, most of challenges I encountered were well documented by Richie (2013) who noted that the report challenges in qualitative design include difficulties of gauging how best to structure accounts of participants and tell a

story, appropriate authorial voice, displaying evidence leading to interpretations and conclusions, descriptions of ranges and diversity and difficulties of choosing the length of report. An expanded discussion and self-declaration espousing the researcher's reflective practices is contained in Appendix E.

Summary

This study sought to explore how faculty educators ground the design of online instruction based on scientific-based research and theory in a higher education learning environment. Some major factors emerged from analysis of data acquired in interviews, course review, and document review.

Participants were consistent in defining the meaning, had supporting evidence, and followed step-by-step processes in grounding design of online instruction on scientific-based research and theory. Time, technology and design logistics barriers were identified as major issues that prevented participant in grounding design of instruction. Regular training, peer profession interactions and support are needs identified that are required to provide smooth process of grounding the design of online instruction using scientific-based research and theory by educators.

Emergent themes were pedagogy, instructional design, instructional technology, support and problems related to the design of online learning which affected the design of instruction. In addition to the grounded practice and design framework, various researchers have indicated the need to ground design of instruction on empirical evidence, scientific-based research, to incorporate best practices design, and to make

teaching more professional. Given that online learning is a relatively new area experiencing exponential growth, more studies should be conducted in this area.

This chapter was organized around the four research questions that were used to guide the study. Included in the chapter was a summary and discussion of the findings, a discussion of the five emergent themes, and ancillary research issues. Implications for policy and practice for each research question and for each theme were offered. The chapter was concluded with recommendations for future research and the researcher's reflections on case reporting.

APPENDIX A
INTERVIEW PLANNING

Interview Planning (Hancock & Algozzine, 2006)

Step actions	Results
STEP ONE: List the research questions that your study explores.	1. What does it mean for a faculty educator to ground the design of online instruction on scientific-based research? 2. What evidence do faculty provides that demonstrate that the design of instruction is grounded on the elements of scientific-based research? 3. What steps does faculty takes in order to ground the design of instruction on scientific-based research? 4. What are the main causes that may prevent faculty from grounding the design of instruction on scientific-based research?
STEP TWO: Break research questions into researchable sub questions.	1. What does it mean for a faculty educator to ground the design of online instruction on scientific-based research? a. Definition of the terms b. Teaching philosophies c. Epistemological beliefs 2. What evidence do faculty provides that demonstrate that the design of instruction is grounded on the elements of scientific-based research? a. Specific scientific-based evidence. b. Standards c. Theories d. Grounded instructional strategies. e. Instructional models 3. What steps does faculty takes in order to ground the design of instruction on scientific-based research? a. Process - Formal/ informal ISD model b. Plan- Instructional strategies 4. What are the main causes that may prevent faculty from grounding the design of instruction on scientific-based research? a. Lack of time b. Lack of resources. c. Politics d. Training issues 5. Resources available a. Instructional support. b. Technology support. c. Administrative support. 6. Anything to add to this research a. Anything forgotten.

STEP THREE: Develop possible interview topics of items with each research questions to ensure that nothing is overlooked.	1. How do you define the process of anchoring/grounding the design of online instructions on scientific-based evidence, theories or grounded strategies? (Prop for keywords such as Evidence based practice (EBP), grounded design practice) 2. What implication does teaching/learning philosophies and epistemologies you hold affect the design of online instruction? (Props for role of faculty such as facilitator, instructional strategies such as problem-based learning). 3. What specific research-based evidence do you base your study design on? (Prop for theories, teaching strategies, instructional models) 4. What process do you go through in designing your online course? (Props for the uses of ISD model, instructional plans) 5. What problems or issues have you encountered when designing your online courses? (Props for lack of time, lack of training, lack of resources, politics, and habits). 6. What resources are available to you when designing your courses? (Props for instructional, technology, administrative support) 7. Is there anything you might add that would help this research?

APPENDIX B
INTERVIEW PROTOCOL

(Creswell, 2007)

Interview protocol research: Faculty Instructor Questionnaires

Time of Interview: x

Place: x **Interviewer:** x

Interviewee: x **Position of interviewee**: x

(Briefly describe the research)
(Get the consent from the participant)

Questions:

1. How do you define the process of anchoring/grounding the design of online instructions on scientific-based evidence, theories or grounded strategies? (Prop for keywords such as Evidence based practice (EBP), grounded design practice)

2. What implication does teaching/learning philosophies and epistemologies you hold affect the design of online instruction? (Props for role of faculty such as facilitator, instructional strategies such as problem-based learning).

3. What specific research-based evidence do you base your study design on? (Prop for theories, teaching strategies, instructional models)

4. What process do you go through in designing your online course? (Props for the uses of ISD model, instructional plans)

5. What problems or issues have you encountered when designing your online courses? (Props for lack of time, lack of training, lack of resources, politics, and habits).

6. What resources are available to you when designing your courses? (Props for instructional, technology, administrative support)

7. Is there anything you might add that would help this research?

   (Thank the participant

   Assure confidentiality of response and future interview)

Interview protocol research: Instructional Designer Questionnaires

Time of Interview: x

Place: x **Interviewer:** x

Interviewee: x **Position of interviewee**: x

(Briefly describe the research)
(Get the consent from the participant)

Questions:

1. What process do you go through in designing your course/in supporting faculty design their courses? (Prop for example of course/courses designed)
2. What support and resources faculty receives from Center of Online Learning CDL? (Props for types of resources and availability).
3. What specific issues do you encounter as Instructional Designer when supporting or training faculty instructors? (Prop for issues affecting the faculty, issues affecting the instructional designer).
4. What process do you go through in designing your online course? Or in supporting the faculty? (Props for the uses of ISD model, instructional plans)
5. What types of training from your department are available for faculty in support for online learning?
6. Who decides to put courses online? Faculty or department?
7. Is there anything you might add that would help this research?

(Thank the participant

Assure confidentiality of response and future interview)

APPENDIX C
QUALITY OF ONLINE COURSE RUBRIC (MODIFIED)

Organization and Design Criteria (Blood-Siegfried et al., 2008)

Criterion One: Organization and Design Criteria	Check listed Criteria Met?	
1. **Each course includes an introduction and/or cyber tour to introduce the student to the course.**	Yes ☐	No ☐
2. **A list of standardized online course expectations is provided for all learners.**	Yes ☐	No ☐
3. **Course is visually and functionally consistent, including consistent navigation.**	Yes ☐	No ☐
4. **Required course elements are clearly delineated from supplemental elements.**	Yes ☐	No ☐
5. **Units of instruction are subdivided in subunits, with headings and subheadings that are logically linked.**	Yes ☐	No ☐
6. **Standards of Netiquette are followed, such as avoiding CAPITALS because they appear to shout at the student.**	Yes ☐	No ☐
7. **Color and graphics are used effectively.**	Yes ☐	No ☐
8. **Online course faculty follows the appropriate legal guidelines with regard to copyright and intellectual property issues.**	Yes ☐	No ☐
9. **Standard course navigation buttons include one for online resources and one for the Honor Code.**	Yes ☐	No ☐
10. **Underlining is used only for hyperlinks.**	Yes ☐	No ☐
11. **Course sites are copied for re-use with permission from the last faculty person who taught the course.**	Yes ☐	No ☐

Course Content (Blood-Siegfried et al., 2008)

Criterion Two: Course Content	Check listed Criteria Met?	
1. **Course description, goals, objectives, content, and assessment are consistent.**	Yes ☐	No ☐
2. **Learning outcomes, performance objectives and student expectations for assignments, discussion, participation and projects are clearly explained.**	Yes ☐	No ☐
3. **Students have appropriate time for investigation of new knowledge and concepts.**	Yes ☐	No ☐
4. **Content links are current and functional.**	Yes ☐	No ☐
5. **Content is complete, accurate, current, and free of typographical errors.**	Yes ☐	No ☐
6. **Examples establish content's relevance with case studies, potential scenarios, examples, and/or problems comparable to real-world situations.**	Yes ☐	No ☐
7. **Each course contains information about being an online learner and links to course specific resources.**	Yes ☐	No ☐
8. **Courses are comparable in rigor to on-campus courses.**	Yes ☐	No ☐
9. **Content is related to other material the learners may have studied or experiences they may have had.**	Yes ☐	No ☐

Instruction (Blood-Siegfried et al., 2008)

Criterion Three: Instruction	Check listed Criteria Met?	
1. **Demonstrates multi-modal teaching strategies such as visual, textual, interactive, and/or auditory activities to enhance diverse learning styles and needs of adult learners.**	Yes ☐	No ☐
2. **Course is geared to adult learners with learning activities that encourage critical thinking, creativity, and problem solving.**	Yes ☐	No ☐
3. **Learning activities are logically sequenced.**	Yes ☐	No ☐
4. **Learning activities are realistic and appropriate and can be performed with the resources and time available to the learners.**	Yes ☐	No ☐
5. **Clear and concise instructions and expectations are provided, including those for collaborative or team-based learning activities.**	Yes ☐	No ☐
6. **Course promotes interdependence, peer support, and the creation of a learning community.**	Yes ☐	No ☐
7. **Course learning activities have real-world relevance.**	Yes ☐	No ☐
8. **Learning strategies include student-led opportunities as well as choice of materials.**	Yes ☐	No ☐
9. **Number of learning activities is sufficient and appropriate to support learning.**	Yes ☐	No ☐
10. **Learners are told which activities must be performed synchronously and which may be performed asynchronously.**	Yes ☐	No ☐
11. **Coaching or remediation is provided at critical times and then support decreases in order to promote self-sufficiency in student.**	Yes ☐	No ☐

Interaction (Blood-Siegfried et al., 2008)

Criterion Four: Interaction	**Check listed Criteria Met?**	
1. **Expectations for communication, collaboration, accountability, and peer coaching among students and between students and faculty are defined and established.**	Yes ☐	No ☐
2. **As a facilitator rather than a provider of content, instructor generates questions to stimulate thought, test ideas, and promote critical thinking.**	Yes ☐	No ☐
3. **Activities engage and motivate; learners must frequently respond to questions, select options, provide information, or contact others.**	Yes ☐	No ☐
4. **Constructive, relevant and frequent feedback is provided on an individual or group basis to promote clarification, elaboration, and transfer of knowledge.**	Yes ☐	No ☐
5. **Instructor creates a positive social environment and develops a community of learners.**	Yes ☐	No ☐
6. **Instructor encourages and frequently interacts with the students(s) to promote effective learning and problem-solving.**	Yes ☐	No ☐
7. **Instructor establishes methods to convene with students online, by phone, by e-mail, by video conferencing or face-to-face meetings.**	Yes ☐	No ☐
8. **Instructor encourages asynchronous interaction and synchronous communication.**	Yes ☐	No ☐
9. **Discussion forums or threads are separated and categorized by common themes.**	Yes ☐	No ☐
10. **Discussion forums or threads ask for information, clarify, summarize and encourage students' participation; students are challenged to justify and elaborate when discussing and answering questions.**	Yes ☐	No ☐
11. **Students doing collaborative projects are divided into groups of three to four; discussion groups are limited to 10 to 12 students per group.**	Yes ☐	No ☐
12. **Students incorporate course content and assigned readings into discussion and class activities.**	Yes ☐	No ☐
13. **Class provides opportunity for students to post personal information and/or non-content related activities.**	Yes ☐	No ☐

Evaluation and Assessment (Blood-Siegfried et al., 2008)

Criterion Five: Evaluation and Assessment	Check listed Criteria Met?	
1. **Detailed step-by-step instructions are provided with each exercise, including guidelines for submitting assignments.**	Yes ☐	No ☐
2. **A variety of content-relevant assignments or evaluative exercises are provided.**	Yes ☐	No ☐
3. **Ongoing assessment is provided in an expected and timely manner.**	Yes ☐	No ☐
4. **Instructor discusses progress individually with student to protect privacy.**	Yes ☐	No ☐
5. **Students are informed about criteria that will be used to evaluate their participation in online activities.**	Yes ☐	No ☐
6. **Objectives are specific, measurable, accountable, controllable, and time- bound.**	Yes ☐	No ☐
7. There is a clear relationship between learning outcomes, evaluation strategies, and course assignments.	Yes ☐	No ☐
8. **Examples of work are given when appropriate.**	Yes ☐	No ☐
9. Coursework promotes self-assessment and reflection.	Yes ☐	No ☐
10. Students are encouraged to provide comments and feedback on each other's assignments.	Yes ☐	No ☐
11. Evaluation and grading procedures are clear and include links to University policies.	Yes ☐	No ☐
12. Honor code expectations are clear and links available for students.	Yes ☐	No ☐

APPENDIX D
INSTITUTIONAL REVIEW BOARD (IRB) APPROVAL

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Exempt Human Research

From: **UCF Institutional Review Board #1**
FWA00000351, IRB00001138

To: **Japheth Koech**

Date: **June 29, 2012**

Dear Researcher:

On 6/29/2012, the IRB approved the following activity as human participant research that is exempt from regulation:

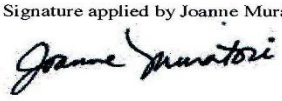
Type of Review:	Exempt Determination
Project Title:	Grounding design of instruction: a study to explore the uses of Scientifically-based research and theory in the design of online instruction by faculty in higher educational settings.
Investigator:	Japheth Koech
IRB Number:	SBE-12-08542
Funding Agency:	
Grant Title:	
Research ID:	N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 06/29/2012 03:14:49 PM EDT



IRB Coordinator

APPENDIX E
SELF-DECLARATIONS

Reflective Practice

This section consist of reflections of researcher's reflective practices (definition of reflective practices, areas of reflective practices, reasons to practice reflections, benefits and advantages of reflective practices). It contain the researcher's own reflection on individual sections of the research (literature, data collection, data analysis, and reporting), the researcher's self-declaration (on interest in technology and computing, enrollment and studies in the computing field, and experience working with computers and instructional technology) as well as the researcher's personal thoughts and emotional reflections.

Definition of Reflective Practices

There are important keywords in this area of reflective practices describing the act of qualitative researchers acknowledging how their role, background, culture, experience and other issues (Creswell, 2014) may affect their studies. These key words are reflections, reflexivity, reflexion, introspection, and bracketing.

Reflexivity is closely described and defined by some qualitative scholars as self-awareness, self-questioning, self-understanding, recognizing the other (Cumming-Potvin, 2013; Newbury, 2011). Other scholars define reflexivity as a method for self-scrutiny, self-awareness, self-analysis (Bourke, 2014; Murray & Holmes, 2013), self-critical attitude (Thomas & Magilvy, 2011), authentic and truthful self-exposure (Weiner-Levy & Popper-Giveon, 2013).

Other definitions of reflexivity includes a continuous process of self-reflection, introspection, intersubjective reflection, mutual collaboration, social critique and

discursive deconstruction (Darawsheh, 2014), creating and clarifying the meaning of experience in terms of self (Lamb, 2013), self-monitoring awareness (Peters, 2013) and the process of meaning-making through sharing and witnessing (Chapman, 2011).

Reflexion is defined as an active and engaged dimension of reflexivity (Murray & Holmes, 2013), and bracketing is defined as activities undertaken by the researcher to manage their subjectivity, e.g., the use of peer debriefing (Chenail, 2011). Reflection is defined as a means of evaluating the experience of the researcher (Lamb, 2013) through writing field notes and content (Elliott, Ryan, & Hollway, 2012). Introspection is defined as a cognitive process that produces consciousness (Peters, 2013).

The definition and concept of the term bracketing is often found in phenomenological studies. Hamill & Sinclair (2010) indicated that bracketing is a process of limiting the researcher's assumptions from shaping data collection or imposing one's understanding on research data collection and analysis. This is an attempt to limit the effect of the researcher on the research by researcher's identification of consigned factors such as interest, personal experience, cultural factors, assumptions, and hunches that could influence how the data are viewed (Fischer, 2009).

Wall, Glenn, Mitchinson & Poole (2004) noted that bracketing is an effort undertaken by researchers to limit their preconception, from affecting data collection and analysis. It suggests the use of reflective framework to guide reflective thoughts and encourage deep and critical thinking to develop bracketing skills. Others define bracketing as an effort to manage subjectivity (Chenail, 2011) so as to mitigate the potential deleterious effect of preconceptions that may taint the research process by the

researchers' awareness of their subjective influence on the research process (Darawsheh, 2014).

There are various areas identified that can be bracketed. These include assumptions, judgement, biases, belief, presuppositions, experience, perceptions, and preconceptions (Hamill & Sinclair, 2010). Hamill & Sinclair (2010) observed that by using bracketing, researchers can conduct studies based on participants' descriptions rather than their own interpretations, and that the main aim highlighted for bracketing is to "produce data and descriptions of the essence of phenomenon that has not been adjusted, massaged, embellished or misinterpreted by participant or researchers alike" (Hamill & Sinclair, 2010, p. 23). Because inexperienced researchers may not be proficient or comfortable with bracketing in a research study, Hamill & Sinclair (2010) suggested that bracketing is a skill; and like any skill, the more the qualitative researcher practice the better the researcher become.

Reflective Practice Areas

In qualitative studies, not only are there many identified areas in which researchers can undertake reflective practice, but also their importance is clearly articulated in this illustrative quotation from Creswell (2014):

> Inquirer reflects about how their role in the study and their personal background, culture, and experience hold potential for shaping their interpretations, such as the themes they advance and the meaning they ascribe to data. This aspect of the methods is more than merely

advancing biases and values in the study, but how the background of the researcher's actually may shape the direction of the study. (p. 186).

The literature suggests that qualitative researchers may practice reflective writing on areas such as their location, experience, worldview, and assumptions (Hunt, 2010), identity, perspective (Medved & Turner, 2011; Noble & Smith, 2015), assumptions, values, experience, interests, beliefs, political stance and social identity (McDermid, Peters, Jackson & Daly, 2014; Noble & Smith, 2015). Other areas include attitudes, thoughts, reactions and habitual action, personalities, background and biases (Clancy, 2013; O'Connor, 2011). Similarly, researcher's characteristics, role, personal background, culture, and experience (Creswell, 2014; Gringeri, Barusch, & Cambron, 2013) should also be addressed.

Reasons to Write Reflexively

There are many reasons highlighted in the literature as to why qualitative researchers should reflect and write reflexively, e.g., upholding a sense of cognizance and openness to the study and unfolding results as noted by Thomas & Magilvy (2011), to lessen the chance of the researcher's preconception affecting the research process (Darawsheh, 2014), provide practical means of wrestling with their subjectivities (Cox, 2012). Houghton, Casey, Shaw & Murphy (2013) indicated that by researchers recording their thoughts about decisions made throughout their research studies, researchers are able to increase dependability and display the transparency of their research processes. Reflexivity is also highlighted by Polit & Beck (2013) as an important tool in the

qualitative research process, whereby the researchers reflect critically on self and scrutinize personal values that may affect data collection and interpretations.

Benefits and Advantages of Reflective Practices

There are many identified benefits, need for, and advantages of qualitative researchers' writing reflexively, such as the need to use reflection to enhance quality of research, demonstrate ethical research practices, and to ensure the ethicality of decisions as specified by Murray & Holmes (2013); to control bias by becoming aware of the researcher's subjective influence on the research process (Darawsheh, 2014), as well as mean of evaluating the experience of the researcher by the reader (Lamb, 2013).

Other noted benefits of reflective writing to the researcher include such issues as achievement of self-discovery, self-awareness, self-analysis, and other-awareness in order to gain scholarly insights, and new hypotheses and research questions (Medved & Turner, 2011). Reflexive writing can also be used to ensure quality by acknowledging and creating awareness of how the researcher's values and assumptions may affect collection and interpretations of data (McDermid, Peters, Jackson & Daly, 2014), as identifiers of quality in qualitative research studies because the research displays meticulous social scientific methods, transparency, reproducibility and reflexivity (Shelton, Smith & Mort, 2014).

Murray & Holmes (2013) specifically stressed that questioning how one's subjectivity is consolidated is necessary if qualitative researchers hope to be more aware of their subjective biases and how these biases might inform their research studies. It is also noteworthy to point out that reflective practice has the potential to raise the

professional status and morale of practitioners (Edwards, 2014). Furthermore, Cassidy (2013) added that acknowledging hubris as one of many social constructions might prove valuable as part of the researcher's considerations of reflexivity without such activity becoming self-indulgent.

Disadvantages of not undertaking reflective writing practices in qualitative studies, according to Bourke (2014) are that, researcher bias will distort data and the given result will not reflect target population (Krishna, Maithreyi & Surapaneni, 2010). Also, a lack of thorough self-analysis will result in the researcher being unaware of any influence that may affect data collections and analyses (Clancy, 2013).

Researcher Reflection: Specific Sections

Researcher Reflections on Research Problem Selection and Literature Section

In selecting the research problem to study, I took the following three specific steps. First, I identified a few broad problem of interest such as instructional design and role of technology. Next, I evaluated each by asking the following: Is the problem a mainstream in the field? Is there a substantial body of literature? Is the problem timely? Finally, I based my selection of topic on factors given by Gall, Gall & Borg (2003): the significance and the importance of the topic, the feasibility of resources and experience and the benefit to the research and my professional goals.

In the literature section, some authors in the field of higher education have stressed the need for doctoral students to perform extensive literature reviews as part of their dissertations. Some of the argument for the need of extensive literature reviews has been to provide an opportunity for doctoral students to showcase their understanding of

the literature and demonstrate their capability to conduct research. The literature assisted this researcher by providing a review of the background and context of the topic of interest along with evaluating the worth of researching the topic (Boote & Beile, 2005; Burton & Bartlett, 2009). Performing a literature review also allowed this researcher to provide evidence that the research study was grounded and proof that the research was verifiable and investigable (Gall et al., 2009; McKenney & Reeves, 2012). The review of the literature assisted this researcher in refining the problem of the study, allowing him to provide a rationale as well as to position the study on existing work in the field of study (Burton & Bartlett, 2009; Creswell, 2007). The literature review also allowed the researcher to place the study within a theoretical and empirical context and understand the contribution of literature to this study's research questions, i.e., to refine and reformulate those questions (Padgett, 2012; Thomas, 2010).

Because Leshom & Trafford (2007) noted that a conceptual framework acts as a blueprint, guiding the design, collecting the data, tracing and connecting research strategies for identification and determination of data collected, this researcher implemented the grounded practice and the design of a constructivist-learning environment by Hannafin el at. (1997) as a framework for this study. The framework's grounded criteria laid the groundwork on which the literature was delineated and guided the identification of important topics that needed to be addressed in the literature section in order to support the research study.

The Researcher's Reflection on Data Collection Section

Qualitative researchers have been encouraged to self-reflect, reflect with other researchers, reflect on participants and on the theoretical framework of what they already know from previous research and to relate those reflections to the literature (Jones, Torres & Arminio, 2006). There are varied roles a researcher can take in a qualitative study and as such, this researcher undertook an active facilitator role in order to manage the interview process and to enable participants to express their thoughts, feelings, views, and experience (Ritchie & Lewis, 2003).

Another area of learning was related to the personal stories and background shared by the participants and especially through the design of the interview protocol. I was very conscious of the need to follow the protocol but at the same time was concerned with the time constraints of the participating faculty. They were gracious in having agreed to participate in the study, and I did not want to burden them with unnecessary questions.

Regarding selection criteria for participants, the criteria for choosing the participants was clear and very useful using criterion sampling. However, it lent itself to being restrictive, because it limited the field of participants.

Although I believed that I collected sufficient data to answer the four research questions posed in this study, there were some limitations in the process. The data collection was restricted, in part, due to my lack of experience and concern for imposing on the time of busy participants. Also, one of the participants did not agree to be audiotaped; thus, the data collected in that interview were limited to what I could write

during the interview process and what I could recall and write after the interview. The study was also limited by several other variables: (a) the inability to fully use all of items in the modified online course rubric due to the difference in the learning management system (LMS) technology at the time of interview, (b) the lack of willingness of Participants 3 and 4 courses to be observed and analyzed , (c) the differing focus of one of the interviews on creation of courses at the departmental level instead of design instruction of the course, (d) absence of illustrative documents such as blue-print, draft, sketches from the participants showcasing their design instructional processes, and (e) instructional design phases are usually all the activities carried out before student enroll in a course, this activities was not observable at the time of the interview, therefore, the document collected did not reflect the instructional design process, but rather, reflected the product of the design process.

Researcher Reflections on Data Analysis Section

Researchers in qualitative studies are encourage to write reflectively through field notes and contents when collecting the research data (Elliott, Ryan & Hollway, 2012). The researcher concurs with Padgett (2012) who stated that "Writing up a qualitative study takes a good deal of effort--it is a craft to be learned and honed over time" (p. 221). As with other aspects of this study, I found the data analysis to be difficult due, in part, to my inexperience. Brown and Walker (2011) acknowledged the challenges posed during the processes associated with coding, summarizing, and interpreting qualitative data. Every day I worked on this research study, I gained new appreciation for the opportunity to acquire one or two additional skill sets. Now, more than ever, I value the competencies

noted by Yin (2011b) that are essential of the qualitative researcher: ability to listen, asking good questions, knowledgeable with the topic of study, taking extra caution with the data, ability to complete parallel tasks, and ability to persevere. Yin expressed it well when he said, “Doing qualitative research is difficult. You need to have a sharp mind and maintain a consistent demeanor about your work” (Yin, 2011b, p. 25).

As noted, researchers are impacted by their roles, background, and experience, all affecting their qualitative studies. This study were no different, and I believe my experience in instructional designed affected the lens through which I designed, collected and interpreted data.

Researcher Reflections on Reporting Section

Features that are important in the concluding section of a qualitative dissertation offered by Daymon & Holloway (2011) include the review of what has been learned from the findings, implications of the study for the practice, contribution of the study to knowledge base, recommendation for future research, and critical reflection on the limitation of the study. As I reflect on my research, there are some things that I would have done differently having now had the benefit of my experience in conducting the study; however, the learning curve that I negotiated in working through the steps of the qualitative design methodology made the whole process a positive and valuable learning experience.

One of the major takeaway experiences from this research relates to the inability of an inexperienced researcher to project into the future so that pitfalls can be avoided.

There were times when I should have perhaps sought further guidance early in the study, thereby avoiding some of the problems I encountered.

In regard to qualitative reporting, most of the challenges I encountered were well documented by Richie (2013) who noted that the report challenges in qualitative design include difficulties of gauging how best to structure accounts of participants and tell a story, appropriate authorial voice, displaying evidence leading to interpretations and conclusions, descriptions of ranges and diversity and difficulties of choosing the length of report.

Researcher Declaration and Reflection

As noted by Fischer (2009), qualitative researchers' sharing of their interest, goals and background is referred to as disclosure and exposition of views. This section contains my exposition of my interest, goals, and background in research for this study.

As I take an opportunity to self-declare my research bias, past experience, prejudices, and orientation in the area of instructional technology, there are three specific areas that are relevant: (a) my interests in technology and computing field; (b) enrollment in computer science, management information system and instructional technology study programs; and (c) experience working in the field of information technology (IT) as student technician, graduate technician, information technology intern, and full-time employee working as an eLearning Specialist at an institution of higher education.

Interests in Technology and Computing

Interests in the computing and technology fields started in high school when I was introduced to computers in the early 1990s. At that time, personal computers were simple and without today's graphic user interfaces (windows). A majority of the access to computers was through DOS commands (typing text instructions on command lines as opposed to the current point and click strategies). Computers were mostly used for games and self-instruction because my high school did not at that particular time have a computer curriculum or area of instructions. Since that time, I have enjoyed working with computing technologies, which, at times, can be frustrating, but I believe this will likely continue to be my future area of interest and work.

Enrollment and Studies in the Computing Field

In college, I formally enrolled and double-majored in computer information systems and mathematics with the sole interest of advancing my skills in the computing world. My encounter with and performance in programming courses was, to say the least, less than stellar. Not to be deterred, I persisted through the first two and one-half years of college with the intention of completing the computer information system undergraduate program. In the process, however, I was introduced to and came to prefer 'softer' areas of computing such as database programming, web programing, and multimedia design over computer languages/software programming, object-oriented programming and advance programming.

After two and one-half years of undergraduate study, I transferred schools and changed majors from computer information science and mathematics to management

information systems with a minor in computer science. Although my overall grades in the subjects were acceptable, struggles in programming language were still evident here and there throughout my undergraduate studies. My interest and love for the area of computing and technology, however, persisted.

After graduating with my bachelor's degree, I opted to enroll in a management information system master's degree program at another institution of higher learning education to continue with studies in the area of my interests in order to advance my academic qualifications and to build my skill level in information technology. My enthusiasm for the information technology field of study was still high. My interest held, and I was able to complete the program and graduate.

After finishing my master's program, I opted again to continue with higher learning by applying, being accepted, and enrolling in a doctoral program. My thought process at the time was to venture into a field of study that was different enough to allow my skill and background experience to expand and broaden but at the same time close enough for my previous experience and skills to be of use. With that mindset, I enrolled in an instructional design and technology Ph. D. program. At the time of this writing, I have advanced to the writing of the dissertation, a requirement to complete the doctoral program.

Experience Working with Computers and Technology

Since I started my undergraduate studies, I have had various opportunities to work in the information technology (IT) area in various capacities. I started working as a computer laboratory attendant, whose job it was to ensure that computers were in

working order, assist patrons with log-ins, and man the phone "help" line. Various permutations of working on the college campus have been in areas of information technology with titles ranging from student technician to graduate student assistant. Working in these areas as computer support have accorded me an opportunity to improve my computing technical skills by learning how to operate, support, troubleshoot, and conduct research in the area of computing technology and other educational technology in higher education settings.

My current position is as an eLearning specialist at an institution of higher education. The duties and responsibilities of eLearning specialist include, among other things, provision of administration, training and support of eLearning applications and other teaching and learning technologies, provision of consultative service for faculty on effective eLearning design strategies and technologies, the creation and conversion of course materials, the development of online training materials, and the support, consultation services and research on best practices of instructional design.

The opportunity to work in the field of IT has also helped me develop varied skills including problem solving, communication, empathy, cooperation, and collaboration with colleagues. I have also expanded my research skills in technology and education and increased my ability to work independently as well as in a team environment.

Reflections: Researcher's Personal Emotions and Thoughts

As Lamb (2013) noted, reflective practice allows qualitative researchers to acknowledge thoughts and emotions being experienced throughout the research process.

Therefore, with this nugget of wisdom, the researcher shares his thoughts and emotions experienced throughout the writing of the dissertation.

There were various emotions, which were swirling inside this researcher during the writing process. They included such emotions as cited by Daymon & Holloway (2011) and included enthusiasm, stress, doubt of ability to finish, and frustration. Also experienced were emotions of self-doubt (Van Den Hoonaard, 2012) who expressed it well in the following statement: "Questioning your ability to bring together all your data you have collected in a meaningful way" (p. 131).

At the time of writing, all these emotions were sometimes overwhelming, but I found support from qualitative scholars such as Yin (2010) who encouraged those in similar situations to persevere and stick to their research, writing in the face of frustrations, uncertainties and un-pleasantries. Other qualitative scholars such as Van Den Hoonaard (2012) have suggested that researchers trust the writing process, and others such as Daymon & Holloway (2011) have suggested using strategies such as selecting interesting topics for writing, maintaining good planning strategies and a healthy lifestyle. This includes resting and relaxing and having conversations with others about one's writing in order to stay motivated throughout the writing process.

All these titbits or nugget of wisdom, encouragement from family, friends and other support groups, plus the feedback and support from dissertation committee members have helped me greatly as I strive to complete this dissertation.

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