THE LEARNER-CENTERED INSTRUCTIONAL DESIGN MODEL:
A MODIFIED DELPHI STUDY

by

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Abstract

The learner-centered instructional design model redefines the standard linear instructional design model to form a circular model where the learner’s needs are the first item considered in the development of instruction. The purpose of this modified Delphi study was to have a panel of experts in the instructional design field review the learner-centered instructional design model and determine if the model is perceived as potentially effective and potentially useful instructional systems design model for postsecondary environments and to what extent it is perceived to meet the needs of the of learners. The overall findings indicated the model is potentially effective and a potentially useful instructional design model.
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CHAPTER 1. INTRODUCTION

Introduction to the Problem

Morrison, Ross, and Kemp (2004) defined instructional systems design (ISD) as the process used to apply learning and instructional theory to create an effective lesson. An instructional design model is the plan that ensures the process will lead to a quality product and successful learner performance (Morrison et al., 2004). The Herridge Group (2004) defined an instructional design model as a representation of a view on how people learn, and a model helps to conceptualize the design process. Many models have been developed that address both instructional and design theories. The Herridge Group stated, “model designers continue to adhere to variations of the ADDIE (Analyze, Design, Develop, Implement, and Evaluate) approach despite changes in technology, society, and business” (p. 7). Additionally, these models reflect a top-down design where the experts decide the objectives, assessment criteria, outcomes, and learning activities (Irlbeck, Kays, Jones, & Sims, 2006).

Reigeluth (1999) suggested that a new paradigm of instructional design is needed to address how to support learning in all its varieties and forms. Clark (2002) stated there are three driving forces behind the need for a new ISD: first, increased economic dependency on knowledge demands training focused on the invisible skills behind thinking and problem solving; second, new research over the past 20 years has created
new cognitive learning theories and tools for design of instruction; and third, emerging
technologies to identify, store, and transmit knowledge objects allow greater access to a
more diverse population than before. Additionally, Irlbeck et al. (2006) stated that the
driving force behind design resides in the behavior of the students and the interactions
between the instructor–learner, learner–learner, learner content, and learner interface.
With the multitude of social changes, emerging technologies, and new developments in
the process of learning, a new learner-centered ISD model may be needed to better equip
today’s instructional designers with a tool that can address the different needs of learners.
J. Gordon and Zemke (2000) accused the ISD of producing bad instruction and of being
out of date with current training needs. Merrill (2002) claimed the highest level of a
system design must include the needs of an organization and the learning needs of the
student. Axmann and Greyling (2003) stated that current change in information and
communication technologies are changing the way learning is conducted which requires a
change in conventional instructional design strategies.

The focal point of this study was the learner-centered instructional design model
created by this researcher. The nonlinear model was created to offer an alternative
instructional design model (Figure 1) that will assist designers in creating content that is
more student-centered and offer the designer greater flexibility throughout the
instructional developmental process.

**Background of the Study**

The growth and development of the Internet has allowed many universities to
expand their classrooms beyond their physical campuses into more global regions. This
expansion has led universities to change their pedagogical structure to incorporate computer-mediated communication learning and teaching opportunities (Morse, 2003). Graff, Davies, and McNorton (2004) stated that e-learning systems need to consider the differences in learners’ characteristics. They identified these differences to include the student’s nationality, gender, and cognitive learning style. Research shows that male and female brains differ in structure and hormonal levels which can influence a person’s spatial reasoning (Glazer, 2005). Young and McSporran’s (2001) study on gender differences in an online course found that women completed more discussion post than men; women completed more assessments than men which often failed to complete all parts of an assessment; and women did more self-assessments than men which often did no self-assessments. Gender researchers agree gender differences do exist in learning but do not agree on the cause of the differences (Glazer, 2005). Williams’s (2002) study on the relationship between learning styles and a computer-assisted instructional unit suggested further studies to explore additional demographical variables that may influence learning styles and online learning. Additionally, the instructional designer needs to consider the additional learning challenges created by both cultural and individual differences (Rice et al., 2001). The learner’s culture will influence how he or she views the learning environment, interpersonal transaction, classroom structure, positive and negative feedback, and competition (Rice et al., 2001).

Instructional designers have the task to develop instructional media which meets the organization’s and learner’s goals. The process can be complex and difficult for some designers to conceptualize. Instructional design models give designers a simplified tool to visualize, direct, and manage the instructional design process (Gustafson & Branch,
The models discussed in this research represent the linear structural design: Dick and Carey, Seels and Glasgow; and nonlinear structural designs: Morrison, Ross, and Kemp; and the learner-centered instructional design model. Each represented model additionally has a foundational link to the core elements in the basic ADDIE model of analyze, design, develop, implement, and evaluate.

The ADDIE instructional design model has no known documented time of origin or creator (Molenda, 2003). Molenda further stated that ADDIE is a colloquial term to describe a systematic approach to instructional development and a term which identifies a group of models which share the same underlying structure. Instructional design models designed after the ADDIE model are ineffective and can deter training professionals from having a more strategic role in their organization (Gayeski, 1998). Visscher-Voerman and Gustafson (2004) stated most models that adhere to the ADDIE design model view it as a problem-solving and linear process.

The Dick and Carey model was developed in 1990 and is considered to be one of the most widely used design models (Gustafson & Branch, 2002). This linear model involves nine stages: identify instructional goals, conduct instructional analysis, analysis of learner’s characteristics, write performance objectives, develop assessment instruments, develop instructional strategy, develop instructional material, design and conduct formative evaluation, and design and conduct summative evaluation. This model has several advantages; it is adaptable to any learning theory, identifies the learner’s needs early in the developmental process, and the design can be used by inexperienced designers. Potential weaknesses are the linear process requires extended time to
completely implement, evaluation is designed as a final phase, and the learner is not a focal point after the initial analysis.

The Morrison et al. model developed in 1994 is based upon four fundamental components of instructional design: learners, methods, objectives, and evaluation (Morrison et al., 2004). These components are supported by nine elements placed in a circular pattern on the inner circle of the model. Morrison et al. stated, “Individuals may proceed through the instructional design process in their own preferred way, starting with one element or another and following whatever order they consider logical or suitable” (p. 8). Both formative and summative evaluation can occur at any time throughout the process. Advantages of this model are the flexibility in selecting a design path and the simplistic design. Possible weakness is the model presupposes content and activities are predetermined for the learner (Irlbeck et al., 2006).

The Seels and Glasgow model consists of three phases: problem analysis, instructional design, and implementation and evaluation. Phase 1 identifies the instructional goals, requirements, and content. Phase 2 is a continuation of Phase 1 and contains six steps: task analysis, instructional analysis, objectives and tests, formative evaluation, development of materials, and instructional strategies and delivery systems. The six steps are all linked by continual feedback and interaction. Phase 3 includes implementation and summative evaluation. This model allows a project to be planned, resourced, and managed with three phases (The Herridge Group, 2004). Possible weakness is the linear structure and constant iteration during the design may create a lengthy design process.
Learner-Centered Instructional Design Model

Tennyson (1997) stated that instructional system design is too complex to employ a linear model. Irlbeck et al. (2006) claimed that the linear implementation process of current approaches do not appear to take a multidisciplinary approach to design. Additionally, current design approaches need modifications to meet the demands and opportunities of the online learning environments (Irlbeck et al., 2006).

The learner-centered instructional design model shown in Figure 1 takes a nonlinear approach to instructional design. The model is based upon a call for a new
radical design that focuses on the emerging needs of the modern online learner and a need for additional nonlinear designed models (Irlbeck et al., 2006; Tennyson, 1997). Past models founded on the ADDIE process created products based upon objectives and features as designed and decided by the instructional designer. The learner-centered instructional design model is based upon the recommendations of instructional design researchers. The model is nonlinear and encourages designers to make all decisions based upon learners' characteristics. Zheng and Smaldino (2003) stated the learner's characteristics and needs influence the design structure, and operation of a learning system as the actions in one part of the system will influence other parts of the system. Ryder (2005) added that the value of a model is based upon the context of use, how well it can share the workload, and how well it can shift the focus from the model to the object of the design. The learner-centered model is structured to start the design process from the center of the circular structure, which is the focal point of the model and representative of learner and the learner's characteristics. The designer's first task is to identify any uniqueness or characteristics which the targeted learners may bring into the course. This model identifies four current learner characteristics which are supported by literature as influential in the learning process: age, learning styles, culture, and prior knowledge. It should be understood that as additional learning theory knowledge and research emerges, these items may be replaced, substituted or expanded. These items are continually revised throughout the design process as indicated by the bidirectional arrows linking the developmental circles. Furthermore, the designer, after analysis of the target audience and the degree of significant the learner's characteristic will have on the final objectives may
elect to ignore the items not pertaining to the group. This feature provides the designer with greater flexibility and control over the design process.

Beyond the learner characteristic’s circle the designer has the flexibility to select the path of continual development; unlike linear models which require the designer to follow a structural developmental path. The learner-centered model’s design enables the designer to select which object to develop and the order the objects will be addressed. The designer may elect instructional strategies, assessment, instructional technologies, or objectives as dictated by organizational requirements, a predetermined learning theory, or the designer’s design and developmental style. Throughout the design process the designer can elect to move in a linear direction around the circle, move from the center outward, move inward toward the center, or move in a combination of directional movements. Additionally, feedback and evaluation can occur as often as needed without disrupting the process or having to return to a defined location within the model as often required on a linear model.

The learner-centered instructional design model gives the designer flexibility in choice and order of each element while still preserving the features, elements, and process of the ADDIE structure. The learner-centered model does not require advanced skills to interpret or understand, thereby offering both experienced and less experienced designers an instrument to assist with the completion of their design activity. The more experienced the designer, the more flexibility the designer has in the application of the model. An experienced designer’s prior knowledge could assist in the determination of which elements of the model are absolutely necessary and which elements will have little
influence on the current project. A designer with less experience needs to address more elements in the design process, requiring extended time during analysis and development.

The development of the learner-centered instructional design model addresses the gap in the limitation of current instructional design models not having a direct focus on the characteristics of the learners. This new model allows the designer to select elements in multiple combinations to meet the needs of both the objectives and learners, with the learner as the focal point throughout the design process and still maintain the ADDIE process.

**Statement of the Problem**

There are many instructional design models available for use by today’s instructional designers (The Herridge Group, 2004); however, their linear design “offers fewer options for modifications” (Tennyson, 2000, p. 232) and the rigid process is time consuming (Gayeski, 1998) and does not permit designers to easily adapt the models to meet the changing needs of the modern learners (Merrill, 2002). It is not known to what extent the learner-centered instructional design model, designed by this researcher, addresses two problems identified in the literature: (a) the need for a new instructional design model that is nonlinear (Gayeski, 1998; Irlbeck et al., 2006; Tennyson, 1997), and (b) flexibility in design to allow the designer to better support the different learner’s characteristics (Clark, 2002; Reigeluth, 1999) and the “fast-changing topics” (Gayeski, 1998, p. 37). Additionally, it is not known if the learner-centered instructional design model will be a potentially effective and a potentially useful design model for secondary instructional designers.
Purpose of the Study

The purpose of this study was to determine if the nonlinear learner-centered instructional design model is perceived as a potentially effective and potentially useful ISD model for postsecondary environments and an ISD model that addresses the different characteristics of learners as perceived by a panel of postsecondary instructional designers. A modified Delphi technique was used to collect and analyze qualitative and quantitative data from a panel of experts in the instructional design community. Members of the Ohio Learning Network’s (OLN) Instructional Designers Forum were solicited to participate in this modified Delphi study. Instructional design members who responded were required to complete the modified Delphi Study Demographic Questionnaire (Appendix A). A respondent was considered an expert in instructional design if he or she had at least three years of work experience in designing or developing material, used a formal instructional design model, had received formal training in instructional design development, and currently worked or instructed in the instructional design industry. The panel consisted of eighteen instructional design experts. Instructional design experts gave feedback on the different aspects of the learner-centered instructional design model to identify the model’s strengths and weaknesses, determine if there is a need to remove or add elements to the model, and the perceived potentially effectiveness the model would have in a postsecondary environment. This research provides qualitative and quantitative data to support the inclusion of this new instructional design model for consideration by the instructional design community as a resource for the development of student-centered
instruction. The refined model will be presented to the instructional design community for additional discussion and field testing.

**Rationale**

Axmann and Greyling (2003) stated, “the 21st century instructional designers are challenged to address the different educational needs in the ever-changing educational environment” (p. 4). Gayeski (1998) stated, “linear models no longer fit learning and performance improvement environments” (p. 36). She further claimed that the models are ineffectual. Additionally, traditional ISD models focus on abstract objectives (Merrill, 2002). The Herridge Group (2004) study of three instructional design models for their appropriateness for use in e-learning design concluded that the models were robust, complete, and clear. The study did not address if the models were still able to meet the needs of today’s designer in addressing an increasing heterogeneous group of learners or their ability to incorporate emerging technologies required by the new global learners.

A multitude of instructional design models are available for today’s instructional designers. However, this researcher has not identified any models that have the learner as the starting or focal point of the instructional design process. Although most models include the learner somewhere within the process, the learner is only one of several elements of consideration in the process of reaching the design objective. Because instructional design models are conceptual models with a goal of making instructional development efficient and predictable in terms of achieving learning (Marliaro & Shambaugh, 2006) and the process of learning and the transfer of learning are central to
how people develop important competencies (Bransford, Brown, & Cocking, 1999), it would seem relevant to have additional models that incorporate the learners with greater importance within the model.

Examining the learner-centered instructional design model for its potential usefulness in the postsecondary environment and its potential effectiveness in addressing the learning styles, age, culture, and prior knowledge of learners will bring forth a new instructional design model for the instructional developers, which can potentially influence the success of instruction.

Research Questions

The following research questions guided this study:

1. To what extent does a group of postsecondary instructional design experts perceive the learner-centered design model as a potentially effective or noneffective ISD model for postsecondary environments?

2. To what extent does a group of postsecondary instructional design experts perceive the learner-centered design model potentially effective or not effective in addressing the differences of individual learners?

Significance of the Study

This Delphi study is significant because it might offer a more appropriate ISD model to the postsecondary instructional design community. Educational institutions have only recently begun to accept instructional design models, whereas instructional design tends to be more accepted in business, industry, government, and the military (Irlbeck et
al., 2006). Furthermore, Irlbeck et al. suggested the idea of learner-centered design that supports spontaneous and creative learning proceeding from the ground up rather than the traditional top-down. Unlike the traditional design process, which begins with organizational needs and develops downward toward the student, the learner-centered instructional design model is learner-centered and intended to process development from the student outward toward the organizational needs. The model will provide instructional designers with an additional instructional design model that offers the ADDIE process of design in a nonlinear format.

Upon completion of this Delphi study, this model will have been reviewed and analysed by experts in the instructional design industry. The experts’ examination and review assisted in the further development and refinement of the model to ensure it meets the changing needs of current online learning environments. Additionally, the experts’ review ensured the model is efficient and effective for postsecondary curricular design and development.

Further significance of this study included an evaluation of the nonlinear design of the learner-centered instructional design model. This study assisted in determining whether a circular design pattern is a beneficial pattern of instructional development in comparison to linear instructional design models. Gayeski (1998) claimed traditional stepwise, linear models lack flexibility and reflect a behaviorist and subject-matter-expert-driven methodology. She asserted the development and analysis time is too long and significantly delays implementation. This study addressed the flexibility of the model and the absence or presence of any learning theory in the review of the learner-centered
innocational design model. The study also determined if the model is an efficient design model that might decrease developmental and analysis design time.

**Definition of Terms**

The following terms were used operationally in this study:

**ADDIE.** An acronym referring to the major processes that comprise the generic ISD process: Analysis, Design, Development, Implementation, and Evaluation and foundational to many instructional design models (The Herridge Group, 2004).

**Delphi study.** “A method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem” (Linstone & Turoff, 2002, p. 3).

**E-learning.** “The use of Internet technologies to deliver a broad array of solutions that embrace knowledge and performance” (Rosenberg, 2001, p. 28).

**Instructional design theory.** “Instructional design theory is a theory that offers explicit guidance on how to better help people learn and develop” (Reigeluth, 1999, p. 5).

**Instructional Systems Design (ISD).** “A problem-solving process that has been applied to the creation of training since the 1940’s” (The Herridge Group, 2004, p. 6).

**Instructional technology.** “A design science that must guide the professional production of instruction” (Clark, 2002, p. 8).

**Learning style.** “Cognitive, affective, and physiological traits that are relatively stable indicators of how learners perceive, interact with, and respond to the learning environment” (Keefe, 1979, p. 4).
Learning theory. “An explanation on how learning takes place to achieve certain types of outcomes” (Morrison et al., 2004, p. 4).

Assumptions

The following assumptions are present in this study:

1. All panel members have been correctly identified as experts.
2. All panel members will have access to the Internet and e-mail.
3. Panel members will be selected without bias or prejudice.
4. Experts will devote the necessary time and effort to completing the study.
5. Panel members will not allow outside influences or opinions to direct responses.
6. Panel members will not collaboration in thoughts, comments, or opinions.

Limitations

The following limitations are present in this study:

1. Results were determined by a limited number of experts.
2. Qualitative data collection process can be time intensive for both the researcher and participants.
3. Selected experts were only from the United States.
4. Data analysis was limited by the skill level of the analyst.
5. Results and interpretation contain the bias of the analyst.
6. Communication was via e-mail.
7. Interpretation of questions and results was limited to the analyst’s ability to correctly comprehend the panel’s remarks without the insertion of the analysis’s personal opinions, bias, or misunderstandings.

**Nature of the Study**

The Delphi approach was developed in 1960 by researchers at the RAND Corporation to gather expert views and consensus regarding the future (T. Gordon, 1994). Linstone and Turoff (2002) defined a Delphi study as “a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem” (p. 3). The process allows the collection of opinions from a panel of subject matter experts (SMEs) without bringing the group together in a meeting (Farmer, 1998). Additionally, the Delphi approach ensures changes in opinion reflect rational judgment without the influence of strong personalities or opinionated leaders (Farmer, 1998). The Delphi approach is best suited for this study as the panel of SMEs will be from a geographically diverse group of instructional designers without the ability to meet at a common location. The SMEs provided anecdotal responses to questions that guided this researcher to further develop additional questions in the process of answering the following questions:

1. To what extent does a group of postsecondary instructional design experts perceive the learner-centered design model as a potentially effective and useful ISD model for postsecondary environments?
2. To what extent does a group of postsecondary instructional design experts perceive the learner-centered design model as potentially effective in addressing the learning styles, age, culture, and prior knowledge of learners?

Data were collected in three unique rounds. Round 1 consisted of a 10-question qualitative survey covering the individual phases of the model. Round 2 was a quantitative survey based upon data collected from Round 1 to identify patterns in responses. Round 3 finalized the data collection through a series of questions to further identify consensus from the panel of experts. Chapter 4 of this research elaborates further on the data collection phase.

**Organization of the Remainder of the Study**

This study consists of five chapters. Chapter 2 presents a literature review that includes a comparison of instructional design theories and their application to online learning, learner characteristics, learner-centered instruction, and the following instructional design models: (a) ADDIE; (b) Dick, Carey, and Carey; (c) Morrison, Ross, and Kemp; and (d) Seels and Glasgow. Chapter 3 presents an overview of the Delphi methodology of research and the research design. Discussion includes assumptions and limitations of the study, data collection, and analysis procedures. Chapter 4 presents detailed analyzed data and findings. Chapter 5 provides a summary and discussion of the findings, implications for the instructional design community, and recommendations for future research.
CHAPTER 2. LITERATURE REVIEW

Introduction

Gardner (1993) stated, “The purpose of a school is to develop intelligences and to help people reach vocational and avocational goals that are appropriate to their particular spectrum of intelligence” (p. 9). Gardner further stated not all people have the same interests and abilities; not all learn in the same way. Felder and Henriques (1995) claimed how much a student learns will be based upon the student’s compatibility of his or her characteristic approach to learning and the instructor’s characteristic approach to teaching. Gender, nationality, and cognitive learning styles have been associated with many learners’ characteristics (Graff et al., 2004). Literature depicts a growing compatibility conflict between the students’ learning characteristics, instructors’ teaching characteristics, and instructional material prepared to link both parties.

Instructional Design Theories

Instructional designers are tasked with the development of learning materials for a diverse range of learners. This requires the designers to be familiar with the different learning theories they can use as a framework during the development process. “Instructional design theory is a theory that offers explicit guidance on how to better help people learn and develop” (Reigeluth, 1999, p. 5). These theories are descriptive and explain how the learning will occur given an identified set of outcomes (Morrison et al., 2004). A designer applies the theories to one of several or a combination of instructional
design models to develop their online content. Three of the more popular theories of learning are behaviorism, cognitivism, and constructivism.

**Behaviorism**

Within the discipline of behaviorism, it should be noted there are three different types of behaviorism. Methodological behaviorism focuses on the behavior of the humans and rules out the effects of beliefs or desires on the behavior (Graham, 2005). Analytical behaviorism associates the mental state to the behavior. Analytical behaviorism characterizes the behavior based upon what the person might do because of his or her beliefs or desires (Graham, 2005). Psychological behaviorism focuses on the external physical stimuli, responses, learning histories, and reinforcements (Graham, 2005). Psychological behaviorists include the works of Ivan Pavlov, Edward Thorndike, John Watson, and B. F. Skinner. It is psychological behaviorism which is often applied to behaviorism learning theory. Foundational beliefs are that learning is a change in behavior caused by external interactions within the environment (Modritscher, 2006) and that the mind is a black box—it ignores the cognitive processes and reacts to stimulus that can be observed (Ally, 2004).

**Behaviorism and Online Learning**

The behaviorist approach to developing online content will create instruction in small instructional steps. Material is presented in a deductive form by starting with concrete concepts that include principles, formulas, rules, and categories (Modritscher, 2006). Learners are also given positive examples to reinforce understanding and negative examples to create conceptual boundaries (Modritscher, 2006). These explicit outcomes
and rigid structure allows learner to assess their own achievements based upon the given set of expectations (Ally, 2004).

Learners are guided through the learning content based upon a sequence of instructions that can increase from simple to complex, known to unknown, and knowledge to application (Ally, 2004). The learner has no control over the sequence or pace of the activities (Modritscher, 2006). Proficiency is attained from frequent review or revision and skills checks with constant feedback and reinforcement to keep the learner motivated (Ally, 2004; Modritscher, 2006).

Cognitivism

Cognitivists view learning not from the influences of external forces, as behaviorists do, but from the recall or application of internal processes. Ally (2004) identified these processes as memory, thinking, abstraction, motivation, and metacognition. Knowledge is acquired from a declarative form to a procedural, compiled form (Mayes & de Freitas, 2004). Learning requires the active transformation of content from three memory systems: sensory, working, and long-term memory (Clark, 2003). Sensations are processed to sensory memory before transferring to working memory. If transfer is not made to working memory within a second, then the sensation is immediately lost (Ally, 2004). Working memory, also known as short-term memory, is limited in capacity, separates and stores auditory and visual data in different areas, and is the center of conscious cognition (Clark, 2003). Information stored in working memory must transfer to long-term memory within 20 seconds to prevent being lost (Ally, 2004). Long-term memory has larger storage capacity, does not process content and skills, and is the permanent repository of knowledge (Clark, 2003).
Unlike behaviorists, cognitivists recognize the individual differences in learners and attempt to identify and address the differences through adjusted learning strategies. These adjusted learning strategies reflect how the learner will perceive, interact, and respond to the presented content (Modritscher, 2006).

**Cognitivism and Online Learning**

Cognitive strategies for online learning will focus on the efficiency of the learning process. Understanding how the information is processed through the different memories and the amount of time available for the process will aid the developers in creating content that completes the transfer to long-term memory. With a limited amount of storage in working memory, theorists suggest that information be chunked into five to nine meaningful units (Ally, 2004). With the smaller units, the learner is able to either assimilate the information with existing knowledge or accommodate the information into the cognitive structure for future assimilation (Ally, 2004).

Online teaching strategy should facilitate all sensors by focusing on critical information, reasoning, and aligning to the learner’s cognitive level (Modritscher, 2006). Sensor stimulation can come from the location of the information on the screen, choice of colors, graphics, size of text, pacing of the material, and method of delivery (Ally, 2004). When developing content, designers must take measures not to overload the working memory of the learners. Designers should manage the delivery mode of the content so that both the visual and auditory storage in working memory are used and prevent the overuse of either (Clark, 2003). Content should include activities for the different learning and cognitive styles. Strategies should force learners to reflect on what they learned through their metacognitive skills (Ally, 2004). Reflection could be facilitated
through collaboration or progress checks. The memory transfer processes can be enhanced by the level of the learner’s effort and persistence. This is referred to as motivation: anything that causes the learner to start a program, use effective learning strategies, and continue in times of conflict (Clark, 2003).

**Constructivism**

Tam (2000) stated that constructivists describe learning as a change in meaning created from experience. Similar to the cognitivist belief, constructivists also believe that knowledge and truth are internal to the learner; learning is personal (Tam, 2000). In contrast, constructivists focus on the cognitive process of constructing knowledge, whereas cognitivists consider learning as information processing. Learning is viewed as an active process (Modritscher, 2006); knowledge is not given but is constructed through the interactivity between existing knowledge, social context, and problem solving (Tam, 2000). Construction of knowledge occurs best when there is less instruction of knowledge and more discovery of knowledge (Ally, 2004).

An additional concept used by constructivists is a social interaction known as scaffolding. Scaffolding is the process of providing structure to make a new activity doable without removing the challenge (Quintana, 2005). The scaffolding support can come from any source that has more knowledge than the learner. The support may be in the form of modeling or demonstrating a new task, providing coaching, prompting learners to reflect, or creating relational representation between concepts and current or prior knowledge (Quintana, 2005).
Constructivism and Online Learning

Moallem (2001) stated, “Constructivist instructional developers value collaboration, learner autonomy, generativity, reflectivity and active engagement” (p. 114). Moallem continued by outlining five common concepts that are central to constructivist instructional design: (a) learning is embedded in a rich authentic problem-solving environment, (b) authentic versus academic contexts for learning are provided, (c) provisions for learner control are incorporated, (d) errors are used as a mechanism to provide feedback on learners’ understanding, and (e) learning is embedded in social experience. Additionally, designers must identify the learning domains, identify complex problems or case studies within those domains, identify the most important learning elements, create and map multiple paths for the learner to control based upon his or her own objectives, provide opportunities for reflection and self-evaluation, and provide the tools for the learner to modify his or her learning based upon self-reflection (Moallem, 2001).

Ally (2004) added several additional requirements for constructivist designers. Learners must be kept active with meaningful activities to stimulate high-level processing and increased personalized meaning and relevance. Learners should experience the information firsthand and not through instructions. Collaborative and cooperative learning opportunities should be created to allow learners the opportunity to use metacognitive skills, and gain knowledge from others within their learning group. Learning should contain interactivity to promote a social presence and a connection with others in the learning community. This interaction among learners, instructors, and content is important to the learning experience (Ally, 2004).
Learner Characteristics

Zheng and Smaldino (2003) stated learner characteristics and learner needs are important elements to consider in the design process because the learner’s characteristics and needs will influence the design, structure, and operation of the learning systems as any action in one part of the system can influence the other parts of the system. Graff et al. (2004) conferred that e-learning systems need to consider the differences in learners’ characteristics, and further identified these differences to include the student’s nationality, gender, and cognitive learning style. Williams’s (2002) study on the relationship between learning styles and a computer-assisted instructional unit suggested further studies to explore the influence of learning styles and online learning. Additionally, the instructional designer needs to consider the additional learning challenges created by both cultural and individual differences (Rice et al., 2001). The learner’s culture will influence how he or she views the learning environment, interpersonal transaction, classroom structure, positive and negative feedback, competition, and gender differences (Rice et al., 2001).

Culture

Today’s learning environments require teachers to educate students in varying cultures, language, ability, and other characteristics requiring teachers to employ culturally responsive pedagogy (Richards, Brown, & Ford, 2007). Morse (2003) stated that due to the reduction of geographical boundaries and temporal limitations, computer-mediated communication has become a widely accepted educational delivery system. However, there are known concerns, which include technology and linguistic skills difficulties (Morse, 2003). With increasing globalization, there is a growing recognition
that different cultures’ fundamental societal assumption creates different behavioral characteristics (Morse, 2003). Morse stated culture plays a primary role in determining individual behavior patterns and provides the paradigm by which experience is interpreted, assimilated, and adapted. Morse expounded that cultural differences are also reflected in learning styles that are based upon the modal behaviors of societal learned values. Furthermore, learned group behaviors impact the development of learning interaction and learning achievement (Morse, 2003).

Sabin and Ahern (2002) stated instructional materials and implementation are usually developed with the idea that learners are all the same. Instructional design theory is not prepared for the heterogeneous or culturally diverse population (Sabin & Ahern, 2002). An analysis of the Dick and Carey and the Seels and Glasgow design models has no mention of culture within the process. However, Sabin and Ahern did find that Morrison et al.’s model had identified learner characteristics to include gender, age, work experience, education, and ethnicity (culture). Additionally, Morrison et al. discussed effective teaching of minority and culturally diverse students (as cited in Sabin & Ahern, 2002).

Cultures can be classified as being in either a high- or low-context group (Morse, 2003; Sabin & Ahern, 2002). High-context cultures view information as already within the person, not requiring much background information (Morse, 2003; Sabin & Ahern, 2002). High-context cultures also have experiential stable traditions and history, and become impatient and irritated when low-context people insist on giving unnecessary information. Low-context people are perceived as being less credible by high-context people. High-context cultures tend to handle conflict in a more desirable and subtle
manner and are predisposed to require learning for the sake of learning. Japanese, Chinese, Korean, African American, and Native American Indians have been identified as high-context cultures (Sabin & Ahern, 2002).

Low-context cultures are defined by the following characteristics: (a) less homogeneous; (b) without a pool of shared common experiences; (b) verbal interaction requires detailed background information; (c) communication tends to be direct and explicit with everything needing to be verbalized; (d) expect messages to be detailed, clear-cut, and to the point; (e) ask blunt questions; (f) feel uncomfortable with vagueness; (g) ambiguity is often associated with limited data; (h) view high-context cultures as being less open; and (i) learning must be relevant or interesting. Sabin and Ahern (2002) classified the United States as an example of a low-context culture.

Richards et al. (2007) stated when the tools of instruction are incompatible with or marginalize a student’s cultural experience, it may cause underachieving, no or low performance, and possibly dropping out of school. Sabin and Ahern (2002) added that cultural differences also contribute to misunderstanding and loss of productivity. Morse (2003) concluded that the awareness of the culture differences has “practical implementation for the future of asynchronous learning and my lead to improvements in market development in the wired global village” (p. 51).

Learning Style

Felder and Brent (2005) stated the goal of instruction should be to equip students with the skills associated with every learning style category, regardless of the students’ personal preference, since they will need all of the skills to function effectively as professionals. Felder and Henrique (1995) posited that the amount a student learns in a
class is partially influenced by the student’s native ability and prior preparation, and the student’s learning characteristics’ compatibility with the instructor’s teaching style. Additionally, Gardner (1993) stated, “It is simply inexcusable to insist that all students learn the same thing in the same way” (p. 73), and stated curriculum needs to be reconfigured so that it focuses on the skills, knowledge, and understanding, and adapted as much as possible to the particular learning styles and strengths of the students.

The purpose of examining the learning styles of the learner is to better understand the behavior patterns that learners exhibit so that they can be incorporated into the instructional design and make the instruction more effective and efficient in helping learners to learn (Baldwin & Sabry, 2003). McLoughlin (1999) defined learning styles as an adopted habitual and distinct mode of acquiring knowledge. Keefe (1979) expanded the definition to include the “characteristic cognitive, affective, and psychological behaviors that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment” (p. 4). Cranton (1994) stated there is confusion about what constitutes a learning style, but practical literature advises educators to adopt a variety of teaching roles to meet the needs of learners with different styles. The learner’s characteristic are a pattern of behaviors developed over time and is how the learner approaches the task of learning (Baldwin & Sabry, 2003). Gardner (1993) surmised that students may exhibit one style with one type of information and exhibit a contrasting style with another. This would support the need to consider different types of instructional design to best fit the different characteristics of a learner.

Additionally, educators need to consider individual differences among the learners to foster learner empowerment. This creates a challenging task for designers and
educators, but Cranton (1994) suggested two ways to address the problem: increase the learner’s awareness of his or her own learning styles, which would empower the student to make decisions as to how they learn best, and for educators to develop a strong awareness of how learners vary in the way they think, act, feel, and see possibilities.

Learning styles can be interpreted differently depending on the category of emphasis. There are three general ways to classify learning styles: perceptual modality, information modality, and personality patterns (Connor, 2002).

**Visual auditory kinesthetic learning styles.** This popular learning styles model is derived from the accelerated learning world, and uses the terminology most currently and commonly heard in classroom settings. This learning model classifies learning strengths by visual, auditory, and kinesthetic groups by answering questionnaires that provide insight to areas of strength or desired learning experiences. While all individuals can learn under any visual auditory kinesthetic learning style, some learners prefer and are most successful utilizing particular learning styles more than others (Clark, 2000).

**Kolb’s theory of experiential learning.** Kolb’s theory of learning styles was introduced in his 1984 book, *Experiential Learning: Experience as the Source of Learning and Development*, and can be applied to all people of all ages. Kolb’s Learning Style Inventory assists individuals in identifying preferred style of learning (Vick, 2003). Kolb developed a four-stage theory containing two dimensions, with the first dimension reflecting attitudes toward experiences as feeling, watching, thinking, or doing, and the second dimension identifying individuals in terms of abstract versus concrete and reflective versus active (Vick, 2003). Kolb posited the way a person learns determines the course of personal development. The personal development occurs in three areas: (a)
acquisition: development of cognitive abilities from birth through adolescence; (b) specialization: development of a particular learning style due to social, educational, and organizational socialization; and (c) integration: application of learning styles in work and personal contexts (Evans, Forney, & Guido-DiBrito, 1998).

There are many advantages considered today for applying learning style theories to the instructional settings:

1. Theories help individuals understand the framework in which cognitive and psychosocial development occurs.

2. Theories are nonpreferential in that no particular stage or learning style is more significant than another; thus, there is not an evaluative factor to strive to achieve. One learning style is simply viewed as being different from another, neither good nor bad.

3. Typologies help explain interpersonal conflicts and can help one to analyze a situation and even prevent conflict from occurring by recognizing personal similarities and differences that could lead to a lack of understanding another’s perspective.

4. Theories can be very useful in determining which individual is best for a particular role in a project or a particular task. Applying the learning styles to effective assignments could result in increased learning satisfaction as well as higher quality achievement for an educational setting (Evans et al., 1998).
Age

The possible impact of age on the development of online instruction can be linked to the learner’s experience and the learner’s ability to understand the presented material. Clark (2003) stated, “research evidence points to prior experience as the most significant learner characteristic influencing learning” (p. 11). Clark further stated that novices have little prior knowledge and therefore their cognitive processes are different from learners with greater experiences, which supports the need for different instructional methods. Although Clark’s novice classification is not defined by any age but by the learner’s experience, it would seem possible to create a correlation between age and a learner’s amount of acquired experience. Few researchers could refute that younger learners have less experience and less prior knowledge than more mature and experienced learners.

With online learning content and materials largely in the textual and visual form, the cognitive ability of learners becomes an important consideration (Clark, 2002). Additionally, the amount of textual material presented to the online learner requires the learner to have a predetermined reading ability. Noh et al. (2007) stated the reader must continually derive meaning from the text and integrate the new information with prior knowledge. This requires the reader to conduct multiple levels of processing and analysis to achieve understanding of the content. Additionally, research supports the designing of instruction to help students with reading difficulties (Jitendra et al., 2004).

Noh et al.’s (2007) research on age differences and learning concluded that there are differences in the amount of reading time required for knowledge-based processing. Older adults were able to produce more elaborate inferences based upon their prior knowledge and text-based processing; implying that the learner’s age should elicit an
interest for developers to consider in interpreting the learner’s level of experience and abilities to comprehend the online content.

**Instructional Design Models**

With the focus of instructional design being a systematic process that creates a superior instructional product, Crawford (2004) posited that instructional designers often rely on design models to guide the process. The selection and implementation of any design model will rest in the designer’s understanding of learning theories, information technology, systematic analysis, and management methods (Morrison et al., 2004). To assist in the selection of a proper design model, Gustafson and Branch (2002) derived the taxonomy of models based upon three characteristics: Models are considered to be classroom-oriented, product-oriented, or system-oriented. Additionally, models have been represented graphically in a linear or circular form. The four models discussed in this review represent each category and graphic form.

**ADDIE Process**

Instructional design systems can be traced back to post-World War II; however, it was not until the 1970s that design models began to proliferate to include over 100 different variations (Allen, 2006). Allen further claimed the models had a common thread in that the models reflect the generic ADDIE process: Analysis, Design, Develop, Implement, and Evaluate. ADDIE’s linear design is based upon an engineering process that assumes alternative solutions to instructional problems using a systems approach to choose a solution to produce the most effective results (Allen, 2006). The analysis phase identifies and defines the problem and proposes a solution; the design phase uses the
information from the analysis phase and creates a plan or strategy that defines the
information that will be used to create the instruction; the development phase produces
the instruction, and all supporting media are identified; the implementation phase delivers
the instruction to the learner; and the final phase, evaluation, measures and checks for the
led the inquiry into the adequacy of the ADDIE archetype given the proliferation of e-
technologies and the increased complexity of instructional design. He suggested the need
for a modification to the model or a visionary and organic model that would respond to
the continuous changes. Allen added that the advancements in how humans learn and
educational technology create many major changes in the system variables, requiring the
ADDIE model to be more complex. Allen further stated that the linear approach of
ADDIE is not adaptable to today’s conditions and requires revision.

The Dick and Carey Model

The Dick and Carey model was developed in 1990 and is considered to be one of
the most widely used instructional design models (Zheng & Smaldino, 2003). The model
includes all the phases described in the ADDIE process and is applicable to a wide range
of environments to include business, government, and the academics (Taylor, 2004). The
model (Figure 2) shows the linear design and nine phases used in the instructional
developmental process: (a) identify instructional goals, (b) analyze instructional goals, (c)
analyze learners, (d) write performance objectives, (e) develop assessment instruments,
(f) develop instructional strategy, (g) develop and select instructional material, (h) design
and conduct formative evaluation, and (i) design and conduct summative evaluation. The
Herridge Group (2004) study of traditional ISD models summarized the Dick and Carey
model as having a systemic approach designed for the creation of courses or curriculum, applicable for all levels of designers skills, extensive front-end analysis, extensive formative evaluation throughout the process, very focused on the project management, and only moderately focused on the learner in the analysis phase.

The Dick and Carey systemic approach is founded on the principle that all parts of the system depend on each other for input and output, and feedback is used to determine if the desired goals have been reached (Dick et al., 2006). The model incorporates tools from three learning theories: Robert Gagne’s behavioral psychology, which reinforces appropriate learner responses; cognitivism, which allows the learner to use internal mental processes of the new the information rather than be influenced by external stimuli and reinforcements; and constructivism, which guides the learner through a construction process based upon the learner’s existing knowledge and experiences (Dick et al., 2006).

Carliner (2008) stated that the Dick and Carey model is a sufficient model for classroom instruction as the instructor can make changes while the class is in session; however, such approach is not sufficient for the self-study and distance learner as the students have little access to instructors when using the material and immediate reply is not possible. Additionally, the model does not make clear how extensive the drafting or revision process is, presenting a flawed view of the actual effort involved in producing material for online learning (Carliner, 2008). This model has several advantages; it is adaptable to any learning theory, it identifies the learner’s needs early in the developmental process, and the design can be used by inexperienced designers. Potential weaknesses are the linear process requires extended time to completely implement,
evaluation is designed as a final phase, and the learner is not a focal point after the initial analysis.

**The Morrison, Ross, and Kemp Model**

The Morrison et al. (2004) model was designed to be an eclectic model for use in program evaluation. This model includes all the steps proposed by Dick et al., with the elements in a circular design. The model consists of nine elements that are not connected with lines or arrows. Morrison et al. chose not to include any lines or arrows, to prevent any directed linear order, as the intent is to convey flexibility. The steps in clockwise order are instructional problems, learner characteristics, task analysis, instructional objectives, content sequencing, instructional strategies, designing the message, development of instruction, and evaluation instruments. Morrison et al. acknowledged that some projects may not require the use of all nine elements; thus, this model allows the designer the flexibility to decide which elements are relevant and which do not require particular consideration. Since the design is nonlinear, the designer will need additional skills and experience to guide the development process often not required in linear models (Bottiri, Cantoni, Lepori, & Tardini, 2006).

With an underlying constructivist philosophy, Morrison et al.’s (2004) model challenges program evaluators to define outcomes in terms of individually mediated processes (Schankman, 2004). Morrison et al. defined the outcomes as learner attitudes, values, demonstrations of self-direction, and development of mental models, based on personal experience. Morrison et al. further explained, knowledge is assessed through the use of a performance content matrix and evaluation is continuous throughout the process. This continual evaluation creates additional challenges for evaluators to continuously
collect data that may require smaller sampling and indirect collection measures (Morrison et al., 2004).

The Morrison et al. model has three elements that separate it from other design models: instruction is considered from the learner’s perspective, model’s components are independent of each other, and project management is emphasized throughout the design process (The Herridge Group, 2004). Advantages of this model are the flexibility in selecting a design path, and the simplistic design. A possible weakness is the model presupposes content and activities are predetermined for the learner (Irlbeck et al., 2006).

**The Seels and Glasgow Model**

The product-oriented Seels and Glasgow (1998) model consists of three phases in a linear design: problem analysis, instructional design, and implementation and evaluation. Phase 1 identifies the instructional goals, requirements, and content. Phase 2 is a continuation of Phase 1 and contains six steps: task analysis, instructional analysis, objectives and tests, formative evaluation, development of materials, and instructional strategies and delivery systems. The six steps are all linked by continual feedback and interaction. Phase 3 includes implementation and summative evaluation. Gustafson and Branch (2002) stated the steps within this model are interdependent, which could require repetitive cycling. Similar to other linear models, the designer has less flexibility throughout the design process. The strength of this model allows a project to be planned, resourced, and managed with three phases (The Herridge Group, 2004). However, possible weaknesses are the linear structure and constant iteration during the design, which might create a lengthy design process. Additionally, product-oriented models
require a team and significant resource commitment to stay within time and budget constraints (The Herridge Group, 2004).

The Herridge Group (2004) comparison of the models presented classified the models as a representation of three different design orientations: (a) Morrison et al.: classroom; (b) Dick and Carey: system; and (c) Seels and Glasgow: product. Additionally, the models’ design approaches were identified as holistic, systemic, and systematic, respectively. The Morrison et al. model requires the least amount of front-end analysis and lowest requirement of designer skills, with the Dick and Carey model requiring extensive front-end analysis but being flexible in required skill levels. Learner focus was strongest in the Morrison et al. model, and was limited to the analysis phase for the other models.

**Summary of Literature Review**

The analysis of the literature identified several areas of concern or special interest to the modern instructional designer. There is an abundance of instructional design models, which have been classified into three categories: classroom, system, and project management (The Herridge Group, 2004). Instructional design models each require different levels of skill and time to use effectively, and no design model will fill all instructional design needs. Additionally, linear models are very process-based and allow little flexibility in any deviation of the design process, whereas nonlinear models give the designer greater flexibility in the design process but often require a higher skill level in project management.
Instructional design models are usually based upon one or a combination of the three major learning theories: behaviorism, the process that encourages learning through external interactions within the environment; cognitivism, a process of learning that encourages the learner to recall or application of the learner’s internal processes (Ally, 2004; Mayes & de Freitas, 2004; Modritscher, 2006); and constructivism, a process of learning based upon the construction of knowledge from experiences (Moallem, 2001; Tam, 2000).

Additionally, all learners have their own set of characteristics that will influence their learning process. Gardner’s (1993) multiple intelligence theories view the characteristics through the different learner’s intelligences. Others (e.g., Baldwin & Sabry, 2003; Felder & Brent, 2005; Felder & Henriques, 1995; McLoughlin, 1999) associate the impact of the learner’s characteristics in the learner’s learning styles, or learned behaviors applied to the approach to learning. There are many different learning style theories, but the more popular theories are the visual auditory kinesthetic learning styles and the Kolb’s theory of learning styles, both of which support the application of learning styles to the design of instruction. The application of learning styles to the instructional setting includes, but is not limited to, helping the learner and developer to better understand cognitive development; understanding that learning styles are not related nor do they have a greater significance to each other—no good or bad learning styles, just different styles; and learning styles could increase the learner’s satisfaction and quality of achievement (Evans et al., 1998; Kolb, 1984).

Other learner characteristics that have been identified for consideration in the design process are the learner’s culture and the learner’s age. The expansion of the
Interent and technological tools made available to educational institutions has led to greater globalization of the educational market (Morse, 2003). This has led to an increase in online students with greater differences in culture, language, ability, and age (Morse, 2003). Cultures offer the students different experiences, which may impact their learning experiences (Richards et al., 2007). These experiences are foundational to the application of learning theories such as constructivism and cognitivism when applied to the design of instruction. The learner’s age has connection to the internalization of the learner’s experiences and ability to comprehend textual material (Clark, 2003; Noh et al., 2007).

Literature supports and identifies several unique learner characteristics that can impact the learner’s experience. Additionally, few models have been identified that are nonlinear and focus on learner characteristics. It was concluded from this review that sufficient information was available to support the need for a new instructional design model that incorporates the learning theories in a nonlinear design that has a greater emphasises on the learner throughout the design process.
CHAPTER 3. METHODOLOGY

Introduction

The purpose of this study as to have a group of instructional design experts evaluate a new instructional design model. The learner-centered instructional design model is a circular design with the learner as the hub of all decision in the design process. This model deviates from the standard linear construction and objective focus found in many of the current instructional design models. It is unknown if this type of model and its structure can be an effective design model for today’s instructional designers. Because people do not learn in the same way (Gardner, 1993), it would seem imperative that the selected design model would be a model that is structured around the learner. A modified Delphi study was used to evaluate this model and to gain consensus in determining to what extent a group of postsecondary instructional design experts perceive the learner-centered design model as a potentially useful ISD model for postsecondary environments and potentially effective model in addressing the learning styles, age, culture, and prior knowledge of learners.

Statement of the Problem

There are many instructional design models available for use by today’s instructional designers; however, their linear design and rigid process do not permit designers to easily adapt the models to meet the changing needs of the modern learners. Additionally, literature supports the development of additional nonlinear models that are designed to address the needs of today’s diverse learner community. The learner-centered
The instructional design model, designed by this researcher, addresses two problems identified in the literature: (a) the need for a new instructional design model that is nonlinear (Irlbeck et al., 2006; Tennyson, 1997), and (b) flexibility in design to allow the designer to better support the different learner’s characteristics (Clark, 2002; Reigeluth, 1999). The problem studied in this dissertation is it was not known if the nonlinear, learner-centered instructional design model, designed by this researcher, is a potentially effective and potentially useful ISD model for postsecondary environments and an ISD model that addresses the different characteristics of the learners.

**Research Questions**

This study used a modified Delphi approach to determine if the learner-centered design model is an appropriate ISD model for the postsecondary instructional design community. The following research questions provided the context and scope of inquiry for this study:

1. To what extent does a group of postsecondary instructional design experts perceive the learner-centered instructional design model as potentially effective and useful ISD model for postsecondary environments?

2. To what extent does a group of postsecondary instructional design experts perceive the learner-centered instructional design model potentially effective in addressing the differences of individual learners?

**Research Methodology**

This study used both qualitative and quantitative data collections processes to support this modified Delphi study. Qualitative data was first collected to create the
foundation of the study and used to build the follow up quantitative questionnaires. Creswell (1998) defined *qualitative research* as an inquiry process of understanding that explores a social or human problem. He further stated that there are several reasons to undertake a qualitative approach: (a) research question starts with a “how” or a “what” that differs from the quantitative questions starting with a “why”; (b) topic requires exploration, variables are not easily identified or theories are not available to explain behavior of the participants or population of the study; (c) the need for a detailed view of the topic; (d) the need to study individuals in their natural setting; and (e) there will be a need to analysis an extensive collection of “text” information. This modified Delphi study satisfied Creswell’s reasons for the selection of a qualitative research methodology.

**Research Design**

A Delphi study is characterized as a research method that deals with a complex problem through a structured group communication process (Linstone & Turoff, 2002). The Delphi method was developed by researchers from the RAND Corporation as a means to address forecasting issues (T. Gordon, 1994). This method encourages a debate among the members, independent of personalities, guarantees anonymity of participating members, and all members are given equal weight through the communication process (T. Gordon, 1994). Linstone and Turoff suggested that at least one or more of the following properties be present to support the need for a employing a Delphi study:

1. The problem does not lend itself to precise analytical techniques but can benefit from a collective judgment.
2. Panel members have no history of adequate communication and their experience and expertise represent diverse backgrounds.

3. Face-to-face interactivity would not be as effective, and meeting times and cost for groups are not feasible.

4. Group dynamics have a negative impact on the communication process.

A modified Delphi method is applicable to this study as this researcher resides in the Republic of Singapore and participating panel members are from various cities across the United States; thus, meeting times were difficult to arrange, travel cost would have been prohibitive, and the diversity of the panel members’ backgrounds and expertise may have a negative impact on all members giving quality responses without anonymity.

**Advantages of the Delphi Method**

The Delphi technique has many advantages. The opportunity to create a panel of experts from different backgrounds and levels of experience gave this study a wider range of personal analysis of the learner-centered design model. If this new model is to be considered a valid tool for the instructional design community, a diverse group of experts had to be properly represented. Additionally, the panel had to reach an objective consensus on the research questions that supported the further analysis of the learner-centered design model. Because members had no knowledge of or direct interaction with the other members, their responses were not influenced by one another. Panel members had sufficient time to review each question before creating a response. Unlike a live group meeting, Delphi responses can be edited as needed by the panel members before submitting them to the researcher.
Disadvantages of the Delphi Method

There are several disadvantages of the Delphi technique that can lead to problems in final analysis. These concerns are manageable but must be considered throughout the process to ensure results reflect the true nature and structure of the Delphi technique. Linstone and Turoff (2002) identified the following:

1. Imposing researcher’s views and preconceptions upon the panel members.
2. Poor techniques in summarizing and presenting group responses.
3. Ignoring and not exploring disagreements that lead to a false consensus being generated.
4. Underestimating the demands of study and not compensating members for their time.

Data Collection Procedures

Data were collected in the following procedural steps:

A pilot study was conducted to validate the Round 1 qualitative questionnaire. Pilot study members were asked to review the survey for clarity and understanding of the focus and purpose of the questions; reviewers were also asked to check that the questions had direct relationship to the two identified research questions. The Round 1 survey instrument was modified to reflect the suggestions of the pilot group. Since the study group was small, all feedback was reviewed by the researcher, and modifications made to the survey as necessary.

Round 1 consisted of 10 qualitative questions (see Appendix B) that asked the panel to evaluate the learner-centered instructional design model. Questions focused on
evaluation of individual phases of the model and identify strengths, weaknesses, perceived problems, effectiveness for postsecondary education, compliances with standard ADDIE structure, and recommended changes or suggestions. Results from Round 1 were transferred into the NVivo 8 qualitative analysis software program. Each survey item was coded and analyzed to identify patterns and incongruent relationships. Once relationships were identified, a Round 2 instrument was developed.

Round 2 was distributed to all respondents from Round 1. Round 2 was comprised of a list of standalone descriptor statements constructed from the researcher’s analysis of the results generated from NVivo 8 qualitative analysis software package. Using the descriptor statements, panel members were asked to evaluate each statement with a Likert-type scale that included the following: 1 = strongly agree, 2 = agree, 3 = undecided, 4 = disagree, and 5 = strongly disagree. Results from Round 2 used descriptive statistics to assist in identifying stronger relationships in responses. Graphical information was created for each descriptor statement demonstrating the descriptive statistical score for each item in Round 2.

Round 3, the final quantitative round of questions was composed of the same descriptor statements as in Round 2, with additional graphical information for each statement demonstrating the descriptive statistical scores from the analysis in Round 2. Panel members were instructed to view the graphic depiction for each statement and then reevaluate the descriptor using the same Likert-type scale presented in Round 2. This final round enabled the researcher to gain a consensus from the panel of expert participants on the efficient, effective, and functional means for application of the learner-centered design model in the instructional design process.
The scores from Round 3 were separated into two categories. The tally of responses of strongly disagree and disagree represented the “negative” category and the tally of strongly agree and agree represented the “positive” category. Responses in the undecided field were not considered in the determination of consensus.

Validity

Creswell (1998) saw validity as a process that occurs throughout the data collection, analysis, and report writing supported by criteria imposed by the researcher and others after the completions of the study. Maxwell (2005) stated the qualitative researcher needs to address two specific validity threats: bias and reactivity. To address the possible bias of a researcher, Maxwell suggested the researcher explain the possible bias and how the researcher will address the bias. In this study, bias was possible as the data were analyzed by this researcher and the nature of the Modified Delphi study does not allow the other panel members to view the collected data. Because this researcher was also the creator of the instructional design model being evaluated, it is possible this researcher’s personal goals added to the bias of the analysis. Additionally, the panel members responded to the questions in written form, so it was possible to misinterpret their responses due to the poor or incomplete responses. Reactivity refers to the influence the researcher might have on the setting or individuals in the study (Maxwell, 2005). The panels of experts used in this study had no knowledge of each other, and this researcher only had contact through e-mail with the members, so reactivity was not a validity issue in this study.
Reliability

A pilot study was conducted to test the Round 1 survey instrument for reliability and validity. Permission to contact members of the OLN listserv was obtained from the OLN administration. Additional pilot study members were requested from faculty members of Capella University who had published articles or studies in the instructional design field.

Data Analysis Procedures

Interpretational data analysis was used to examine the qualitative data in order to find constructs, themes, and patterns (Gall, Gall, & Borg, 2003). The analysis process began with this researcher reviewing and organizing the responses to the Round 1 questionnaire. Respondents’ files were imported into NVivo 8, the qualitative analysis software package. Once patterns and relationships were identified, categories were created and codes assigned to assist in the sorting and further analysis of the data. Given the structure of the questionnaire items, categories included strengths, weaknesses, and recommendations for the learner-centered instructional design model. Further analysis of the relationships supported the development of Round 2’s quantitative questionnaire. Responses to the 5-point Likert-scale survey were entered into Microsoft Excel software package. An examination of the mean, median, mode, and standard deviation was used to identify areas of consensus. Round 3 required respondents to review items from Round 2 that still lacked consensus and contrasted them using group consensus data. Respondents had the option to keep their initial rating or change it by marking in the space provided
for the new rating. Respondents were asked to qualify any rating they did not wish to change.

**Ethical Considerations**

Possible ethical considerations include the possibility of harm to members of the panel of experts. Panel members might perceive a fear of professional damage or repercussion due to the publication of their responses in part or full to questions that might question their professionalism or expertise on the subject matter. To minimize this fear of risk, each panel member was assured that no one other than this researcher would have access to the identity of any respondent or any association of the response to its actual author. Additionally, the identity of all panel members remained anonymous to all other panel members. All references or statements within any response that might lead to the possible identity of any panel member were removed before any information as shared in the course of this study.

**Limitations**

The following limitations are present in this study:

1. Results were determined by a small number of experts.
2. Qualitative data collection process can be time intensive for both the researcher and participants.
3. Selected experts were only from the United States.
4. Data analysis was limited by the skill level of the analyst.
5. Results and interpretation contain the bias of the analyst.
6. Communication was via e-mail.

7. Panel of experts may not reflect an international consensus.

8. Interpretation of questions and results was limited to the analyst’s ability to correctly comprehend the panel’s remarks without the insertion of personal opinions, bias, or misunderstandings.

9. Data collection over a three-round process with analysis between each round caused the collection of data and results of the study to be delayed.

**Chapter Summary**

This study utilized a mixed-methodology research design. Both qualitative and quantitative data were collected, analyzed, and applied to the analysis of the learner-centered design model. A pilot study was conducted to increase the validity of the survey instrument. A modified Delphi method was selected for its qualitative and quantitative data collection strengths, which include the ability to collect data from a panel of experts from a diverse geographical region, and anonymity of panel members, allowing for responses void of influential factors from other panel members. Analysis of the Round 1 qualitative data with NVivo 8 qualitative analysis software led to the development of the Round 2 survey. The quantitative results from Round 2 and 3 were analyzed with Microsoft’s Excel software to derive the mean, medium, mode, and standard deviation of identified data items.
CHAPTER 4. DATA ANALYSIS AND RESULTS

The purpose of this study was to determine if the nonlinear learner-centered instructional design model is a potentially effective and useful ISD model for postsecondary environments and an ISD model that addresses the different characteristics of learners as perceived by a panel of postsecondary instructional designers. A modified Delphi technique was used to collect and analyze qualitative and quantitative data from a panel of eighteen experts in the instructional design community. The study was designed to answer the following research questions:

1. To what extent does a group of postsecondary instructional design experts perceive the learner-centered design model as potentially effective or noneffective ISD model for postsecondary environments?

2. To what extent does a group of postsecondary instructional design experts perceive the learner-centered design model as potentially effective or not effective in addressing the differences of individual learners?

All data were collected by this researcher from three surveys through e-mails sent individually to each panel member. A pilot study was conducted to validate the first-round survey instrument. Round 1 consisted of eight qualitative questions in which results were coded by the qualitative coding company, DataSense. Round 2 and Round 3 consisted of Likert-scale questions generated after analysis of the prior round’s questions by this researcher. Microsoft Excel was used to support and direct the creation of the quantitative surveys.
Pilot Study

Pilot Study Participants

Instructional design faculty members from Capella University were solicited to participate in the pilot study. An e-mail was sent to four faculty members who had published research on instructional design models. Two members accepted the pilot study invitation. A follow-up demographic survey was sent to verify their qualifications and consent to participate in the pilot study.

Pilot Study Analysis

Each member was e-mailed a copy of the study proposal, description of the instructional model under investigation, and the Institutional Review Board (IRB)-approved Round 1 survey. Participants were informed that the purpose of the study was to achieve greater reliability and validity for the researcher-generated Round 1 survey. Participants were asked to provide feedback on the structure, content, and alignment of the proposed survey questions with the research study questions. Three rounds of responses were received from the participants, with each round generating multiple changes to the questions’ structure and content to bring them in greater alignment with the research questions. Participants were provided with all responses and suggestions from each round to assist in additional analysis. This researcher made all modifications to the Round 1 survey as suggested by the members. Members recommended the new survey be resubmitted to the IRB for approval as the survey had major modifications. The survey was resubmitted and approved by the IRB.
Modified Delphi Study

Study Participants

An e-mail was sent to the OLN instructional designers’ listserv group inviting participants to volunteer for a modified Delphi research study. The OLN instructional designers’ listserv contains over 350 members. Participants were instructional designers, higher-education professors, and others in roles related to online content development. Qualifications for the study required participants to be employed in a postsecondary educational institution and to be responsible for the development of instructional content.

A total of 27 instructional designers responded to the invitation; however, seven did not qualify based upon either job assignment or failure to return the demographic or consensus form. Twenty individuals met the required qualifications and were sent the demographic and consent forms. All 20 members completed the forms and returned the forms as an e-mail attachment. All 20 members completed Round 1. One member’s e-mail became invalid, and after multiple failed attempts to contact the member, the member was removed from the panel. A second member did not respond to three separate reminders over a 2.5-week period and was removed from the panel. Eighteen members completed the Round 2 survey, yielding a 90% response rate for Round 2. Eighteen members also responded to Round 3, yielding a 90% response rate for Round 3.

Demographics

Panel members completed a demographic form requesting general and professional information. The following data are provided for those individuals who were selected to participate as panel members and who also completed all three rounds of questionnaires ($n = 18$). Data were analyzed with Microsoft Excel software.
The majority of panel members (35%) had 6–10 years experience as instructional designers; the next significant group (30%) consisted of members with instructional design experience of 3–5 years. Combining these two categories gave the panel’s instructional design experience of 3–10 years, a total of 65% representation of the panel membership. The remaining members’ instructional design experience consisted of 25% having less than 3 years experience and only 5% with design experience greater than 11 years. Members represented designers from novice to advanced experience in instructional design. Achieving consensus with selected members of diverse experience could be interpreted to have greater application to the general instructional designer population.

Participants were surveyed on years experienced in teaching face-to-face and years experienced in teaching online. Face-to-face experience ranged from 0–32 years. The majority of participants (55.6%) had less than 10 years experience; 27.8% had 11–20 years experience, and 16.6% had more than 21 years experience. Comparing online teaching experience with the same group of participants yielded 55.5% with less than 6 years experience, 33.3% with 6–10 years experience, and only 11.2% with experience of 11–20 years. There were no participants with experience greater than 20 years, which could be attributed to the limited availability of technology and educational institutions providing online services. Tables 1 and 2 show the breakdown of teaching experience in both environments.
Table 1. Years Teaching Experience in Face-to-Face Environment

<table>
<thead>
<tr>
<th>Range in years</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–5</td>
<td>5</td>
<td>27.8</td>
</tr>
<tr>
<td>6–10</td>
<td>5</td>
<td>27.8</td>
</tr>
<tr>
<td>11–15</td>
<td>2</td>
<td>11.2</td>
</tr>
<tr>
<td>16–20</td>
<td>3</td>
<td>16.6</td>
</tr>
<tr>
<td>21 and above</td>
<td>3</td>
<td>16.6</td>
</tr>
<tr>
<td>Totals members</td>
<td>18</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 2. Years Teaching Experience in an Online Environment

<table>
<thead>
<tr>
<th>Range in years</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 5</td>
<td>10</td>
<td>55.5</td>
</tr>
<tr>
<td>6 – 10</td>
<td>6</td>
<td>33.3</td>
</tr>
<tr>
<td>11 – 15</td>
<td>2</td>
<td>11.2</td>
</tr>
<tr>
<td>Total members</td>
<td>18</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Participants were asked for additional information to determine their expertise to qualify as members of the study’s panel. Information requested included members’ gender, age, highest degree earned, and place of employment. Fourteen members were women (77.7%) and four were men (22.2%). Thirteen participants were over 40 years old.
(72.2%) and the remaining five were between 20 and 40 years old, with only one participant (5.6%) having an age in the lowest range. Panel members (94.4%) were well experienced in their field.

Table 3. Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>4</td>
<td>22.2</td>
</tr>
<tr>
<td>Female</td>
<td>14</td>
<td>77.8</td>
</tr>
<tr>
<td>Total members</td>
<td>18</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 4. Age Range

<table>
<thead>
<tr>
<th>Age range in years</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>20–30</td>
<td>1</td>
<td>5.6</td>
</tr>
<tr>
<td>31–40</td>
<td>4</td>
<td>22.2</td>
</tr>
<tr>
<td>41 and above</td>
<td>13</td>
<td>72.2</td>
</tr>
<tr>
<td>Total members</td>
<td>18</td>
<td>100.0</td>
</tr>
</tbody>
</table>

During the period of this study, all members selected for the panel were employed in postsecondary educational institutions or businesses with direct assignments to instructional design or development. Thirty-three percent held doctoral degrees and 67%
held masters degrees. Most panel members were employed by universities (61%) or community colleges (33.3%). Only one member worked for a corporation.

Table 5. Highest Degree Earned

<table>
<thead>
<tr>
<th>Degree</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor’s</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Master’s</td>
<td>12</td>
<td>67</td>
</tr>
<tr>
<td>Doctoral</td>
<td>6</td>
<td>33</td>
</tr>
<tr>
<td>Total members</td>
<td>18</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 6. Description of Institutions of Employment

<table>
<thead>
<tr>
<th>Institution type</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community college</td>
<td>6</td>
<td>33</td>
</tr>
<tr>
<td>Public university</td>
<td>8</td>
<td>44</td>
</tr>
<tr>
<td>Private university</td>
<td>3</td>
<td>17</td>
</tr>
<tr>
<td>Private business</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Total members</td>
<td>18</td>
<td>100</td>
</tr>
</tbody>
</table>
Questionnaires

Three rounds of questionnaires were used in this study to determine consensus on the proposed research questions. All questionnaires and responses were sent and received through individual e-mails between this researcher and each panel member. Bulk e-mails were not used for any communication to protect the members’ identification and participation in the study.

Round 1 consisted of qualitative questions that were analyzed and coded with NVivo 8 qualitative data analysis software. Rounds 2 and 3 consisted of quantitative questions based upon a 5-point Likert scale. Data were analyzed using Microsoft Excel software. Panel members were sent results from the prior questionnaire to assist in understanding the direction and focus of the new questionnaire.

Round 1 questionnaire. Panel members were sent two documents in Round 1 of the study. The first document was a diagram and brief explanation of the proposed model. The second document consisted of the Round 1 questionnaire of eight open-ended questions as reviewed and revised by the pilot study panel. The Round 1 panel consisted of 20 members; all 20 members responded to all questions. The questions were analyzed with NVivo 8 that created the following eight categories:

- Question 1: Of value to you now
- Question 2: Problematic or hindrance
- Question 3: Effective
- Question 4: Noneffective
- Question 5: Strengths for focus on learner’s needs
- Question 6: Weaknesses for focus on learner’s needs
Question 7: Learner needs: Important or Not as important

Question 8: Model should focus on learner’s needs

Each category (node) was further analyzed and coded for subcategories and emerging themes within each question. Multiple coding was performed when deemed reasonable within the subcategories. The coding strategy used was one that attempted to provide reminders within various nodes rather than attempt to code every line of text to every single node possible.

**Question 1: Of value to you.** Question 1 asked, “What design features of this model would be of value to you in your present position as an instructional designer?” Analysis of the panel’s responses yielded five common themes that were identified as a value to them as an instructional designer: (a) model’s learner-centered design, (b) inclusion of learning style, (c) inclusion of prior knowledge, (d) design allows for use as a model that could be used to teach other designers, and (e) the model being a visual nonlinear instructional design model.
Table 7. Question 1 Emerging Themes

<table>
<thead>
<tr>
<th>Emerging theme</th>
<th>$f$</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learner-centered</td>
<td>13</td>
<td>65</td>
</tr>
<tr>
<td>Visual nonlinear model</td>
<td>11</td>
<td>55</td>
</tr>
<tr>
<td>Learning Style</td>
<td>8</td>
<td>40</td>
</tr>
<tr>
<td>Teaching other designers</td>
<td>8</td>
<td>40</td>
</tr>
<tr>
<td>Prior Knowledge</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Total members</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

**Question 2: Problematic or hindrance.** Question 2 asked, “Based upon your experience as an instructional designer, what design features of this model would you find problematic or a hindrance to your instructional design process?” Utilizing NVivo 8 and standard methods for coding text, nine subcategories or themes were identified as significant importance to the panel members. One common theme identified was the lack of any problems or hindrances. This theme did not support the question and was rejected for additional focus. Another theme mentioned the model did not address a means to keep up with instructional technologies; this theme was not considered for further attention as it only represented one member (5%). These themes were considered of little significance by this researcher.

The remaining seven themes identified problems or possible hindrances within the learner-centered instructional design model. The members believed these themes would interfere with their current instructional design process: (a) design process and
descriptions, (b) evaluation and feedback, (c) age of learner, (d) model missing features, (e) learning styles of the learner, (f) designer’s preference for a linear design, and (g) consideration of the learner’s prior knowledge. Further analysis of the panel’s comments yielded some consensus for the need to have additional information provided to the designer to assist in better understanding and application of the model as designed; also, the evaluation and feedback phase was considered confusing. The learning styles and prior knowledge theme had the greatest differences of disagreement in members’ comments throughout the study but first surfaced in Question 2. Learning styles and prior knowledge had greater focus in Round 2 questionnaires to assist in determining how panel consensus could be attained with these two themes. Additional common themes included better design to make the model more balanced and less flat, and a disapproval of the circular design of the model. Several members were unable to identify any problems or hindrances and stated the following:

The design model includes all of the essential features needed to design an effective set of instructions.

I don’t think that any area of this model would hinder my instructional design process . . . everything seems very clear, and I like that Objectives is across from Assessment and Technologies across from Strategies.

None of it would be a hindrance.

Strictly speaking, I’m not an instructional designer; I design my courses within the constraints laid down by university faculty. But again what I like about this model is the variety of options it would give me to target diverse types of students.
Table 8. Question 2 Emerging Themes

<table>
<thead>
<tr>
<th>Emerging theme</th>
<th>( f )</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design process and descriptions</td>
<td>8</td>
<td>40</td>
</tr>
<tr>
<td>Evaluation and Feedback</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Not problematic</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Age</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Missing features</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Learning styles</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Prefer linear design</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Prior knowledge</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Keeping up with instructional technologies</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Total members</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

**Question 3: Effective.** Question 3 asked, “What design features makes this model an effective instructional design model for a postsecondary instructional designer?” Six subcategories were identified during analysis: (a) learner as the center of the model and process, (b) the model’s circular design, (c) the inclusion of the learning style of the learner, (d) continuous evaluation and feedback during the design process, (e) model’s design made it possible to work with other designers, and (f) the model may not meet postsecondary school needs. The most common themes from participants were the model’s central focus on the learner during the process and the model’s circular design (45%). Division of opinions became more apparent over the importance of learning styles.
as a consideration during the design process. This is the second time learning styles was a common theme; it was also identified in Question 1. In Question 1, it was considered as a problem or hindrance (15%); however, in Question 2, it was considered as an effective part of the model’s design (25%). Learning styles was a key component in future rounds to bring clarity and consensus on the panel’s opinions. Members responded that the design allowed developers to keep focused on the learner, and the model was easy to understand.

Table 9. Question 3 Emerging Themes

<table>
<thead>
<tr>
<th>Emerging theme</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learner-centered</td>
<td>9</td>
<td>45</td>
</tr>
<tr>
<td>Circular visual model</td>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td>Learning style</td>
<td>5</td>
<td>25</td>
</tr>
<tr>
<td>Continuous evaluation and feedback</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Working with designers</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>May not meet postsecondary school needs</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total members</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

Continuous evaluation and feedback was identified by 15% of the members as a means to keep instruction current and maintain a focus on the objectives during the design process. A final theme was the question of whether or not this model would meet
the postsecondary needs. This theme only represented one member (5%) and was not considered significant enough for further investigation.

**Question 4: Noneffective.** Question 4 asked, “What design features make the model noneffective as an instructional design model?” Three themes were identified as being of common interest to the panel members as possible noneffective design features: (a) model needs some reworking, (b) a linear design would be more efficient and practical for designers, and (c) model has no noneffective design features. The most common theme \((n = 12)\) suggested reworking the model’s design. Members stated the design process would be slowed due to excessive focus on the learner as the audience often changes, requiring repeated analysis during the process. Following are examples of the responses for the theme of reworking the model’s design:

Because it requires so much analysis of the learner throughout the development process, it seems that it would almost be difficult to move forward because the information/audience would be continuously changing.

An additional element should be added between design and implement to complete the loop. Possibly add, revise, re-do or something of that nature.

One thing that stands out is a lack of focus on the analysis phase. Yes, there is good detail in terms of the learner analysis but task analysis is a big part of establishing a foundational understanding of the instructional process.

The circular design does not provide a strong starting point.

It doesn’t have a clear path, and it seems to be missing the feedback loop, where you revise the material based on the initial implementation.

Additionally, a linear design was preferred by some members \((n = 4)\). This theme was also identified by members \((n = 6)\) in Question 2 as an effective design feature. This division among panel members’ views on the significance of a circular design had greater focus in Round 2 questionnaires to assist in determining how panel consensus may be
attained with these two themes. Members \((n = 7)\) did not identify any noneffective features of the model and stated comments relating to all features being effective.

Table 10. Question 4 Emerging Themes

<table>
<thead>
<tr>
<th>Emerging theme</th>
<th>(F)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Needs reworking</td>
<td>12</td>
<td>60</td>
</tr>
<tr>
<td>All are effective</td>
<td>7</td>
<td>35</td>
</tr>
<tr>
<td>Linear is more efficient &amp; practical</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Total members</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

**Question 5: Strengths for focus on learner’s needs.** Question 5 asked, “What design features of this model would you consider as strengths for keeping the focus on the learner’s needs?” The following themes were identified as strengths for keeping the design process focused on the learner: (a) model is designed with the learner as its center, (b) feedback and evaluation elements of the model, (c) inclusion of the learner’s learning style, (d) inclusion of the learner’s prior knowledge, (e) inclusion of the learner’s age, and (f) inclusion of the learner’s culture. Panel members overwhelmingly (75%) listed the learner-centered feature as a strength for keeping the focus on the learner. Additionally, 35% of the members also mentioned the feedback and evaluation being available throughout the process and bidirectional, making it a strong feature for learner focus. Learning styles and prior knowledge were suggested as strengths as both were viewed as being necessary in the early stage of the development as they would influence
the development of the instruction, formation of objectives, assessments, technologies, and strategies. This was the third appearance of learning style and prior knowledge as a theme. This question yielded a 20% response for both prior knowledge and learning style. It is apparent that both themes are of significance for additional focus in future questionnaires. Age and culture were mentioned as strengths, but members responded with limited detail reasoning. Examples of some of the respondent’s comments are as follows:

Continual evaluation and feedback are strengths. This aligns with the ADDIE model that is often used. In fact, I view this model as a nonlinear implementation of the ADDIE model with the main difference being that any weakness in the development that have been identified in the evaluation phase always points back to a learner-centered approach for improvement.

That the learner is at the center and that one can freely move back and forth as needed, keeping the learner at the center of the process.

The central circle devoted to the LEARNER keeps pulling attention there. Simultaneously focusing on the learner while developing elements, such as outcomes or assessment tools, is a constant reinforcement of the primary goal.

The design feature that keeps focus on the learner’s needs is the “Learning Style” feature. If the learning style of a learner is assessed early on in the process, it will determine how the instructions should be designed and developed to bring about achievement in individual learners.
Table 11. Question 5 Emerging Themes

<table>
<thead>
<tr>
<th>Emerging theme</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learner-centered</td>
<td>15</td>
<td>75</td>
</tr>
<tr>
<td>Feedback &amp; evaluation</td>
<td>7</td>
<td>35</td>
</tr>
<tr>
<td>Learning style</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Prior knowledge</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Culture</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Age</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Total members</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

Question 6: Weaknesses for focus on learner’s needs. Question 6 asked, “What design features of this model would you consider as weaknesses for keeping the focus on the learner’s needs?” Common themes identified were (a) there were no features that prevented focus from the learner; (b) some learner characteristics are weak and should not be included in model; (c) model needs additional features added to strengthen the focus; and (d) model does not account for items outside of models designed, which may influence the design process. Panel members had near consensus (n = 12) that the model had no weaknesses to prevent it from keeping the focuses on the learner’s needs. Members’ comments stated that all elements focused on the learner and learner focus was clearly articulated throughout the model. However, two different panel members believed the learning styles and age features are unnecessary features. One member stated that research on learning styles is “sketchy and whether definable learning styles persist and
can be shown to consistently be a determining factor in learning outcomes.” Another member mentioned that the design of this model would allow the designer to ignore some components. They viewed this as a problem as an inexperienced instructional designer may overlook an aspect that could be very helpful to learners. Suggestions were made to add an “experience” feature as the members believed it would have more impact than age would on the instructional process. Additional comments mentioned improvements to the design to include the addition of a “task analysis” or an “editing” feature, and a “check-and-balance” feature.

Table 12. Question 6 Emerging Themes

<table>
<thead>
<tr>
<th>Emerging theme</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No weaknesses</td>
<td>12</td>
<td>60</td>
</tr>
<tr>
<td>Weaknesses in current features</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Additional features needed</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Nondesign factors</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Total members</td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>

**Question 7: Learner needs.** Question 7 asked, “This model has selected four learner needs as identified by the literature review: culture, age, learning style, and prior knowledge.” Panel members were asked to identify which learners’ needs they viewed important or not important to the design process. Analysis of this question generated the same five common themes for both important and not as important categories: (a) all
elements are important to the design process, (b) learning styles of the learner, (c) prior knowledge of the learner, (d) student’s culture, and (e) student’s age. Further analysis showed the same members responded with “all are important” in both subcategories, yielding a 40% agreement in the acceptance of all four features as identified in the proposed model. Additional review of the members’ comments identified several comments that were stated in both all are important and another individual theme. Once the duplications were removed, a more accurate analysis of the panel’s comments was possible.

Table 13. Question 7 Emerging Themes

<table>
<thead>
<tr>
<th>Emerging theme</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Important themes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All of them are important</td>
<td>8</td>
<td>40</td>
</tr>
<tr>
<td>Learning style</td>
<td>11</td>
<td>55</td>
</tr>
<tr>
<td>Prior knowledge</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Culture</td>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td>Age</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Total members</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Not as important themes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All are important</td>
<td>8</td>
<td>40</td>
</tr>
<tr>
<td>Learning style</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Prior knowledge</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Culture</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Age</td>
<td>9</td>
<td>45</td>
</tr>
<tr>
<td>Total members</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

Table 14 shows the adjusted percentages based upon the removal of duplicated comments in multiple themes. The new percentages show greater consensus on the value
and importance the learner’s characteristics may have on the design process given the proposed instructional design model. The panel was clearly divided on the importance of age in the design process.

Table 14. Question 7 Adjusted Emerging Themes

<table>
<thead>
<tr>
<th>Emerging theme</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Important themes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning style</td>
<td>13</td>
<td>65</td>
</tr>
<tr>
<td>Prior knowledge</td>
<td>15</td>
<td>75</td>
</tr>
<tr>
<td>Culture</td>
<td>12</td>
<td>60</td>
</tr>
<tr>
<td>Age</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td><strong>Total members</strong></td>
<td>20</td>
<td></td>
</tr>
<tr>
<td><strong>Not as important themes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning style</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Prior knowledge</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Culture</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Age</td>
<td>9</td>
<td>45</td>
</tr>
<tr>
<td><strong>Total members</strong></td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

**Question 8: Model should focus on learner’s needs.** Question 8 asked, “As an instructional designer, do you believe there is a need for a model that has a main focus on the learner’s needs through the design process?” The panel had total consensus in agreement that there is a need for a model that has the learner as the focus throughout the design process. The following comments are examples of the panel’s responses:

Yes, I believe there is a need for a model that has a main focus on the learner’s need through the design process. I believe the learner’s input on design/development of instructions is also important. This input would aid in strengthening the “Learning Style” feature of any instructional design model.
Learner focused design models aim to achieve better or improved learner assessment scores.

Yes. ADDIE and other formal models of instructional design articulate a process that is best for the designer and maybe the best for the subject matter expert, but not the best for the learners. Iterative and rapid prototyping processes can be more learner-centered because they don’t leave the evaluation stage for last, and allow the design and development teams to intervene before the project goes too far and a return to “home base,” if you will, costs too much.

All the models I have come in touch with have a look at the learner’s needs. However, they tend to quickly move on to another area for any variety of reasons.

Any instructional design model should focus on the needs of the learners; however, many designers skip the first and most important step, in the traditional and widely used ADDIE model, the analysis of learners. I think that this model amplifies this step to be of primary importance.

Yes. The existing models tend to focus on the content. That’s not a bad thing, but it’s good to remember that the learner is the reason why we’re designing instruction in the first place.

**Round 2 questionnaire.** The Round 2 questionnaire consisted of 25 five-point Likert-scale questions. All 20 panel members were sent the questionnaire via e-mail as an attachment in Microsoft Word document format. One panel member’s e-mail account rejected all e-mail attempts, which resulted in the removal of the member from the study. An additional member did not return the questionnaire after several reminders and was also removed from the panel. The remaining 18 members completed the questionnaire as per the written instructions. Responses were analyzed using Microsoft Excel. The Round 2 questions were based upon results and analysis from Round 1. Round 2 questions were grouped according to the Round 1 question from which they were derived. Panel members were given feedback from Round 1 to assist in the clarification and purpose of the proposed Round 2 questions. Members were asked to rate their responses based upon a 5-point Likert scale with 1 = *strongly agree*, 2 = *agree*, 3 = *undecided*, 4 = *disagree*,
and 5 = strongly disagree. Members were also given the opportunity to add comments after each response.

Question 1 in Round 1 asked, “What design features of this model would be of value to you in your present position?” Analysis of the panel’s responses yielded five common themes that were identified as a value to them as instructional designers: (a) model’s learner-centered design, (b) inclusion of learning style, (c) inclusion of prior knowledge, (d) design allows for use as a model that could be used to teach other designers, and (e) the model being a visual nonlinear instructional design model.

Learning styles was also identified but was common in several other questions and will be addressed later in this chapter. The following five subquestions were designed to identify which features were of greatest value to the panel members. Responses of strongly agree and agree were considered favorable responses and disagree and strongly disagree were considered nonfavorable responses. Undecided responses were considered neutral and a determining factor for additional questions in Round 3. Consensus was achieved in three of the five questions. Panel members agreed that the learning-centered focus (94.4%), the nonlinear design (77.78%), and the importance of having prior knowledge as a feature (77.74%) were of greatest value to them in their current positions. Additional questions were needed in Round 3 to achieve consensus on the model’s basic and circular design and its perceived usefulness in teaching other designers the design process.

Question 2 from Round 1 asked, “What design features of this model would you find problematic or a hindrance to your instructional design process?” Quantitative analysis identified the following most common problems or hindrances from responses:
(a) design process and description, (b) age, and (c) learning styles. Six subquestions were created from the Round 1 responses. Agreement was attained from two questions: more documentation was needed (83.33%) and keeping learning styles as one of the learner’s characteristics (83.33%). The design process required additional questions as analysis showed the panel was split on the need for an identified starting point, with 50% responding favorably to having an identified starting point and 44.44% in opposition. Only one member was undecided. A similar question was developed to determine if the circular model needed an identified stopping point. Members were less divided, but still no consensus was achieved as 66.67% rejected the need for an identified stopping point, 27.78% supported a stopping point, and 5.56% were undecided.

Round 3 questions were needed to achieve consensus on the need of having age as one of the learner’s characteristics. Results had six members (33.33%) in agreement, six members (33.33%) undecided, and six members (33.33%) in disagreement. Additionally, panel members were still divided on the issue of the need to add experience to the current list of learner’s characteristics. Results showed 66.67% supporting the addition of experience, 22.22% in opposition, and 11.11% undecided.

Question 3 from Round 1 asked, “What design features make this model an effective instructional design model for a postsecondary instructional designer?” Analysis of responses identified the following effective features of this model’s design; six subcategories were identified during analysis: (a) learner as the center of the model and process, (b) the model’s circular design, (c) the inclusion of the learning style of the learner, (d) continuous evaluation and feedback during the design process, (e) model’s design made it possible to work with other designers, and (f) the model may not meet
postsecondary school needs. Panel members were given the following definition of effective: “adjective—adequate to accomplish a purpose; producing the intended or expected results” (“Effective,” n.d.). All panel members (100%) agreed the learner-centered design was an effective feature of the model. Additional effective design features that achieved positive panel consensus were the continuous feedback location (88.89%), the circular design of the model (77.78%), and the need for learning styles inclusion in the model (72.22%). It was determined that panel members had agreement and consensus on Question 3 and therefore did not require additional data collection in Round 3.

Question 4 from Round 1 asked, “What design features make the model noneffective as an instructional design model?” Quantitative analysis showed a majority of responses identifying a need for reworking the model’s design, while some stated all features as presented are effective. Three subquestions were generated to determine consensus with noneffective features of the model. This researcher proposed the relocation of the feedback and evaluation arrows within the design to help clarify the model’s design intent. Fourteen members (77.78%) agreed with the proposal, four (22.22%) were undecided, and none disagreed (n = 18). Members were also in consensus with the need to add a revised feature to the model’s design. Fifteen members (83.33%) agreed to the addition of a revised feature, five were undecided (16.67%), and none were in disagreement (n = 18). Consensus was not achieved on the issue of allowing the designer to identify and select the learner’s needs during the design process. Four members (22.22%) agreed the learner’s needs should be left to the designer, six (33.33%)
were undecided, and eight (44.44%) disagreed. Additional data were collected in Round 3 to determine consensus for this question.

Question 5 from Round 1 asked, “What design features of this model would you consider as strengths for keeping the focus on the learner’s needs?” Learner-centered design, the feedback, and evaluation elements were identified overwhelmingly as the leading strengths of the design features. Analysis of responses produced consensus, resulting in no additional data required.

Question 6 from Round 1 asked, “What design features of this model would you consider as weaknesses for keeping the focus on the learner’s needs?” Sixty percent (n = 12) of the respondents felt there were no weaknesses in the design to distract from the learner focus. However, quantitative analysis identified many smaller common themes divided among the members, which suggested a need for additional data in Round 2.

Three additional questions were created from the most common themes:

1. Model has no major features that will impede an instructional designer from focusing on the learner’s needs.
2. As a designer, I do not consider the learner’s needs as a focal point during the design process.
3. As a designer, I do not consider learning styles a focal point during my design process.

Consensus was reached on all three questions. Panel members agreed (83.33%) there were no major feature to impede the designer from focusing on the learner’s needs. All members (100%) considered the learner’s needs as a focal point during the design process, and learning styles were considered a focal point for 77.78% of the members.
during the design process. Consensus was achieved for these questions and, therefore, no additional data were collected in Round 3 for this theme.

Question 7 from Round 1 consisted of two parts. Part 1 asked, “Which of the identified learner characteristics—culture, age, learning style, and prior knowledge—were considered important to the design process?” Analysis produced consensus with learning styles and prior knowledge as the most important of the elements selected; however, 40% (n = 8) responded that all identified elements were important. The second part of Question 7 asked, “Which of the identified learner characteristics—culture, age, learning style, and prior knowledge—were considered not important to the design process?” Round 2 analysis further supported the inclusion of learning styles (83.33%), prior knowledge (94.44%), and culture (77.78%). Additionally, age was identified as the only learner characteristic that had the panel members with more diverse opinions and nonagreement. Additional data collection was necessary in Round 3 to achieve consensus on the inclusion of age in the model.

Analysis of the final question from Round 1 (Question 8) produced consensus, resulting in no data collection in Round 2. Members reached consensus on the theme that there is a need for a model that has a main focus on the learner’s needs through the design process.

**Round 3 questionnaire.** In Round 3, panel members were presented with an additional set of questions derived from each question from Round 2 that did not achieve consensus. Seven questions were presented to the members for further evaluation and a final attempt to achieve consensus.
Round 2 asked additional questions about the design features of the model that would be of value to members in their present positions. Members were in agreement on the value of the circular design but divided on the value of the design as a training tool. Question 1 in Round 3 attempted to determine if division was isolated to the design of the proposed model or if members had the same view for any circular model. The question presented stated, “If I were to develop an Instructional Design Process unit to train other instructional designers, I would select a circular design model.” Analysis produced similar data to the associated question from Round 2. Results yielded nonconsensus on the value of the model as a possible training tool, as displayed in Table 15.
Table 15. Nonconsensus of LCM as a Training Tool

<table>
<thead>
<tr>
<th>Question</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>M</th>
<th>Mode</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Round 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) Model’s circular design makes the model useful in teaching other instructional designers the design process.</td>
<td>55.56%</td>
<td>27.78%</td>
<td>16.67%</td>
<td>3.00</td>
<td>2</td>
<td>0.55</td>
</tr>
<tr>
<td>(e) Model’s basic design makes the model useful in teaching other designer the design process.</td>
<td>66.67%</td>
<td>22.22%</td>
<td>11.11%</td>
<td>2.80</td>
<td>2</td>
<td>0.54</td>
</tr>
<tr>
<td>Round 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If I was to develop an Instructional Design Process unit to train other instructional designers I would select a circular design model.</td>
<td>61.11%</td>
<td>22.22%</td>
<td>16.67%</td>
<td>2.87</td>
<td>2</td>
<td>0.70</td>
</tr>
</tbody>
</table>

Question 2 from Round 2 asked, “What design features of this model would you find problematic or a hindrance to your instructional design process?” Analysis of Round 2 responses found some consensus in the requirement for additional documentation and the need to add experience to the learner’s characteristics. However, there was still division over other design features, to include (a) a defined starting and ending point, and (b) the need to have the learner’s age and/or experience included in the design process. Consensus was achieved, with 88.89% agreeing that the design process should be from
the center of the model identified in the model as the learner. Members also agreed (94.44%) that the design process is a continual process without a static ending point, removing the request by members earlier in the study suggesting the need to identify a stopping point within the design. Additional consensus (94.44%) was achieved on the topic of including the learner’s experience within the model’s design. Consensus was not achieved after three rounds on the topic of the need for having the learner’s age included in the model’s design. Table 16 displays the comparison data from both Round 2 and Round 3.

Question 3 had two subquestions based upon the results from the Round 2 question that asked members to identify features of the model that made the model noneffective as an instructional design tool. Members were in disagreement on the model’s feature that had preselected four learner’s needs as based upon the literature review. Only 50% of the panel agreed the model had correctly identified the most important learner’s needs. The remaining 50% consisted of 16.67% undecided and 33.33% in disagreement. However, consensus was achieved (83.33%) when the members were given the option to adapt the model’s list of learner needs to fit their design objectives. Undecided members (5.56%) and disagreeing members (11.11%) completed the panel’s responses.
Table 16. Nonconsensus of the Learner’s Age in Model’s Design Process

<table>
<thead>
<tr>
<th>Question</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>M</th>
<th>Mode</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Round 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) This model should not include AGE as part of learner’s characteristics.</td>
<td>33.33%</td>
<td>33.33%</td>
<td>33.33%</td>
<td>3.53</td>
<td>3</td>
<td>0.53</td>
</tr>
<tr>
<td>Round 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I do NOT consider the learner’s age during my design process.</td>
<td>44.44%</td>
<td>0.00%</td>
<td>55.56%</td>
<td>3.60</td>
<td>4</td>
<td>0.50</td>
</tr>
</tbody>
</table>

**Summary**

This modified Delphi research study utilized a mixed methodology of both quantitative and qualitative data collection and analysis. The Round 1 panel consisted of 20 members, with Rounds 2 and 3 consisting of 18 members. All members were selected from criteria as established through a pre-study qualifying questionnaire. Foremost in the required criteria was that members had to be currently employed as instructional designers.

Members were sent three rounds of questions. Round 1 consisted of eight qualitative questions that were coded into eight nodes as identified by NVivo 8 qualitative software. Each category (node) was then read and coded to additional subcategories and emerging themes within each question. Multiple coding was performed when deemed reasonable within the subcategories. Qualitative analysis of Round 1
achieved consensus on the theme that there was a need to have an instructional design model that focused on the learner throughout the design process. This consensus was foundational to the study as the experts gave validity to the purpose and focus of this study.

The second round of questions was developed to bring additional consensus on the remaining seven themes. Twenty-five subquestions were identified from the panel’s Round 1 responses. A Likert-scale format was selected for both Round 2 and Round 3 questionnaires. Round 2 was analyzed using the descriptive statistical functions in Microsoft Excel. Consensus was achieved on 18 questions (72%), complete consensus on three themes, and near consensus on the remaining four themes.

The final round of eight Likert-based questions was developed to bring additional consensus. Consensus was achieved on four questions; with members remaining divided on subthemes on the perceived usefulness of the model as a training tool for designers and the importance or need for the learner’s age to be a consideration in the instructional design process.

The following chapter provides an overview of the study, discussion of the results, implications of the study, limitations of the study, and recommendations for further research.
CHAPTER 5. RESULTS, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

This chapter discusses the results of the modified Delphi study conducted with a panel of eighteen instructional design experts. A summary of the study is presented that discusses the process and procedure used to collect the data, the population of the study, and a review of the problem as identified by the literature review. Additionally, the statistical analysis of the findings is discussed in sequential order as presented in Chapter Four. Conclusions were drawn and are discussed based upon the evaluated data as applied to the two research questions. Implications of this study are identified and discussed as related to what possible suggestions and solutions could be gleaned from the study. Future research topics are suggested to add to the current data on this model and other models that might support additional research for instructional designers considering nontraditional instructional design models. The final section summarizes the entire chapter and includes a discussion of the purpose of the study, followed by an overview of the findings and conclusive remarks.

Summary of the Study

A review of the literature suggested a need for a nontraditional instructional design model that was nonlinear and had a stronger focus on the learner throughout the instructional design process. This researcher developed the learner-centered instructional design model to address the need as identified. This study examined the newly developed learner-centered instructional design model. A panel of eighteen instructional design
experts was selected from those who responded to an invitation sent via e-mail to the Ohio Online Instructional Designers listserv. Participants completed a demographic questionnaire to verify their years of instructional design experience in both online instructional design and face-to-face instructional design and experience with instructional design models. Three rounds of questions were sent to the panel members. Round 1 consisted of eight qualitative questions that were analyzed using NVivo 8 qualitative analysis software to generate common themes and categories for the development of 25 quantitative questions for the second questionnaire. Results from Round 2 identified several areas of nonconsensus, which allowed the further development of questions for the final survey. Each round of questions focused on attaining consensus of the 18 members to answer two research questions:

1. To what extent does a group of postsecondary instructional design experts perceive the learner-centered instructional design model as a potentially effective and useful ISD model for postsecondary environments?

2. To what extent does a group of postsecondary instructional design experts perceive the learner-centered instructional design model potentially effective in addressing the differences of individual learners?

Chapter 1 addressed the background of the study and introduced several instructional design models and their instructional design process. The models discussed were the Dick, Carey, and Cary model; the Morrison, Ross, and Kemp model; the Seels and Glasgow model; and the learner-centered instructional design model. Chapter 2 reviewed the available instructional design literature and the foundational instructional theories that govern instructional development. Behaviorism, cognitivism, and
Chapter 3 discussed the mixed methodology used during this study. Round 1 used the Modified Delphi technique to collect the qualitative data from an eight-item questionnaire. Data coded using NVivo 8 software generated nine major themes and 49 subcategories. Data were analyzed by an external data analysis company to remove possible bias by the researcher and increase the validity of the initial analysis. Round 2 consisted of 25 Likert-scale 5-point questions, with 1 = strongly agree, 2 = agree, 3 = undecided, 4 = disagree, and 5 = strongly disagree. A statistical report was created using Microsoft Excel software. Consensus was obtained on 16 of the 25 questions. A third and final questionnaire was created that consisted of 15 Likert-scale questions in the same format as Round 2’s questionnaire. Acceptable consensus was reached in all areas and no further data were requested from the panel members.

Findings

The learner-centered instructional design model was examined by a panel of eighteen experts to determine if the model was potentially effective and useful for postsecondary instructional designers and if the model was potentially effective in addressing the differences of individual learners. The Round 1 qualitative questionnaire
identified common themes for each question. Themes were discussed in detail in Chapter Four. Round 1 was able to reach panel consensus on two of the eight qualitative questions. Question 5 asked, “What design features of this model would you consider as strengths for keeping the focus on the learner’s needs?” Panel members identified and agreed that the model’s nonlinear or circular design, the inclusion of prior knowledge, learning styles of the learner, and the continuous feedback and evaluation design were the major strengths of the model’s design. Round 1 also generated 100% consensus on Question 8, which asked, “Do you believe there is a need for a model that has a main focus on the learner’s needs through the design process?”

Round 2 brought additional consensus on the subcategories as identified in Round 1’s analysis. Round 2 findings continued to support the model’s circular design as an effective part of the design. Additionally, members supported the inclusion of prior knowledge (94%), learning styles (83%), and culture (78%) as necessary design elements in the instructional design process. The acceptance of the learner’s age as an important design element remained a division among all members. Members (89%) supported the continuous feedback and evaluation design feature; however, the model needs to reposition the feedback and evaluation arrows within the graphical representation of the design to give the model greater clarity in the design process. Most importantly, panel members had 100% agreement that the model was learner-centered and that no design features would impede an instructional designer from keeping the focus on the learner throughout the design process.

Round 3 was the final round of questions to bring consensus and identify areas that may need additional research. Consensus could not be achieved on the model’s
usefulness in training other designers, therefore removing some of its value to today’s instructional designers. The inclusion of the learner’s age in the design process remained a topic of nonagreement. Panel members remained evenly divided in all rounds of the questionnaires. Members did agree that the learner’s experience should be an added element to the model’s design (94%) and that the design process should start from the center of the design—the learner’s circle (89%). An unexpected finding from Round 3 was the negative response on the model’s identification of the most important learner needs for consideration in the design process. This was confusing as prior panel consensus supported the model’s design and choice of learner characteristics. Members did agree that if they were to use the learner-centered instructional design model, they would adjust the learner elements to fit their instructional design objectives. However, no additional suggestions from the panel members identified which elements would be adjusted, removed, or replaced.

Conclusions

In conclusion, the learner-centered instructional design model was supported by a panel of experts to be a potentially effective and potentially useful model for postsecondary instructional design. Additionally, data also supported that the model was perceived to be potentially effective in addressing the learner’s needs. However, the model needs several modifications to bring it into better alignment with the needs of current instructional designers. The model needs greater documentation to support both novice and advanced designers. Since most instructional design models are of a linear design, the new circular design requires greater explanation to assist in the transition from
a linear design process to a circular or revolving design. Clarity needs to be given to the placement of the outer circles and the location of corresponding elements to add to the model’s use and application. Data from the panel’s responses supported the consideration of keeping the learner’s characteristic elements more flexible to allow the designer to add or remove the elements as necessary to support his or her design objectives.

Members of the panel did not agree on the importance of age within the design process; however, literature does support the importance and consideration of age in the development of instructions. This researcher has extensive experience within a multi-aged instructional environment and has found from professional experience that age often interferes with the learning of others as well as with the learner’s ability to understand presented concepts. With the expansion of education into the global and virtual realms, the instructional designer will need to be cognitive of the possibility that there will be a greater gap in the ages within the online classroom. A designer should consider all possible factors that may prevent or hinder a student’s learning.

Additional field testing is necessary to give this model greater validity and identify additional weakness in the design. Field test should involve members of the instructional design community that currently use an instructional design model. Selected members would replace their model with the learner center instructional design model and document any problems or issues discovered during the use of the model. Designers would also make recommendations for modification to the current design. Final modifications and adjustments would then allow the model to be presented to the instructional design community.
Recommendations for Future Research

Given the data and findings of this study, the following recommendations are proposed for future research:

1. This study consisted of only 18 members from the midwestern region of the United States. Panel membership could not be considered as full representation of the general population of instructional designers. Given the expansion of online instruction to global regions, an additional sample might consider a larger and more global representation of instructional designers.

2. The panel included a mix of members, some of whom had used an instructional design model during their instructional design process and some who had not used any model for instructional design. It would be of great interest to further investigate the proposed model with a group of instructional designers who actually use instructional design models on a regular basis.

3. This Modified Delphi study was conducted in a controlled environment with the researcher directing the study and with possible bias; a field test should be conducted with this model to investigate if the model could withstand the demands and requirements within a real-world environment that were not possible within the confines of this study.

4. Since the model is designed with a central student focus and predetermined student characteristic as identified by the literature, an additional study could evaluate the possibility of adding other student characteristics or if the model would be more effective with fewer characteristics or designed to allow each designer to adjust the characteristics to meet his or her identified population.
5. An additional study should be conducted to determine the effectiveness of the instructional design model in the design process. The study could address the following questions: (a) Is there a need for instructional design models? (b) What percentage of instructional designers use models? and (c) Why do not other designers use an instructional design model?

6. Given the large number of available instructional design models, further research could determine which instructional design models are used the most and what makes one model more effective and useful than another.

Limitations

The following limitations are present in this study:

1. Results were determined by a limited number of experts.

2. Qualitative data collection process can be time intensive for both the researcher and participants.

3. Selected experts were only from the United States.

4. Data analysis was limited by the skill level of the analyst.

5. Results and interpretation contain the bias of the analyst.

6. Communication was via e-mail.

7. Interpretation of questions and results was limited to the analyst’s ability to correctly comprehend the panel’s remarks without the insertion of the analyst’s personal opinions, bias, or misunderstandings.
Summary

The purpose of this study was to determine if the nonlinear learner-centered instructional design model is potentially effective and potentially useful ISD model for postsecondary environments and an ISD model that addresses the different characteristics of learners as perceived by a panel of postsecondary instructional designers. A modified Delphi technique was used to collect and analyze qualitative and quantitative data from a panel of experts in the instructional design community. This modified Delphi study was significant because it offered a more appropriate ISD model to the postsecondary instructional design community. This modified Delphi study allowed a panel of instructional design experts to discuss the presented model through a three-tier review of questions as directed by their responses and the researcher’s analysis. Members were able to respond to questions without the influences of other members.

Round 1 contained eight open-ended questions that were analyzed by an external research firm to prevent researcher bias. Consensus was achieved on two of the eight questions in Round 1. Panel members agreed there was a need for a learner-centered instructional design model and identified learning styles, prior knowledge, feedback, and the nonlinear design as important elements in the model’s design. This researcher used the Round 1 coding and subcategories from the remaining questions to develop Round 2’s 5-point Likert-scale questionnaire. Round 2 identified the need for additional documentation and further supported the learning styles, prior knowledge, culture, and continuous feedback as strengths of the model. Members agreed that design needed some slight modification to the graphical representation but that there were no features that would impede the designer from staying focused on the learner during the design process.
Analysis of the data showed that the learner’s age element within the design was still an item of disagreement.

Round 3 focused on the final items that still lacked panel consensus. These items included (a) the model’s potential usefulness in training other designers, (b) consideration of age in the design process, (c) addition of the learner’s prior experience as an added design element, (d) the starting point of the design process, and (e) the model’s selection of the most important learner characteristics. Consensus was not reached on the model’s potential usefulness to train other designers or the need to consider a student’s age during the design process. Consensus was achieved to add the student’s experience to the models design, and the design process should start from the center circle. Additionally, members agreed they would adjust the model to fit their design objectives, which means they would add or remove learner characteristics depending on the objectives of their instructional design.

Given the support from the literature, which states the need for additional nonlinear instructional design models and models that focus more on the learner and less on the objectives, the learner-centered instructional design model can potentially meet that need. This researcher concluded that the learner-centered instructional design model is potentially effective and useful ISD model. Additionally, the model is perceived to be potentially effective in addressing the differences of individual learners. However, the model does need to have additional documentation created to better explain the model’s design process. Graphical design needs further adjustment of the placement of the elements to clarify process and progression through the design process. Finally, the model identified four learner characteristics that are not in total agreement with the
panel’s design philosophy. Suggestions include the removal of the learner’s age and the addition of the learner’s prior experience.

Instructional design models are tools used to assist in the creation of instruction. The predominant tools available are linear-focused and objective-focused. Instructional designers will need to shift paradigms and adjust personal and organizational philosophies to allow the change from objective to learners to take place. The learner-centered instructional design model was designed to give designers an additional choice in design tools that are more aligned with current educational research and trends. Once modifications are made based upon this research and additional field studies, this model will be presented to the instructional design community.
REFERENCES


APPENDIX A. PRE-STUDY DEMOGRAPHIC QUESTIONNAIRE

DIRECTIONS: Please answer the following questions completely. This information will remain confidential and will not be connected to any future responses.

1. Name:___________________________________________________________
2. Contact: Phone: __________________ Fax: __________________
   E-mail:_______________________________________________
3. Gender: Male □ Female □
4. Age Range: 20 yrs–30 yrs □ 31–40 yrs □ 41 and over □
5. Job Title / Designation: ______________________________________________
6. Years at current position:
   0–2□ 3–5 □ 6–10 □ 11–15 □ Over 20 □
7. Name of Employee Institution:________________________________________
8. Years of experience in teaching face-to-face: ______
9. Years of experience in teaching online: __________
10. Do you design and / or develop online coursework? Yes □ No □
11. Do you use a formal instructional design model? Yes □ No □
12. Highest degree earned:
    Associates □ Bachelors □ Masters □ Ph. D. □
13. Major of your highest degree:________________________________________
14. List all professional license, organizations and/or certifications you have earned
    or are a member of:

___________________________________________________________________
___________________________________________________________________

Thank you for responses.
APPENDIX B. MODIFIED DELPHI STUDY QUESTIONNAIRE: ROUND 1

Direction: Please read each question carefully. Please be as specific and thorough as possible. Feel free to draw from your experience and knowledge to express your complete opinion. Please type your response below each question. Document will expand as you type—Do not worry about pagination or format as you type.

Please elaborate your responses. The more details and information you provide will ensure a proper Delphi process and summary.

1. After reading the synopsis and referencing the learner-centered instructional design model, what is your overall opinion of the model?

2. Is the model easy to understand and follow? Please explain.

3. Identify any strengths of the model?

4. Identify weaknesses or significant problems of the model?

5. Does it seem like the model will be effective? Please explain.

6. Does it seem likely that the model will be efficient? Please explain.

7. Does the model allow the designer to keep the learner as focal point throughout the process without impeding the ability to complete a possible design objective?

8. Does the nonlinear design adequately incorporate the ADDIE design phases? Please explain.

9. Are there any changes you would recommend to either the design or phases? Please elaborate as much as possible as this will have direct impact on future design and modifications to the model.

10. Can you recommend any other research that should be pursued in relationship to this model?

Thank you for your time and effort in completing this first round of questions.
APPENDIX C. MODIFIED DELPHI STUDY QUESTIONNAIRE: ROUND 2

Directions: Please mark an “X” in the box that best represents your professional views for each question. You may add comments after each question.

Question 1: Round 1 asked what design features of this model that would be of value to you in your present position. Analysis identified the following common features from responses: 1) learner-centered, 2) visual non-linear model, 3) learning style, 4) teaching other designers, and 5) prior knowledge. Learning styles will be further addressed later in this survey. Please reflect upon your experience as an instructional designer and mark the box which represents your level of agreement or disagreement.

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1a. A valued feature of this model is the Learner-centered focus.

Comments:

1b. A valued feature of this model is the non-linear design.

Comments:

1c. Prior knowledge should remain a major focal point in this model.

Comments:

1d. Model’s circular design makes the model useful in teaching other instructional designers the design process.

Comments:

1e. Model’s basic design makes the model useful in teaching other designer the design process.

Comments:

Please Continue to Next Page
**Question 2:** Round 1 asked what design features of this model would you find **problematic or a hindrance** to your instructional design process? Analysis identified the following most common problems or hindrances from responses: 1) design process and description, 2) age, and 4) learning styles.

Please reflect upon your experience as an instructional designer and mark the box which represents your level of agreement or disagreement.

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**2a. This circular model needs an identified starting point.**
Comments:

**2b. This circular model needs an identified stopping point.**
Comments:

**2c. This model needs more documentation to explain the design process.**
Comments:

**2d. This model should not include Learning Styles as part of learner’s characteristics.**
Comments:

**2e. This model should not include AGE as part of learner’s characteristics.**
Comments:

**2f. This model should add Experience to the Learner’s characteristics.**
Comments:

Please Continue to Next Page
**Question 3:** Round 1 asked what design features makes this model an **effective** instructional design model for a post secondary instructional designer. Analysis of responses identified the following effective features of this model’s design: 1) learner-centered, 2) circular design, 3) learning styles, and 4) continuous feedback. Please use the below definition for *effective* as you reflect upon your experience as an instructional designer and mark the box which represents your level of agreement or disagreement.

**Effective:** –adjective
Adequate to accomplish a purpose; producing the intended or expected results.

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<td>3a. The <em>learner-centered</em> design feature is an effective feature of this model.</td>
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<td>3b. The <em>circular design</em> feature of this model makes it more effective than linear models.</td>
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<td>Comments:</td>
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<td>3c. The <em>Learning styles</em> feature is necessary to make this model effective.</td>
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<td>Comments:</td>
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<td>3d. The <em>continuous feedback</em> between the two outer layers is an effective feature of this model.</td>
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Question 4: Round 1 asked what design features make the model non-effective as an instructional design model. Majority of responses stated a need for reworking the model’s design with others stating all features as presented are effective. Please reflect upon your experience as an instructional designer and mark the box which represents your level of agreement or disagreement.

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<td>4a. Reposition (move) the feedback and evaluation arrows between the learners’ characteristics and not directly in line with characteristics to prevent misunderstanding or assumed direct associations.</td>
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<td>4b. Model should not define the learner’s needs but should be left to the designer to identify and select as required.</td>
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<td>4c. A “revise” feature needs to be added to the model.</td>
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Question 5: Round 1 asked what design features of this model would you consider as strengths for keeping the focus on the learner’s needs. Learner-centered design, the feedback, and evaluation elements were identified overwhelming as the leading strengths of the design features. Analysis of responses produced consensus resulting in no additional data required. THANK YOU!

Please Continue to Next Page
**Question 6:** Round 1 asked what design features of this model would you consider as weaknesses for keeping the focus on the learner’s needs. Most responses felt there were no weaknesses in the design to distract from the learner focus. However, consensus was not attained due to multiple differences divided among others with no common focal point.

Please reflect upon your experience as an instructional designer and mark the box which represents your level of agreement or disagreement.

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6a. Model has no major features which will impede an instructional designer from focusing on the learner’s needs.

Comments:

6b. As a designer, I do not consider the learner’s needs as a focal point during the design process.

Comments:

6c. As a designer I do not consider learning styles a focal point during my design process.

Comments:

**Please Continue to Next Page**
**Question 7a**: Round 1 asked which of the identified learner characteristics, Culture, Age, Learning Style, and Prior Knowledge were considered important to the design process. Analysis produced agreement with *Learning styles and Prior knowledge* as the most important of the elements selected. A third group of respondents stated that *all identified elements* were important.

**Question 7b**: Round 1 asked which of the identified learner characteristics, Culture, Age, Learning Style, and Prior Knowledge were considered not important to the design process. Analysis produced a split agreement that *Age was not important* but also *all elements are important*.

Please reflect upon your experience as an instructional designer and mark the box which represents your level of agreement or disagreement.

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<td>7a. I believe the <em>Learning Styles</em> element is important to this model’s design process.</td>
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<td>7b. I believe the <em>Prior Knowledge</em> element is important to this model’s design process.</td>
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<td>7c. I believe the <em>Culture</em> element is important to this model’s design process.</td>
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<td>7d. I believe <em>Age</em> should NOT be included in the design process.</td>
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Question 8: Round 1 asked as an instructional designer, do you believe there is a need for a model that has a main focus on the learner’s needs through the design process? Analysis of responses produced consensus resulting in no additional data required.

Please Remember—we may need a third and final round if consensus is not achieved. You must complete all three rounds (if required) to receive payment.

Please complete the following:
Name:
(written on the check)
Mailing address:

End of Round Two Survey

Thank You for your help!
**APPENDIX D. MODIFIED DELPHI STUDY QUESTIONNAIRE: ROUND 3**

Directions: Please mark an “X” in the box that best represents your professional views for each question. You may add comments after each question.

**Question 1:** Round 2 asked additional questions about what design features of this model that would be *of value to you* in your present position. Analysis of Round 2 responses found consensus in all sub-questions except the one listed below. Question has been re-written to assist in further clarification.

Please reflect upon your experience as an instructional designer and mark the box which represents your level of agreement or disagreement.

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**Round 2 Question:**
Model’s circular design makes the model useful in teaching other instructional designers the design process.

55.56% 27.78% 16.67%

**Round 3 Question:**
If I was to developing an *Instructional Design Process* unit to train other instructional designers I would select a *CIRCULAR* design model.

Comments:

Please Continue to Next Page
**Question 2:** Round 1 asked what design features of this model would you find **problematic or a hindrance** to your instructional design process? Analysis of Round 2 responses found consensus in all sub-questions except the one listed below. Questions have been re-written to assist in further clarification. Please reflect upon your experience as an instructional designer and mark the box which represents your level of agreement or disagreement.

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**Round 2 Question:**
*This circular model needs an identified starting point.*

50.00% 5.56% 44.44%

**Round 3 Question:**
2a.
*The starting point for this model should be the center – “the Learner”.*

Comments:

**Round 2 Question:**
*This circular model needs an identified stopping point.*

27.78% 5.56% 66.67%

**Round 3 Question:**
2b.
*As a designer, I believe the design process is a continual developmental process without a static end point.*

Comments: Teaching improves with change. I get nervous if I don’t change things at least once in a while. Change means development.

**Round 2 Question:**
*This model should *not* include AGE as part of learner’s characteristics.*

33.33% 33.33% 33.33%

**Round 3 Question:**
2c.
*I do **NOT** consider the learner’s age during my design process.*
### Round 2 Question:
*This model should add *Experience* to the Learner’s characteristics.*

66.67%  11.11%  22.22%

### Round 3 Question:
2d.
I **DO** consider the learner’s *experience* during my design process.

Please Continue to Next Page
**Question 4:** Round 1 asked what design features make the model *non-effective* as an instructional design model. Analysis of Round 2 responses found consensus in all sub-questions except the one listed below. Questions have been re-written to assist in further clarification.
Please reflect upon your experience as an instructional designer and mark the box which represents your level of agreement or disagreement.

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<td><strong>Round 2 Question:</strong></td>
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<td>Model should not define the learner’s needs but should be left to the designer to identify and select as required.</td>
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<td>4a. Model has identified the most important learner’s needs.</td>
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<td>4b. <em>If I choose to use this model.....</em> I would adjust the learner’s needs of this model to fit my instructional design objectives.</td>
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<td>Comments: Teachers have a better idea what learners need to learn than the learners do, generally. That’s why teachers are teachers.</td>
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**Question 7b**: Round 1 asked which of the identified learner characteristics, Culture, Age, Learning Style, and Prior Knowledge were considered not important to the design process. Analysis produced a split agreement that *Age was not important* but also *all elements are important*.

Analysis of Round 2 responses found consensus in all sub-questions except the one listed below. However, **No additional response is required** as data comparison shows strong correlation between *Round 2 question 2e responses* and *Round 2 question 7d responses*. Round 3 question 2c responses will be used to bring the required clarification to this sub-question.

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**7d. I believe Age should NOT be included in the design process.**

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This question is addressed above in question 2c. **No response required!**

Please Continue to Next Page
End of Delphi Study
Thank You for your help!

I will be in transit from Singapore to the US on 19 Dec. I hope to mail your payment by 21 Dec if your responses are returned. I will email you once I send the check.
I cannot express how much your support has helped me in completing this study. I am very grateful for your time and professional responses.

God Bless and Seasons Greetings!