Measuring Transactional Distance in Online Courses:

The Structure Component

by

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Online or web-based courses have become prolific in our educational environment over the past several years. The development of these courses can be guided by systematic design models to ensure quality instructional design. Transactional distance, the theory that claims the distance an online student feels is more of a pedagogical distance than a geographic one, consists of three factors: structure, dialogue, and learner autonomy. Accurate measurement of these three factors is needed in order to substantiate its claims and to best determine the delivery implications. This study produced an instrument that measures the structure component of the transactional distance theory as it pertains to the online environment. A total of 20 online courses were evaluated using the Structure Component Evaluation Tool (SCET). Experts in the field validated the instrument and reliability was determined by calculating Cronbach’s alpha as well as examining inter-rater reliability. The SCET also excelled in a comparison to other instruments in the field in terms of its ability to produce rich, valid information about the structure of online courses.
CHAPTER ONE
INTRODUCTION

The demand for online learning has become inescapable (Wagner 2001). This demand has been spurred due to teacher shortages, the need to attract new students to higher education, and an increasing demand placed on employees by their employers to remain competitive by continuously updating required workplace skills. This alone has spawned a great demand for an increase in online course offerings in many colleges and universities. The potential to create, develop, and offer opportunities to meet these demands and to establish lifelong learners is present now more than it ever has been before with the advent and the continual advancements in technology. As a result, to expedite the development of online courses, many designers and professors are putting their traditional classes online, by uploading all of their class notes, creating an enormous amount of “shovel-ware” (i.e. simply uploading all lecture notes void of instructional design principles). Very real learning issues that exist in a traditional classroom are consequently being transferred to the virtual classroom, issues such as how the course is structured (i.e. the structure variable), the communication that occurs throughout the duration of a course between instructors and students as well as communication amongst students themselves (i.e. the dialogue variable), and individual characteristics that each learner brings to the classroom (i.e. the learner autonomy variable). The extent that these inclusive variables are in opposition or not balanced, regardless of the delivery medium, theoretically can affect learners in many ways possibly leading to
lifelong impairment of learning potentials or desires thus jeopardizing the very
goal that was initially sought.

Imbalances can occur when the structure and dialogue variables of a
course are low, when the dialogue and autonomy variables are low, when the
structure and autonomy variables are low, and when the autonomy and structure
variables are low. (Notice that three out of four of the above dichotomies include
the structure variable.) Transactional distance is a construct that addresses all of
these variables thus it permeates every educational program as well as
addresses each one of these issues. Hence, distance is not determined by
geography but by the way in which instructors, learners, and the composition of
the learning environment interact with one another. Being able to individually
measure each facet of the transactional distance construct is paramount to
research efforts so as to provide practitioners with the ability to assess their
designed instruction for organization and learning delivery.

Statement of the Problem

Life long learning is becoming the norm not to mention the expectation in
industry. In order to provide this continual learning web delivery mediums are
being heavily tapped. To develop a population of competent learners within the
online environment, educational researchers need to examine issues that affect
the learner’s ability to adapt to the online learning environment. By so doing,
learning barriers can be broken within this medium of learning thus, benefiting
the student and decreasing the frustration level of instructors.
Knowing best practices to use when structuring an online learning environment are imperative to the flow and understanding of the course as well as being imperative to fostering the success of the learners in this environment. Instructor and student frustration can be greatly minimized if the course structure communicates efficiently to the learners. How an instructor designs or lays out their course to present the content is critical to the student since the design or layout of information can influence how students learn the material (NC State University, 1998.) It is good practice to clearly tell the student why an activity is included, how much time they should spend on the activity, and in what format to submit a response (Bernard, 2003.) To date, there has been no means of quantitatively measuring the structure of an online course. Moore, in his theory of transactional distance, has identified course structure as a variable that can influence the student’s perception of distance when participating in an online course (Moore & Kearsley, 1996).

Purpose of the Study

The purpose of this study is to design and develop an instrument that can be utilized to measure the structure of an online course. This instrument is intended to be used for assessing the structure component of an online course by instructional designers and researchers both in and out of the field of instructional design. The proposed study contains objectives for developing a creative approach to measuring the structure component of transactional distance found in online courses. By so doing, I anticipate that by further
investigating into the nature of transactional distance and examining the possible factors that contribute to high and low transactional distance will assist in guiding future research and development efforts of all modes of courses as well as illuminate the construct itself.

Research Questions

Three research questions have been developed in conjunction with this study. These research questions are:

1. What specific components of an online course define the structure variable of the online course?
2. What is the content-related evidence that the designed measurement is a valid measure of the structure variable?
3. What is the estimated reliability of the designed measurement?

The process by which these three research questions will be answered involves examining the course design process to extract the parts of the process that directly affect the structure of a course.

Content-related evidence of the Structure Component Evaluation Tool (known as the SCET throughout the remainder of the dissertation) will be considered throughout the development process. Categories and sub-categories (listed below) were created, based on experience and search of the literature, to guide the development of the item specifications. The specific areas and sub areas that are being examined and included in the instrument to define course structure are:
1. Content
   a. Overall
   b. Syllabus
   c. Sequencing
   d. Course Schedule
2. Context
   a. Overall
   b. Consistency
   c. Flexibility
3. Interactions
   a. Student to Instructor
   b. Student to Student
   c. Student to Interface

Item review and revision will be conducted as needed following the item writing. Four subject matter experts, the researcher and three others, will review written items. Recommendations will be taken for the development of new items, modifications of current items, and modification of current categories.

The instrument was pilot tested by myself and a colleague or doctoral student. I used it to evaluate the structure of two online courses. Necessary changes were made and the final draft will be sent to the subject matter experts for their review.
Definitions

**Transactional distance** – the universe of teacher-learner relationships that exist when learners and instructors are separated by space and/or time (Moore, 1993).

**Theory of Transactional Distance** – hypothesizes that distance is a pedagogical, not geographical distance. It is a distance of understandings and perceptions that can lead to a communication gap or a psychological space of potential misunderstandings between people (Moore, 1996).

**Structure component** – a variable of the transactional distance theory that refers to how the instructional program is designed.

**Dialogue component** – a variable of the transactional distance theory that refers to the communicative transaction between and among students and teachers.

**Learner autonomy** – a variable of the transactional distance theory that refers to the characteristic of self-direction.

**Discriminant Validity** – showing that two or more measures are not related, or that relationships between measures from different constructs are low.

**Construct Validity** – an assessment of how well theories or ideas translate into actual programs or measures.

**Content Validity** - extent to which a measure assesses all the important aspects of a phenomenon that it claims to measure.

**Learning Management System** – a means of managing learners and course content that provides the ability to keep track of a learner’s progress as well as managing content or learning objects that are served up to the right learner at the right time.
Learner-Learner Transactional Distance - refers to the psychological distance that learners perceive while interacting with other learners

Learner-Interface Transactional Distance - refers to the degree of user friendliness/difficulty that learners perceive when they use the delivery systems

Learner-Instructor Transactional Distance – refers to the psychological distance of understandings and communication that learners perceive as they interact with their teacher

Learner-Content Transactional Distance - refers to the distance of understandings that learners perceive as they study the course materials and the degree that the materials meet their learning needs and expectations to the course.

ADDIE – is an acronym that refers to a generic model of the five phases of instructional systems design: Analysis, Design, Development, Implementation, and Evaluation.

Structurally Sound Course – Course is developed in conjunction with instructional designers or an instructional design team, and has run ‘live’ for at least one semester so that ‘first-time’ errors/bugs have been found and fixed.

Delimitations
The intended use of the instrument is by researchers in the field of educational/instructional technology and instructional designers. The validity of the instrument that will be developed should not be generalized for use to a population who does not fit within these parameters.
Limitations

The sampling of courses to be rated as to their structure is purposeful, which may limit generalizability of results.

The integrity of the instrument is dependent upon the experts who are evaluating it, so consistency in experts, from course to course, is preferred.

The sample of courses used during instrument development is localized within a single geographic region. This may raise issues in sampling of culturally diverse course content facilitated by instructors of diverse cultures. Therefore, a possible limitation to the analysis of structural components is whether or not there exists a difference in the structural elements of transactional distance due to the culture of the instructor (subject matter expert) or designer.
CHAPTER TWO
REVIEW OF THE LITERATURE

Introduction

A review of the literature was conducted to investigate previous research concerning transactional distance. The search was expanded to include any research regarding the structure component of the transactional distance theory. This chapter is divided into several sections: a brief history of the theory, the course design process, the course design process and structure, the importance of structure in course design, the instructional elements of an online course, the need for an instrument to measure structure of online courses, and the categories/sub-categories used in the development of the instrument for measuring course structure.

Transactional Distance Theory

The theory of transactional distance was developed by Michael Grahame Moore from the concept of transaction derived from John Dewey and developed by Boyd & Apps. Boyd & Apps described the construct as the interplay among the environment, the individuals, and the patterns of behaviors in a situation between people (Boyd & Apps, 1980). Moore expanded the theory by proposing that distance education is the transaction. He further states that distance education is the “interplay between people who are teachers and learners, in environments that have the special characteristic of being separate from one
another, and a consequent set of special teaching and learning behaviors exist” (Moore & Kearsley, 1996).

The theory of transactional distance seeks to isolate the elements of educational transactions that can critically influence learners in a distance education environment. Transactional distance exists in all educational events, even those in which learners and teachers meet face-to-face in the same learning environment (Rumble, 1986). Therefore, distance is not defined by geography but by the methods of interactions between instructors, learners, and the learning environment and the extent to which they interact with one another. The degree of distance felt by a student is dependent on the level of autonomy present within the learner. For example, those learners with a high level of autonomy are emotionally independent of an instructor and have a self-concept of being self-directed whereas learners with low levels of autonomy tend to depend on the instructor for guidance through course structure, communication, and tend to exhibit more dependency throughout the learning process (Muller, 2003).

Moore has agreed that much of what we already know regarding learning and teaching can be applied to an online environment. One issue he noted is the fact that if the distance between instructor and student and student and student is great then traditional expository teaching can be transformed significantly and alternative methods of teaching are needed (Kanuka, Collett & Caswell, 2002.) Moore’s theory hypothesizes that distance is a pedagogical, not geographic phenomenon. That it is a distance of understandings and perceptions that may
possibly lead to a communication gap or a psychological space of potential misunderstandings between people (Chen, 2001). Additionally, Moore suggested that this distance had to be overcome in order for effective, deliberate, planned learning to occur. The variables that Moore uses to define his theory are: dialogue and structure (as two critically underlying variables) and learner autonomy (the previous two variables are in relationship to this one.) (Moore & Kearsley, 1996). The dialogue and structure variable encompass the instructional dimension. Dialogue, for purposes of this study, is the interaction between instructor and student as well as interaction amongst the students themselves. The structure dimension represents the manner in which the course is designed and the way in which the content and constructs of the course are taught. It can and does include how and when communication (dialogue) takes place. For example, in a course syllabus the instructor might outline the manner and the timeframe in which he will respond to email, discussion postings, etc. Structure expresses the rigidity or flexibility of the program or educational objectives, teaching strategies, and evaluation methods (Moore, 1996). Structure also refers to the organization and delivery of learning events and activities in a distance education environment (Kearsley & Lynch, 1996.) Learner autonomy is the extent to which in the teaching/learning process that the learner, not the instructor, determines the goals, the learning experiences, and evaluative decisions. There exists relationships between structure and dialogue and structure and learner autonomy. None of the variables surrounding the theory are mutually exclusive. This does not mean that each variable cannot be measured independently. On
the contrary, to gain a complete understanding of the relationships of the variables of transactional distance each one must be defined independently. Valid and reliable measurement techniques must be established for each variable in order to communicate the magnitude of the variable thus allowing for their effects and inferences about their relationships to be studied. According to Moore’s theory, learning environments that are rich with directions and guidance combined both with course design and dialogue, are said to have a low level of transactional distance. In contrast, when learners are left to their own devices, making their own decisions about strategy and have minimal dialogue the level of transactional distance is said to be high. However, the above scenarios are dependent on the level of autonomy of the learner. For example, students with advanced competence as an autonomous learner tend to be quite comfortable with less dialogic programs with little structure, whereas, more dependent learners prefer programs with more dialogue and varying degrees of structure that are dependent on the closeness of the relationship that the student has with the instructor. The closer the relationship with the instructor the less structure a student desires (Muller, 2003). Many online distance education courses contain a high level of transactional distance and alternative teaching strategies are needed to lessen the level of transactional distance. Properly utilizing tools available in the particular educational environment can potentially enhance the learning experiences.

A factor analysis study conducted at the Helsinki Virtual Open University (HEVI) and the Apaja Internet Service from 1995-99 reported disadvantages of
learning in a virtual environment. The factor solution for disadvantages of learning in a virtual university reported a ‘lack of interaction with other students’ as the highest loading factor. Other detrimental factors were: difficulties in communication, lack of personal guidance (possibly speaking to the structure component of the transactional distance theory), and difficulties with the environment as a whole. Horn (1994) and Hirumi and Bermudez (1996) are researchers that have found that providing proper instructional design, distance courses can be more interactive than traditional courses and provide more personal and timely feedback to meet students’ needs than is possible in large, face-to-face courses. Additionally, research has shown that both students and faculty have added responsibilities in a distance environment. Faculty have the task of altering course design and teaching strategies to realize benefits of technology and assure maximum interaction. However, students must assume more responsibility for their learning by taking the initiative for requesting clarification and feedback when it is needed (Malone et al., 1997.)

The Course Design Process

In order to determine the components of the structure variable needed in a course, attention turns to the process of instructional course design. There are many ISD (instructional systems design) models, but almost all are based on the generic “ADDIE” model, which stands for Analysis, Design, Development, Implementation, and Evaluation. Each step has an outcome that feeds the subsequent step. When discussing instructional design one must refer to the
wisdom of Dick and Carey. They state that instruction is a systematic process in which every component is critical to the learner’s success (Dick & Carey, 1996). Just as the variables of the transactional distance theory are interrelated, so is the design process. This approach consists of a set of interrelated parts that are all working together towards a goal. The purpose of the instructional system is for learning to occur. The components of the system are the student, the instructor, the content, (or course materials), and the environment (Dick & Carey, 1996). These components are present in some form or capacity in any learning environment. In the online learning environment, the instructor and student are often separated geographically, but due to technology the separation need not creep towards the pedagogical elements of the environment. Not only are there asynchronous methods of instructing online but synchronous opportunities that allow students to view their instructor and their instructor view them via a web cam, as well as providing the ability to hear voice tones through voice over IP, are becoming a realistic and prevalent means of instruction online as high speed broadband connections become a reality and the norm for many students.

When beginning the design process, Dick and Carey (1996) suggest that an analysis of the learning environment take place to determine “what is” and “what should be.” For the online environment, the “what is” encompasses a review of what tools are available to the facilitator for instruction. The “what should be” is equipment (hardware), software, and resources (both for the student and for the instructor) that adequately support the online environment. Designing a course that is friendly and usable by the target audience is part of
the process, but another equally important aspect of course design is for the course to be implemented as planned. For this to occur, the facilitator (instructor, professor, or teacher) must be a part of the design process. If facilitator support of the course is not present, than the student(s) has an added barrier associated with the potential for learning to occur. Hence, the reason facilitators must be included in the design process. Their “buy-in” to the structure of the course is imperative to how efficiently and effectively the course functions and directly affects the success of the course and the subsequent success of the learners.

Another process that obviously bears mentioning is Gagne’s nine events of instruction; according to Robert Gagne, there are nine events that activate processes needed for effective learning (Gagne, 1985.) Gagne believes all lessons should include this sequence of events: gain a learner’s attention, inform the learner of the objectives in the lesson, stimulate recall of prior learning, present the stimulus material, provide guidance to the learner, elicit the learner’s performance, provide feedback to the learner, assess the learner’s performance, and enhance retention and transfer. Every one of these events plays an important role in the design of online courses. In order to present the material and provide guidance to the learner in a productive manner, aspects of the course structure need to be considered. If a student does not comprehend the layout (structure) of the course they will not know how to access the stimulus material. If the facilitator or designer does not provide necessary guidance to each learner through appropriate dialogue, the learner’s performance, retention, and transfer will potentially be less.
The Course Design Process and Structure

Within the context of course design, structure can refer to two distinct but related aspects (Scott, 2003). A distinction that has been familiar to educators from the time of Aristotle onwards, the distinction of “knowing why” (theoretical, conceptual knowledge) and “knowing how” (practical, performance knowledge.)

The definition of structure can apply to the layout of a course: how material is divided into segments such as units or modules, how course tools are made accessible (i.e. in a course menu bar or on an organizer page), basically how you organize the layout of all content, resources, and tools. Many of these decisions can be and are dictated by a computer-based authoring system that provides shells in which an instructor can layout their course. These shells serve somewhat as a template. Initially, these management systems did not allow for much flexibility so course design and structure were somewhat prescribed. However, the learning management systems are becoming much more sophisticated and are providing greater flexibility for course design by allowing for individual customization for students via parameters such as selective release. This particular tool allows the instructor to set boundaries for individual students that grant access to course materials upon successful completion of previous assignments, assessments, or readings.

Another definition of structure can refer to the conceptual framework that ensures that the course is a coherent whole. This structure determines how the content may be ordered and organized for instructional purposes. Included in this organization are factors such as the following: does the student easily navigate
the course within a particular concept, and are their logical relationships between key concepts and activities?

Another dimension of course structure refers to the extent of rigidity or flexibility in the course organization and delivery. This dimension is present in both the layout of the course and the conceptual framework and addresses issues such as: Can students move ahead in a course? Is selective release of materials used in the design of the course so that a student must perform a particular function or assignment successfully before being able to proceed? Do students have the ability to organize chats amongst their own group members or classmates without soliciting the assistance of the instructor? How are course tools accessed, only one way? Huang (2002) concluded in his study that online courses can provide good organization with regards to objectives, assignments, and grades, but can also deliver course content in a flexible manner for learners to access and learn at their own pace. To provide for future studies, it is important that the instrument designed as part of this study be able to measure the rigidity/flexibility of the online course as well.

When thinking about the course design process and structure, one can refer to numerous cognitive theories; however, since the Structural Learning Theory’s greatest strength is its ability to guide designers/instructors in the selection of content and sequencing requirements so as to provide only the particular instruction needed by the learner (course structure), I have chosen to highlight this theory to include in the discussion of structure (Scandura & Stevens, 1987.)
The Structural Learning Theory (SLT) derived by Joseph M. Scandura (Scandura & Stevens, 1987) is a theory, derived from one of Scandura’s earlier cognitive theories of learning, that focuses on deciding what to teach. In this theory, all knowledge is represented by rules. These structural learning rules include both declarative and procedural forms of representation (Scandura & Stevens, 1987.) Each rule contains three components: domain, range, and operation. According to Scandura, the domain component is made up of internal cognitive structures that correspond to the total of all relevant environmental learning elements of a learning situation. In other words, the domain is the content upon which a learner operates to produce the results that are specified in the objectives (Scandura & Stevens, 1987.) If there has been error when developing the domain component (structuring the content) and it fails to function as intended (usability issues) due to this conceptual error, then learner operations will be deficient. If a student cannot follow a particular layout of a course (usability) and cannot determine which action to take next when participating in an online course (a procedural form), there has been a breakdown somewhere within the domain element. Hence, the structure component found in a distance learning environment has not been cultivated so learner success can be in jeopardy. When participating in an online environment, students must travel through various navigational paths defined within the course structure. If a learner cannot follow a particular path because the structure of the course is poor in either content or layout, again, the student’s success is at risk.
With the advent of the newer learning management systems, courses with customized lessons are a reality.

*Importance of Structure in Course Design*

In 1990, the American Library Association Presidential Committee on Information Literacy endorsed the value of information literacy as a means of correcting "social and economic inequities" (Goetsch and Kaufman 1998). The report stated that people who are information literate are those people that have learned how to learn and they are prepared for lifelong learning because they can always gather information for any task or decision. The report continued to emphasize that informationally literate people master the learning construct because they know how knowledge is organized, how to find information, and how to use that information. As previously stated, the structure dimension in a course represents the manner in which the course is designed and the way in which the content, constructs, and information flow is communicated to the learner. The course structure should identify what information is needed and how the learner is to go about finding, using, and managing the information. By failing to structure an online course effectively, the course can potentially fail the learner to the extent in which it promotes attainment of information literate skills in addition to distancing the student from the entire online experience. In contrast, by structuring a course effectively, information competency can be encouraged and pedagogical distance minimized.
John Biggs (1999) wrote that “Learning is the result of the constructive activity of the student. Teaching is effective when it supports those activities appropriate to understanding the curriculum objectives.” According to this view, for the learner to achieve the stated outcomes two factors come into play. One is, the assessments or activities must allow the learner to demonstrate understanding and secondly, the learning process around which the course is built (course structure) must support the student’s approach to satisfying the course outcomes which also means that the student grasped the course objectives. To prevent a student from becoming a passive learner, it is important to make clear to the student the purpose of the activities included in the course. The student should be told why an activity is included, how much time should be spent on the activity, and what form of response is required. Aligning learning, teaching and assessment demands consistency (course structure) in producing course objectives, learning activities, and outcomes, and providing a teaching process to support the student(s) (Hall 2002.) Whitston (1998) stated that effective use of educational media depends upon curriculum design and the Chic (Courseware for History Implementation Consortium) project’s findings suggest that in order for the use of new media to be meaningful, it must be driven by curriculum design (Hall 2002.) Hall (2002) further states that the learner’s ability to make sense out of a learning experience depends upon the course structure, mediated through the instructor as facilitator.

A high degree of structure must be present in a distance education program (Kearsley & Lynch 1996.) Moore and Kearsley (1996) agree that many
important issues exist in distance education but those having to do with curriculum structure are the most fundamental. Curriculum structure is the component that distinguishes formal from informal learning experiences. Students can acquire information from various sources independent of an instructor by browsing the Internet or searching through books and journals in a library. However, by including a structure component to learning and organizing the information and the activities into a course offering a valuable educational experience is created. In a traditional classroom, structure is at least implicitly understood whereas in the online environment, it is much less clear due to the newness of the medium and the multiple ways in which it can be accomplished.

In the online environment, one of the more important design aspects is to set and communicate clear expectations to help students keep track of their learning. These expectations can be communicated by having the course and each unit’s objectives stated clearly for the students, specifying criteria that will allow students to assess their own proficiency, and clearly communicating assignments and schedules. Statement of the expectations will lay the groundwork for construction of a learning experience that explicitly links performance with the objectives and the criteria.

The advantage of online learning fails to exist when the structure of the course is inadequate. Speaking to the structure of the dialogue component in a course, the student must understand when, where, or how to communicate with their instructor or classmates to maintain a sense of belonging or community in the course. Should this communication mechanism become impaired because
confusion exists on how or when to communicate, the student must rely solely on the layout of the course to find answers to any questions. Without the structure boundaries of the communication tool, misconceptions cannot be shared in dialogues amongst learners and teachers. Formative feedback regarding their performance on learning activities and summative feedback on how well they are meeting the learning outcomes of the course is lost as well. In a nutshell, instructional design provides structure to the student's process of working through course material and directs students on how and where to access and receive assistance when needed.

Instructional Elements of an Online Course

To effectively design a course, the logical and conceptual structure of a course must be exposed (Scott, 2003). Organizing a course is a necessary task when developing online, but the most vital components in the course are the content and how the content is accessed or usability. How the course is designed or laid out to present this information (NC State University, 1998) as well as the content can both influence how and if the student learns the material. Ingram (2002) suggests that the structure of a course web site will affect the site’s usability. He further states that no information or activity can teach anything if students cannot find them or respond to them correctly. By examining the research on web site usability, we can begin to determine the instructional elements needed to structure online courses. Jakob Nielsen (1993) defines usability of any technological system as consisting of five major characteristics:
learnability, efficiency, memorability, error rates, and satisfaction. Learnability refers to the ease and speed with which beginners can learn the system. Efficiency refers to the ease and speed with which one can use the system after it has been learned. The memorability of a system is the ease with which one can return to the system after a period of time and still remember how to use it, and error rates refer to how often the learner makes mistakes with the system and how easily they recover from the mistake. Lastly, satisfaction is a subjective measure that quantifies whether users like using the system and if they believe that they were able to benefit from the system.

When designing an online course all five characteristics need to be considered. However, it is not likely that all can be met equally in all areas. Any design will involve compromises among the five goals. To design web usability for a course one should observe students performing representative tasks (Rubin, 1994.) Overall, a good instructional site should be easy to learn: a new student should be able to find their way around the site, figure out the structure of the site and the location of various types of information. The course should also be efficient for the experienced online learner. Memorability is not much of an issue in an online course site since students access the course regularly; the need for them to remember is reduced. However, should an institution develop online courses using a particular management system, it would help their students if certain tools (such as the discussion tool, the email tool, etc) were found to be consistent both in use and in location amongst courses the college offers, thereby increasing the course efficiency and making it easier for a student
to learn to navigate the course. By doing so, it may help to increase the satisfaction of the learner with the overall online experience at the institution especially if the learner enrolls in more than one online course. As far as errors go, maintaining a working site is of utmost importance when facilitating an online course. Frequently checking to make sure your links, programs, and scripts are in working order will help with student usability and will cut down on unnecessary frustrations. On the other side of error rates, it is important that the designer do their best to prevent a student from having to look or search blindly for any element of the course. For a student to have to do so speaks volumes about the structure component or lack thereof in the course. Course navigation in a course must be explained or obvious to the learner.

Specific components of usability should be present in a good instructional website. Simple step-by-step instructions provided with the course can aid in alleviating student anxiety related to the technology; Ingram (2002) states that information or activities cannot teach anything if students cannot find them or respond to them correctly. Components such as the site should be easy to learn: A new student in the course should be able to find their way around the site and figure out the structure of the site as well as locations of various types of information without difficulty. Next, the site should be efficient for the experienced students: Quickly and easily students should be able to locate the information, activities, and tasks they require to be successful in the course. Finally, students should not be unnecessarily distracted by information they needed at the beginning of the course but no longer require (Ingram, 2002.)
Michigan Virtual University states that usability standards deal with function as it supports an optimal learning environment. These standards are: interface consistency, learner support, navigational effectiveness and efficiency, functionality of graphics and multimedia, and integration of communication (Distance Education Report, 2002.) Suggested elements found in the literature include but are not limited to: a homepage, intro page, or overview page, a syllabus, an area that identifies assignments, a quizzing or assessment page, course content/materials or note’s page, resource pages, and study guides. One research article defines the study guide as the student’s main reference to the course content, structure, and activities (Carr-Chellman & Duchastel, 2000.) No matter the name of the file (many instructors would call this the syllabus), according to Carr-Chellman and Duchastel (2002), the document must include the traditional elements of good instructional design, particularly a clear description of the instructional aims and learning objectives of the course. Additionally, the document should also include a list of learning resources (i.e. textbook chapters to read, associated articles to consult, supplementary readings, and a guide containing websites of interest), a list of assignments or projects along with due dates and assessment criteria, preferably linked to the learning objectives or outcomes. Also, pages that address frequently asked questions that specifies where a student can find out how to get help with a problem they encountered and an area specifically designed to assist students in navigating through the course can be invaluable. These online documents must provide a level of detail that is sufficient to allow the learner to proceed in the
course without substantial personal interaction or clarification from the instructor. Clear descriptions and directions are a must within this document. Jeris and Ann (2002) state that online syllabi serve as an advanced organizer of the content and processes that unfolds during an online course.

Key elements included in the Illinois Online Network Program (IONP) outline (2003) consist of content that has been converted to fit the online environment by organizing course content into modules with clear deadlines for all assigned work within the unit. This could take form as an online calendar or a course schedule. The outline further states that clear, achievable goals with learning objectives relevant to the learning needs of the students are sought while promoting maximum dialogue among the participants. The program suggests that instructors give clear and simple assignments, reduce lectures and compensate with open-ended remarks that elicit comments and encourage varying viewpoints, and provide a focus on application of knowledge to the real world while fostering critical thinking skills so as to promote an interchange of ideas among students and the facilitator. The final component reported by the IONP to produce a successful online program is technical support. They state that the technology used to deliver instruction must accommodate the lowest common denominator in the class. Minimum requirements are necessary to participate but not the latest and greatest system that is on the market at the time. Experiential findings using web technology in another study showed that web support personnel should be consulted regarding any material distributed to
students. Students should also be given information on how and where to contact web support personnel (McAlpine, Lockerbie, Ramsay, & Beaman, 2002.)

Instrument Need

The availability of current literature investigating the measurement of transactional distance is minimal with access to an instrument that focuses on measuring only the structure component non-existent. The studies that are available have measured only pieces of the construct, such as the interactive component, or have limited the measurement to a particular form of a course (i.e. interactive television) thus, hampering external validity of the study. Most instrumentation used in these studies has identified limitations.

Bischoff (1996) conducted an exploratory study that examined the effect of transactional distance on the education of health professionals in an interactive television learning environment. Student volunteers (n=221) in thirteen public health and nursing graduate courses at the University of Hawaii at Manoa responded to a 68-item investigator-developed questionnaire (on a 5 point Lickert scale) regarding elements of dialogue, structure, and transactional distance in their courses. Principal components and internal consistency reliability analyses verified the presence of three factors: structure, dialogue, and transactional distance. Internal consistency reliability was assessed using Cronbach’s alpha to test instrument reliability. Content validity was obtained through consultation with experts in the field of education and with those familiar with interactive television as an instructional delivery medium. The purpose of this research study was to fill
gaps between theory and practice by gathering empirical data about the variables of the transactional distance theory by comparing these elements in two learning environments: a distance format (two-way interactive television) and a traditional formal (face to face). This study included the dialogue and structure component of transactional distance and stated that no one instrument or methodology has been established for measuring transactional distance and its individual components. The omission of the student autonomy component (a known variable) in the measurement of transactional distance prompted many unanswered questions as to the effect of the components that were studied and their relative effect(s) on the transactional distance of the courses since that distance is very much a function of the expectations that a student has upon entering into the learning process and those expectations emanate from the learner’s internal skills they have developed from previous learning and life experiences.

Saba and Shearer (1994) conducted a study that explored the idea of transactional distance using a system dynamics model. Their instrument was adapted from a classroom interaction analysis and was limited to the desktop videoconferencing context where single individuals interacted with the instructor. Excluded measures of transactional distance were a structure component, the learner autonomy component, and other forms of interactivity that would make up aspects of the dialogue component.

Chen’s (2001) study focuses on the interactivity component as well. This researcher proposed to measure the components of transactional distance using
an instrument with a five point Lickert scale that attempts to describe and analyze all situations facing a learner. It contained 23 items describing all the situations facing learners including all aspects of communication in the online environment as well as interaction with the learning materials and the delivery medium used. Using seventy-one learner’s experiences with the World Wide Web, Chen examined the postulate of Moore’s theory and identified the factors constituting transactional distance. Four types of interactions were evaluated: learner-learner, learner-interface, learner-instructor, and learner-content. Exploratory factorial analysis using a principal axis factor method was conducted and it was concluded that this concept represented multifaceted ideas. Transactional distance, perceived by learners, consisted of four factors: (dimensions) learner-learner transactional distance referred to the psychological distance that learners perceive while interacting with other learners, learner-interface transactional distance referred to the degree of user friendliness/difficulty that learners perceive when they use the delivery systems, learner-instructor transactional distance involves the psychological distance of understandings and communication that learners perceive as they interact with their teacher, and learner-content transactional distance referred to the distance of understandings that learners perceive as they study the course materials and the degree that the materials meet their learning needs and expectations to the course. (Chen, 2001). This study focused on all components of transactional distance perceived by the learner in the World Wide Web environment. A suggestion that was made
in the conclusion of the study was to fully address transactional distance; additional items that lie within the factors must be identified.

Ingram’s (2002) study focused on the usability of two different course organizations (content organization vs. assignment organization.) Ten subjects were tested with each course organization. All information was available on each site; only the organization varied. The test subjects first responded to a short questionnaire on their prior knowledge and experience using the Internet and the Web and their knowledge of the subject matter of the course. There were 11 tasks all of which were things that would likely be required that a student be able to do in a course itself. The subjects then were asked to complete a second questionnaire to assess their satisfaction with using the system. The results suggested that instructional websites should be designed from a student-centered and assignment-oriented point of view. Many times a design is approached with a bias towards the structure of the content itself; whereas students attend a course wanting to find out what they have to do and how to do it. This study was task driven and did not account for any methods of instruction or address the learning process within the structure of the course. However, the study did highlight some useful information that could be incorporated into an instrument measuring the structure component.

Dr. Hsiu-Mei Huang (2002) from the National Institute of Technology in Taiwan conducted a study on student perceptions in an online mediated environment and found that interaction, course structure, and learner autonomy were correlated to each other because they had the same causal variable, the
interface or delivery system. He also found that learners must possess the necessary skills to peruse the learning environment before they can be successful. Because course structure has a causal variable of delivery method, my study will focus on measuring structure in the online environment only. The primary elements that frame the structure of an online course (i.e. syllabi, study guides, course format (any mandatory face-to-face meetings), etc., are included in the developed instrumentation. Huang’s study attempted to develop an attitude scale to measure student perceptions on online courses, explore any relationships between student perceptions and demographic or general variables (e.g. age, gender, online course experience, computer skills, etc;) and investigate the relationships between interface and interaction (Huang, 2002.) This study mainly employed correlational research design and conducted descriptive, correlational and multiple regressions statistics. His study had a small sample size of (n=31) collecting data over two quarters. Huang operationally defined structure as the extent of rigidity or flexibility in the course organization and delivery. As his study attempted to explore any possible relationships between interface and interaction course structure and learner autonomy dimensions, this study will attempt to narrow that focus to include only those dimensions that measure the structure component of an online course. Additionally, the section in his instrument that addresses course structure is geared for student’s response and contains only two categories, course organization and course delivery. Huang calls for future research to explore more variables (descriptors) for each dimension of transactional distance. The SCET
developed in this study will attempt to meet that request by designing an
instrument that will measure the structure component of transactional distance
and all of its various dimensions that can also be used as a guide for designers
and instructors in the creation of their online courses. It will contain three
categories of organization: content organization, delivery organization, and
course interactions organization.

The proposed study contains objectives for developing a creative
approach to measuring the structure component of transactional distance found
in online courses. A measurement of this type is needed to enable future
researchers in determining effects such as: increasing structure on a course with
low dialogue, increasing structure in a course that contains students with
characteristically low autonomy, decreasing structure and providing for greater
flexibility for students that have a profile of high autonomy, or analyzing whether
or not an increase in dialogue would compensate for a minimum amount of
structure in a course. By so doing, I anticipate that by further investigating into
the nature of transactional distance and examining the possible factors that
contribute to high and low transactional distance will assist in guiding future
research and development efforts of all modes of courses as well as illuminate
the construct itself.

Course Structure Categories and Sub-Categories

The following categories and sub-categories form the criteria that were
used to guide the development of items included in the instrument. The
categories were determined from examination of the ADDIE course design
process and Gagne’s nine events of instruction. The content organization
category was developed considering both the analysis and the design phases of
the ADDIE model as well as considering Gagne’s first five events of instruction.
The delivery organization category was developed considering the design,
development, and implementation phases of the ADDIE course design model
and Gagne’s events of gaining a learner’s attention, informing the learner,
presenting the stimulus material, providing feedback, and enhancing retention
and transfer (through the flexibility sub-category.) The course interactions
organization addresses the development, implementation, and evaluation phases
of the ADDIE model and addresses several components of Gagne’s events:
providing learner guidance, eliciting performance, providing feedback, and
assessing performance.

An explanation of what is contained within a category follows. From these
explanations, items were written to address each area of structure for the
purpose of measuring the structure component of online courses.

The overall sub-category that is found in the content and delivery
organization categories was used as a means to encompass the main, general
features of the particular category. It does not eliminate the need or the
importance of the other sub-categories contained therein.

Content Organization
This category’s components are created from the analysis and design
phase of the course design process where the target audience’s characteristics
are examined as well as determining how the course can meet the audience’s needs.

Overall.

When examining the overall content of an online course, the instructor should be cognizant that the content is written for the intended target audience. Additionally, all goals or objectives should focus on what students should learn from the course. Any necessary supplemental references or materials need to be clearly stated and easily retrieved from anywhere within the course. The course needs to also provide a general FAQ section that provides the students with general directions for operating within the framework of the course structure. Included in this section are items such as: how to submit an assignment, how to post and reply to a discussion posting, how to send emails to classmates and to the instructor, and also course specific questions can be answered in this area such as: How do I install the supplemental software needed for this course? Or how do I view and interact with the multimedia contained within the course?

Syllabus.

The syllabus found in an online course should be focused on what your students will learn rather than what materials you will cover. In so doing, your focus when designing the syllabus will be directed appropriately so as to maximize your students learning in the course (Bragg, 1998.) By focusing on student learning, issues such as consistency among your course rationale, course content, objectives, student activities, and assessment will be taken into consideration. The syllabus page should detail subject areas to be covered,
required projects or assignments, tests, readings, college policies, accommodations, grading policies, etc.

**Sequencing.**

Sequencing refers to the manner that the material is presented. Within each unit or module, the material should be presented in a logical order that transcends throughout each module. Each unit or module should be all inclusive in that the student will be able to access content information and will know what the expectations for the particular unit are and how to meet those expectations. The sequencing should be consistent within the course across each unit of instruction.

**Course Schedule.**

The purpose of the course schedule is to provide to the student one page that can be printed that outlines the deliverables for the entire semester that the course is running. Additionally, the course schedule should contain due dates along with directions on where to submit assignments and readings required to prepare the student to complete the assignment. By providing such specifics in one general area, the instructor need only update this one page from semester to semester as far as dates and possibly page numbers are concerned. Its function is similar to the course calendar that is provided in many learning management systems however, by providing one single page with all of this information, the student can print it and have it handy for quick review at any time as opposed to scrolling through an online calendar.
Delivery Organization

Overall.

The overall context of an online course speaks to the course’s ease of use. The homepage of the course needs to be clear and simple, uncluttered. The initial layout page should provide the student with access to all tools needed while participating in the course as well as intuitiveness as to where the student might go to find anything that is needed. The navigation layout of the course should communicate to the student where they are within the course and where they need to go next.

Consistency.

The usability of the course’s navigation must remain consistent throughout the course. As the student moves from page to page inside of a course, a navigation scheme such as a course menu bar should be visible at all times allowing the student to travel back or forward to certain areas in a non-linear fashion. By providing this consistency within the course it prevents the student from becoming lost and allows them to return to areas for additional directions or just a refresher on how to do something.

Flexibility.

Flexibility refers to the extent that the learner has control over their learning environment and experience. If the course provides a good amount of flexibility, the student can skip pages, return to a previously viewed page, or move ahead if the material is easy for a student. The extent that a course is
flexible speaks to how well the course can adapt to the learner or whether or not a student can proceed at their own pace. Additionally, any multimedia components included within a course should allow the student to control the play, rewind, stop, and pause functions so that they can maximize their viewing/listening experience.

Course Interactions Organization
Student to Instructor.
By addressing the structure of the student to instructor we can determine how well these interactions have been structured within a course, if at all. This communication is necessary in that it directly affects the student’s expectations. There are many times that these types of interactions will not be structured or will be unplanned. However, there are components about these unplanned interactions that speak to the structure component and need to be addressed. For example, is it stated by the instructor in the course how they will respond to an email, or a discussion posting? The instructor should communicate to the student how long before they can expect a response from the instructor to an email or to a class discussion post. Some instructors may prefer to just monitor the discussion areas and leave the postings mainly to the students with an occasional comment to keep the discussion in line or on track. If this is the case, the instructor needs to communicate this policy up front to their students. Also, can students phone the instructor, if so, are there any time constraints? Is the instructor available for a face to face meeting if the student is in the local area?
**Student to Student.**

This area should address how students are expected to communicate with each other. Does the course have group assignments? If so, how will the students communicate with group members? Also included in this area should be guidelines for student’s to follow that address appropriate online communication behaviors. Also, any other guidelines regarding student to student interactions should be identified such as if there is a meeting offline or by phone, a transcript should be provided to the group so that those who could not attend are informed. Additionally, an instructor might want to request copies of all such transcripts as well.

**Student to Interface.**

This area addresses the usability aspects of the course. Can the student find the needed information or activities to participate effectively in the course? When the student first enters into the virtual classroom, do they know where to begin without having to send an email to the instructor for clarification? Once a student understands the tasks that need to be done, can they interact with the environment to accomplish those tasks (i.e. submit assignments, download materials, take online quizzes, etc)?
Chapter Summary

Communication possibilities and opportunities to offer online programs are now easy realities, globally as well as locally. Asynchronous text-based Internet communication tools and course content management systems are rapidly becoming the technologies of choice. They can better support interpersonal interaction and sustain two-way communications as well as providing a means to organize and present course materials. They have other advantages such as not being time or place bound and they are more cost-effective than other communication tools that are available (Kanuka, Collett & Caswell, 2002.) As with any new tool available to educators unique instructional issues invariably follow their introduction. Research is needed in this area to better understand the existing issues, how the issues impact the learning environment, and what can be done to improve educational practices. Further investigation into the nature of transactional distance and the factors that contribute to close and remote transactional distance are needed to further illuminate the construct and provide suggestions for more effective teaching and learning strategies as well as the need to refine existing instruments used to measure the components of transactional distance (Bischoff, 1996). Jung (2001) requests that studies be conducted that discuss what is already known about learning and teaching with different communication technologies as well as examining pedagogical features of web-based instruction in various teaching and learning contexts in the attempt to make firmer conclusions on pedagogical features. Also needed is more vigorous data on pedagogical features of web-based instruction in various
teaching and learning contexts to make strong conclusions on these pedagogical
features of web-based instruction (Jung, 2001). Specific questions that are
suggested include: Does the extent of rigidity or flexibility in the structure of a
web-based instruction course affect dialogue and transactional distance? Other
suggested questions for research encompass the effects of different types of
interaction on learning and satisfaction in web-based instruction and how it can
be designed to provide meaningful dialogue among participants through various
types of interactions (Jung, 2001). Additionally, it has been suggested that
successful distance education programs will tend to have a high level of structure
to produce effective learning, and programs that fail do so because they lack
sufficient structure (Kearsley & Lynch, 1996.)

All of the above questions will need an instrument that tenably measures
the structure component as it relates to transactional distance in order to
effectively conduct the research. Measuring the structure component of
transactional distance in a pure format (i.e. measuring the primary elements that
structure comprises) has yet to be challenged. In my proposed study, the primary
elements of structure that contribute to one of the variables which measure
transactional distance as defined by Michael Moore (i.e. structure, dialogue, and
learner autonomy) will be developed and studied for its ability to predict the
structure of a course as it relates to transactional distance. To the extent that
prediction of the structure component as it relates to transactional distance, using
the designed instrumentation, is shown to be tenable, this study will aid
designers and instructors in the future in an effort to create courses that possess
as low of a transactional distance as possible. By being able to measure the structure component of a course, possible design and teaching strategies can be realized in an effort to increase student achievement, thus possibly increasing student satisfaction, and minimizing drop-out rates in the online environment.
CHAPTER THREE
DEFINING THE STRUCTURE VARIABLE

This study sought to develop an instrument that measured the structure component as related to the transactional distance theory. The content of the instrument is defined by a survey framework designed to serve three main functions:

1. To measure the structure component of the transactional distance theory.
2. To support future research in the area of transactional distance.
3. To assist designers and instructors in developing online courses.

To date, there is no instrument that solely measures this variable of the theory in the online environment.

The development of the SCET followed a criterion-referenced design procedure. The defensibility of this instrument is dependent upon the content validity of the items included. Content validation involved establishing a relationship between each descriptor and instructional design practices as well as content expert’s review of each item and their placement within the instrument. Additionally, each item within a specific category should correlate highly with one another. In an attempt to ensure that the SCET measured a construct that is different from those measured by other instruments available in this area, discriminant validity analyses were conducted.
Specifically, the study addresses the following research questions:

1. What specific components of an online course define the structure variable of the online course?
2. What is the content-related evidence that the designed measurement is a valid measure of the structure variable?
3. What is the estimated reliability of the designed measurement?

The flowchart shown in Appendix E provides an overview of the procedure that was followed in order to answer these three research questions. Initially, I created items based on review of the research in instructional design of online courses and experience (four years working with faculty designing online courses) that was included as part of a survey to measure structure of online courses. Once the items were developed, I studied and reviewed them for possible grouping into categories. At this point, categories were formed that described each subset of items. Next, I enlisted the assistance of three subject matter experts in the field of instructional design for the online environment to sort descriptors into provided categories in order to ensure (Appendix G) accuracy of items and grouping and had them perform an item analysis on each descriptor. The item analysis for each item within each category was analyzed for its clarity, and its quality. (Quality addressed the descriptor’s ability to contribute to the definition of the proposed category.) This was done using a Semantic Differential scale where 0 is no clarity or no quality, 1 is minimal clarity or minimal quality, 2 is moderate clarity or moderate quality, and 3 is maximum clarity or maximum quality.
The sort produced three separate draft instruments, one from each expert. I analyzed each category of descriptors from the expert’s drafts for percent of agreement with my pre-defined instrument for each category analyzing both the main and the sub category placements. The goal was to obtain a minimum of 75% agreement with my pre-defined categories. Should 75% not have been obtained from the sorting exercise, the researcher would have utilized item analysis to assist in determining whether or not a descriptor was unclear creating a placement discrepancy or whether the item was of poor quality overall and needed to be eliminated. The mean for each item’s clarity and the mean for each item’s quality were compared to assist with this decision. If the mean for a particular descriptor was below 2 (moderately clear or of moderate quality) then the descriptor was reviewed for the possibility of revision or re-placement to another category. Once 75% agreement was achieved with the researcher’s draft the instrument was considered ready to use in the pilot study. Initial results showed that 88% or 44 out of the 50 items demonstrated some form of agreement with either the main or sub-category placement.

**Pilot Study**

A purposeful sample of four courses was examined by myself and an IT doctoral student to test the revised instrument. Courses used for the pilot study were online courses from an accredited higher educational institution. The sample for the pilot study consisted of two courses that were created with minimal assistance from an instructional designer (assumed to be less structurally sound), and two courses that were created with regular assistance of
an instructional designer or instructional design team (more structurally sound.)
All courses had run ‘live’ or been piloted for a minimum of one semester. This
was done so that most first time errors/bugs were found and fixed. The
researcher chose the courses to be used in the pilot study.

Field Study

Upon successful completion of the pilot study, the actual study consisted
of myself and two additional colleagues; one colleague is an IT doctoral student,
who evaluated 10 online courses each that were purposively sampled (5
structurally sound courses and 5 less structurally sound courses, further defined
below.) Once the data were collected, statistical analysis was conducted to
determine the correlation of each category of items along with the calculation of
Cronbach’s alpha to measure the survey’s internal consistency as it pertained to
each category. Additionally, inter-rater reliability was estimated. Discriminant
validity was conducted using the SCET as compared to parts of other
instruments in existence to show difference, and to show that current existing
instruments do not solely measure the structure component of transactional
distance.

Subject Matter Experts

Three subject matter experts were recruited to participate in the process of
survey development. In order to enhance validity, a stratified sampling strategy
was employed to secure a nationally–known expert on Transactional Distance, a
practicing faculty member who is experienced in the online environment, and a
distance learning administrator. See Appendix B for a sample of the email used
to solicit expert reviewers.

Qualifications.

Each subject matter expert had knowledge of the instructional systems
design process. The faculty expert teaches web-based and web-enhanced
courses in community health nursing. Her courses incorporate the use of
technology to facilitate student learning through web and library searches to
access scientific evidence for nursing practice. The distance learning
administrator brings extensive and practical expertise in computer-based
learning, instructional design and distance learning, and was one of the initiators
of Web-based education on the University of South Florida campus. She has
continued to support Web-based education on the campus since its inception ten
years ago. Her research interests involve distance education with a specialization
in online and synchronous learning. She is currently writing her dissertation on
Synchronous Online Learning and has presented at many national conferences
in the areas of teaching, technology and distance education. Her publications are
varied and include a book on Electronic Marketing as well as papers and
presentations on instructional technology and distance education. The
researcher has been affiliated at his University with the ISD-Training and
Development program since 1995. He served as the director for the Training
Systems Graduate Programs through 2001. Previously, he directed the Center
for Teaching and Technology at Georgetown University, where he also worked
as the Assistant Director for the Academic Computer Center. His chief research
interests are related to distance education and online learning. He is a prolific and widely published author of texts and journal articles on this topic. All experts are familiar with the use of content management systems such as BlackBoard, WebCT, Desire2Learn, or Angel, just to name a few, and have knowledge of how content management systems can be used to design and present courses.

Courses

Permission for use of 20 courses (10 structurally sound courses and 10 less structurally sound courses) was obtained. Courses obtained for use in the field study were online courses from an accredited College. An email (sample can be found in Appendix A) was sent to college administrators in order to secure use of the institution’s courses. The institution and all pertinent parties were informed that the use of the instrument required no human interaction and that the IRB at USF determined that I did not need to file with them (A copy of their email response is included in Appendix F.)

The 20 courses purposively selected for measuring the structure component were of two types. Ten courses were considered structurally sound and 10 were considered less structurally sound. By structurally sound I mean developed in conjunction with instructional designers or a design team, and run or piloted, for at least one semester/quarter. All courses were offered by an accredited higher education institution. Courses were offered via a learning management system. There were no course used in this study that were offered via an html/web format however; the instrument was designed to accommodate this form of delivery as well. Permission for evaluation was obtained from the
institution. See Appendix A for a sample of the email that was sent out to appropriate parties in order to gain approval for use of the institution’s online courses in the study.
Procedure

Survey Instrument development

A review of the literature and existing instruments were used in this study to assist in the writing of the items.

Instrument Review

After searching the literature for instruments that measured any part of transactional distance, a total of four instruments were found and reviewed. Any pertinent information that assisted in highlighting aspects of the structure component of Moore's theory was identified and extracted for use in this study. None of the instruments described below provide a full compilation of measures needed for evaluation of the structure component as it relates to transactional distance in an online environment.

Bischoff (1996)

The instrument designed by Bischoff (1996) includes minimal measures of the structure variable and was designed for student response. This study was designed for comparison of traditional instruction to the interactive television learning environment therefore the external validity for measuring online courses is compromised. In contrast, the SCET will measure solely the structure component of online courses.

Seven questions were identified to be used in evaluating discriminant validity. Many of the questions chosen are worded for student response. For my purposes, I will use the questions from the viewpoint of the researcher evaluating each item for presence. They are listed in Appendix K.
Chen (2001).

This study focused primarily on the interactivity variable as it relates to transactional distance by examining the postulate of Moore’s theory. The study identified the dimensions constituting transactional distance and concluded that the concept represented multi-faceted ideas. Upon writing to Yau-Jane Chen for a copy of her instrument, she sent me the survey she used of learning experiences in videoconferences (PictureTel.) She stated that the instrument used in the article that I read is in Chinese and she did not have a translation and felt that the survey she sent would suffice. Therefore, the obtained instrument measures an interaction, a level of flexibility, an autonomy variable, and student perception as to the transactional distance students felt as it pertains to the interactivity variable.

One area from Chen’s instrument was used in evaluating discriminant validity. Seven questions were used from the part of the instrument measuring course flexibility. Because this instrument was designed for a videoconference class, many questions were not applicable. The questions are included in Appendix J.

Huang (2002).

Huang’s study produced an instrument titled ‘Student Perceptions of Online Courses.’ This instrument was divided into two sections. The first section consisted of demographic and general information. The second section evaluated student perception of online courses and contained four sub-sections: Interaction, Course Structure, Learner Autonomy, and Interface. The course
structure sub-section contains six items. These items are very generally worded. The overall idea presented with each item was considered for relevancy in my study. If the idea appeared relevant based on past experience and the literature review, it was extracted and detailed for use in my instrument.

The six questions from the structure sub-section will be used in performing discriminant validity. They are included in Appendix I.

*Ingram (2002).*

The purpose of Ingram’s study was to find out how people find their way around instructional web sites so as to make them easier and more effective to use. This study specifically examined usability of online courses by asking the participants to perform a series of tasks in random order. The participants were given two questionnaires to complete in order to assess their satisfaction with using the course. The first asks students about their computer and web experience. The second questionnaire asks students about their experience navigating and performing tasks in an instructional web site. Mainly, the types of questions he posed made me consider some issues students could experience while taking an online class in respect to its usability. I took this concept, usability, into consideration when developing the SCET.

Seven questions from his instrument will be used in performing discriminant validity. They are included in Appendix H.
Literature Review and Survey Development

This development phase entailed reviewing the literature with respect to structural issues as they related to distance education. This process identified components that existed in defining structure. Through this review, the idea of developing categories in order to develop questions to target measuring the structure component was conceived. The initial categories created included sequencing, presentation, planned interactions, and defined evaluations and were more concisely defined throughout the development process. After the basic categories were identified, criteria to include within each category were more easily recognized. Examples of such criteria include course objectives, deadlines/timelines (exam and assignment), contact information, etc. By design, use of the instrument requires an expert to examine a syllabus from each course being evaluated to assist in the analysis of the structure component to extract any “structure” relevant information. The expert also thoroughly reviewed the actual online course elements for structure components. All course information was evaluated using the created instrument.

Item Development

A total of 53 items were written in the initial stages of the instrument development. These items were grouped into categories then broken down further and grouped into sub-categories. Instrument categories/sub-categories and components were created solely by the researcher based on past experience and examining and studying the research for relativity. The
researcher created three categories: Content Organization, Delivery Organization, and Course Interactions Organization. Within each one of these categories, sub-categories were created. Overall, syllabus, sequencing, and course schedule are the sub-categories created within the Content Organization category. Overall, consistency, and flexibility are the sub-categories created within the Delivery Organization category. Lastly, student to instructor, student to student, and student to interface were the sub-categories created within the Course Interactions Organization category. The initial 53 items and 10 categories, after revisions, regroupings, and editing became a total of 50 items and 8 categories.

**Expert Evaluation**

During the last phase of development, the instrument was distributed to content experts for content validation. Each expert was told of the purpose of the study. The experts were provided categories and descriptors contained in the instrument. They were asked to sort the descriptors and align them with the category they felt provided the best fit. They were also asked to provide an item analysis as to the clarity and quality of each item once the compiled draft was completed (See Appendix L.) Once I received the sorted items from each expert, I incorporated their input into a draft instrument for each expert. Each category was examined for the number of descriptors that agree with the researcher’s pre-defined instrument. A mean of the number of items in agreement was derived from the three expert drafts for each category. A 2/3 agreement rate (for each
descriptor for each category) was desired for their inclusion into a particular category (main and/or sub.) For example if 2 out of 3 experts agreed with the main and sub category placement then the descriptor remained as is. If 2 out of 3 experts agreed with the main only and agreed amongst themselves with the sub category then the descriptor was moved to the sub category agreed upon by 2/3 of the experts. If there was no agreement or less than 2/3 agreement the descriptor was considered for revision or eliminated. Additionally, an overall agreement rate of 75% was desired. (Overall agreement rate is calculated by a descriptor having any form of agreement with the researcher main and/or sub.) Additionally, to assist with descriptor placement, each expert was asked to rank, using a Semantic Differential scale, each descriptor as to the clarity/quality of each in describing and defining the category as it pertains to the structure component of an online course (detailed earlier). A mean score (all experts) for each descriptor’s clarity and quality (one score for each) in regards to a particular category as it pertains to the structure component was calculated. If the mean for a particular descriptor is below 2 (moderately clear or of moderate quality) then the descriptor was reviewed for the possibility of revision, new placement, or elimination. Refer to Appendix M for the Item Rating Results.

Pilot Testing

The revised instrument was pilot tested by myself and a colleague/doctoral student to measure the structure of four online courses at an accredited University or College (2 structurally sound courses and 2 courses that
are less structurally sound.) Success of the instrument was determined based on
the ease of use of the instrument and its ability to include all elements and sub-
elements of structure. As the courses were evaluated we made note of how well
the instrument related to the online course and the structure evaluation process. I
solicited feedback from the expert who assisted with the pilot study in regards to
the performance of the instrument during the pilot testing.

Additionally, the applicable parts of the four instruments from other
researchers were used on the four courses in the pilot study by me and the
expert, to establish inter-rater reliability for use in the field study.

The instrument performed as expected. A duplicate descriptor was
discovered and deleted with no other revisions or modifications needed. The
colleague/doctoral student rater found the instrument to be clear and easy to use.

Field Testing

Upon completion of the pilot test, the instrument was used to evaluate the
structure of 20 online courses. The online courses were selected from the
institution’s total online offerings. In order to ensure inter-rater reliability, the
researcher and two other experts/practitioners in the field evaluated the courses.
These experts were myself, one doctoral student from the IT area and one
experienced instructional designer in the field. Each expert evaluated 10 online
courses each (5 structurally sound courses and 5 less structurally sound
courses.) Because evaluating each course is a time-consuming process, the
researcher evaluated all 20 of the courses using the developed instrument. To
evaluate the courses, the expert must first familiarize themselves with the layout of the course, the navigation process, and how the content is organized which can require a minimum of 30 minutes per course. Due to the length of time required and the fact that the experts were volunteers that didn’t have time to devote to analyzing 20 courses each, the researcher evaluated all 20 courses and comparisons were made to the 10 courses evaluated by each expert. Another notable piece of information is that no expert other than the researcher knew the significance of the naming schema used to identify the courses. Only the researcher was aware of the IS/NIS categorization.

The researcher also evaluated the courses using parts of the four comparison instruments that are currently available in the literature. These evaluations were for gathering data to perform statistical tests of discriminant validity.

The instrument produced scores for each descriptor. A mean was computed for each category and a total score was computed by summing the means from each category. All categories are weighted equally in the instrument. Therefore, the highest possible score is 24 (8 categories with a mean of 3 for each category.)

Statistical Analysis

Validity of the Instrument

Because an instrument that measures solely the structure component of an online course has not been developed prior to this research study, the validity of the operationalization of this construct needs to be evaluated. Since the study
purports to translate the construct of structure into a functioning and operating reality it is imperative that the study evaluates how well the translation was done.

Construct Validity

Translation Validity
The way the construct was translated or operationalized as evidenced by face and content validations (Trochim, 2000).

Face Validity.
Face validation addresses whether or not “on its face” the instrument appears to be an accurate translation of the construct. The face validity of this instrument was verified by the subject matter experts retained to participate in this study once consensus was reached regarding categories and their items. The experts, using their own expert judgment, addressed whether or not the items and the categories included in the instrument were clear and of quality representation as well as defining of the structure component of transactional distance as it pertains to online courses, and whether or not the instrument provided a logical tie between the items and the instrument’s purpose of measuring the structure component of online courses.

Content Validity.
Content validation is based on the extent to which a measurement reflects the specific intended domain of content. For the researcher to accurately represent that which constitutes a relevant domain of content in order to measure the structure component of transactional distance, the expert opinion of three
researchers was solicited. Their task was to first, sort given items into provided categories then to evaluate each item for its clarity and its quality. Upon completion of the sort, the experts determined if the proposed categories contained within the instrument are entirely representative of the structure construct and if not, they provided recommendations. Additionally, once consensus is reached regarding inclusion of items and their placement into categories, the experts assessed if the items contained in each category were all conclusive of descriptors measuring the structure component of online courses within that particular sub-category.

_Criterion-related Validation._

Criterion related validity seeks to check the performance of the operationalization. For example, the convergent validity will show high correlations amongst the items in a given category and the discriminant validity will show low correlations amongst the other instruments discussed in this paper.

_Convergent Validity._

In order to establish convergent validity, the instrument needs to show that items that should be related are in reality related. For instance, each item within a category that purports to measure that area of structure should exhibit high intercorrelations with other items in that same category. We should see item correlations for all item pairings to be very high. This will show that all items are converging on the same construct.
Discriminant Validity.

In order to establish discriminant validity, the study showed that the SCET was not related, or differed, from the other four instruments described in this dissertation. The researcher evaluated all 20 courses using the applicable parts (listed as appendices) of the other four instruments discussed in the body of this paper in order to gather data to evaluate for discriminant validity. Additionally, a doctoral student (the student that assisted with the pilot study) evaluated the four courses in the pilot using the four instruments in an effort to establish reliability in my obtained scores from the four instruments. Reliability was established with a 92% correlation between my scores and the doctoral student’s scores with the Ingram instrument, 94.6% correlation with the Huang instrument, 97% with the Bischoff instrument, and 100% with the Chen instrument. Once reliability of my scores was established, my ratings of the 20 courses using the four instruments were justified to be used in the calculations of discriminant validity in the field study.

Reliability of the Instrument

Reliability is the extent to which an experiment, test, or any measuring procedure yields the same result on repeated trials (Trochim, 2000.) It allows for researchers to be able to make claims about the generalizability of their research.
Internal Consistency.

Internal consistency is the extent to which tests or procedures assess the same characteristic, skill, or quality (Palmquist, 2004.)

Cronbach’s alpha measures how well a set of items measures a single latent construct. A Cronbach’s alpha will be obtained for each category within the instrument as well as computing a Cronbach’s alpha for the entire instrument.

Inter-rater Reliability.

Inter-rater reliability measures the extent to which two or more raters agree (Palmquist, 2004.) It addresses the consistency of the implementation of the rating system. It is dependent upon the ability of two or more individuals being consistent in their evaluations.

This study had a total of three subject matter experts (myself and two others) evaluating the SCET. A detailed description of what the expert is to do when evaluating the SCET was provided to improve the inter-rater reliability. See Appendices C and D for an example of the email and accompanying directions/tool that was sent to each expert evaluator. Additionally, the minimum qualifications of the expert were described above so as to have consistency within raters thus, increasing inter-rater reliability.

Each expert rated a total of 10 courses, 5 structurally sound and 5 less structurally sound. I rated all 20 courses. To determine inter-rater reliability as it pertains to using the instrument for measuring the structure component of online courses, three researcher’s responses along with my responses for each category were examined. Each rated category, by an expert, produced a
categorical mean. A correlation coefficient using the expert’s response and my response were calculated for each pair of categorical means. The method of examination was an overlap as depicted in the diagram below. For example, the categorical mean of Participant A’s responses to 5 structurally sound and 5 less structurally sound courses were correlated with my response and the categorical mean of Researcher B’s response were correlated with my response also. (The diagram shown below was repeated twice for a total of 20 rated courses.)

```
A A A A A B B B B
C C C C C C C C C
```
The methods of validation and reliability described above ensure that sound survey construction principles were employed. Subject matter experts were used to determine the content validity of the instrument and to ensure that instructional design principles were followed as closely as possible. Their feedback was incorporated into the revision of the instrument until all experts were satisfied, providing a sound and accurate development of an instrument designed to measure the structural component of the transactional distance theory.

Pilot testing of the prototype instrument was conducted prior to conducting the field research. In so doing, final verification of the functionality of the instrument was tested. The pilot testing was followed by a second item review and revision. Field-testing using a sample of 20 online courses was then conducted. Each expert evaluated 10 online courses. Each course was from an accredited higher-education institution. Statistical analyses of the field-testing included convergent and discriminant validation as well as internal and inter-rater reliability measures.
CHAPTER FOUR
EVIDENCE OF VALIDITY & RELIABILITY

The method utilized for the development and validation of the SCET for measuring the structure component of online courses was based on sound principles of survey construction. Specifically, the method that was used for the development of the SCET addressed the following research questions:

1. What specific components of an online course define the structure variable of the online course?
2. What is the content-related evidence that the designed measurement is a valid measure of the structure variable?
3. What is the estimated reliability of the designed measurement?

The process of survey development requires that design steps be followed in a sequential order. Therefore, the research questions stated above will be answered in the order listed above and the evidence that they have been adequately addressed will be apparent throughout this chapter.

Item Development

The method used to determine the items that define structure for an online course addressed the first research question:

What specific components of an online course define the structure variable of the online course?

Initially, a review of the existing literature identified components that exist in defining course structure. From that review and my experience with designing
and facilitating online courses, a total of 53 items were generated. After reviewing the items, ten categories emerged.

**Item and Category Sort**

Conducting the sort and clarity/quality ratings addressed the second research question:

> What is the content-related evidence that the designed measurement is a valid measure of the structure variable?

Experts were recruited and were emailed a document whose purpose was to provide them with a means of sorting items into representative categories (Appendix G). The initial document did not contain columns for rating the clarity and quality. For the first distribution, the experts only sorted the items by assigning them to one of the categories provided.

**Sorting results.**

The results of the sort were: 18% or 9 out of the 50 items had a minimum of 2 of the 3 experts’ agreement with the main category only. For these items my pre-derived sub-category was used knowing that another level of expert evaluation was due to occur where they would evaluate all item placements as to their clarity and quality. Further, 26% or 13 out of 50 of the items had two out of three expert agreement with both the main and sub-categories. If I had a particular item in the agreed upon main category but not the sub, I moved the item to the expert’s agreed-upon sub-category. If I did not have that item in either of the agreed main or sub-categories, the item was moved to the categories agreed upon by the experts. Finally, 56% or 28 out of the 50 items contained a
minimum of 2 out of 3 experts’ agreement with both the main and the sub-categories so no movement of these items were necessary. Overall, 88% or 44 out of 50 items contained some form of agreement with either my initial placement of the main category and/or sub-category. As a result of the initial sorting process 3 items and 2 categories were deleted. The items were deleted due to no consensus at all amongst the experts and the categories were eliminated because after the sort no items were placed in them. The deleted items were:

- Each course unit/module clearly communicates where to submit assignments due.
- Course/unit module provides a summary of the presented material.
- Course provides directions on how to use all course tools.

The deleted categories were:

- Course Organization: Sequencing
- Course Interaction Organization: Student to Interface

*Item Rating: Clarity and Quality*

The next step in validating the instrument was for the experts to rate the items and their placement as to clarity and quality using a Semantic Differential scale from zero (not evident) to three (fully evident). See Appendix L to view the document that was distributed. For those items that had a quality rating under two, the experts were asked to make a recommendation to either move the item, re-write the item, or to discard the item. A detailed summary of each item’s results to this rating can be found in Appendix M.
• Item 5 of the Course Organization Overall category, Course objectives are present, received a quality mean of 1.67. The lower score was due to a concern as to whether the descriptor should be placed in the Course Organization Overall category or the Course Organization Syllabus category. After discussing this concern with the experts, it was agreed that it was better placed in the Course Organization Overall category.

• Item 7 of the Course Organization Overall category, Course provides detailed directions on how to submit each assignment or activity, received a quality mean of 1.33. The experts felt this descriptor was better located in the Course Organization Syllabus category so it was moved.

• Item 6 of the Course Organization Course Schedule category, Course has a menu that remains constant as the student moves within the course, received a quality mean of 1.33. The experts felt this descriptor was better located in the Delivery Organization Consistency category so the descriptor was moved.

Once these changes were made and the results were compiled the working instrument for determining structure for online courses was assembled. (See Appendix N.)

Pilot Study

A preliminary tryout of this instrument was conducted after all revisions by the three content experts had been made. After the pilot study was conducted, statistical analyses were run in order to address the third research question:

What is the estimated reliability of the designed measurement?
To conduct the pilot study, four courses were selected for evaluation. Myself and one other doctoral student in the field evaluated the four courses using the SCET. Two of the courses were deemed structurally sound while two others were not based on the criteria listed in Chapter Three. One non-structurally sound course (titled BSC1005I_NIS for purposes of this study) received overall scores from each rater of 14.4 and 15.6 out of a possible 24 or 60% and 65% respectively. The other course (titled CGS1100I_NIS for purposes of this study) that was categorized as not structurally sound produced much higher scores than expected, 22.2 and 22.8 (93-95%) respectively. Further investigation revealed that, although this course was not designed initially with the aide of an instructional designer, this particular instructor did attend a few training courses over the past year or so and re-developed parts of his course.

The two courses that were categorized as structurally sound courses did in fact show to be structurally sound based on the overall scores. However, one course did enjoy an overall higher score than the other even though they were both developed with the assistance of an instructional designer. One of the courses was true to expectations and resulted in scores of 21.75 and 21.23 respectively or 88% and 91% of the instrument’s total score. The other course was designed a few years ago with the help of an instructional designer. However, upon further investigation it was discovered that the faculty member had eliminated a few items from the original design and made some other modifications. The scores for this course were 18 and 17.6 respectively or 75% and 73% of the instrument’s total score. These scores are not low enough to
deem this course not structurally (using an overall cut score of 50% or 12/24) sound but they are lower than was expected.

The pilot study showed that the provisional criteria for categorizing courses didn’t perform well. It appears that some courses may have been modified by faculty after their initial development and that other faculty may have done some independent study to educate themselves about effective instructional design. To address this issue in the field study, the provisional criterion for course placement was refined as follows: after courses were placed using the provisional criteria, the researcher will perform an express expert review of each course’s placement in consideration of broadly accepted instructional design standards. If the placement does not appear to be accurate, then an appropriate placement was determined and a detailed explanation will be given as to explain action taken.

No other concerns with the manner in which the instrument performed were identified in the pilot study. The categories and descriptors functioned as intended and no clarifying changes were needed.

**Statistical Analysis**

*Content-related Validation.*

The purpose of a content validation procedure is to ensure that the items adequately represent the specific construct of interest (Crocker & Algina, 1986). The content-related evidence was acquired throughout the item categorization/sorting process and through the quality/clarity ratings by the experts. Overall, 88% or 44 out of 50 items contained some form of agreement
with either my initial placement of the main category and/or sub-category. Additionally, once the descriptors were sorted for placement in categories, experts rated each descriptor’s placement as to its clarity and quality within that particular category and adjustments were made if necessary. Detailed results are provided in the appendices as mentioned above.

Estimates of Reliability.

The reliability of the instrument’s use in the pilot study was estimated by computing a coefficient alpha for each category of items to estimate the internal consistency of each rater’s scores as well as computing a Pearson correlation coefficient for each rater and each course at the category level. Additionally, at the item level, a Kappa coefficient was calculated for each of the 8 categories. See table 1 below for a listing of the mentioned statistics. (Refer to Appendix G for the definition of each category and its associated acronym.)
Table 1

*Pilot Study Statistics*

*Correlation Coefficients and Coefficients Alpha and Kappa by Category*

<table>
<thead>
<tr>
<th>Category</th>
<th>Pearson Correlation of Raters</th>
<th>Coefficient Alpha</th>
<th>Coefficient Kappa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Org: Overall</td>
<td>0.99287</td>
<td>0.995998</td>
<td>0.8152</td>
</tr>
<tr>
<td>Content Org: Syllabus</td>
<td>0.97180</td>
<td>0.980165</td>
<td>0.8876</td>
</tr>
<tr>
<td>Content Org: Course Schedule</td>
<td>0.94388</td>
<td>0.949153</td>
<td>0.6629</td>
</tr>
<tr>
<td>Delivery Org: Overall</td>
<td>0.95784</td>
<td>0.978417</td>
<td>-----</td>
</tr>
<tr>
<td>Delivery Org: Consistency</td>
<td>0.97714</td>
<td>0.985782</td>
<td>0.9200</td>
</tr>
<tr>
<td>Delivery Org: Flexibility</td>
<td>0.66967</td>
<td>0.800457</td>
<td>0.7377</td>
</tr>
<tr>
<td>Course Int. Org: Student to Student</td>
<td>0.96397</td>
<td>0.931818</td>
<td>-----</td>
</tr>
<tr>
<td>Course Int. Org: Student to Instructor</td>
<td>1.00000</td>
<td>1.000000</td>
<td>1.0000</td>
</tr>
</tbody>
</table>
As is evidenced by the coefficient alpha scores above, the internal consistency of each category portrays high reliability (usually 0.7 and above is acceptable) (Nunnally, 1978.) Additionally, Pearson Correlation coefficient’s of the two raters shows a high correlation amongst their rating values in all categories (r=0.7 or above.) The delivery organization flexibility category is only slightly under the desirable value of 0.7 but the coefficient alpha for this category is above the 0.7 “cutoff” supporting a high degree of internal consistency for this category.

Coefficient Kappa is reported above to assess the rater level of agreement. Caution must be exercised not to view these scores independent of the other coefficients reported. One use of Kappa is to quantify a level of agreement amongst raters excluding the proportion of chance (or expected) agreement (i.e. as an effect-size measure.) This term is only relevant when raters are statistically independent which in most cases, including this one, is not met. Therefore, viewing this statistic in conjunction with the others reported is highly advisable. In lieu of this, the reader can see that most categories enjoy a high level of agreement (above 0.7) amongst raters according to the Kappa statistic. Two of the categories, Delivery Organization: Overall (DOO) and Course Interaction Organization: Student to Student (CIOSS), did not produce a Kappa statistic. This is because SAS only computes Kappa for tables that are symmetric. However, these two categories enjoy a high Pearson correlation and Coefficient Alpha. Additionally, the Course Organization: Course Schedule (COCS) category produces a Kappa statistic of 0.6629, a minimal amount under
the desired level of agreement of 0.7. However, upon examining the correlation of the two raters, 0.94, and the internal consistency of the category, 0.95, the reliability of this category holds.

Field Study

The field study was conducted and statistical analyses were run in order to show that the instrument can distinguish a structurally sound course from one that is less structurally sound, and to demonstrate that the instrument developed for this study differs from any others found in current research.

The field test was conducted using a sample of 20 courses from an accredited Community College. The selected courses represented varying departments and genre's of courses available. They were divided as to structurally sound and not-structurally sound using the previously stated criteria. I verified the course placement using an express expert review as stated above. As a result, 10 courses were placed in the structurally sound category and 10 courses were placed into the non-structurally sound category. My expert express review did not identify any placement concerns. The courses were further randomly divided for distribution to the experts for evaluation. Each expert received access to 5 structurally sound courses and 5 not structurally sound courses for a total of 10 total courses to evaluate.

The SCET contains a total of 8 categories and 8 sub-categories. Each sub-category contains a varying number of descriptors that are to be rated using a Semantic Differential scale from 0 to 3 where 0 is not evident, 1 is minimally
evident, 2 is moderately evident, and 3 is fully evident. To determine a value for each descriptor, the expert must first thoroughly review each course both from the viewpoint of an instructor and from the viewpoint of a student prior to using the instrument for evaluation purposes. Once the experts familiarized themselves with the course they began using the instrument as part of the evaluation process.

Field test administration was conducted via email. Two experts were recruited to participate in the field study. Each expert was told the purpose of the study and their role was communicated so they understood the commitment required. The two experts in the field that were chosen and agreed to evaluate 10 courses each (5 structurally sound and 5 not structurally sound) using the SCET to measure the structure component of the sample courses were emailed the URL address and log in instructions complete with a user ID and password for accessing the courses. Also contained in the email were an attachment of the instrument and the abstract of the study. They were asked to respond when they had received the email with an estimated time of completion. It was also communicated to them that they could submit their results via email as attachments and to notify me of any questions or concerns. Refer to Table 2 for the list of courses assigned to each particular rater. The researcher (rater 3) rated all 20 courses.
### Table 2

**Course Listing by Rater**

<table>
<thead>
<tr>
<th>Rater 1 Courses</th>
<th>Rater 2 Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro Comp Apps 1100C</td>
<td>Micro Comp Apps 1100_IS</td>
</tr>
<tr>
<td>Comp Concepts 1000_IS</td>
<td>Adv. Micro Comp Apps 2108_IS</td>
</tr>
<tr>
<td>Intro to Comp Prog. 1000_IS</td>
<td>Intro to Psych 1012_IS</td>
</tr>
<tr>
<td>Educational Tech 2040_IS</td>
<td>Intro to Public Speaking 2600_IS</td>
</tr>
<tr>
<td>Intro to Internet Res. 2004_IS</td>
<td>Intro to Sociology 2000_IS</td>
</tr>
<tr>
<td>LifeSpan Dev. 2004_NIS</td>
<td>Intro to Education 1005_NIS</td>
</tr>
<tr>
<td>British Literature 2012_NIS</td>
<td>Medical Terminology 2531_NIS</td>
</tr>
<tr>
<td>Intro to Biology 1005_NIS</td>
<td>Composition II_1102_NIS</td>
</tr>
<tr>
<td>Intro to Psychology 1012_NIS</td>
<td>Drug Calculations_NIS</td>
</tr>
<tr>
<td>Intro to Statistics 2023_NIS</td>
<td>Intro to Networking 2263_NIS</td>
</tr>
</tbody>
</table>
In addition, before the experts made their final submission of results, they were asked to review each completed instrument to ensure that the proper course title and the rater name were included and to also verify that they marked a rating for each descriptor in each category.

*Item Analysis of Field Test Results*

Statistical analysis of the results of field testing was computed to determine estimates of reliability, discriminant validity, and to determine based on overall total score how well the SCET distinguishes a structurally sound course from one that is not.

*Estimates of Reliability.*

Reliability estimates of the field study results were computed by the use of two methods in order to address the third research question:

What is the estimated reliability of the designed measurement?

First, internal consistency of the instrument was computed by use of the Cronbach’s alpha statistic for each rater where the categorical means were compared to rater 3 (the researcher.) Cronbach’s alpha was also computed on the overall scores for raters 1 and 2 as compared to the researcher and yielded a Coefficient Alpha of .989 (raw and standardized) for rater 1 and a Coefficient Alpha of .987 (raw) .994 (standardized) for rater 2. Also, a Kappa statistic was computed for each item in each category to verify inter-rater reliability. Each rater was compared with the third rater (the researcher.) The delivery organization category shows some lower Kappa values than would be preferred. However, the correlation statistics are desirable. Due to the lower inter-rater reliability in this
category training or communication to the raters using the instrument is needed to detail the meaning/purpose of each descriptor. Tables 3 and 4 detail the results.
Table 3

*Correlation Coefficients and Coefficients Alpha and Kappa by Category*

*R1 X R3*

<table>
<thead>
<tr>
<th>Category</th>
<th>Correlation</th>
<th>Alpha (Cat.)</th>
<th>Kappa (Item)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cat. Item</td>
<td>Raw Standardized</td>
<td>Simple Weighted</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Content Org:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>.92035</td>
<td>.79305</td>
<td>.955404</td>
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<tr>
<td>Content Org:</td>
<td>.90994</td>
<td>.78968</td>
<td>.935013</td>
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<tr>
<td>Syllabus</td>
<td>.75419</td>
<td>.70330</td>
<td>.853900</td>
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<td>Course</td>
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<tr>
<td>Schedule</td>
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</tr>
<tr>
<td>Course Int. Org: Student</td>
<td>.90757</td>
<td>.81367</td>
<td>.945728</td>
</tr>
<tr>
<td>to Student</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course Int. Org: Student</td>
<td>.90757</td>
<td>.81367</td>
<td>.945728</td>
</tr>
</tbody>
</table>
Table 4

Correlation Coefficients and Coefficients Alpha and Kappa by Category

$R^2 \times R^3$

<table>
<thead>
<tr>
<th>Category</th>
<th>Correlation</th>
<th>Alpha (Cat.)</th>
<th>Kappa (Item)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cat.</td>
<td>Item</td>
<td>Raw</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Content Org:</td>
<td>.94515</td>
<td>.79686</td>
<td>.943108</td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Content Org:</td>
<td>.90390</td>
<td>.81138</td>
<td>.847673</td>
</tr>
<tr>
<td>Syllabus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Content Org:</td>
<td>.97465</td>
<td>.88523</td>
<td>1.00000</td>
</tr>
<tr>
<td>Course Schedule</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delivery Org:</td>
<td>.86723</td>
<td>.94819</td>
<td>.941112</td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delivery Org:</td>
<td>.94755</td>
<td>.72052</td>
<td>.966589</td>
</tr>
<tr>
<td>Consistency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delivery Org:</td>
<td>.87720</td>
<td>.67429</td>
<td>.882893</td>
</tr>
<tr>
<td>Flexibility</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course Int. Org:</td>
<td>.98342</td>
<td>.95935</td>
<td>.971223</td>
</tr>
<tr>
<td>Student to Student</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course Int. Org:</td>
<td>.91924</td>
<td>.87638</td>
<td>.929124</td>
</tr>
<tr>
<td>Student to Instructor</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

78
Overall Scores.

Each evaluated course produces a composite score that is determined by summing the means of each category. The total possible score is 24 (8 categories times the highest possible mean score from each category, 3.) Table 5 below details the computed score per course by rater (the researcher will be known as Rater 3 throughout the remainder of the dissertation.)
Table 5

*Rater’s Total Score for Each Course*

<table>
<thead>
<tr>
<th>Course</th>
<th>Rater 1</th>
<th>Rater 2</th>
<th>Rater 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro Comp Apps 1100C_IS</td>
<td>17.81</td>
<td>17.22</td>
<td></td>
</tr>
<tr>
<td>Comp Concepts 1000_IS</td>
<td>17.84</td>
<td>17.60</td>
<td></td>
</tr>
<tr>
<td>Intro to Comp Prog. 1000_IS</td>
<td>14.78</td>
<td>17.10</td>
<td></td>
</tr>
<tr>
<td>Educational Tech 2040_IS</td>
<td>21.24</td>
<td>21.69</td>
<td></td>
</tr>
<tr>
<td>Intro to Internet Res. 2004_IS</td>
<td>20.44</td>
<td>19.94</td>
<td></td>
</tr>
<tr>
<td>Micro Comp Apps 1100_IS</td>
<td>17.67</td>
<td>18.37</td>
<td></td>
</tr>
<tr>
<td>Intro to Psych 1012_IS</td>
<td>17.44</td>
<td>17.95</td>
<td></td>
</tr>
<tr>
<td>Intro to Public Speaking 2600_IS</td>
<td>21.35</td>
<td>21.54</td>
<td></td>
</tr>
<tr>
<td>Intro to Sociology 2000_IS</td>
<td>17.00</td>
<td>17.90</td>
<td></td>
</tr>
<tr>
<td>LifeSpan Dev. 2004_NIS</td>
<td>11.22</td>
<td>8.73</td>
<td></td>
</tr>
<tr>
<td>British Literature 2012_NIS</td>
<td>4.17</td>
<td>4.39</td>
<td></td>
</tr>
<tr>
<td>Intro to Biology 1005_NIS</td>
<td>7.28</td>
<td>8.58</td>
<td></td>
</tr>
<tr>
<td>Intro to Psychology 1012_NIS</td>
<td>8.00</td>
<td>8.37</td>
<td></td>
</tr>
<tr>
<td>Intro to Statistics 2023_NIS</td>
<td>7.46</td>
<td>7.15</td>
<td></td>
</tr>
<tr>
<td>Intro to Education 1005_NIS</td>
<td>7.33</td>
<td>8.15</td>
<td></td>
</tr>
<tr>
<td>Medical Terminology 2531_NIS</td>
<td>13.37</td>
<td>12.55</td>
<td></td>
</tr>
<tr>
<td>Composition II_1102_NIS</td>
<td>10.30</td>
<td>9.86</td>
<td></td>
</tr>
<tr>
<td>Drug Calculations_NIS</td>
<td>8.78</td>
<td>8.19</td>
<td></td>
</tr>
<tr>
<td>Intro to Networking 2263_NIS</td>
<td>8.51</td>
<td>8.97</td>
<td></td>
</tr>
</tbody>
</table>
Specifically, mean scores of each rater for each type of course, IS (structurally sound) and NIS (not structurally sound), yielded mean scores for rater 1 of 18.42 and 7.63 and for rater 2 of 17.37 and 9.66 respectively. The researcher's mean scores were 18.42 for IS courses and 8.50 for NIS courses. Additionally, percent scores for each course and mean percent scores/rater for each type of course were computed to assist with determination of how well the instrument delineated a structurally sound course from a not structurally sound course. These percent values are show in Table 6 below.
Table 6

*Percent Scores for Each Course*

<table>
<thead>
<tr>
<th>Course</th>
<th>Rater 1</th>
<th>Rater 2</th>
<th>Rater 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro Comp Apps 1100C_IS</td>
<td>74%</td>
<td>72%</td>
<td></td>
</tr>
<tr>
<td>Comp Concepts 1000_IS</td>
<td>74%</td>
<td>73%</td>
<td></td>
</tr>
<tr>
<td>Intro to Comp Prog.1000_IS</td>
<td>62%</td>
<td>71%</td>
<td></td>
</tr>
<tr>
<td>Educational Tech 2040_IS</td>
<td>89%</td>
<td>90%</td>
<td></td>
</tr>
<tr>
<td>Intro to Internet Res.2004_IS</td>
<td>85%</td>
<td>83%</td>
<td></td>
</tr>
<tr>
<td>Micro Comp Apps 1100_IS</td>
<td></td>
<td>74%</td>
<td>77%</td>
</tr>
<tr>
<td>Adv. Micro Comp Apps 2108_IS</td>
<td>56%</td>
<td>62%</td>
<td></td>
</tr>
<tr>
<td>Intro to Psych 1012_IS</td>
<td>73%</td>
<td>75%</td>
<td></td>
</tr>
<tr>
<td>Intro to Public Speaking 2600_IS</td>
<td>89%</td>
<td>90%</td>
<td></td>
</tr>
<tr>
<td>Intro to Sociology 2000_IS</td>
<td>71%</td>
<td>75%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>47%</td>
<td></td>
<td>36%</td>
</tr>
<tr>
<td>British Literature 2012_NIS</td>
<td>17%</td>
<td>18%</td>
<td></td>
</tr>
<tr>
<td>Intro to Biology 1005_NIS</td>
<td>30%</td>
<td>36%</td>
<td></td>
</tr>
<tr>
<td>Intro to Psychology 1012_NIS</td>
<td>33%</td>
<td>35%</td>
<td></td>
</tr>
<tr>
<td>Intro to Statistics 2023_NIS</td>
<td>31%</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>Intro to Education 1005_NIS</td>
<td>31%</td>
<td>34%</td>
<td></td>
</tr>
<tr>
<td>Medical Terminology 2531_NIS</td>
<td>56%</td>
<td>52%</td>
<td></td>
</tr>
<tr>
<td>Composition II_1102_NIS</td>
<td>43%</td>
<td>41%</td>
<td></td>
</tr>
<tr>
<td>Drug Calculations_NIS</td>
<td>37%</td>
<td>34%</td>
<td></td>
</tr>
<tr>
<td>Intro to Networking 2263_NIS</td>
<td>35%</td>
<td>37%</td>
<td></td>
</tr>
</tbody>
</table>
Discriminant Validity.

For the purposes of establishing inter-rater reliability of the other four instruments mentioned in this study, during the pilot study the doctoral student rated the four courses using my instrument and the four other partial instruments: Bischoff's instrument, Chen's instrument, Huang's instrument, and Ingram's instrument. The correlation of the researcher's ratings and the doctoral student's ratings are as follows: Bischoff's instrument produced a .970 correlation, Chen's instrument produced a 1.00 correlation, Huang's instrument produced a .946 correlation, and Ingram's instrument produced a .924 correlation. Having established inter-rater reliability, the researcher solely rated all 20 courses using each of the other four instruments. Correlation statistics were computed to determine the degree of difference, if any, the SCET was from the parts of the other instruments. The correlations to the SCET are as follows: Bischoff's partial instrument produced a .156 correlation, Chen's partial instrument produced a .010 correlation, Huang's partial instrument produced a .273 correlation, and Ingram's partial instrument produced a .711 correlation. None of the other instruments compare well with the SCET. Ingram's instrument moderately compares to the SCET as a whole but does not compare in distinguishing structurally sound courses from those that are not. This difference is by design as Ingram's instrument's purpose is web site development not instructional course design. This difference is clearly visible upon examination of the instrument content (see Appendix H.)
To further examine the reason for the correlation of Ingram’s instrument with the SCET, correlations were calculated comparing each sub-category with the total score of the Ingram’s partial instrument. A priori predictions were that Ingram’s instrument would correlate higher with the SCET’s Delivery Organization sub-categories (i.e. Delivery Organization Consistency, Delivery Organization Overall, and Delivery Organization Flexibility.) The results appear in Table 7. The largest correlation does appear in the Delivery Organization category, specifically, the flexibility subcategory. There is not enough of a difference between the other SCET categories and Ingram’s to provide any clear conclusion regarding particular correlations with the SCET’s subcategories. This could be in part due to the fact that Ingram’s instrument measures the quality of web sites and the SCET measures quality of online courses. However, Ingram’s partial instrument does not detail any of the components of instructional design for online courses as identified by the SCET and is not specific to any type of site, such as an instructional one, but simply addresses any form of a website in any context. To demonstrate that the SCET distinguishes instructionally sound courses from courses that are not instructionally sound, effect sizes were computed amongst all of the categories and an effect size was computed using the results of Ingram’s partial instrument as well, to show that it does not distinguish the level of instructional quality as well as the SCET. Refer to Table 8 for the computed effect sizes. As is shown, every category of the SCET has a larger effect size than the overall effect size of Ingram’s instrument detailing that the SCET does in fact distinguish instructionally sound courses from those that
are not. The effect size of Ingram’s instrument (1.57) although under most circumstances may be considered robust is not anywhere close to the effect sizes present with the use of the SCET. Additionally, the overall effect size of the SCET is 4.8.
Table 7

*Correlation of Sub-Categories with Ingram’s Instrument*

<table>
<thead>
<tr>
<th>Category</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Organization Overall</td>
<td>0.55475</td>
</tr>
<tr>
<td>Content Organization Schedule</td>
<td>0.45774</td>
</tr>
<tr>
<td>Content Organization Course Schedule</td>
<td>0.64798</td>
</tr>
<tr>
<td>Delivery Organization Overall</td>
<td>0.67179</td>
</tr>
<tr>
<td>Delivery Organization Consistency</td>
<td>0.54134</td>
</tr>
<tr>
<td>Delivery Organization Flexibility</td>
<td>0.76358</td>
</tr>
<tr>
<td>Course Interaction Organization</td>
<td></td>
</tr>
<tr>
<td>Student to Instructor</td>
<td>0.59785</td>
</tr>
<tr>
<td>Course Interaction Organization</td>
<td></td>
</tr>
<tr>
<td>Student to Student</td>
<td>0.62013</td>
</tr>
</tbody>
</table>
Table 8.

*Effect sizes of all Categories and with Ingram’s Instrument*

<table>
<thead>
<tr>
<th>Category</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Organization Overall</td>
<td>3.39</td>
</tr>
<tr>
<td>Content Organization Schedule</td>
<td>2.35</td>
</tr>
<tr>
<td>Content Organization Course Schedule</td>
<td>3.71</td>
</tr>
<tr>
<td>Delivery Organization Overall</td>
<td>3.00</td>
</tr>
<tr>
<td>Delivery Organization Consistency</td>
<td>1.89</td>
</tr>
<tr>
<td>Delivery Organization Flexibility</td>
<td>2.20</td>
</tr>
<tr>
<td>Course Interaction Organization Student to Instructor</td>
<td>2.43</td>
</tr>
<tr>
<td>Course Interaction Organization Student to Student</td>
<td>1.84</td>
</tr>
<tr>
<td>SCET</td>
<td>4.80</td>
</tr>
<tr>
<td>Ingram’s Instrument</td>
<td>1.57</td>
</tr>
</tbody>
</table>
Chapter Summary

The selection of the 20 online courses that were evaluated in the field study were selected based on availability. From those that were available, courses were deliberately chosen to ensure an equal number of structurally sound and not structurally sound courses. These selections were based on pre-determined criterion that was revised to include an expert express review following findings of the pilot study.

The content-related validity of the instrument was assured by use of both judgmental and empirical data analysis. Three subject matter experts who have varying backgrounds in online course design and instruction were used in the validation process. Additionally, statistical analysis of pilot and field test data for estimates of reliability, overall scores, and discriminant validity were conducted.
CHAPTER FIVE
DISCUSSION

Online course design is occurring in all institutions across all parts of the world at an exponential rate. The purpose of this project was to develop a valid and reliable instrument that measures the structure component of online courses. The method employed for the development of this instrument was based on sound survey and instructional design procedures. The 47 item instrument called the Structure Component Evaluation Tool can be used by instructional designers as a course development guide that can be shared with faculty and as a strong formative and summative measure to determine how well the structure of a course is defined.

This chapter is organized around the research questions asked and will serve to summarize the methods and results that have led to the development of the SCET in its present form. Specifically, a summary of the method used for the development of the instrument will be reviewed and the evidence that the SCET is a valid measure of the structure variable will be addressed. Next, the results of the procedure used for establishing the reliability of the instrument will be discussed including issues that arose during pilot testing. Finally, suggestions for refinements to the instrument will be proposed, usability issues will be examined, and possible future implications for the SCET will be discussed.
Instrument Development and Evidence of Validity

The method used to develop the instrument and the content-relative evidence that the SCET is a valid measure was addressed by the first and second research questions:

- What specific components of an online course define the structure variable of the online course?
- What is the content-related evidence that the designed measurement is a valid measure of the structure variable?

To develop any instrument that measures the product of a process, a review of the tasks that make up the process must be considered. This consideration required that the instructional systems design processes be analyzed for best practices in curriculum design. This required that a review of all tasks necessary for designing an online course be conducted. The researcher, using her experience in designing online courses, began reviewing the tasks by breaking down the online instructional design process she routinely follows. Additionally, a review of various systematic instructional design methods was conducted to ensure that all aspects of the instructional design processes were considered and that all parts needed to create an instructionally sound course were identified. After a draft instrument was compiled, the researcher recruited three subject matter experts to assist in validating the instrument. The experts were asked to sort the provided descriptors into categories that were given to them. Once these results were compiled, another draft was sent to the experts asking them to now rate the placement of each descriptor as to its quality and
clarity. Results of the expert’s efforts produced a valid instrument to be used in the pilot study.

Pilot testing of the instrument was then conducted using a sample of 4 courses and one doctoral student in the field. The four courses were divided into categories of structurally sound and not structurally sound for the purposes of showing if the developed instrument could delineate a structurally sound course from one that was not. Statistical analyses were computed. Specifically, statistical analyses to determine inter-rater reliability, internal reliability, and overall scores of each course resulting from the use of the instrument were calculated. Additionally, this tryout allowed the researcher to use the instrument herself on courses and to discuss usability issues of the instrument with another colleague in the field and receive feedback for possible improvements to the instrument. Only a repetitive descriptor was identified during the pilot study and a revision to the instrument was made. The pilot study also identified possible issues with the manner in which courses were being segregated into structurally sound and not structurally sound categories. Adjustments to how the courses would be placed were determined prior to the commencement of the field study. Also, during the pilot study, the doctoral student evaluated the other four partial instruments identified in this study and statistics were computed to establish inter-rater reliability with the researcher. Specifically, correlational statistics between the colleague and the researcher’s ratings using the other instruments were computed.
Field testing of the instrument using a sample of 20 online courses from an accredited institution was then conducted. Statistical analyses of these results were computed. Particularly, statistical analyses to determine inter-rater reliability amongst each rater with the researcher, internal reliability of the instrument, and comparisons of overall scores of each course resulting from the use of the instrument were calculated to determine whether or not the instrument could accurately and reliably distinguish a structurally sound course from one that is not structurally sound.

Finally, the researcher used the other four partial instruments on each of the 20 courses to determine if their instrument measured a similar construct. Inter-rater reliability for use of these instruments by the researcher was conducted and verified as part of the pilot study. Three of the partial instruments returned very small correlations proving they are not similar to the SCET. Ingram’s partial instrument returned a correlation of 0.71. Upon examination of Ingram’s instrument it is concluded that the reason for the moderate correlation is that this instrument measures usability of web sites. The instrument contains questions that are pertinent to the clarity of web site development. Ingram wrote questions that pertain to the organization of a site and how one navigates through a particular site. Because the courses that were analyzed are all online courses utilizing the web, there may be some similarities due to site navigation and overall layout of the course. Additionally, as shown by the effect sizes, Ingram’s instrument does not distinguish a structurally sound course from one that is not structurally sound as the SCET does.
Establishing Reliability

The methods used to establish reliability of the SCET addressed the third research question:

- What is the estimated reliability of the designed measurement?

**Internal and Inter-rater Reliability**

Cronbach’s alpha statistics were calculated for each category of the SCET by comparing each rater’s categorical mean and for the overall internal consistency of the SCET by comparing total scores. The total scores were computed by summing the mean of each category. There was no alpha below .85 for any category and the overall alpha was .98.

Lower Kappa’s were found with the Delivery Organization category. Upon examination of the Item Rating Results (Appendix M) no problems with the quality or clarity with the descriptors in any area of the Delivery Organization category are apparent.
Issues and Recommendations

Course Placement Issue

The course placement issue that emerged as a result of the pilot study will be discussed. After receiving results back from the pilot study as part of the evaluation process overall scores for each course were computed. One of the courses that was thought to not be structurally sound scored high using the SCET. The researcher, upon examination of the course, noted that the course in question, on its face, appeared to have been re-designed with the assistance of an instructional designer or someone that had such knowledge. After speaking with the facilitator of the course, it was learned that the instructor had been recently educated as to sound instructional design processes and had made significant changes to his course. Upon learning of these sorts of possibilities and having no means to control for such variables (i.e. continual changes/updates to courses and/or the current facilitator of a course may not be the original facilitator and numerous changes could have taken place since initial development) the researcher decided to augment the placement algorithm by performing an express expert review of each course’s placement in consideration of broadly accepted instructional design standards.

Usability Issues

To effectively use the Structure Component Evaluation Tool to assess an online course the evaluator needs to familiarize themselves with both the designer and the student’s view of the course. This can take a considerable amount of time. Another alternative use of the instrument is to allow it to guide
The development of an online course. The instrument was designed and developed with sound instructional design processes in mind therefore to use it as a guide would be appropriate. By doing so, the course designer can ensure that many important pieces of an online course are included and by using the instrument re-design time could be reduced. One caveat, although this instrument can be utilized by those not formally educated in the area of instructional design as a guide to developing an online course, the instrument was developed for persons with this background.

Recommendations

Instrument Refinement.

A suggested refinement for the SCET is to provide a means of denoting applicability of a particular descriptor for a particular course. For example, some courses may not contain any video or audio components. This would not necessarily translate into the course not being structurally sound but presently the only way to denote the absence of such a component is to enter a 0 for that particular descriptor thus lowering the course’s overall score. Percent scores for each course were computed by dividing the total score by the total possible score and multiplying by 100. Therefore, if a course is reporting a lower score as a result of the Structure Component Evaluation Tool (50% or below) the evaluator will need to perform a cursory review of the values for each descriptor to determine whether or not revisions to the course need to be made. Also, in an effort to increase inter-rater reliability with the Delivery Organization Category I would recommend a survey from those who have used the instrument as to how
each descriptor was interpreted. Once the results of this survey are received some clarification to the descriptors may be appropriate.

Additionally, caution needs to be exercised when evaluating the flexibility component of the online courses with the SCET. The DOF category reported lower Kappa scores indicating that the interpretation of the descriptors were somewhat subjective. Defining what is meant by flexible or adaptable learning routes and learner control prior to using the SCET is desirable. Again emphasizing the importance of using the SCET along with the expert help of an instructional designer when structuring an online course.

Potential Uses.

Student performance measures collected from an online course may be analyzed in relation to its course structure. For example, the researcher can examine student satisfaction, student success, time spent on-task, etc., in relation to the score the online course received from the SCET. I would expect to see success and course structure or score received on the SCET to be directly proportional.

Another potential use for the SCET would be to use it to perform causal-comparative research especially as it relates to Michael Moore’s theory of transactional distance. Currently, a measure would need to be identified for measuring the dialogue component of online courses but once that piece has been developed studies may be conducted to determine the relationships of all three of the variables found in Moore’s theory.
Future Research.

In an effort to increase external validity, it is recommended that additional instructional designers perform analyses on other online courses to determine the value and robustness of the SCET under varying conditions.

Conclusion

The Structure Component Evaluation Tool is an instrument containing 8 categories and 8 sub-categories made up of 47 descriptors that will be used by instructional designers as a tool for measuring the structure component of online courses and may also be used as a guide for developing and designing online courses. A course scoring below 50% or less than 12/24 can be considered to be not structurally sound with a course scoring 51% and above considered to be structurally sound. Caution must be taken when evaluating a course solely on the overall score produced by the Structure Component Evaluation Tool. The overall score should serve as a “red flag” to the designer that the course needs a more in-depth review. Each categorical score must be reviewed to determine where the discrepancy may be occurring in a non-structurally sound course in order to evaluate the overall significance of the lower rating produced by the instrument.

The researcher is confident that the instrument development processes described in this paper have provided evidence of initial validation and reliability and that sound instrument development procedures have been followed.
REFERENCES


Lorenzetti, J. P. (2002). Practical Course Assessment Standards from MVU. *Distance Education Report, 2-4*.


Appendices
Appendix A: Sample Email for Course Access

To: Administrator
From: Cheryl N. Sandoe

Re: Dissertation research study

I am a doctoral candidate in the College of Education. My dissertation proposes to measure the structural component that exists in every online course. To date, there is no instrument that measures only this component. To perform and complete this study I would like to examine your online course for the degree of structure present.

In order for me to measure this component, I will need access to online courses at the instructor level. No changes to any course regarding its organization or content or in any other way will be made. Additionally, no student or faculty information need be present. The courses will need to maintain their syllabi but the faculty information can be removed.

After the analysis is complete, I will share the results of my study with you. I sincerely appreciate your help and support as I complete this study.

Sincerely,

Cheryl N. Sandoe
Doctoral Candidate
University of S. Florida
Appendix B: Sample Email for Recruitment of Experts

To: Potential Expert  
From: Cheryl N. Sandoe  
Re: Participating as an expert in a research study

Salutation:

I am currently a doctoral candidate at the University of South Florida. Dr. James White, Ph.D. is my major professor. My dissertation is based on Michael G. Moore’s Theory of Transactional Distance. I am developing an instrument to measure the structure component of this theory. To ensure inter-rater reliability of my instrument, I am in need of two subject matter experts to review my instrument and provide feedback as to its content. I have attached a copy of my proposal for your review. You will note that I have used many of your articles in my literature review so I would be very interested in your participation as you are the experts in this area.

Also, if you are interested in participating, as soon as the instrument has been revised and agreed upon amongst all experts (there will be a total of three, myself included) will be asked to evaluate 10 online courses using the instrument. The evaluation process should take no longer than 30-45 minutes per course.

I would sincerely appreciate your expert knowledge and assistance with my dissertation process. Please let me know as soon as possible if you are interested in participating.

Sincerely,

Cheryl N. Sandoe  
Doctoral Candidate  
University of South Florida
Appendix C: Sample Email to Subject Matter Expert for Sorting Exercise

To: Subject Matter Expert  
From: Cheryl N. Sandoe  
Re: Sorting Descriptors

Salutation:

Attached are the descriptors and directions on performing the sorting exercise along with information regarding the evaluation of each descriptor for clarity and quality. When complete, please attach to an email and send back to me. Thanks for your participation with my study.

Sincerely,

Cheryl N. Sandoe  
Doctoral Candidate  
University of South Florida
Appendix D: Dimensions of Structure Measurement Tool

Each item should be rated to the degree to which the elements are present.

The scale is:

0 – not evident
1 – minimally evident
2 – moderately evident
3 – fully evident

Content Organization

Overall

The course:

1) content/instruction is appropriate for the target audience
2) objectives match the course exams
3) provides a glossary or additional references
4) utilizes media (graphic, animations, diagrams, video, and audio) that are relevant to the course
5) contains a course calendar that includes important course dates

Syllabus

The syllabus contains:

1) faculty contact information
2) course description
3) course objectives
4) information about any pre-requisites or entry-level skills needed
5) information where students can contact technical support
6) information regarding student support services
7) information regarding the instructor’s grading policies
8) information regarding participation requirements
9) information regarding course policies (i.e. late assignments, make-up policies, etc)
Appendix D (Continued)

Sequencing

Each course unit or module contains:

1) a clear overview of the material to be presented
2) clear objectives of the material to be presented
3) a page that clearly communicates all activities to be completed
4) clearly communicates how to submit assignments due
5) a summary of the material that was presented

Course Schedule

1) Assignments by week (or other time unit) (includes calendar dates.)
2) Point value of all assignments.
3) All assignments, including assigned reading.
4) All due dates for assignments
5) All exam or assessment dates.
6) Suggested assignment beginning dates.

Delivery Organization

Overall

1) A layout screen that is clear, clean, and well organized.
2) On screen instructions that are simple, clear, and concise.
3) The ability for the student to bookmark areas of the course.
4) The ability for students to access archived discussions (i.e. synchronous chats or desktop conference meetings.)
5) On screen navigation (i.e. breadcrumbs) that tell a learner where they are, where they have been, and where they can go.
6) FAQ's or the equivalent to address functional aspects of the course.
7) Clear exit/logoff paths.

Consistency

1) Having a course menu that remains constant as a student moves throughout the course.
2) Each content module or unit is accessed in the same manner as a student moves throughout the course.
3) The module/unit layout is presented consistently (in the same manner) in each unit.
Flexibility

The learner:

1) has control over the rate of presentation
2) can review previous frames of information as often as desired
3) can skip on screen instructions if they have already been viewed
4) can proceed at their own pace
5) has flexible or adaptable learning routes
6) can pause or re-play any audio or video segment as often as desired

Course Interactions Organization

Student to Instructor

Instructor provided:

1) a statement as to their timeliness of responses to email and student inquiries.
2) a statement as to what type(s) of communications are required (i.e. discussion, email)
3) discussion information: such as a link and time of discussion (if synchronous); criteria expectations (length of posts), quantity of participation required (if asynchronous)
4) their availability for phone or F2F conferencing
5) guidelines for all communication

Student to Student

Student to student communication

1) methods were communicated clearly
2) guidelines were communicated clearly (i.e. netiquette)
3) guidelines regarding all offline meetings was communicated (i.e. posting a transcript of offline meetings for the entire group)

Student to Interface

The course provided detailed directions on how to:

1) submit each assignment or activity
2) use all course tools
Appendix E: Process Overview

- **Development of category specifications:** Write items for each
- **Review of Literature and Experience:** Initial creation of items for instrument
- **Item Specifications:** Map each item to course design principles
- **Review of items and revision:** Researcher reviews items written and revises for clarity and accuracy
- **Item Re-writing:** Researcher re-writes items
- **Item review and sort:** Items are sorted by subject matter experts and analyzed for clarity and quality
Appendix E (Continued)

- **Pilot testing:** Informal tryout using 4 courses

- **Item review and revision:** make item revisions based on pilot testing

- **Field testing:** enlist SME to use instrument on 10 courses each

- **Statistical Analyses:**
  - Estimate reliability by correlating two researcher’s responses on items and Cronbach’s alpha procedures
  - Estimate validity by calculating correlations within each category
  - Estimate validity by calculating discriminant validity
  - Estimate validity by comparing expert’s placement with researcher’s for 75% agreement
Hi Cheryl,

From your description of the project, the Chair indicated that it doesn’t appear to involve human subjects (the experts are not subjects) as defined by the federal rules on human subject protections and thus the IRB process is not needed.

However, please note the following:
--Even though the activities are not subject to the federal rules, you should still follow the applicable ethical standards of your profession including the implementation of an informed consent process if indicated.

--If procedures change significantly, please contact the IRB office again so that we might work with you to reassess the applicability of the federal rules.

Let me know if you have any questions. Good luck with your project!

Thanks,
Trudy
APPENDIX G

Sorting descriptors into categories and evaluating descriptors:

The proposed instrument contains three main categories: Content Organization, Delivery Organization, and Course Interactions Organization. Each main category consists of sub-categories and each sub-category is made up of descriptors. The categories and sub-categories along with their acronyms are listed below. Below the categories and the acronyms, are the lists of descriptors. Next to each descriptor is a place for you to enter the letters representing the category and sub-category of the area where you believe each descriptor best fits. Review each descriptor and enter the appropriate acronym for its placement.

After the instruments have been collected from all three experts, the results will be compiled and a new instrument will be distributed where you will rate each item for its clarity and quality as it pertains to the category you assigned using the following semantic differential scale:

0 – no clarity or no quality
1 – minimal clarity or minimal quality
2 – moderate clarity or moderate quality
3 – maximum clarity or maximum quality

NOTE: Keep in mind that once the draft instrument is compiled the presence of each descriptor in a course will be evaluated using a Semantic Differential scale with rating criteria of:

0 – not evident
1 – minimally evident
2 – moderately evident
3 – fully evident
## Content Organization

<table>
<thead>
<tr>
<th>Sub-Categories</th>
<th>Acronyms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>COO</td>
</tr>
<tr>
<td>Syllabus</td>
<td>COS</td>
</tr>
<tr>
<td>Sequencing</td>
<td>COSeq</td>
</tr>
<tr>
<td>Course Schedule</td>
<td>COCS</td>
</tr>
</tbody>
</table>

## Delivery Organization

<table>
<thead>
<tr>
<th>Sub-Categories</th>
<th>Acronyms</th>
</tr>
</thead>
<tbody>
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<td>Overall</td>
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</tr>
<tr>
<td>Consistency</td>
<td>DOC</td>
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<tr>
<td>Flexibility</td>
<td>DOF</td>
</tr>
</tbody>
</table>

## Course Interactions Organization

<table>
<thead>
<tr>
<th>Sub-Categories</th>
<th>Acronyms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student to Instructor</td>
<td>CIOSI</td>
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<tr>
<td>Student to Student</td>
<td>CIOSS</td>
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<tr>
<td>Student to Interface</td>
<td>CIOSI</td>
</tr>
</tbody>
</table>
## Listing of Descriptors

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Placement</th>
<th>Clarity</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content/instruction contained in course is appropriate for the target audience.</td>
<td></td>
<td></td>
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<tr>
<td>Each course unit/module contains a clear overview of the material to be presented.</td>
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<tr>
<td>Course has a menu that remains constant as the student moves within the course.</td>
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<tr>
<td>Course unit/modules are presented consistently throughout the course.</td>
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<tr>
<td>Course provides FAQ’s or equivalent.</td>
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<tr>
<td>Instructor grading policies are present.</td>
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<tr>
<td>Participation requirements are provided.</td>
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<tr>
<td>Instructor provides expectations regarding discussion posts or other class interactions (synchronous or asynchronous.)</td>
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<tr>
<td>All assignments including assigned reading is available for access.</td>
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<tr>
<td>Contains a course calendar that includes important course dates.</td>
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<tr>
<td>Contains information regarding course policies (i.e. late assignments, make-up policies, etc.)</td>
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<td>Course contains due dates for assignments.</td>
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<td>Course provides detailed directions on how to submit each assignment or activity.</td>
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<tr>
<td>Suggested begin dates for each unit/module are provided.</td>
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<tr>
<td>Ability to access archived discussions (i.e. synchronous chats or desktop conference meetings) are provided.</td>
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<tr>
<td>Course objectives are present.</td>
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</tbody>
</table>
Appendix G (Continued)

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Placement</th>
<th>Clarity</th>
<th>Quality</th>
</tr>
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<tbody>
<tr>
<td>Guidelines were provided regarding all offline student communication (i.e. posting transcripts of offline meetings for a group.)</td>
<td></td>
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<tr>
<td>Students can proceed at their own pace.</td>
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<tr>
<td>Course provides on screen navigation (i.e. breadcrumbs) to let the learner know where they are in the course.</td>
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<tr>
<td>Technical support contact information is provided.</td>
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<tr>
<td>The course contains flexible or adaptable learning routes.</td>
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<tr>
<td>Student to student communication methods were clearly communicated.</td>
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<tr>
<td>Course contains assignments by week (or other time unit, including calendar dates.)</td>
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<tr>
<td>Each course unit/module clearly communicates where to submit assignments due.</td>
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<tr>
<td>Media such as graphics, animations, diagrams, video, and audio that are utilized are relevant to the course.</td>
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</tr>
<tr>
<td>Point value of all assignments is available.</td>
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</tr>
<tr>
<td>Course description is present.</td>
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<tr>
<td>Objectives match the course exams.</td>
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<tr>
<td>Learner has control over the rate of presentation of material.</td>
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<tr>
<td>Course unit/module provides a summary of the presented material.</td>
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<tr>
<td>Information regarding student support services is available in the course.</td>
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<tr>
<td>Instructor is available for phone or F2F conferencing.</td>
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<tr>
<td>Faculty contact information is present.</td>
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<tr>
<td>Descriptor</td>
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<td>Clarity</td>
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<tr>
<td>Students can review previous frames of information unlimited times.</td>
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<tr>
<td>All exam or assessment dates are provided.</td>
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<tr>
<td>Student has the ability to bookmark areas of the course.</td>
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<tr>
<td>Course provides directions on how to use all course tools.</td>
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<tr>
<td>Student can pause or re-play any audio or video segment as desired.</td>
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<tr>
<td>Each course unit/module contains a single page that communicates all activities to be completed.</td>
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<tr>
<td>Instructor provides guidelines for all student communication.</td>
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<tr>
<td>Each module/unit is accessed in the same manner throughout the course.</td>
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<tr>
<td>Previously viewed on screen instructions can be skipped.</td>
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<td>Student to student communication behaviors are clearly communicated.</td>
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<td>Course provides a layout screen (homepage) that is clear, clean, and well organized.</td>
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<td>Course provides on screen instructions that are simple, clear, and concise of how to begin.</td>
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<tr>
<td>Glossary or additional references are provided.</td>
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<td>Course provides clear exit/logoff paths.</td>
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<td>Faculty provides information as to their timeliness of responses to email and student inquiries.</td>
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</table>
Information about any pre-requisites or entry-level skills needed is present.

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Each course unit/module contains clear objectives of the material to be presented.

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APPENDIX H

Questions from Ingram’s instrument used to evaluate discriminant validity.

1. What kind of organization did this site have?
   - Hierarchy
   - Task-oriented
   - Schedule
   - Other
   - No organization

2. How clear were the goals of this Web site?
   - Not clear at all
   - Somewhat Clear
   - Neutral
   - Clear
   - Very Clear

3. How clear were the tasks you did today?
   - Not clear at all
   - Somewhat Clear
   - Neutral
   - Clear
   - Very Clear

4. How easy was it to use this Web site?
   - Not easy at all
   - Somewhat Easy
   - Neutral
   - Easy
   - Extremely Easy

5. How well organized was the material in this Web site?
   - Not organized at all
   - Somewhat organized
   - Neutral
   - Well-organized
   - Extremely well organized

6. Did you feel lost in this Web site?
   - Almost never
   - Sometimes
   - Often
   - Almost always
   If you did feel lost, please describe what you were doing at the time (one incident is enough.)

7. Did you know where to click to navigate around the site?
   - Almost never
   - Sometimes
   - Often
   - Almost always
APPENDIX I

Questions from Huang's instrument used to evaluate discriminant validity.

These items were rated as to 1 (strongly disagree) to 7 (strongly agree).

1. I believe online course syllabus is well presented.
2. I believe assignments are reasonable.
3. I believe grading criteria are clear.
4. I am able to access course materials at any time.
5. I can actively participate in the learning process.
6. I believe course materials will meet my needs.
Questions from Chen’s instrument used to evaluate discriminant validity.
These questions were rated as to flexibility in the class:

1=Extremely Rigid  
2=Very Rigid  
3=Rigid  
4=Moderate  
5=Flexible  
6=Very Flexible  
7=Extremely Flexible

1. Learning activities used in class  
2. Pace of the course.  
3. Attendance  
4. Objectives of the course  
5. Choice of readings  
6. Course requirements  
7. Deadline of assignments
APPENDIX K

Questions from Bischoff’s instrument used to evaluate discriminant validity.

1. Were you provided with a syllabus/outline at the beginning of this course?
   Yes          No

2. If you received a syllabus/outline, select the description that most closely resembles your syllabus:
   Topics and assignments with dates
   Topics and assignments no dates
   Tentative topic list
   Suggested topics and assignments options for student directed topics
   Topics and assignments selected by students

The next four questions are answered using a Likert scale:
   1=Strongly agree to 5=Strongly disagree

3. I have input into what information/content is covered in this course.
4. I have a ‘say’ in what assignments and other learning activities I want to do in the course.
5. I have a ‘say’ in how my grade is determined.
6. I have the freedom to choose the deadlines for my assignments and/or exams.
7. I have a teacher who directs my learning
Rating descriptors for quality and clarity after sort:

The following organization is the result of the initial sort process by three experts. Please rate each descriptor as to its clarity and its quality as it pertains to the category. Evaluate each descriptor for its clarity and quality using a Semantic Differential scale with rating criteria of:

- 0 – not evident
- 1 – minimally evident
- 2 – moderately evident
- 3 – fully evident

<table>
<thead>
<tr>
<th>Listing of Descriptors</th>
<th>Clarity</th>
<th>Quality</th>
</tr>
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<tbody>
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<td><strong>Content Organization</strong></td>
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<td><strong>Syllabus</strong></td>
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</tbody>
</table>
Technical support contact information is provided.

Point value of all assignments is available.

Information regarding student support services is available in the course.

Faculty contact information is present.

Instructor provides guidelines for all student communication.

Information about any pre-requisites or entry-level skills needed is present.

Instructor provides expectations regarding discussion posts or other class interactions (synchronous or asynchronous.)

Guidelines were provided regarding all offline student communication (i.e. posting transcripts of offline meetings for a group.)

Course description is present.

Each course unit/module contains a clear overview of the material to be presented.

<table>
<thead>
<tr>
<th>Course Schedule</th>
<th>Clarity</th>
<th>Quality</th>
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<tbody>
<tr>
<td>Course contains due dates for assignments.</td>
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**Delivery Organization**
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<td>Course provides clear exit/logoff paths.</td>
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<td><strong>Consistency</strong></td>
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<td>Each module/unit is accessed in the same manner throughout the course.</td>
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<td>Each course unit/module contains a single page that communicates all activities to be completed.</td>
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<td>Course unit/modules are presented consistently throughout the course.</td>
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</tr>
<tr>
<td><strong>Flexibility</strong></td>
<td><strong>Clarity</strong></td>
<td><strong>Quality</strong></td>
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<tr>
<td>All assignments including assigned reading is available for access.</td>
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<tr>
<td>Ability to access archived discussions (i.e. synchronous chats or desktop conference meetings) are provided.</td>
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<td>Students can proceed at their own pace.</td>
<td></td>
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<tr>
<td>The course contains flexible or adaptable learning routes.</td>
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<tr>
<td>Students can review previous frames of information unlimited times.</td>
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</tr>
<tr>
<td>Student can pause or re-play any audio or video segment as desired.</td>
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</table>
Previously viewed on screen instructions can be skipped.

Learner has control over the rate of presentation of material.

<table>
<thead>
<tr>
<th>Course Interactions Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Student to Student</strong> Clarity Quality</td>
</tr>
<tr>
<td>Student to student communication behaviors are clearly communicated.</td>
</tr>
<tr>
<td>Student to student communication methods were clearly communicated.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Student to Instructor Clarity Quality</th>
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<tbody>
<tr>
<td>Faculty provides information as to their timeliness of responses to email and student inquiries.</td>
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<td>Instructor is available for phone or F2F conferencing.</td>
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### Item Rating Results

<table>
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<th>Descriptor</th>
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### Delivery Organization

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### Overall

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### Consistency

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### Flexibility

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### Course Interaction

#### Student – Student

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#### Student – Instructor

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Appendix N
Final Working Instrument

Structure Component Tool

Course Title: ______________________________________________________
Rater: ____________________________________________________________

Rate each item as to the degree which the elements are present in the online course.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – not evident</td>
<td></td>
</tr>
<tr>
<td>1 – minimally evident</td>
<td></td>
</tr>
<tr>
<td>2 – moderately evident</td>
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<tr>
<td>3 – fully evident</td>
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</tbody>
</table>

| Listing of Descriptors | | | | | |
|------------------------|--|---|--|---|
| Descriptor | Rating |
| Content Organization | | | | |
| Overall | | | |
| Media such as graphics, animations, diagrams, video, and audio that are utilized are relevant to the course. | | | |
| Objectives match the course exams. | | | |
| Glossary or additional references are provided. | | | |
| Each course unit/module contains clear objectives of the material to be presented. | | | |
| Course objectives are present. | | | |
| Course provides FAQ’s or equivalent. | | | |
| Content/instruction contained in course is appropriate for the target audience. | | | |
| Syllabus | | | |
| Instructor grading policies are present. | | | |
| Participation requirements are provided. | | | |
| Contains information regarding course policies (i.e. late assignments, make-up policies, etc.) | | | |
| Technical support contact information is provided. | | | |
## Appendix N (Continued)

<table>
<thead>
<tr>
<th>Point value of all assignments is available.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information regarding student support services is available in the course.</td>
</tr>
<tr>
<td>Faculty contact information is present.</td>
</tr>
<tr>
<td>Instructor provides guidelines for all student communication.</td>
</tr>
<tr>
<td>Course provides detailed directions on how to submit each assignment or activity.</td>
</tr>
<tr>
<td>Information about any pre-requisites or entry-level skills needed is present.</td>
</tr>
<tr>
<td>Instructor provides expectations regarding discussion posts or other class interactions (synchronous or asynchronous.)</td>
</tr>
<tr>
<td>Guidelines were provided regarding all offline student communication (i.e. posting transcripts of offline meetings for a group.)</td>
</tr>
<tr>
<td>Course description is present.</td>
</tr>
<tr>
<td>Each course unit/module contains a clear overview of the material to be presented.</td>
</tr>
</tbody>
</table>

### Course Schedule

<table>
<thead>
<tr>
<th>Course contains due dates for assignments.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course contains assignments by week (or other time unit, including calendar dates.)</td>
</tr>
<tr>
<td>All exam or assessment dates are provided.</td>
</tr>
<tr>
<td>Suggested begin dates for each unit/module are provided.</td>
</tr>
<tr>
<td>Contains a course calendar that includes important course dates.</td>
</tr>
</tbody>
</table>

### Delivery Organization

<table>
<thead>
<tr>
<th>Overall</th>
</tr>
</thead>
</table>
### Appendix N (Continued)

<table>
<thead>
<tr>
<th>Course provides a layout screen (homepage) that is clear, clean, and well organized.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course provides on screen instructions that are simple, clear, and concise of how to begin.</td>
</tr>
<tr>
<td>Student has the ability to bookmark areas of the course.</td>
</tr>
<tr>
<td>Course provides clear exit/logoff paths.</td>
</tr>
</tbody>
</table>

**Consistency**

| Course has a menu that remains constant as the student moves within the course. |
| Course provides on screen navigation (i.e. breadcrumbs) to let the learner know where they are in the course. |
| Each module/unit is accessed in the same manner throughout the course. |
| Course has a menu that remains constant as the student moves within the course. |
| Each course unit/module contains a single page that communicates all activities to be completed. |
| Course unit/modules are presented consistently throughout the course. |

**Flexibility**

| All assignments including assigned reading is available for access. |
| Ability to access archived discussions (i.e. synchronous chats or desktop conference meetings) are provided. |
| Students can proceed at their own pace. |
| The course contains flexible or adaptable learning routes. |
| Students can review previous frames of information unlimited times. |
| Student can pause or re-play any audio or video segment as desired. |
Previously viewed on screen instructions can be skipped.

Learner has control over the rate of presentation of material.

### Course Interactions Organization

#### Student to Student

Student to student communication behaviors are clearly communicated.

Student to student communication methods were clearly communicated.

#### Student to Instructor

Faculty provides information as to their timeliness of responses to email and student inquiries.

Instructor is available for phone or F2F conferencing.

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About the Author

Cheryl Sandoe received a Bachelor’s Degree in Marketing from the University of South Florida in 1987 and a M.S. in Education from the University of South Florida in 1997. She began her career as a Technology Specialist in the Pinellas County, Florida public school system. While teaching she began pursuit of her Doctorate. She made a job change to a Research Assistant for Educational Outreach at the University where she assisted the department in researching current theories and aspects of distance learning. After about two years working for Educational Outreach she became an Instructional Designer for the College of Nursing. Upon completion of all of her doctoral coursework she took a job as the Director of Instructional Technology at a local community college.