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A Model for Assessing the

Quality of Learning in Distance Education

by
George C. Lassetter, III

B.S. June 1973, United States Naval Academy
M.P.A. December 1979, Golden Gate University

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Approved by:

Dr. Nina Brown, Dissertation Chair	Dr. Anne Raymond-Savage, Member
Dr. Rebecca Bowers, Ph.D. Director	Dr. Steve Gaither, Member
Dr. Donna Evans, Dean	Dr. Bob MacDonald, Member

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ABSTRACT

A Model for Assessing the Quality of Learning in Distance Education

George C. Lassetter, III
Old Dominion University, 1995
Director: Dr. Rebecca S. Bowers

The factors contributing to the quality of learning in distance education were investigated. These factors were used to develop an empirically based model for the assessment of the quality of learning in distance education. The affective, cognitive, and conative domains of learning and the ethical domain of distance education were defined and used as the theoretical foundation for a search of distance education studies and evaluations that identified over 150 variables that potentially affected quality of learning. A Delphi technique was used to validate the variables and construct a survey instrument. Surveys were distributed to 3 groups totaling 523 students attending 4 classes during the Fall, 1995 semester at ODU. The three groups were Teletechnet students (class via satellite), studio students (class at the satellite transmission site), and students attending identical on-campus classes taught by the same instructor. Tests of significance for the demographic data, and ANOVA, MANOVA, and factor analyses for the scale data were conducted for the 248 surveys returned. There were 3 significant demographic differences between Teletechnet and on-campus students: age ($p < .01$), student status ($p < .001$), and work status ($p < .01$). There were no significant differences between the on-campus and studio classes and these classes were combined for the factor analysis. The factor analysis reduced the 150 variables to 7 factors for Teletechnet students and 8 factors for on-campus students that accounted for over 50% of variance in the analysis. These factors

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were given descriptive names and their contribution to variance was used to construct the quality of learning assessment model for distance education. These factors showed Teletechnet students more concerned with the lower levels of the cognitive domain of learning and on-campus students more concerned with the higher levels of the cognitive domain. The analysis showed that neither technology nor affective domain related variables contributed significantly to the factors defining the quality of learning for these students. It was recommended that evaluations for Teletechnet and on-campus students contain questions to reflect the factors that are most important to each group and that courses be designed to facilitate student interchange at distant sites.

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DEDICATION

This dissertation is dedicated to my wife, Kathy, for the support and confidence that she provided during this long process.

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ACKNOWLEDGMENTS

It is impossible for words to sufficiently describe the impact Dr. Nina Brown, my Dissertation Chairperson, had on me and this process. Her encouragement, guidance, critical analysis, and accessibility made completion possible. I am also grateful for the timely and thought provoking reviews of my numerous drafts by the Dissertation Committee members Dr. Anne Raymond-Savage, Dr. Steve Gaither, and Dr. Bob MacDonald.

Four professors also played an important role in the completion of this dissertation by allowing me access to their students for completion of the quality of learning questionnaire: Dr. Jack Grimes, Dr. Thomas Cash, Mr. Michael Zugelder, and Dr. Dwight Allen. Thank you.

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Chapter 1

Introduction

Six decades of studies and evaluations of distance education programs utilizing a variety of measures (Moore, 1989) yielded the almost unanimous conclusion that distance education programs provided educational experiences equivalent to their traditional, campus-based counterparts in a variety of situations. These studies focused on effectiveness of distance education by comparing it to an assumed ideal of traditional, campus-based education, and on the use of technology to create more campus-based characteristics within distance education. Hawkins (1991) described this first phase of research as concentrated on understanding the potential of distance education, its effectiveness, and needed supports. Hawkins also called for research in distance education to move to a second phase, where the impact of distance education on the learning and social functioning of its students was assessed. Further, Moore (1989) suggested that empirically based studies of distance education were a necessity to develop a strong foundation and framework for the discipline of distance education.

Equally important was the identification of other educational experiences which were taking place in the distance education environment. Discovering these experiences

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required a new paradigm -- A Model for Assessing the Quality of Learning in Distance Education.

Statement of the Problem

Advances in telecommunications technology led to over 1500 distance education courses being offered for credit by 298 institutions. Despite this proliferation, existing data on effectiveness was largely qualitative and anecdotal (Moore, 1989; Verduin & Clark, 1991). This exploratory, quantitative research focused on the development of an empirical model to assess the quality of learning in distance education. The problem investigated was defined as "What factors contributed to the quality of learning in distance education?" This research problem was operationalized as four hypotheses:

1. There will be no significant difference among on-campus, studio, and Teletechnet students on demographic variables.

2. There will be no significant difference in the order among on-campus, studio, and Teletechnet students of factors extracted for the domains of learning.

3. There will be no significant differences among on-campus, studio, and Teletechnet students for the number of items rated as considerable impact (4) and significant impact (5).

4. There will be no significant difference in the order of factors derived for the on-campus, studio, and Teletechnet students.

Purpose of the Study

The purpose of the study was to develop a model for evaluating the quality of learning in distance education. This study defined the current factors differentiating the

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quality of learning in distance education from traditional, campus-based education; examined the validity of these factors with a review panel of experts in the field of distance education; tested these validated factors in four courses of study at Old Dominion University; and assembled these factors into a quality of learning assessment model for distance education.

The need for a rigorous model for assessing quality of learning in distance education was further focused and amplified by an understanding of key periods in the development of distance education, by corresponding periods in education and society in general, and by an understanding of distance education and the distance learner.

Distance Education Defined

In the broadest sense, distance education is the use of a technological media to assist in spanning the distance between geographically dispersed teachers and students. This definition encompasses all of the current forms of distance education with correspondence courses, one-way and two-way video, two-way audio via radio and telephone hook-ups, and computer conferencing being the most utilized. It has been argued that broadcast radio and television, newspapers, and magazines are also suited to this broad definition of distance education. A variety of authors have developed recommended essential characteristics of distance education programs and gained added precision in the definition of distance education (Keegan, 1986; Garrison and Shale, 1987; Moore, 1987; Verduin and Clark, 1991; Evans and Nations, 1993; Cartwright, 1994).

Common to all definitions of distance education are (a) the geographic dispersion of the student and teacher, (b) the use of media or technology to bridge this distance, and

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(c) the provision for two-way communications between the student and teacher. An additional characteristic in most of the definitions is the importance of the influence of an educational organization for accreditation of programs; and counseling, advising, and assistance for students.

This academic definition of distance education implies that it is possible to earn a college degree without physically entering a traditional college classroom. While colleges and universities have been retreating from in loco parentis in recent years, concerns were being raised over the quality of education at many campuses, and distance education was not immune to these concerns. Gaining an historical perspective of the growth of distance education from correspondence courses to full degrees provided aid in understanding this quality concern.

Historical Summary

Distance education has been defined by the technology available throughout its 100 year history. In the late nineteenth century, the printing press and the railroad made possible the delivery of the first correspondence courses from The Pennsylvania State University to remote farmers eager to take advantage of advances in agriculture developed at this land grant institution. Obviously, delivery was dependent on the railroad schedule, and feedback was long in coming.

The first half of the twentieth century brought the development of radio, television, and the telephone. Delivery of lectures and training could supplement the written correspondence courses, dependent only on the availability and schedules of the radio and television broadcasters. This second generation of distance education continued to evolve

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during the second half of the twentieth century with limited computer use and satellite transmission of video and audio over systems owned and operated by educational institutions. The systems available and in use today represented a wide variety of combinations of available technology. These technologies included (a) one-way video and two way audio, (b) two-way audio and video, (c) electronic-mail, (d) fax, (e) voice-mail, (f) regular mail, (g) computers, and (h) telephone. Available, but not used extensively, were interactive computer facilities (or computer conferencing) that held promise for distance education's pursuit of its third generation. Internet use and commercial on-line information services use increased dramatically, providing evidence of the deep and widespread potential of this coming generation of distance education.

Technological innovations, ensured of continuing at an ever-increasing pace, will have the potential to impact distance education in many ways. This fact made essential the development of an assessment model independent of underlying technology. Technology had to be the medium, not the message.

Distance education and its enabling technology were only the latest in a series of phenomena that impacted access to higher education in its 300 year history. The late 1800's and the industrial revolution fueled society's demand for more sciences and modern languages, and more relevance in the universities' curriculum. The 1862 Morrill Act and the 1887 Hatch Act brought the Federal government into higher education, first with land granted to states to start colleges for the teaching of agriculture and then with money to these colleges for agricultural research. Two world wars and a depression later, in 1944, access to higher education was revolutionized with the G. I. Bill. Soldiers and

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sailors from two world wars descended upon campuses in search of an education and their ticket to a good job in the post-war economy. The sixties and seventies saw the development of community colleges and junior colleges, which resulted in still greater access to post-secondary education. As the catalyst for distance education, the information and technical revolution paved the way for the potential to have an even greater impact on higher education than any of the previously discussed phenomena. The maturation of the information revolution into the information age increased the impact of distance education. As this impact increased, more needed to be known about people taking advantage of distance education, i.e. the distance learners.

As society moved through this information revolution and into an information society, distance education and the distance learner became more prevalent. Working adults comprised half the student population in the United States in late 1994 (Halal and Leibowitz, 1994). A closer examination of these distance learners is warranted.

The Distance Learner

There were three groups of distance learners: (a) place-bound, (b) returning and time-bound, and (c) equality-of-access-bound. Place-bound distance learners were initially rural teachers, military personnel, and members of isolated communities. Their situation made campus-based education impractical, if not impossible. They formed one of the largest groups of distance learners. A second group of distance learners continued to grow. These were professionals seeking an advanced degree to improve their position, mothers coming back into the work-force both voluntarily and out of necessity, and others who did not start (or finish) directly from high school. These individuals were the time

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bound. The distance from the campus was unimportant. Their work and family commitments made attendance on campus untenable, but their desire for furthering their education was just as great. The final group of distance learners was equality-of-access-bound. These potential learners may have been disabled, incarcerated, under long-term hospital care, or in circumstances beyond their control that prevented their pursuit of a campus-based education.

A demographic snapshot (Verduin & Clark, 1991) was useful in further understanding the different groups of distance learners. The majority were mostly female (58%) and married (61%). Four fifths (80%) were part-time students and just under three quarters (71%) were employed full-time. The majority (61%) were paying their own way through school. They tended to be older than the traditional college student, as 75% were between the ages of 25 and 44. The vast majority (90%) were within a 45-minute drive of the campus, and two thirds were also enrolled in on-campus courses. This demographic profile will probably continue to shift toward the time-bound and equality-of-access-bound distance learner given the pressures seen in today's society and described in chapter 2.

Need for Continued Development

There were numerous pressures on society, education in general, and distance education in particular during society's transition to an information base. The most obvious was the economic reality of maintaining quality service despite budget cuts and downsizing. These economic pressures necessitated surviving an environment of almost continuous change, a constant state of flux caused by the continuous flow of new information which in turn created the need to realize continuous improvement. Other

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pressures in today's society included a new emphasis on accountability for products, for services, and for ourselves and a new emphasis on customer service and support.

A prerequisite for society transforming into an information society was efficiency and effectiveness of process, product, and people. This efficiency and effectiveness were key motivators for corporate America who responded with Total Quality Management (TQM) and what was essentially a zero tolerance for failure. These programs stemmed from the realization that it was far more cost effective and efficient to have quality designed into a process and the resultant product than to attempt to "inspect in" quality after the fact (Senge, 1990; Carey, 1992). Education had historically resisted this movement; maintaining built-in, traditional, and accepted failure rate was natural and needed (Bonstingl, 1992; Freeman, 1987). Limitations in space and faculty at educational institutions had supported this stance, but as distance education continued to develop and mature at traditional, campus-based institutions, this argument lost appeal.

Distance education practitioners, administrators, and proponents must be prepared to defend their craft not only as equivalent to traditional education, but also, in some very important ways, as superior and more effective in achieving particular goals of the institution. The following section deals with the need and rationale for the Model for Assessing the Quality of Learning in Distance Education.

Rationale

Background

Six decades of research and evaluation in distance education assumed traditional, campus-based education as the ideal model for distance education to emulate. These

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studies were designed to compare and contrast the process and product of traditional and distance education. This traditional planning process depended on a stable substrate of goals and objectives. The process tended to break down when goals and objectives changed faster than they could be implemented, (Walker, 1993) which can happen in distance education. The political visibility of distance education with its low unit cost and ready accessibility, appeared to ensure that its objectives would be in a continuous state of flux (Evans, 1993) for the foreseeable future. This change and political visibility provided an opportunity to build an empirical assessment model based not on existing traditional courses but on well established learning theory. It is possible that distance education will be shown to be superior to traditional education in some very important aspects and measures. More information is needed on how the quality of learning can, and should be assessed in the distance learning environment.

Unique Aspects of Distance Learning

Instructional technology and delivery technology had differing impacts on distance education and the distance learner (Clark, 1989). Delivery technology enhanced and increased student access; instructional technology enhanced student achievement. As Clark said, media ". . . do not influence learning any more than the truck delivering groceries influences the nutrition of a community" (p. 3). Stated another way, ". . . learning seems to be affected more by what is delivered than by the delivery system" (Schramm, 1977, p. 273). The delivery technology was important as it enabled the process of distance education; therefore, must be assessed and evaluated. The fundamental purpose of distance education was the provision of the educational experience to place-

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bound, time-bound, and equality-of-access-bound students. Models for the assessment of learning in distance education needed to address that purpose independent of the implementing delivery technology.

Also unique was how distance education tended to go through three distinct phases when introduced in a traditional, campus-based institution. The first phase was a period of proving the technological reliability of the systems in place. This was followed by a period of concentrating on support service availability for the systems and the people taking advantage of them. Finally, there was a period of organizational adaptability when the new system became another educational tool in the institution's toolbox or remained on the periphery, never really accepted as an equal partner (Wagner, 1993). Available studies did not appear to have addressed the phase of the particular program being assessed or its impact on that assessment. Assessment of quality of learning also needed to address program status within the institution.

Warnings, predictions, cynicism, and advice were abundant in any discussion, conference, or literature on distance education. The following examples served as a warning to distance educators and as further justification of the need for an assessment model that does more than compare distance education student test scores to campus-based test scores.

"Education in the year 2000 will be radically different" (Smith, 1987, p.1).

"Lectures are a way to transfer materials from the lecturer's notes to the student's notes without passing through the minds of either" (Jevons, 1987, p.19).

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"It is not possible to provide an education for the 21st Century without the new technology" (Commonwealth of Virginia, 1991, p.8).

". . . technology must be given a larger role in meeting the challenges that higher education faces" (DeLoughry, 1992, p.20).

"Interactive multimedia to revolutionize education, people learning many different subjects in many locations" (Halal, 1994, p.21).

". . . the concept of interaction has changed. . . . it is the computer which is changing our definition" (Raymond-Savage, 1994).

Importance of the study

Distance education and the technology with which it was implemented were critical to higher education as it moved through the information revolution and into the information age. Knowing the capabilities and limitations of distance education and technology in delivering learning was critical to judging that success. The Model for the Assessment of the Quality of Learning in Distance Education was aimed at that goal. This model was also the first attempt to step beyond the test scores and the technology and take a critical look at only the learning aspects of distance education. Taking this step required making a few assumptions and identifying the limitations and delimitations of the model.

Assumptions

The ultimate responsibility of distance education was identical to that of traditional, campus-based higher education -- to foster student learning and personal development (Kuh, 1993).

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Distance education was the combination of many processes, technologies, theories, and beliefs -- the whole of which is greater than the sum of these parts. This was to say that there were spontaneous or serendipitous learning events that occurred, neither planned nor anticipated, that contributed positively to the quality of learning in distance education (Raymond-Savage, 1994).

Limitations

The distance learner was not easily classified or defined. The only characteristics shared by all were the inability to, or preference not to, attend on-campus programs or classes and the desire to further their education.

The variables for the model were factors of the three domains of learning (cognitive, affective, and conative) and the ethical domain of distance education. These factors will be operationalized in the literature review.

Delimitations

This research was focused on post-secondary, pre-graduate distance education, as primary, secondary, and post-graduate distance education programs had necessarily different goals, objectives, and challenges.

Only distance education programs that were affiliated with traditional, campus-based four-year institutions were considered.

This research was delimited by the inability to foresee the potential consequences of the rapid advancement of digital technology in telecommunications on distance education.

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Many public and private institutions of higher learning began distance education initiatives. Service to clientele and broadening the clientele base were often among the reasons for the initiative; therefore, one must consider why these initiatives were particularly important to urban education.

Urban Education Perspective

The differentiating characteristic of an urban university is its ability to have a positive impact on, and to foster mutually rewarding relationships with, the historically underrepresented people and the surrounding community. Distance education provides the means for ready accessibility and low unit cost that can be instrumental in attracting these groups in large, urban population centers (Moore, 1989; Ohler, 1989). Distance education is well positioned to assist urban higher education in addressing the unprecedented challenge it is facing, becoming a welcoming and hospitable environment for members of the historically underrepresented racial and ethnic minorities that make up its community (Kuh, 1993). The distance in distance education can be measured in city blocks or in country miles.

Developing an empirical model to assess the quality of learning in distance education demanded a deliberate, methodological research process. An examination of that process follows.

Organization of the Research

This research consisted of three phases. Phase one presented the theoretical foundation for the assessment of quality of learning. Phase two identified and validated the measurable and observable factors related to the quality of learning. The final phase

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assembled factors into a model for the assessment of the quality of learning in distance education. Operationally, these three phases became a ten-step research process listed here.

1. Identification of variables used in previous research;
2. Sorting variables into domains of learning;
3. Instructors' review of variables;
4. Contact panel of experts, select classes;
5. Review of variables by panel of experts;
6. Construct survey questionnaire;
7. Administer survey to selected classes;
8. Preliminary statistical analysis to describe differences between classes;
9. Exploratory factor analysis on combined class data, on-campus data, and Teletechnet classes data; and
10. Interpretation and reporting of results.

These ten steps are expanded in subsequent chapters.

Distance education and the technology involved in its implementation vocabularies are presented in Appendix A.

Chapter Organization

A brief history of distance education and the need for a model to assess the quality of learning in distance education has been presented. Chapter II will present a review of the distance education literature focused on building the theoretical foundation for quality of learning assessment and searching for the factors of quality of learning in studies,

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evaluations, conference proceedings, and on the Internet. Particular attention will be paid to any discussions of what has been defined as the ethical domain of distance education. Chapter III details the methodology to be followed in constructing the assessment model. Chapter IV presents the results of analysis used to synthesize and validate the rating scale data collected and provides an explanation of how the data is used in the construction of the assessment model. Chapter V discusses the implications and conclusions of the study and suggestions for future research.

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Chapter 2

Literature Review

This chapter presents a progression through the literature of distance education focused on defining the variables potentially impacting the quality of learning in distance education. After a review of the need for empirical, quantitative research in distance education, a theoretical foundation for quality of learning assessment is built based on the open systems model of higher education (Getzels & Guba, 1957) and the domains of learning.

The trends and themes of the distance education literature are investigated based on the developed foundation,. Six trends and themes are identified and described -- understanding the structure necessary for support, defining the field, defending the field, redefining the field, refining the definition, and demanding inclusion in higher education's preparation for the future. Along with these trends, three gaps in current research are identified and how this research will help close those gaps is described.

The focus then turns to the identification of potential quality of learning variables that have been used in previous studies and evaluations in distance education. Four broad categories of studies and evaluations are reviewed: student achievement, instructor skills, student access and control, and environmental factors.

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This progression through the literature leads directly to the need for this assessment model and a database of over 150 potential variables to consider for this model.

Previous Findings

A computer search of the literature utilizing ERIC, The Pennsylvania State University's on-line American Journal of Distance Education, and distance education newsgroups on the Internet managed by a variety of colleges and universities revealed three categories of discourse on distance education: research studies; reviews of research; and, theory and practice issue papers, monographs, and books. During the period 1939 to 1994, over fifty studies of distance education were identified. All of these studies evaluated distance education as compared to traditional, campus-based education. Most also found that distance education was as effective as, or better than, the traditional methods when evaluated on a wide variety of measures. The research reviews, while confirming this assessment, added significant caveats. Hoyt (1972) noted that fourteen of the twenty-one evaluations reviewed were nothing more than subjective, enthusiastic descriptions of on-going programs by people with vested interests in the program. Clark (1989) called for a change in the evaluation method used for distance education, proposing that there was more to evaluation than the statistical similarities of test scores. The Congressional Office of Technology Assessment (1989) stated that most research had only dealt with the motivated adult or the college-bound secondary student. Johnstone (1991) stated that distance education needed a broader measure to ensure the delivery of quality education to all learners.

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Finally, Wagner (1993) developed an approach for conducting decision-making evaluation of distance education utilizing Stuffelbeam's Context - Input - Process - Product (CIPP) model. The stated purpose of the evaluation approach was cross-project comparability on (a) effects of technology on student achievement, (b) effective mix of technology for delivery, and (c) cost-benefit variables. The Wagner paper was important because it was the first which focused solely on distance education. It was important for that reason, but it focused on the technology of distance education. However, the focus needed to include the distance learner and the learning process.

In order to address the need for empirical research in the field of distance education and build upon technological effectiveness and previous program evaluation research, it was necessary to closely examine the learning process itself and how it related to distance education. The open systems model provided a framework for examining this learning process within the larger context of higher education.

Theoretical Foundation

Systems models consisted of three steps: Input→ Process→ Output. In an open system, each of these steps interacted with the environment outside the system. For this simplified model of higher education, the student was the input, a college education was the process, and the output was an educated individual ready to take his place in society. Environmental forces affecting the input stage included (a) the perceptions, valence, and expectancy of the student; (b) the culture of the institution, the distance learning center, and the student body; (c) the institutional mission; and (d) the expectations, training, and perceptions of the instructor. At the process stage, the environmental forces included the

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technology available, the standards of the institution and its governing body, and the faculty of the institution. The demands of society made up the environmental forces acting on the output of this simplified model. The success or failure of this output served as feedback to the institution, its culture, and its faculty. It was the process stage of the model that was the focus for this study.

Based on the Getzels and Guba (1957) social systems model, a single unit (a class or course) of the educational process was dissected in a fashion similar to the higher education model.

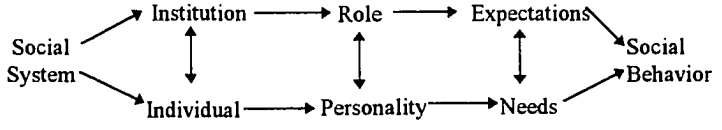

Figure 1. Getzels-Guba Model.

Modified for distance education, the Social System became the distance education class, the Institution became the Instructor/Institution, the Social Behavior became learning, and technology was inserted between all double-headed arrows (the interactions). The model, modified for distance education, is presented in Figure 2.

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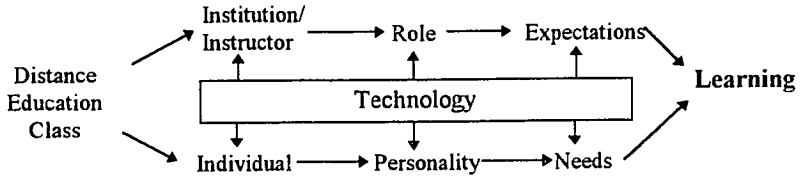

Figure 2. Getzels-Guba modified for distance education.

The models have graphically shown the potential impact of technology in the distance education class. The technology and the interactions of the model were topics for research that frequently used test scores as a surrogate measure for learning. As Johnstone (1991) and Hawkins (1991) concluded and recommended, it was time for the field of distance education to move to broader measures of effectiveness and ask how distance education was impacting the learning of students.

Domains of Learning

Four processes were identified in the distance education literature that affected or potentially affected the quality of learning in distance education (Atman, 1987; Verduin and Clark, 1991; Wagner, 1993): the cognitive, affective, conative, and ethical domains of learning. Three related directly to the learner and were accepted descriptions of the major categories of learning in their respective domain (Grolund and Linn, 1990; Atman, 1987); i.e., cognitive, affective, and conative. These three processes were also observable or measurable and hierarchical. The fourth related to the level of ethical quality of the distance education program itself. A graphical depiction of this framework is presented in

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Figure 3. The psychomotor domain of learning (Simpson, 1972) was excluded because previous research (reviewed in Verduin and Clark, 1991) indicated that this domain was best suited for "work in vocational-technical, esthetic, and recreational and leisure areas..." (p 152) which was not the focus of this research.

The taxonomy of each of these learning domains is described and defined in the following discussion.

The Cognitive Domain of Learning: (Bloom, 1956). The cognitive domain concerns the acquisition and utilization of knowledge on a continuum of increasing development from simple knowledge acquisition to complex value judgments based on knowledge gained. The hierarchy is defined in order of increasing cognitive development.

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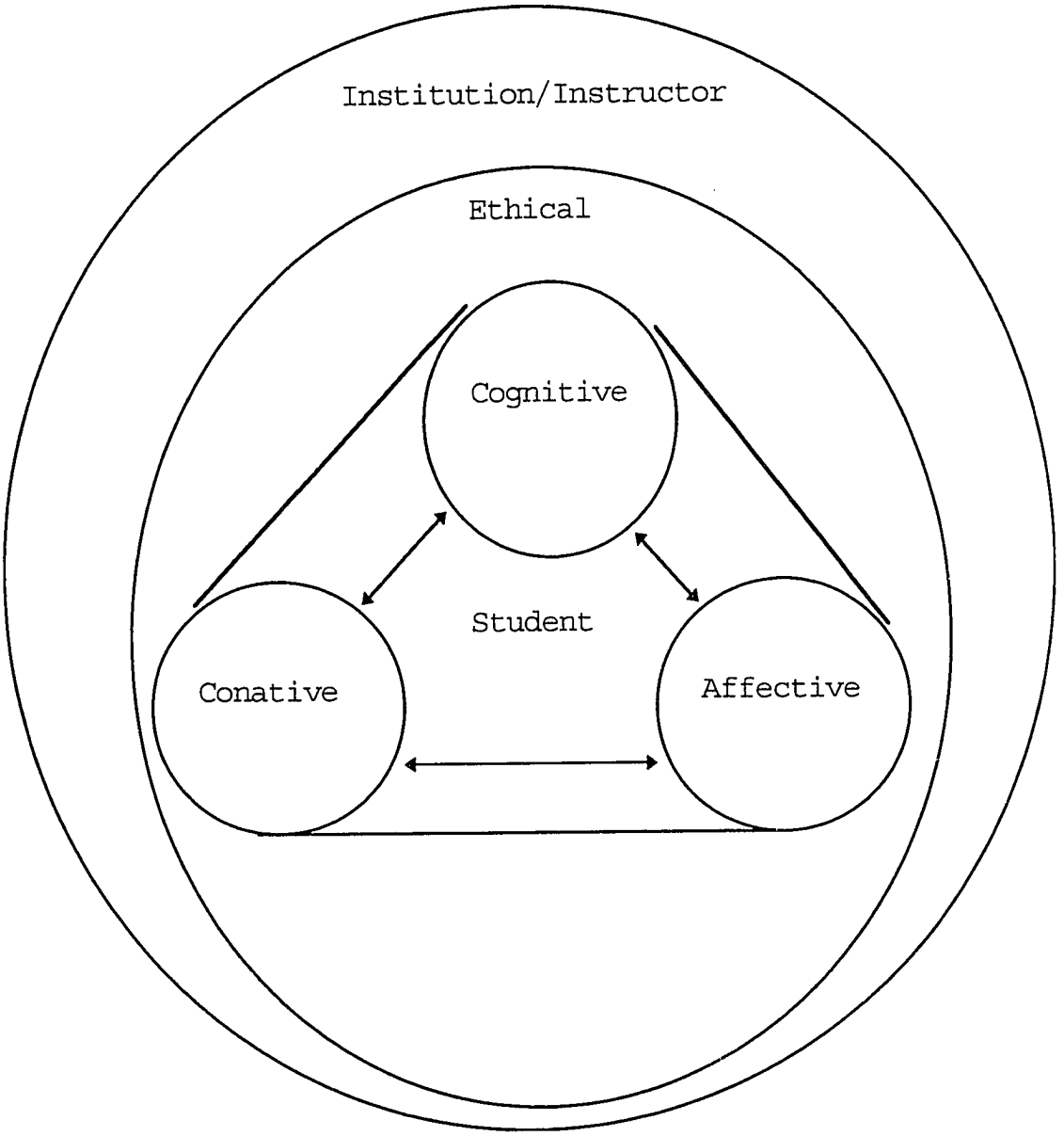

Figure 3. Learning domain framework.

Knowledge -- Knowledge is defined as the remembering of previously learned material involving the recall of a wide range of material, from specific facts to complete

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theories. Knowledge represents the lowest level of learning outcomes in the cognitive domain.

Comprehension -- Comprehension is defined as the ability to grasp the meaning of material. This is shown by translating material from one form to another, by interpreting material, and by estimating future trends. These learning outcomes go one step beyond the simple recall of material and represent the lowest level of understanding.

Application -- Application is defined as the ability to use learned material in new and concrete situations. This ability includes the application of such things as rules, methods, concepts, principals, laws, and theories. Learning outcomes of this level require a higher level of understanding than those under comprehension.

Analysis -- Analysis refers to the ability to break down material into its component parts so that its organizational structure may be understood. This includes the identification of the parts, analysis of the relationships between parts, and recognition of the organizational principles involved. Learning outcomes here represent a higher intellectual level than comprehension and application because they require an understanding of both the content and the structural form of the material.

Synthesis -- Synthesis refers to the ability to put parts together to form a new whole. This involves the production of a unique communication, a plan of operations, or a set of abstract relations. Learning outcomes in this area stress creative behaviors, with major emphasis on the formulation of new patterns or structures.

Evaluation -- Evaluation is concerned with the ability to judge the value of material for a given purpose. The judgments are to be based on definite criteria. These may be

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internal criteria or external criteria, and the student determines the criteria or is given them. Learning outcomes in this area are highest in the cognitive hierarchy because they contain elements of all of the other categories plus value judgments based on clearly defined criteria.

Verbs typically used within this domain for stating learning objectives and outcomes include define, describe, convert, defend, change, compute, break down, diagram, categorize, combine, appraise, compare.

The majority of distance education studies reviewed made measurements and comparisons within this domain. These studies showed that distance education methods and technologies can effectively assist students move up the hierarchy of cognitive development. Only a few studies, based on anecdotal data, attempted to look at the affective domain of learning within distance education classes.

The Affective Domain of Learning: (Krathwohl, 1964). The affective domain is concerned mainly with the inner growth of learners as they received, become aware of, and begin to adopt certain attitudes and principles that define their behavior. The hierarchy is defined in order of increasing affective development.

Receiving -- Receiving refers to the student's willingness to attend to particular phenomena or stimuli. Learning outcomes in this area range from the simple awareness that a thing exists to selective attention on the part of the learner. Receiving represents the lowest level of learning outcomes in the affective domain.

Responding -- Responding refers to active participation on the part of the student. At this level he or she not only attends to a particular phenomenon but also reacts to it in

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some way. Learning outcomes in this area emphasize acquiescence in responding, willingness to respond, or satisfaction in responding. The higher levels of this category include those instructional objectives that are commonly classified under interest.

Valuing -- Valuing is concerned with the worth a student attaches to a particular phenomenon, object, or behavior. This ranges in degree from the more simple acceptance of a value to the more complex level of commitment. Valuing is based on the internalization of a set of specified values, but clues to these values are expressed in the student's overt behavior. Learning outcomes in this area are concerned with behavior that is consistent and stable enough to make the value clearly identifiable.

Organization -- Organization is concerned with bringing together different values, resolving conflicts between them, and beginning the building of an internally consistent value system. The emphasis is on comparing, relating, and synthesizing values. Learning outcomes become concerned with the conceptualization of a value or with the organization of a value system.

Characterization by a value or value complex -- At this level of the affective domain, the individual has a value system that has controlled his behavior for such sufficient time that lifestyle has developed and behavior has become pervasive, consistent, and predictable. Learning outcomes at this level covers a broad range, but the major emphasis is on a typical behavior being developed.

Verbs typically used within this domain for stating learning objectives and outcomes include ask, choose, answer, assist, complete, explain, adhere, arrange, influence, qualify.

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A third important domain of learning had not been addressed by researchers in distance education until Atman's 1987 article in The American Journal of Distance Education. The cognitive and affective domains implied and assumed that the necessary actions would take place for the student to proceed up the respective hierarchies. These domains did not consider the energy required to move from stage to stage. The conative domain includes the personal energy required of the students to progress through their studies and to their goals. Research to date in distance education contained mostly qualitative and anecdotal evidence of the impact of the conative domain on distance education and the distance learner.

The Conative (Striving) Domain of Learning: (Atman, 1987). The conative domain of learning concerns the volition, will, energy, and motivation of learners in pursuing the learning process. The hierarchy of the conative domain is described below in order of increasing conative development.

Perception -- The perception stage occurs when the individual is open to all forms of sensory and intuitive stimuli. The environment is discerned through a continual, intelligent scanning process. Everything is seen as a flow, a whole, a set of relationships. Energy levels are low.

Focus -- Focusing happens when the individual brings items, events, or individuals into clear relief, distinguishing them from their background. A goal is set, giving the focused information clarity and value. This initial energy is used to formulate ways in which goals could be accomplished.

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Engagement -- At the engagement stage, work begins toward goals, information gained is used, extraneous information is disregarded, and questions are asked to clarify issues. The individual is progressively energized during this stage.

Involvement -- Five attention levels are identified at this stage. The first four stages are entered at any of these five levels. Involvement at this stage depends upon involvement at previous stages. The five attention levels are as follows:

1. Minimal -- The individual is present in body only.

2. Cursory -- The individual takes only superficial action.

3. Perfunctory -- The individual is grudgingly acquiescent and exhibits mechanical behavior.

4. Thorough -- The individual is in control of self, oriented toward competent performance.

5. Absorbed -- The individual is still in control, but is likely to lose track of time.

Transcendence -- The individual becomes totally immersed in the task and participates wholly, totally, and without self-recrimination. Individual energy begins to taper off as energy is drawn from the task.

The final domain being considered shifts the concentration from the distance learner to distance education programs, practitioners, and their impact on the learner. Ethics is essentially concerned with exploring how we should act in relation to others. No code of ethics existed for distance educators (Reed and Sork, 1990), and little research

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was found on ethics in distance education. But, as defined in the next section, ethics had potential to be an important factor in determining quality of learning in distance education.

The Ethical Domain of Distance Education: (Duning, 1993). The ethical domain is concerned with the equity, climate, autonomy, and relationships within distance education. Each is defined.

Equity -- Defined as accessibility to educational resources, just and impartial treatment, and educational opportunity for all students. These are oft-used justifications for investment in distance education technologies. The important questions are accessibility by whom and opportunity for whom.

Climate -- Defined as the atmosphere, the attitude, and the interplay of people, structure, and culture in the learning environment.

Autonomy -- Defined as the self-direction, independence, and self-control of the individual over his or her learning environment.

Relationships -- Described as the entrepreneurial relationship, the customer service perspective, that has developed between the distance learner and the distance educator. Has this new student teacher relationship been a barrier to wider diversity of participation in distance education? The vocabulary of selling and marketing may not be well tuned to multicultural sensibilities.

The theoretical foundation established for building a model for the assessment of the quality of learning in distance education was one that emphasized learning as a central construct in the open systems model of higher education. Learning has also been operationally defined within distance education by two accepted domains of learning

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(affective and cognitive), one new domain of learning (conative), and one proposed domain of distance education (ethical). It has also been shown that, to this point, distance educators and researchers had been satisfied with using surrogate measures to assess quality of learning.

The need for this type of model was supported by an examination of the current trends and themes in the field of distance education.

Trends and Themes in the Literature

Inflection

The inflection point in the development of the field of distance education in the United States was the year 1987. Inflection implied change of direction and, in 1987, the field of distance education moved from an emphasis on understanding the potential, limitations, and supports needed for distance education programs (Hawkins, 1991; Moore, 1989) to an emphasis on defining the field of distance education (Moore, 1987). Moore's 1989 review of distance education research for the Office of Technology Assessment pointed out the early emphasis on understanding the field in the reviews of effectiveness studies (Blackwood and Trant, 1968; Boswell, Mocker, and Hamilton, 1968; Hoyt and Frye, 1970; Puzzoli, 1970; Chapanis, 1976; Vandehaar, 1986); student attitude studies (Davis, 1984; Smeltzer, 1986); teaching behavior studies (Haaland and Newby, 1984; Shaeffer and Roel, 1985); instructor skill studies (Monson, 1980; Bronstein, Gill, Kineman, 1982); program design studies (Batey and Cowell, 1986); and course and curriculum development studies (Parker and Monson, 1980; Hezekiah, 1986).

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Defining the Field

The move toward an emphasis on defining the field was shown clearly in the editorial and articles in the premier issue of The American Journal of Distance Education (1987). The editorial by Michael G. Moore discussed the lack of consensus for a definition of distance education. An article by Garrison and Shale (1987) critiqued earlier definitions of the field and offered its own composit definition. Other books and essays during the same period dealt with topics related to defining the field of distance education. Smith and Kelly (1987) edited a collection of essays that discussed the convergence of distance education and mainstream education -- convergence in methods, in clientele, and in movement toward learner-centered learning. These essays also listed the many advantages of distance education and lamented the second-class citizen status of distance education programs and courses. Other writings indicative of this definition stage included Freeman's 1987 definition quality in distance education, which included requirements for maintaining quality for students, curriculum, learning methods, faculty, marketing, administration, organization, and the professional staff. As a final representative of this definition period, Nil Whittington's 1987 review of literature in distance education concluded that the most critical aspect of student achievement was effective instructional design whether taught by traditional or telecommunications methods.

The concentrated academic attention and scrutiny during this defining stage led to Federal attention in 1989 when the Office of Technology Assessment (OTA) funded a series of monographs and research efforts. Three of these (Richard E. Clark, 1989;

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Moore, 1989; Ohler, 1989) were pertinent to this review and marked a transition in distance education from defining the field to defending the practice.

Defending the Practice

Moore's extensive review of the literature concluded that three critical gaps existed in the state of practice and research in education in general and in distance education in particular. First, there was a wide disparity in the educational needs of the country and what was actually being provided. Traditional education alone cannot fill that gap, but with the help of properly applied distance education, it can be bridged, and some of the problems brought about by the information age can be alleviated. Standing in the way of this achievement was a gap solely within the practice of distance education.

Second, the actual application of distance education fell far short of its potential in assisting traditional education in many areas such as the provision of an educational opportunity for more learners and increasing the quality of education for all, especially adult and continuing education students. Closing this gap would have obviously benefited all methods of education.

Finally, even though research pointed to many unanswered questions, there was still a great store of knowledge and research that was available concerning the use of technology in education that was not being applied in practice. Distance education could have been used to help solve these educational problems.

It was the second gap, assisting in the provision of educational opportunity for more learners, that triggered the need for the ethical domain of distance education as

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defined in this research. As previously mentioned, this was an oft-quoted goal of distance education that needed further evaluation and research.

Richard E. Clark's critical analysis (1989) of the evaluation of distance learning technology pointed to the need for a change in the way distance learning and distance education were being evaluated. He concluded that too much attention had been paid to the delivery technology and not enough to the instructional technology used in distance education and that future evaluators must distinguish between the two -- an important distinction because, while the delivery technology increased access to education, only instructional technology enhanced student achievement. Clark provided two quotes that succinctly summarized his position: ". . . learning seems to be affected more by what is delivered than by the delivery medium" (Schramm, 1977), and media ". . . do not influence learning any more than the truck delivering groceries influences the nutrition of a community" (Clark, 1983). Technology assessment had been the primary focus of research in distance education. Clark (1983) also believed there was a need for more research of the learning itself, not just the technology.

The third OTA sponsored document reviewed was Jason Ohler's 1991 look at the importance of distance education and its potential to totally transform schooling. He likened the impact of distance education in the information age to that of busing in the industrial age (we moved the people then instead of the information). His eighteen points entitled "Why Distance Education?" are included in Appendix B and served as a succinct reminder of the tremendous potential impact of distance education.

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This intense scrutiny of the field of distance education reached a peak in 1991 and continued into 1994 as the theme of writings in distance education shifted from defending the field to redefining the practice of distance education. Two particular works symbolized this transition.

Redefining Distance Education

Ohler's "Why Distance Education" (1991) was an update of his 1989 study for OTA which called for a fresh perspective in research and evaluation in the field of distance education: new tools, new approaches to learning, and educational contexts more in touch with the world the where students actually work. Ohler also added a nineteenth reason to his previous "Why Distance Education?" list. He called distance education a step in society's social evolution to an information society and critical to a successful transition from the industrial age to an information age.

Dede's (1991) emphasis was that, while the technology served mainly as the medium for distance education, this technology did, in fact, also affect the learning that took place. His analogy of how people reacted differently to a fairy tale (or any story) when read in a book and when viewed in a movie was particularly appropriate to distance education. Something different was taking place, and research was needed to define that "something". He further expressed the need for distance education today to reflect the community and workplace as envisioned in the future.

Learning Environment

John Carey, in 1991, reminded the field that discussions and initiatives taking place in distance education were very similar to discussions and initiatives that followed a 1982

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OTA study, Information Technology and Its Impact on American Education and a publicly popular book, A Nation At Risk, which took American education to task. A campaign to correct the issues identified in this book "fizzled" badly, according to Carey. He warned that a danger far worse than losing the battle for support of distance education was winning the battle and then setting sights too low in its implementation. Carey also recommended that the field move past effectiveness questions and begin to question the types of learning taking place in the distance education environment. As he implied in "Interstate of the 21st Century," distance education had the potential to have an even greater impact on society than the first interstate system. An article in the same publication (Hawkins, 1991) reiterated the need for distance education to move into a second phase of research, from emphasizing the equality of test scores between distance and traditional education to understanding the impact of distance education on the quality of learning and social functioning of this schooling environment.

Writings in 1991 continued with a book in the field of American distance education, John R. Verduin and Thomas A Clark's Distance Education. It was the breakdown of their research review into categories that stimulated the domains of learning approach of the current research. The categories they used were cognitive, psychomotor, affective, motivational, and barriers. These became the cognitive, affective, conative, and ethical domains of learning of this research. The psychomotor domain was excluded from the current research for reasons previously stated. Verduin and Clark (1991) provided succinct justification of this approach stating "The cognitive, psychomotor, and affective domains actually define the behavioral 'package' that each adult possesses. If distance

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educators are in the business to help adults gain new proficiencies, then these domains must be given constant attention." (p.25).

The last 1991 article reviewed here took a position similar to Hawkins (1991). Johnstone (1991) called for a broader measure of effectiveness in distance education than the equality of test scores and research on how to ". . . bring quality education to all learners" (p.57).

Refining Goals and Objectives -- Demanding Input

The next transition identified in the literature of distance education is ongoing. Redefining has become a refining of the goals, objectives, and definitions of distance education, and a new trend has emerged that demands that higher education consider the impact of distance education in preparing for its future. During 1993 and 1994, four authors, in particular, demonstrated these new trends.

Duning (1993) wrote about a renewed emphasis on the primacy of the learner in distance education. She discussed quality and equity issues and felt distance education was focused on too narrow an audience. She also called for research on quality in distance education to include defining how to measure values underlying new relationships distance education was developing with learners. She emphasized that distance education was not just traditional instructional standards delivered by technological means and that distance educators appeared to be easily satisfied with surrogate measures, e.g. test scores, of the quality of the distance education environment. This position represented another demand for research on quality in distance education. One example of research that was responding to this demand was Wagner's 1994 research. Following her research on

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evaluation factors in distance education, Wagner developed a functional definition of interaction in the distance education environment that explicitly accounted for the intrinsic and continuous motivation of many adult learners. Cartwright (1994) not only supported Wagner, but also decried the depressing state of higher education economy and the limited use of distance education. Cartwright also extended Wagner's definition of interaction to include not only interaction between people, but also interaction between people and information and between people and computers, concluding that no one method will be right for everyone but that a strength of distance education was the availability of choices of methods and technologies.

Finally, Halal and Liebowitz (1994) cited research in the corporate world that identified a 50% decrease in learning time and an 80% increase in retention of learned material using distance education technologies. They also reminded higher education that these same working adults in the corporate world made up over half of the student population of higher education. Accordingly, institutions of higher education must restructure and must redesign their educational programs to take advantage of the choices available from distance education and its technology.

These trends and themes in distance education: Understanding, Defining, Defending, Redefining, Refining, and Demanding inclusion in higher education's preparation for the future; and the main gaps identified: the failure to apply our knowledge of harnessing technology to education to actual educational problems; the disparity in the educational needs of our society and what is being provided; and the actual implementation of distance education as compared to its potential, guided this current

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research effort in developing the quality of learning assessment model to help distance education practitioners and administrators begin to close a small part of the gap between the promise and the implementation of distance education programs.

Mindful of these trends and themes and using the four domains established in the theoretical foundation, over fifty research studies were reviewed to identify variables previously used in the assessment of distance education with the potential of being used in the model for the assessment of the quality of learning in distance education.

Identification of Variables

Achievement Variables as Evaluation

Interest in the effectiveness of distance education was found as early as 1939 with D. C. Cook and C. L. Nemziek's "The Effectiveness of Teaching by Radio," in The Journal of Educational Research. They found that 300 Detroit public school students put in two groups matched on sex, grade, and IQ scored statistically the same on identical tests whether their instruction was via radio or traditional means.

A primary reliance on test scores for evaluating distance education continued for the next four decades (Hoyt and Frye, 1972; Moore, 1989; Johnstone, 1991). It was those studies that were an exception to the primary use of test scores that provided the factors for use in this study.

An early example of researchers going beyond comparing test scores was Blackwood and Trant's 1968 study of a non-credit money management course for adults offered both in person and over an "amplified telephone" set-up. A t-test found no significant difference between the test scores of the two groups. The researchers then

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correlated test results and age, level of education, time of day, and attitude (as measured by the students' perception of the instruction and the technology). The only statistically significant correlation found was a positive one between test scores and level of education. This study helped open the way for researchers to start considering more than test results in their assessments of distance education programs.

Four years later, Hoyt and Frye (1972) used achievement tests, final examination grades, final grades, a self-rating of students' progress, and a student survey and found on-campus and telephone classes equally successful in academic achievement. Analysis of covariance, t-tests, and Chi-Square statistics were used. Self-rating of progress and the student survey were derived from a review of research literature. Thirty-two learning preference factors and twenty-seven personal attitude factors were included. Appendix C lists these factors and the studies reviewed by Hoyt and Frye. Their study was an early indication that successful distance learners tended to be more self-reliant and independent than their successful on-campus counterparts, but that motivation and responsibility varied little between successful on-campus and distance learners.

Instructor Skills as Evaluation

The next group of studies reviewed (Monson, 1980; Pereyra, 1980; Bronstein, Gill, and Koneman, 1982; Boone and Bassett; 1983; and Parker, 1984) moved away from both test scores and student attributes and focused on the instructor skills necessary for any level of instruction, including distance education. Similar skills were listed by all five studies: (a) promptness on-line, (b) natural and smooth delivery, (c) spontaneity, (d) liberal use of visual aids, (e) frequent changes of pace in instruction, (f) frequent

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participation of students, (g) use of students' names, and (h) short concluding summaries of all important concepts. The Boone and Bassett study (1983) used an expert panel to verify the appropriateness of these skills. A high correlation was found between what the literature said was effective and what the expert panel identified as effective.

Haaland and Newby (1984), Shaeffer and Roel (1985), Pryor (1985), and Bevan (1983) found that what the students perceived as effective instruction correlated significantly with what the experts described as effective instruction. Haaland and Newby listed statistically significant, student defined, instructor behaviors as (a) use of student names, (b) a clear statement of purpose for each lesson, (c) liberal use of printed material, (d) encouragement of student discussion and participation, and (e) does not speak in a monotone.

Towles, Ellis, and Spencer (1993) studied the impact of instructor-initiated telephone contact with distance learners and its impact on student persistence. They found that instructor-initiated contact had the greatest effect on freshmen students, but very little effect on sophomores, juniors, or seniors. While seemingly at odds with previous research on the importance of instructor contact with distance learners (Crane, 1985; Burnham, 1988; Hezel & Dirr, 1990), the researchers concluded that factors outside the influence of the institution, e.g., work and family conflicts, overrode the importance of faculty contact and that instructor contact was still important, especially for freshmen and students new to distance learning.

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Student Access and Control

In a somewhat different approach, Ross H. Paul (1990) proposed that distance learning was one step toward the ideal of open learning where the student enjoyed accessibility, flexibility, control over course content, a choice of delivery systems, and the accreditation of the course work. His factors for success included course completion rate, graduation rate, persistence rates, cost efficiency and cost effectiveness measures, skill development, and post-graduation performance. While not a study in the sense of the other works reviewed here, Paul's work was included because it expressed a philosophy of education that applied to the purpose of distance education. Paul's philosophy of education is included as Appendix D.

Environmental Factors in Learning

One of the more exhaustive studies reviewed and the source of over 100 factors for consideration in this research was Ellen D. Wagner's 1993 report, Evaluating Distance Learning Projects: An Approach for Cross-Project Comparison. This study, funded by the Annenberg/CPB Project, included an environmental scan process that identified 117 data points in nine categories that were likely to be collected in any distance learning project evaluation. The nine categories were (a) institutional characteristics, (b) faculty characteristics, (c) student characteristics, (d) student psychographics, (e) student achievement, (f) course development, (g) faculty development, (h) support services, and (i) technology mix.

Seven projects were funded including 27 colleges and universities and three state networks. The seven project leaders and their teams independently developed data points

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within the nine categories. After compilation and elimination of redundant factors, project leaders rated the resulting 117 factors on a Likert-type scale of importance. These 117 factors are given in Appendix E. Twelve of the 117 factors received a ranking of 4 or 5 from each of the five projects completing their evaluation forms. Two of the five institutions did not respond by the project deadline. These twelve most important factors were (a) profile of population served, (b) number of students served, (c) student motivation for pursuing distance learning experience, (d) course completion, (e) course satisfaction, (f) media services for faculty, (g) media services for students, (h) on-line library services, (i) cost of course delivery, (j) computer networks used, (k) pre/post attitudes of students, and (l) pre/post attitudes of faculty.

The list did not contain any factors related to determining student achievement as a "most important" factor in evaluating distance education. Wagner's (1993) own words explained this best, "Only after a distance delivery system is in place and there are sufficient numbers of satisfied students receiving instruction at a distance are institutions able to devote significant energy toward determining student achievement outcomes in distance learning experiences" (p.6).

The final group of studies reviewed in the search for potential indicators of quality in distance education concentrated on profiling the characteristics of the successful distance learner (Cookson, 1989). These studies were represented by the 1995 study of Martin L. Bink, Paul M. Biner, Michelle L. Huffman, Brandie L. Geer, and Raymond S. Dean. This study took the factors identified in previous research as profiling the successful distance learner and asked the question: To what extent can the attitudinal, college/course

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related, and demographic factors identified predict distance learner achievement if prior grade point average (GPA) is controlled? Prior GPA was a well established predictor of academic success in traditional education (Littlepage, Bragg, and Rust, 1978; Cookson, 1989) and had also been well established in the distance education literature (Greenberg, 1981; Dille and Mezack, 1991). Using correlation and multiple regression analysis, their research showed that only "Year in college" and "Promptness of material delivery" added significantly to the predictive power of prior GPA. Appendix F lists all factors included in this study and all research reviewed. Appendix G lists additional studies and reviews of research that used similar indicators as those used in this chapter.

This literature review has presented a theoretical foundation for the assessment of the quality of learning in distance education, a path through the trends and themes in the literature that leads directly to the need for this assessment model and a database of over 150 potential variables to consider for this model.

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Chapter 3

Methodology

The purpose of this study was the development of an empirical model to assess the quality of learning in distance education. The problem investigated was defined as "What factors contributed to the quality of learning in distance education?" This research problem was operationalized as four hypotheses:

1. There will be no significant difference between the three groups on demographic variables.

2. There will be no significant difference in the order between the three groups of factors extracted for the domains of learning.

3. There will be no significant differences between the three groups for the number of items rated as considerable impact (4) and significant impact (5).

4. There will be no significant difference between the order of factors derived for the three groups.

Research Questions

Addressing these hypotheses required the investigation of the following research questions:

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1. What variables have been used to assess learning in distance education in previous research?

2. How did these variables relate to the domains of learning defined?

3. Did these variables measure quality of learning in their respective domains?

4. What are the demographics of the student population being investigated?

Research Population

The three groups consisted of 513 students that attended four upper division courses at Old Dominion University in the Fall semester of 1995. Criteria for course selection was that the on-campus sections and Teletechnet sections of the course had to be taught by the same instructor. Six courses met this criteria and four instructors agreed to participate. The courses and instructors were (a) Counseling 491 -- Dr. Jack Grimes, (b) Education Curriculum Instruction 300 -- Dr. Dwight Allen, (c) Finance 331 -- Mr. Michael Zugelder, and (d) Psychology 405U -- Dr. Thomas Cash.

To assist in the initial analysis of over 150 identified variables, thirteen experts in the field of distance education were identified during the literature review. A professional and expert within distance education was consulted to derive the list of experts in the field, and the assistance of the following distance education practitioners and administrators was requested. Appendix H is a copy of the letter sent to each person requesting their help. The individuals contacted were:

1. Michael G. Moore -- The Pennsylvania State University

2. Martyn J. Miller -- The University of Georgia

3. Richard E. Clark -- The University of Southern California

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4. Becky Duning -- The Western Interstate Commission

5. Ellen D. Wagner -- The DLS Group

6. Jason Ohler -- The University of Alaska

7. Christopher Dede -- The University of Houston

8. Anne Batey -- The University of Oregon

9. Debbie Vandehaar -- The University of Wisconsin

10. John Carey -- Greystone Communications

11. Barbara Safford -- The University of Iowa

12. Phil Swain -- Purdue University

13. Susan Bridwell -- The University of South Carolina

The remainder of Chapter 3 will describe the research methodology used to address the questions and hypotheses developed.

Research Methodology

The research methodology followed the ten steps listed here and described below:

Step 1. Identification of variables used in previous research;

Step 2. Sort variables into domains of learning;

Step 3. Instructors' reviews of variables;

Step 4. Contact panel of experts and select courses;

Step 5. Review of variables by panel of experts;

Step 6. Construct survey questionnaire;

Step 7. Administer survey to selected classes;

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Step 8. Preliminary statistical analysis to describe differences between classes;

Step 9. Exploratory factor analysis on combined class data, on-campus data, and Teletechnet data ; and

Step 10. Interpretation and reporting of results.

The ten steps of this research design were adapted from a seven-step methodology developed by Wiersma (1980) and depicted in Figure 4 with the ten-step adaptation for this research. The additional steps were used to detail Weirsma's Planning Step and to further delineate the statistical analysis to be used.

Step one in the methodology was the identification of variables that were used in previous research to measure or observe the progression of distance learners along the cognitive, affective, and conative domains of learning. For the ethical domain, the review of the literature was used to expand and supplement the questions presented previously. Over fifty studies had been identified that formed the data base for this step.

Step two was to sort the variables collected by domain of learning. This was accomplished by a content analysis of the variables, comparing the verbs used in the variables with the representative verbs presented in the taxonomy for each domain of learning in Chapter Two. Table 1 lists these representative verbs from each of the domains. An initial computer-based readability analysis was performed. In the ethical domain, the variables were matched with the concepts presented in the discussion of the ethical domain of distance education, (e. g., equity, climate, autonomy, access, opportunity, and relationships).

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Step three was to submit the results of step two to a review by instructors familiar with the domains of learning for their input on the content and construct validity of the variables. Five instructors were selected based on their familiarity with the domains of learning and involvement with distance education. The letter requesting their assistance is included in Appendix H.

Step four was the initial contact of the review panel of fifteen experts in the field of distance education identified at the beginning of the chapter. They were selected based on their publications in the field, their positions within the distance education community, and references to their work by their colleagues. This initial contact was to explain the study and to request participation in the review panel.

Step five The learning domain variables were submitted to the expert review panel. The panel of experts was asked to rank each factor according to its impact upon the quality of learning of distance education students using a rating scale of one to five, from 'significant impact on quality of learning' to 'no impact on quality of learning'. There was a zero on the scale to use if they felt the variable did not belong in the domain of learning where it was listed. Comments and suggestions on both the learning process of the distance education student, the readability of the instrument, and on the variables selected for the rating scale were solicited.

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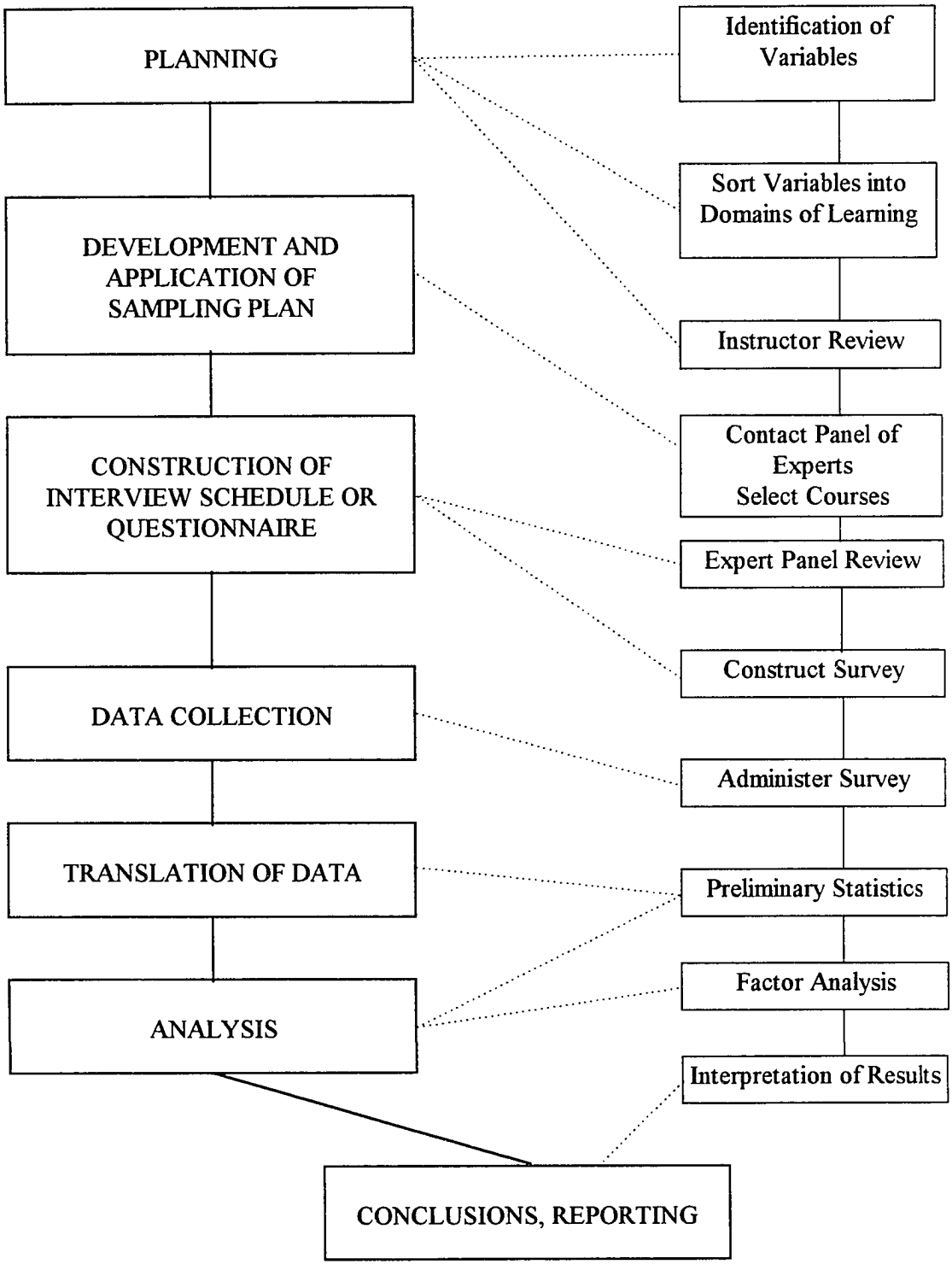

FIGURE 4. Wiersma seven step methodology vs. ten step methodology.

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Table 1

Representative Verbs/Terms for the Domains of Learning

Affective	Cognitive	Conative	Ethical
Asks	Defines	Perception	Access
Chooses	Matches	Focus	Opportunity
Describes	Selects	Engagement	Equity
Follows	Defends	Involvement	Autonomy
Identifies	Distinguishes	Transcendence	Climate
Answers	Generalizes		Relationships
Assists	Predicts		
Performs	Changes		
Completes	Computes		
Explains	Diagrams		
Proposes	Differentiates		
Adheres	Illustrates		
Combines	Infers		
Integrates	Categorizes		
Qualifies	Compiles		
Solves	Designs		
Verifies	Appraises		
Complies	Compares		
Locates	Concludes		
Uses	Summarizes		

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For step six, the feedback from the expert panel and instructor review was used to restructure the survey questionnaire. Once revised, a second computer-based readability analysis was performed.

In step seven, the revised survey questionnaire was administered to the students in the courses that were simultaneously taught via Teletechnet, in a traditional, campus-based mode and to the studio class where Teletechnet transmission originated. All classes in the Fall '95 catalog meeting the above criteria where professors agreed to participate were administered the survey. On-campus class surveys were administered by the researcher. Studio and Teletechnet sites were administered with the assistance of the professor and his/her graduate assistant. Appendix I is the weekly scheduling of these classes.

Step eight was the preliminary statistical analysis of the collected data. Significant differences in the demographics of the on-campus and Teletechnet students were determined by non-parametric tests (Baynton, 1992). A multivariate analysis of variance (MANOVA) was used to determine significant differences between on-campus and Teletechnet classes on their responses to the survey questionnaire.

Step nine consisted of separate, exploratory factor analyses for the on-campus classes, the Teletechnet classes, and the combined data. All three analyses used the principal factors method of factor analysis with orthogonal rotation used to maximize each factor's contribution to total variance. Rotation was guided by Thurstone's five principles of simple structure. Those principles were:

1. Each row of the factor matrix should have at least one loading close to zero.

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2. For each column of the factor matrix there should be at least as many variables with zero or near zero loading as there are factors.

3. For every pair of factors (columns) there should be several variables with loading in one factor (column) but not in the other.

4. When there are four or more factors, a large proportion of the variables should have negligible (close to zero) loading on any pair of factors.

5. For every pair of factors of the factor matrix, there should be only a small number of variables with appreciable loading in both columns (Kerlinger, 1973).

It is important to note here that the term factors as used in factor analysis applies to the domains of learning in this research.

Computation of Eigenvalues (proportion of total variance accounted for by each of the factors) made it possible to identify the contribution of each learning domain to the quality of learning model. Loading of each of the variables within each domain allowed simplification and reduction of the numbers of variables investigated.

Figure 5 shows the flow of the statistical analysis of steps eight and nine.

Step ten was the interpretation of the results of step nine in relation to the learning domain framework and quality of learning model developed in Chapter Two. This interpretation resulted in an empirically based quality of learning model for distance education.

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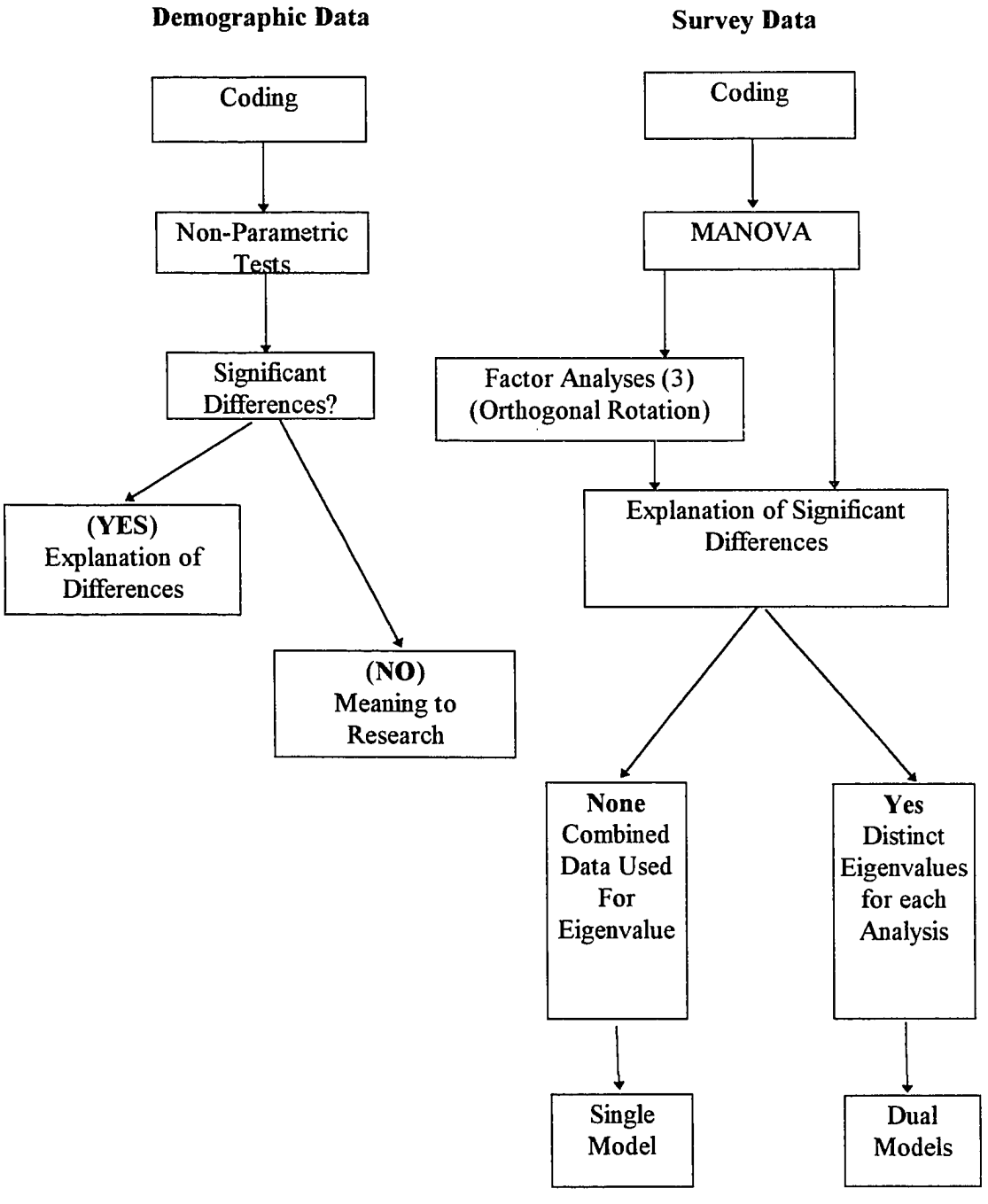

FIGURE 5. Flow of Statistical Analysis

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Chapter 4

Results and Findings

This chapter presents the ten steps used to construct the quantitatively based quality-of-learning assessment model described in chapter 3. Each of the steps is described with the ensuing analysis of data gathered at each step. The results from each of the steps were used as input for the next step. The final model for assessing quality of learning for distant learners was derived from the analysis.

Analysis of Steps

Step One Results

The 150 plus variables contained in Appendix J were identified in studies conducted from 1939 to 1995, and the original form, used in the original study, was maintained. These variables consisted of four categories. The first category contained variables which described students' perceptions of learning experiences, including their expectations of the course and instructor. The second category included variables that described the University's technical support structure for distance education students. The third category of variables concerned the students' perceptions of the instructor's teaching style, teaching experience, and course organization. The last category investigated the students' perception of his or her own learning style.

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Step Two Results

Table 1 presented the verbs and terms used to categorize the variables as belonging to the affective, cognitive, conative, or ethical domain of learning. The verbs were those described by Grolund and Linn (1990) as the clarifying verbs for developing instructional objectives in the affective and cognitive domains. The terms were those used by Atman (1987) to describe the hierarchy of the conative domain and by Duning (1993) to describe the ethical issues of distance education. Using these verbs and terms, each variable was analyzed and placed in either the affective, cognitive, or conative domain of learning or the ethical domain of distance education (Appendix K). This classification of the variables served as the basis for the instructor review and expert panel review to determine if the variables measured (a) the student's inner growth toward the development of a set of guiding principles (the affective domain); (b) the student's acquisition and utilization of knowledge (the cognitive domain); (c) the student's motivation and desire to learn (the conative domain); and (d) the student's perceptions of the accessibility of learning resources, of the learning environment, of his or her control over the learning process, and of a new type of relationship with the instructor or institution (the ethical domain).

Once sorted by domain of learning, a 5-point Likert-type scale was attached to each variable in preparation for assessing the relative importance for students. A preliminary Flesch-Kincaid Grade Level readability analysis determined the questionnaire was written at the ninth grade level.

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Step Three Results

Five instructors familiar with the domains of learning and teaching via media reviewed the variables sorted by domain of learning. Written feedback was received from three of five reviewers. Verbal feedback was received from the remaining two reviewers.

In addition to recommendations for the rewording of variables to improve clarity, three of five reviewers recommended a different presentation of the variables. They commented that presentation of the variables by domain of learning would probably be confusing to the student.

Duplication of variables was identified by each reviewer and eliminated by the researcher. The results of this review were set aside pending the completion of Step 5 -- the Expert Panel Review.

Step Four Results

Of the thirteen distance education experts who were identified in chapter 2 and who were mailed the quality of learning variables sorted by domain, three surveys were returned with no forwarding address. Six replies were received from the remaining ten selected for the panel resulting in a 60% return rate. Repeated attempts by telephone, voice mail, and E-mail to improve participation were unsuccessful.

Step Five Results

As in the instructor reviews, the expert panel reviews identified variable duplication and recommended rewording several of the variables to reduce ambiguity. More significantly, five of six made comments that the presentation of the variables by domain of learning was unnecessarily confusing to the students. One reviewer

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recommended a logical way of presenting the variables as STUDENT RELATED, INSTRUCTOR RELATED, COURSE RELATED, and UNIVERSITY RELATED. A unanimous comment was that the survey was too long. At this point, variables rated either 0, does not belong in domain, or 1, no impact on domain, were eliminated from the questionnaire. Together with the duplications found, this process reduced the questionnaire to 84 variables.

Step Six Results

Based on the instructor and expert panel reviews, the survey questionnaire was modified as shown in Appendix L. A second Flesch-Kincaid Grade Level readability analysis after modifications indicated the questionnaire was written at a tenth grade level.

Step Seven Results

Four classes were surveyed:

1. Counseling 491, Family Systems/Family Development, taught by Dr. Jack Grimes, an adjunct faculty member of Old Dominion University and Norfolk State University. Total enrollment in the three sections (on-campus, studio, and Teletechnet sites) was 131 students.

2. Education Curriculum and Instruction 300, Social and Cultural Foundations of Education, taught by Dr. Dwight Allen, a professor in the School of Education. Total enrollment in the three sections was 105 students.

3. Finance 331, Legal Environment of Business, taught by Mr. Michael Zugelder, a lawyer and recent addition to the Finance Department. Total enrollment in the three sections was 151 students.

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4. Psychology 405U, Abnormal Psychology, taught by Dr. Thomas Cash, a professor in the Psychology Department. Total enrollment in the three sections was 136 students.

The administration of the survey took place over a three week period, from September 18, 1995, to October 7, 1995. For on-campus classes, time was provided by each instructor for distribution and explanation of the survey and consent form on the initial class visit. Two Instructors permitted their students to complete the surveys immediately, and two required students to take them home or complete them after class. Two follow-up visits were made to each class to collect surveys. For studio and Teletechnet classes, each instructor's graduate assistant helped in the distribution of the surveys to Teletechnet sites and the studio classrooms and in collection of surveys from studio classes. Instructions were given to studio classes before class. Written instructions were included with surveys distributed to Teletechnet sites and the instructor, or the graduate assistant, requested students' assistance in completion of survey forms during two class satellite transmissions.

Surveys were distributed to Teletechnet sites during the week of September 25. All surveys to Teletechnet sites included a stamped envelope addressed to the researcher to facilitate return and improve response rate. Teletechnet sites were asked to return surveys by October 7. The number of students surveyed for on-campus, studio, and Teletechnet classes and response rates for all survey sites, as displayed in Table 2, reflect a total of 523 surveys distributed and 248 returned for an overall response rate of 47%.

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Step Eight Statistical Analysis

Preliminary statistical analysis performed on demographic data include frequency tables for each of the demographic variables, and non-parametric tests on variables to determine differences among the three groups of students (campus, studio, and Teletechnet). Analysis of this data revealed similarities and differences among the groups. Table 3 presents this data for all three groups and results of tests for significance.

Table 2

Survey Response

Site	Distributed	Returned	Returned
	N	N	Pct.
Campus	224	132	59
TTN Studio	83	35	42
TTN Sites	216	81	38

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Table 3

Demographic Response by Location

	Campus		Studio		TTN Sites		Tests of Significance		
Variable	n	P	n	P	n	P	χ^2	U[b]	U[c]
Age							8.27*	2222.5	4248.5**
18-21	47	36	15	43	13	16			
22-25	54	41	11	31	42	52			
26-30	12	9	3	9	10	12			
>30	19	14	6	17	16	20			
Gender							2.14	2165.0	4965.0
Male	46	35	10	29	34	42			
Female	86	65	25	71	47	58			
Course							4.40	2128.5	4664.5
Finance	46	35	8	23	40	49			
Education	18	14	9	26	6	7			
Counseling	23	17	5	14	13	16			
Psychology	44	33	13	37	22	27			
Course							4.17	2041.0	4709.5
Required	100	76	24	71	69	85			
Elective	29	22	10	29	11	14			

(Table Continues)

	Campus		Studio		TTN Sites		Tests of Significance		
Variable	n	P	n	P	n	P	χ^2	U[b]	U[c]
Status							1.61	2273.5	4726
Graduate	6	5	2	6	0	0			
Senior	58	44	17	50	44	55			
Junior	49	37	8	24	36	44			
Sophomore	13	10	4	12	0	0			
Freshman	1	1	0	0	0	0			
Non-Degree	4	3	3	9	1	1			
Stu. Status							158.15***	2174.0	922.5***
Part-time	13	10	4	11	75	93			
Full-time	119	90	31	89	6	7			
Work Status							10.16**	1621.5	3516.5**
Part-time	87	66	23	66	47	58			
Full-time	23	17	8	23	34	42			

(Table Continues)

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	Campus		Studio		TTN Sites		Tests of Significance		
Variable	n	P	n	P	n	P	χ^2	U[b]	U[c]
Work Hours							2.43	999.0	2273.5
0-10	42	32	11	31	22	27			
11-20	31	24	8	23	19	23			
21-30	31	24	7	21	23	28			
31-40	14	11	7	21	13	16			
>40	5	4	2	6	4	5			

[a] df = 2. [b] Campus to studio. [c] Campus to TTN site.

*$p < .05$. **$p < .01$. ***$p < .001$.

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General Observations

Although there was a significant difference in age among groups, the majority of students in all groups were between the ages of 18-25. The number of students with ages over 30 were approximately the same for students on-campus and distant sites.

The percentage of males was higher at the Teletechnet sites (42% vs. 35% and 29% for the on-campus and studio groups).

The largest number of students participating were from finance class for on-campus and Teletechnet groups, and from psychology class for the studio group.

The majority of students were taking a required course.

The majority of students were juniors and seniors.

The majority of students attending on-campus and in the studio were full-time.

The majority of students in all three groups who reported working did so part-time. The mean number of hours worked per week for each group was: (a) on-campus, 16.76 hours; (b) studio, 18.36 hours; and (c) Teletechnet, 21.68 hours.

Similarities of the Groups

The majority of students in all groups were female -- 65% on-campus, 71% in the studio, and 58% of Teletechnet students. While the proportion of males in Teletechnet classes was higher than the on-campus or studio groups, the difference was not statistically significant. Students in all groups were predominantly juniors and seniors taking a required course. Work status differences will be discussed in the next section but, if a student worked, there was no statistical difference between groups in the number of hours they worked.

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Differences Between Groups

The Kruskal-Wallis H was used to determine differences between the three groups of students, and showed significant differences for three characteristics (a) Age ($p < .01$), (b) Student Status ($p < .001$), and (c) Work Status ($p < .01$). While the majority of students in all groups worked part-time, 66% of campus and studio students and 58% of the Teletechnet students, significantly more Teletechnet students were employed full-time. Forty-two percent of Teletechnet students worked full-time as opposed to 17% of on-campus students and 23% of studio students.

A multivariate analysis of variance (MANOVA) was performed to determine any significant differences in responses from the four classes of on-campus students. There were no significant differences in on-campus responses. Adding the studio responses to this analysis had no effect on significance level. Accordingly, on-campus and studio responses were combined for the remaining preliminary statistics and the factor analysis conducted in the next step.

Analysis of Survey

On-campus and studio responses were combined when no significant differences were found in the demographic data or survey response data. Once combined, means and standard deviations were computed for each of the 84 variables for the combined on-campus/studio group and the Teletechnet group. An ANOVA showed no significant difference between groups (Appendix M). Analysis of these means revealed the combined on-campus group rating 5 of 84 variables higher than 4.00 (considerable impact on quality of learning), while Teletechnet students rated 8 of the 84 variables above 4.00. The two groups agreed on the significance of the impact of receiving materials in a timely fashion,

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a well-prepared and well-organized instructor, interesting and informative lectures, and satisfaction with a job well done. The Teletechnet students added the availability of individual assistance, the ability to express divergent opinions, and the availability of a detailed class outline to the significant impact list. The mean response to all questions on the questionnaire was 3.16 (a 3 on the scale represented some impact on quality of learning) for the combined on-campus group and 3.23 for the Teletechnet group.

Step Nine Factor Analysis

Table 4 presents the results of a factor analysis with orthogonal rotation and iteration. Eight campus factors and seven Teletechnet site factors were derived that accounted for over 50% of the variance. Variables that loaded on these factors are shown in Table 5. The factors were named to reflect the variables that combined to form the loading. Only variables that had a .50 relationship or above were retained.

Factors for On-Campus and Studio Group

The first factor accounted for almost 20% of total variance for the combined on-campus group and was labeled Instructor/Student Interaction. Variables loading greater than .50 included (a) ability to express divergent opinions (.73), (b) availability of individual assistance (.73), (c) provision of a Study-Pak (.65), (d) brief summaries of important points (.65), and (e) satisfaction with job well done (.53).

The second factor, accounting for almost seven percent of the variance was labeled Instructor Course Management. Variables loading on this factor included (a) reasonable course time commitments (.73), (b) well-organized instructor (.60), (c) well-prepared instructor (.56), (d) instructor provision for different learning styles (.56), and (e) the ability to participate in group discussions with the instructor and other students (.51).

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The third factor, Instructor Added Value, accounted for almost five percent of variance. Variables loading included (a) instructor use of students' names (.73), (b) ability to see real life benefit of course (.69), and (c) the instructor's ability to actively involve the students in the course (.55).

Over four percent of variance was accounted by the fourth factor, College Environment. Variables loading included (a) college courses require college atmosphere (.77), (b) course completion rate (.75), (c) provision of timely grades (.61), and (d) college graduation rate (.54).

Factors five through eight each accounted for about four percent of variance to complete the 50 percent of variance contributed by the first eight factors. These four factors were (a) Course Efficiency, (b) Course Content, (c) Time-of-Day, and (d) Student Motivation. Variables loaded on these factors as shown in Table 5.

Factors for Teletechnet Students

The first factor for Teletechnet students, Instructor Course Management, accounted for over 20 percent of total variance. The same variables that loaded on this factor for on-campus students also loaded for Teletechnet students, with the addition of the item on instructor technology proficiency (.55).

Over six percent of variance was accounted for by the second factor for Teletechnet students, Course Content. Only two variables were loaded on this factor, small class size (.85) and readings from a good text book (.77).

The third factor, Student Motivation, accounted for almost six percent of total variance. Variables loading on this factor included (a) strong motivation to succeed (.78),

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(b) satisfaction with job well done (.60), and (c) turning in homework on-time or ahead (.58).

The fourth factor was Instructor/Student Interaction. Variable loading was almost identical to the first factor of the on-campus group. Three additional factors, Course Mechanics, Course Environment, and Instructor Efficiency, added almost 13 percent to total variance, which brought the total contribution of these seven factors to over 50 percent of variance. The variables loading on these factors as displayed in Table 5.

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Table 4

Top Loading Factors -- Campus and Teletechnet

Campus				TTN Site			
Factor	Name	Eigenvalue	Pct. Var.	Factor	Name	Eigenvalue	Pct. Var.
1	Instructor/Student Interaction	9.49	19.8	1	Instructor Cse Management	9.37	20.4
2	Instructor Cse Management	3.33	6.9	2	Course Content	2.90	6.3
3	Instructor Efficiency	2.35	4.9	3	Student Motivation	2.64	5.7
4	College Environment	2.10	4.4	4	Instructor/Student Interaction	2.33	5.1
5	Course Efficiency	1.97	4.1	5	Course Mechanics	2.13	4.6
6	Course Content	1.78	3.7	6	Course Environment	1.93	4.2
7	Time of Day	1.67	3.5	7	Time of Day	1.79	3.9
8	Student Motivation	1.62	3.4				

Comparison of Factors for Groups

Table 4 shows that on-campus and Teletechnet students had the following factors in common (a) Instructor/Student Interaction, (b) Instructor Course Management, (c) Instructor Added Value, (d) Course Content, and (e) Student Motivation. The impact, or the factors' contribution to variance, varied widely between groups.

Factor 1, Instructor/ Student Interaction accounted for 20 percent of the variance for the on-campus students, but only five percent (Factor 4) for the Teletechnet students. Factor 1 for

Teletechnet students, Instructor Course Management, accounted for over 20 percent of variance while this factor accounted for only seven percent of the variance (Factor 2) for the on-campus students.

Another difference between the two groups was the factor Student Motivation. This was Factor 3 for the Teletechnet students, and accounted for almost six percent of variance. It was Factor 8 for the on-campus students, and accounted for a little over three percent of variance.

Analysis of the factors with respect to the domains of learning revealed several subtle differences between the on-campus and Teletechnet students. The most important factor for on-campus students was Instructor/Student Motivation and for Teletechnet students was Instructor Course Management. The majority of the variables loading on these variables for both groups originated in the cognitive domain. This loading initially presented a problem since Instructor/Student Interaction also loaded as Factor 4 for the Teletechnet students and Instructor Course Management also loaded as Factor 2 for the

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Table 5

Factor Variable Loading -- Campus and Teletechnet

Campus		Teletechnet	
Factor 1 Instructor/Student Interaction		Factor 1 Instructor Course Management	
Variable	Loading	Variable	Loading
I14. Divergent Opinions	.73	C1. Time Commitments	.77
I13. Individual Assistance	.73	I17. Well-Organized	.75
I18. Provides Study Pak	.65	I10. Well-Prepared	.66
I8. Summaries	.65	I11. Learning Styles	.65
S4. Satisfaction with job	.53	C3. Group Discussions	.60
S9. Asks Questions	.43	I12. Technology Proficiency	.55
C8. Timely Materials	.41	C2. Frequent Tests	.49
Factor 2 Instructor Course Management		Factor 2 Course Content	
C1. Time Commitments	.73	C4. Small Class	.85
I17. Well-Organized	.60	C5. Good Text	.77
I11. Learning Styles	.60		
I10. Well-Prepared	.56		
C3. Group Discussions	.51		
C2. Frequent Tests	.41		
Factor 3 Instructor Added Value		Factor 3 Student Motivation	
I3. Uses Names	.73	S13. Strong Motivation	.78
S12. Real Life	.69	S4. Satisfaction with Job	.60
I2. Actively Involve Student	.55	S14. On-time Homework	.58
I1. Provides Incentives	.46	S11. See Instructor	.48

(Table Continues)

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Campus		Teletechnet	
Variable	Loading	Variable	Loading
Factor 4 College Environment		Factor 4 Instructor/Student Interaction	
C13. College Atmosphere	.77	I14. Divergent Opinions	.69
C15. Completion Rate	.75	I13. Individual Assistance	.63
C14. Timely Grades	.61	I8. Summaries	.59
U1. Graduation Rate	.54	I2. Actively Involve Students	.50
Factor 5 Course Efficiency		Factor 5 Course Mechanics	
U2. Cost Efficiency	.83	I16. Detailed Outline	.73
C20. Test Pressure	.65	I15. Follows Syllabus	.63
U19. Book Procurement	.51	C8. Timely Materials	.55
		U7. Quality of Library Services	.50
Factor 6 Course Content		Factor 6 Course Environment	
C4. Small Class	.76	I7. Changes Pace	.68
C5. Good Text	.70	I6. Uses Visual Aids	.67
I22. Instructor Experience	.44	C12. Morning Classes	.49
Factor 7 Time of Day		Factor 7 Instructor Added Value	
C7. Time of Day	.72	C14. Timely Grades	.79
C12. Morning Classes	.69	I3. Uses Names	.52
Factor 8 Student Motivation			
S14. On-time Homework	.79		
S13. Strong Motivation	.67		

Note. C = Course related; I = Instructor related; S = Student related; U = University related.

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on-campus students. This could mean the factors for the cognitive domain of learning were not discrete.

Closer inspection of the variables loading on each of these factors revealed that they were associated with different levels of the hierarchy of the cognitive domain -- the Instructor/Student Interaction variables with the higher levels of Application and Analysis of Knowledge and the Instructor Course Management with the lower level of Knowledge Comprehension.

Factor 3 for Teletechnet students and Factor 8 for on-campus students -- Student Motivation -- related directly to the conative domain variables of the questionnaire. The Affective domain variables appeared at Factor 3 for on-campus students and Factor 7 for Teletechnet students and was labeled Instructor Added Value.

Ethical domain variables were most prominent in Factor 4 for on-campus students -- College Environment. This factor did not appear in the factor analysis for Teletechnet students, indicating its lack of importance for this group.

Table 6 presents the factors and associated learning domain. If the factor included variables from more than one domain, it has a label of mix. Where appropriate, level within the domain was included. Table 6 formed the basis for construction of the Model for Assessment of Quality of Learning in Distance Education.

A final statistical analysis was conducted on the 84 variables of the factor analysis which determined internal consistency and reliability of the variables. The Alpha model (Cronbach's Alpha) within SPSS resulted in an estimated reliability of .87 and above for the variables as used in the on-campus and Teletechnet analysis.

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Table 6

Top Loading Factors and Associated Domain of Learning

Campus				TTN Site			
Factor	Name	Domain	Pct. Var.	Factor	Name	Domain	Pct. Var.
1	Instructor/Student Interaction	Cognitive (App/Anal)	19.8	1	Instructor Cse Management	Cognitive (Comp)	20.4
2	Instructor Cse Management	Cognitive (Comp)	6.9	2	Course Content	Cognitive (Acq)	6.3
3	Instructor Efficiency	Affective	4.9	3	Student Motivation	Conative (Engage)	5.7
4	College Environment	Ethical (Climate)	4.4	4	Instructor/Student Interaction	Cognitive (App/Anal)	5.1
5	Course Efficiency	Ethical (Equity)	4.1	5	Course Mechanics	Cog-Eth Mix	4.6
6	Course Content	Cognitive (Acq)	3.7	6	Course Environment	Cog-Con Mix	4.2
7	Time of Day	Conative (Percept)	3.5	7	Time-of-Day	Conative (Percept)	3.9
8	Student Motivation	Conative (Engage)	3.4				

Note. Cog = Cognitive; Con = Conative; Eth = Ethical

Step Ten Construction of the Model

The Model for the Assessment of the Quality of Learning in Distance Education was compared with a similar model for the traditional on-campus students in Figure 6. The most

obvious similarity of the two models was the cognitive domain, which accounted for over 50 percent of the impact on quality of learning for both groups of students. The difference in this impact appeared in the level of the domain the two groups considered more important. Teletechnet students concentrated on the lower levels of the cognitive domain -- Knowledge acquisition and comprehension -- while on-campus students concentrated on the higher levels of application and analysis.

The conative domain had the next highest impact on quality of learning for Teletechnet students, followed by factors that contained combinations of the cognitive-ethical domains and cognitive-conative domains. The affective domain was almost non-existent in the Teletechnet model, only appearing in Factor 5 mixed with conative domain variables.

In contrast, on-campus students rated the impact of the affective domain second. The ethical domain was a close third while the conative domain did not appear until Factor 7.

Finally, the affective domain appeared to have the least impact on Teletechnet students' perception of the quality of learning. The affective domain deals with the inner growth and experiences of students, their relationships, and personal characteristics.

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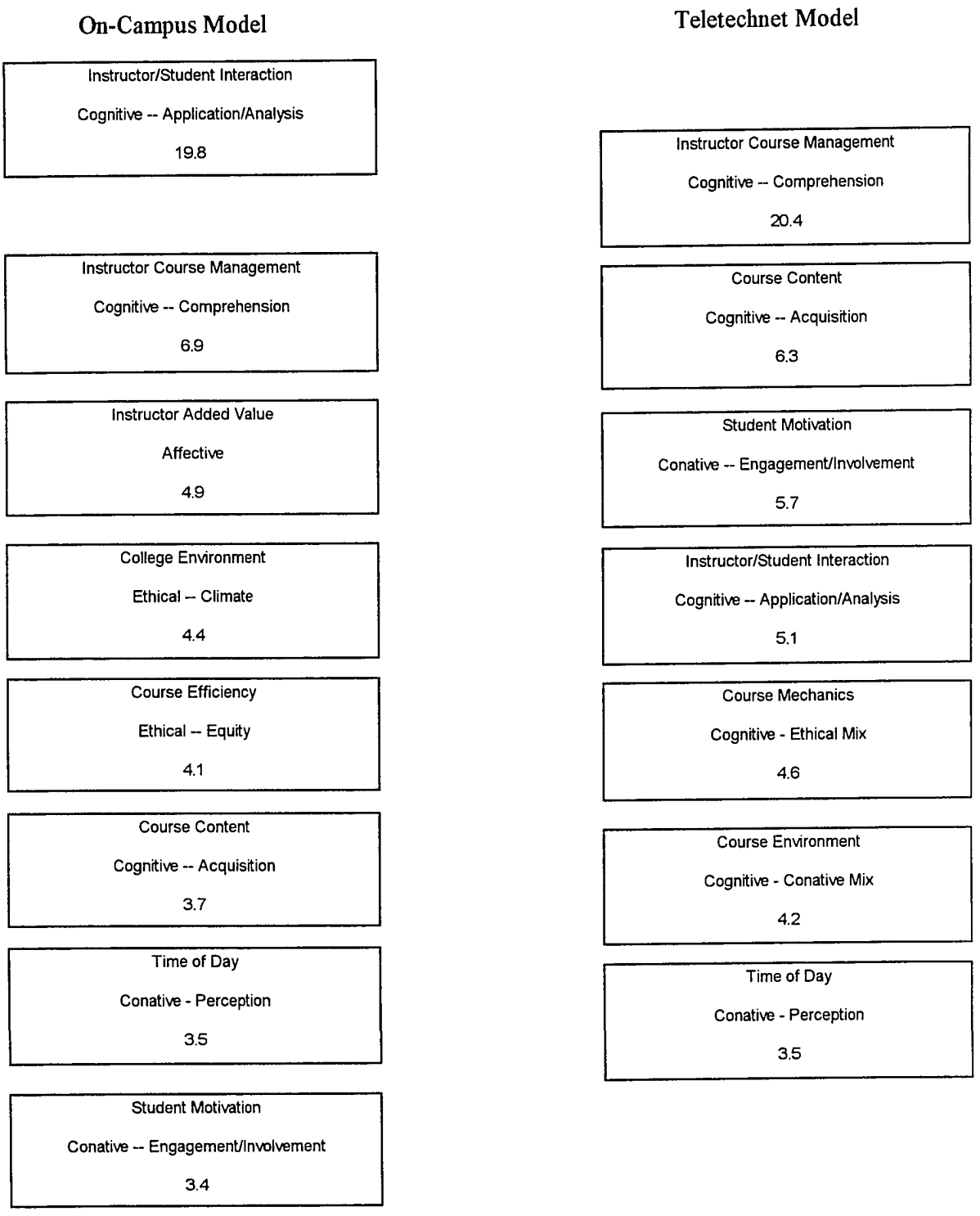

Figure 6. Campus and Teletechnet quality of learning assessment models.

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Teletechnet students judged this domain to be of least importance in the effectiveness of their learning.

Summary of Findings

The goal of this research was to build an assessment model for the quality of learning in distance education based on the defined domains of learning. Significant findings included:

Demographics

Significantly more on-campus student were below age 25 than Teletechnet students.

Significantly more Teletechnet students attended school on a part-time basis.

While the majority of all students worked part-time, significantly more Teletechnet students held full-time jobs.

Quality of Learning

Delivery technology variables had no impact on Teletechnet students' perception of quality of learning, evidenced by its absence in the variance examined in the analysis. This seems to reinforce the quote from Clark (1989) that compared the influence of media on learning to the influence of a truck delivering groceries on the nutrition of a community. Unfortunately, students tend to remember only the negative impacts of technology -- the satellite was down, the microphones were not working, or the televisions were not working.

Factor loadings indicated that on-campus students were impacted more by higher levels of the cognitive domain, whereas Teletechnet students were more impacted by

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knowledge acquisition aspects of their college education -- the lower levels of the cognitive domain.

Availability of quality library resources did not significantly load on any of the Factors.

The motivational (conative) variables were rated higher by Teletechnet students than on-campus students, a confirmation of the more motivated and mature adult distance learner about which Johnstone (1991) wrote.

Affective domain variables did not load significantly on any of the Factors for Teletechnet students, while on-campus students rated these variables second only to the cognitive domain variables.

Ethical domain variables did not load significantly on any of the Factors for Teletechnet students.

After an overview of the research, the conclusions and implications of these findings will be discussed in chapter 5.

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Chapter 5

Conclusions and Implications

The purpose of this study was the development of an empirical model to assess the quality of learning in distance education. The problem investigated was defined as "What factors contributed to the quality of learning in distance education?"

Johnstone (1991) and Hawkins (1991) concluded and recommended that distance education needed a broader measure of effectiveness that asked how distance education was impacting the learning of students. A review of research in distance education (Verduin & Clark, 1991) categorized studies in five ways: cognitive, psychomotor, affective, motivational, and barriers to success. The studies concentrated on a single category; none researched more than two of these categories simultaneously. The expressed need to go beyond test scores (Johnstone, 1991) and the categories of research reviewed by Verduin and Clark (1991) were the starting points for this research. The need to go beyond test scores focused the research on studies that concentrated on factors other than grades or test scores. The five categories of research led to development of the domains of learning theoretical foundation.

Blackwood and Trant's (1968) study was an early example of research that went beyond test scores. They correlated age, time of day, level of education, and attitude with test scores and found a significant correlation between level of education and test scores.

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Hoyt and Frye (1972) added a student self-rating of progress. Their study included thirty-two learning preference factors and twenty-seven personal attitude factors derived from the literature and was an early recognition of the importance of self-reliance, independence, motivation, and responsibility for the distant learner.

Research beyond test scores also focused on the distance education instructor and the skills necessary to be successful. Bronstein, Gill, and Koneman's (1984) research was indicative of all the studies of instructor skills reviewed. All listed similar skills for the successful distance education instructor.

Student success factors (Cookson, 1989) and student control factors (Paul, 1990) were also the subject of studies and developed many more factors for consideration in the quality of learning model.

Finally, Wagner (1993) identified 117 factors important to the evaluation of distance education programs through an environmental scan process that covered all aspects of distance education. Wagner found 12 of these to be most important to the institutions in her study.

Conversion of the factors identified in the literature by the categories defined by Verduin and Clark (1991) to the domains of learning framework defined in the theoretical foundation was straightforward. The cognitive, psychomotor, and affective categories of Verduin and Clark's (1991) review were the accepted descriptions of the three major categories of learning (Grolund & Linn, 1990). The motivation category became the conative domain (Atman, 1987), and the barriers to success category became the ethical domain (Reed & Sork, 1990; Duning, 1993). The psychomotor domain was excluded

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because research (reviewed in Verduin & Clark, 1991) indicated the domain was not suited to the focus of the research.

While studies, mostly qualitative, had been conducted in each of the major domains of learning, their synergistic effect in distance learners had not. No research was found on the impact of the ethical issues in distance education. These three domains of learning and the ethical issues facing distance education formed the theoretical foundation for the construction of a quality of learning assessment model for distance education.

Process Used to Develop the Model

A ten-step process was developed to construct the model from the theoretical foundation and empirical data. This ten-step process provided the framework where constraints were discovered, imposed, or inherent in the development of the quality of learning assessment model.

Constraint I: Selection of classes (Step 4)

Six courses were initially identified; two were dropped from the survey. One instructor elected not to participate, and a second instructor wanted changes made to the survey. Distribution of the survey was in progress and no additional changes could be made.

Constraint II: Selection of classes (Step 4)

No classes were surveyed from the sciences, engineering, or health sciences. Future studies should include these disciplines.

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Constraint III: Expert panel selection and review (Steps 4 and 5)

Only six of ten on the expert panel responded to the survey. While their comments were similar and necessary to the completion of the survey, more experts should be selected in future research to account for attrition.

Constraint IV: Administration of survey (Step 7)

Two of the on-campus classes were one hour classes which required that students be allowed to take the survey and return at the next class period or complete after class on their own time. The result was a lower response in these two classes.

Statistical analysis of the demographic data proved no statistically significant difference between the on-campus and studio students. There were three statistically significant demographic differences between on-campus and Teletechnet students on age, student status, and work status. Factor analysis of the survey data showed subtle difference in the quality of learning assessment models for on-campus and Teletechnet students.

A graphic representation of the quality of learning assessment model was developed for both on-campus and Teletechnet students (Figure 6). The numbers expressed for each of the domains of the model were developed from variance explained by the factors loaded in that domain.

Results of Hypothesis Testing

MANOVA and ANOVA results indicated no significant differences between the responses of the on-campus and studio groups of students, so these two groups were combined for the factor analysis. It was hypothesized that:

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1. There will be no significant difference between the three groups on demographic variables. The hypothesis is accepted between the on-campus and studio group.

The hypothesis is rejected between the on-campus and Teletechnet group. Age, student status, and work status showed significant differences between on-campus and Teletechnet groups.

2. There will be no significant difference in the order between the three groups of factors extracted for the domains of learning.

The hypothesis is rejected. The combined on-campus students placed more emphasis on the higher levels of the cognitive domain, i.e. , application and analysis, while Teletechnet students emphasized the cognitive domain's lower level, comprehension. The affective and ethical domain followed the cognitive domain in importance for on-campus students, while the conative and the application and analysis level of the cognitive domain followed for Teletechnet students.

3. There will be no significant differences between the three groups for the number of items rated as considerable impact (4) and significant impact (5).

The hypothesis is accepted. An ANOVA showed no significant difference between on-campus and Teletechnet students. On-campus students rated 5 of 84 variables above 4.0, while Teletechnet students rated 8 of the 84 variables above 4.0, with five being identical to the five highest rated on-campus variables.

4. There will be no significant difference between the order of factors derived for the three groups.

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The hypothesis is rejected. Instructor/Student Interaction accounted for the greatest variance with on-campus students while Instructor Course Management accounted for the greatest variance with Teletechnet students.

Conclusions and Implications

Quality of Learning

The data collected shows that Teletechnet and on-campus students view the quality of their learning experience from different perspectives within the domains of learning. It follows that instructor evaluation of Teletechnet students and Teletechnet students' evaluation of instructors need to ask a different set of questions than the on-campus counterparts of these evaluations. Teletechnet student evaluations of courses and instructors should include a focus on questions concerning the instructor's efficient use of class time, the course's value to the student, and the instructor's effective use of the technology delivering the course. The instructor's evaluation of Teletechnet students should include a focus on evidence of course discussion and interchange among the students and on an assessment of the student's response to homework and in-class assignments.

Cognitive Domain

Within the domains of learning, Teletechnet students' primary learning emphasis is the acquisition and comprehension of knowledge. Courses for Teletechnet need to be designed to maximize this knowledge transfer. Lessons should include specific time set aside for a question and answer period. Specific group discussion topics and times should be included in the course to facilitate student interchange at the distant sites.

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Instructor

Additionally, Teletechnet students feel they learn best from organized, efficient, and well-prepared instructors and appreciate effective course and time management by the instructor. All Teletechnet instructors receive basic training on teaching via television. This training should be expanded to include reminders to the instructors on how critical efficient time utilization is in a Teletechnet course.

Ethical Domain

Issues of institutional climate, relationship building, equity, and access did not affect Teletechnet students' perception of quality of learning. Teletechnet student responses appear to indicate that once the student has access to the education desired, the issues defined as the ethical domain become subordinate to the pursuit of that education.

Affective Domain

Affective domain growth does not appear as a major consideration for Teletechnet students in this survey. Teletechnet course design and development should focus on the goals and objectives of advancing the student along the cognitive domain learning hierarchy.

Technology

With the exception of Instructor Technology Proficiency, no technology variables were statistically significant for Teletechnet students. As long as the chosen delivery technology works, emphasis should focus on issues of effective curriculum development technology for distance education as described by Wagner (1993).

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Teletechnet vs. On-campus

Teletechnet students are more like students on campus than they are different from a demographic point of view. Teletechnet instructors must be careful not to stereotype Teletechnet students.

Suggestions for Future Research

The demographic similarity of Teletechnet and on-campus students could be an indication of the convergence of traditional and distance education predicted by Smith and Kelly (1987). The convergence themes of clientele, of instructional methods, and of a tendency toward open learning provides an interesting premise worthy of further investigation.

The sciences, engineering, and health sciences were not included in this analysis. These areas should be included in future studies.

Teletechnet students perceived small class size as having a major impact on quality of learning while none of the courses surveyed had less than 50 students. That Teletechnet students perceive class size as the number of students at their site is a premise worthy of further investigation.

The exploratory nature of the factor analysis and the purposive sampling criteria for the classes surveyed dictate generalizability to any other group of students or distance education program should be tentative and cautious. However, the methodology and the analysis does offer a new quantitative tool to assess quality of learning in any distance education program. There are many other distance education programs that could benefit

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from this type of quantitative statistical analysis, and the results of tools tend to improve as they are used and improved upon.

Distance education programs are becoming more and more popular throughout the country and the world. Assessments of the technology of distance education and of the curriculum development for distance education have provided insights to the distance educators involved in this growth. This research built on that previous research to provide insight on another, equally important, aspect of distance education -- the quality of learning.

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Appendix A

Definition of Terms

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Audioconferencing: interactive audio communications between individuals or groups at three or more locations.

Asynchronous instruction: an instructional approach that does not require students and instructor to be in the same place at the same time, or even available during a specified time. made possible by computer based information technology.

Bandwidth: the spread between the highest and lowest frequencies a communications channel is capable of carrying. the broader the bandwidth, the greater the amount of information that can be carried.

Bridge: an electronic device that interconnects three or more locations, usually for audio communications using telephone lines.

Broadcast signal: transmission of information in one direction that is available to an undifferentiated audience.

Computer-assisted instruction: a system in which the student receives individualized instruction by interacting with a computer.

Computer-based telecommunications system: a telecommunications system that makes use of a computer as the platform for processing and transmitting information.

Culture: the collective, mutually shaping patterns of institutional history, mission, physical setting, norms, traditions, practices, and beliefs that influence the behavior of individuals and groups and provide a frame of reference to interpret events and actions on and off the campus.

Dedicated system: an educational telecommunications system designed to operate twenty-four hours a day.

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Delivery technology: the techniques used to exchange information between the teacher and learner in a distance education environment.

Direct-broadcast satellite: a communications satellite designed specifically to transmit video signals directly to small rooftop receiver systems owned or leased by members of the general public who subscribe to such services.

Distance Education: an educational activity in which the teacher and learner are physically separated and one or more techniques are used to exchange information between them.

Downlink: the ground equipment, including a dish and other electronic components used to receive signals from a satellite.

Educational telecommunications system: an organizational unit composed of hardware, software, delivery technologies and people to manage and use the system.

Electronic mail(E-mail): the use of computers and terminals as message centers for users.

Expectancy: the belief that the contemplated action will bring the desired result.

Instructional technology: the techniques used to develop curriculum materials used in the classroom.

Instructional Television Fixed Service (ITFS): narrowcast television channels, assigned by the Federal Communications Commission for nonprofit use, which require a special antenna for signal reception.

Interactive educational telecommunications system: a system that allows for some form of two-way communications between users, most often as real time communications.

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Interactive videodisc system: computer-assisted instruction using videodiscs, which allows instantaneous changes in the lesson delivery based on student input to the system.

Live-via-satellite system: a telecommunications system based on the live transmission of signals using satellite transport.

Mission: the broad, overall long-term purpose of the institution that guides institutional priorities and practices.

Multimodel design: the application or blending of more than one technique or technology to address a project or situation such as distance education.

Narrowcast signal: electronic transmission of information to a specific audience rather than to the general public.

Operating life: a period of time that experience has shown to be the average useful time over which a device will function properly and reliably.

Origination site: the point of origin of an activity or program.

Philosophy(Institutional): the widely shared values and assumptions on human potential, teaching, and learning that guide the day to day routine of the institution.

Radio talkback: a microwave technology that uses frequencies at the high end of the IFTS band to transmit voice communications from remote sites to the origination point of a network.

Receive equipment: equipment used at a receive site to receive, process, and present a program.

Receive site: the point of reception of an activity or program.

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Satellite: an electronic retransmission device serving as a repeater, which is normally placed in orbit above the Earth in a geosynchronous orbit (having a constant position above one spot on the Earth) for the purpose of receiving and retransmitting electromagnetic signals.

Sending equipment: equipment used at an origination site to process and send a program to receive sites.

Synchronous instruction: based on a fixed unit of time, requiring that teacher and learner be at the same place at the same time. What we think of as conventional college classes. A variation is used in distance education where the teacher and learner have to show up at the same time but not the same place and communicate electronically.

Transponder: a channel of a satellite used for receiving and retransmitting signals.

Transport: methods for sending and receiving information between different locations.

Uplink: the ground equipment, including a dish and other electronic components, used to transmit signals to a satellite.

Valence: the belief that an opportunity is a conceivable means of satisfying perceived needs.

Video telecommunications system: a telecommunications system with the capacity to transmit video signals only from an origination site to a receive site (*one-way*) or between all sites (*two-way*).

Videoconferencing: interactive video communications between individuals or groups at three or more locations.

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Videotext-teletext: the process of delivering computer-generated data in text or graphic form into homes using a TV set as the receiving equipment.

Voice: the content of a telecommunications system with capability to transmit two-way audio communication solely or in addition to transmitting other content such as data and one-way or two-way video.

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Appendix B

Ohler's Eighteen Points

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Why Distance Education?

1. No other way to receive state sanctioned education due to geographic isolation.

2. Avoid or reinforce particular content.

3. Incarceration.

4. Avoidance of social influences.

5. Experience or avoid certain learning dynamics.

6. Severe disability.

7. Avoid abandoning a lifestyle or culture.

8. Resolve schedule conflict.

9. Not learning in traditional setting.

10. Escape tracking.

11. Learn in more global context.

12. Learn information economy skills.

13. Remediation.

14. Schools too expensive for states to provide.

15. Improve local communications.

16. Reduce anxiety and improve face-to-face skills.

17. Media are motivational!

18. Take advantage of a world of experts and resources only media can provide.

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Appendix C

Factors and Research -- Hoyt and Frye

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Learning Preferences

Lectures by articulate expert

Q&A sessions in small groups

Opportunity for individual assistance

Listening to someone explain

Freedom to proceed at own rate

Being required to figure out concepts on own

Seeing demonstration of course principles

Having divergent opinions expressed by peers

Opportunity to ask questions in class

Frequent tests over small portions of course

Definite weekly schedule

Detailed outline of course procedures and expectations

Participating in group discussions with instructor

Opportunity to apply course concepts in real life setting

Well organized presentations from instructor

'Entertaining' instructor

Guest experts for special aspects of course

Being member of a small class

Having assigned readings in a good text

Having small group discussions

Being member of a large class

Having detailed study guide

Few exams over large portions of course

Discussing material with knowledgeable person

Library references readily available

Ability to see instructor as they teach

Receiving extensive course supplementary information

Instructor ability to see student

One long rather than several short classes per week

Late afternoon classes

Evening classes

Morning classes

Personal Attributes

Stick to job until finished

Learning ability more than adequate for curriculum

Prefer to study by myself

Strong motivation, need little assistance from instructor

Can disagree without offending

Take advantage of opportunity to do additional work

Get satisfaction from completing the task

Turn in work on or ahead of time

Learn better when competing with others

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Personal evaluation more important than instructors	Impression on other people important
	Very cooperative individual
Need pressure of scheduled tests and assignments	Need instructors evaluation to measure progress
	Do most interesting first, most distasteful last
Have trouble finishing assignments	Do well on limited work, mediocre on larger
Make more commitments than I can fulfill	Motivated by failure, not success
Classes move too slowly	Learning for learning's sake has no appeal
A self-starter	Do better on objective tests, not essay
Dependable	Take courses for employers benefit
Can learn as much on my own as in class	College requires college atmosphere

Additional Research Studies

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Dubin, R. and T. C. Taveggia. 1968. The Teaching -- Learning Paradox. Eugene, Oregon: Center for the advanced Study of Educational Administration.

Edelman, Lily. 1968. "Teaching Adults Via Telelecture and Electrowriter." Adult Leadership. Volume 17, No. 4, October.

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Lapore, Albert R. and Jack D, Wilson. 1958. An Experimental Study of College Instruction Using Broadcast Television. San Francisco: San Francisco State College.

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Appendix D

Paul's Philosophy of Education

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That education is central to the development of a better life and a better world.

That education is a never-ending process of discovery and self-discovery, learning, unlearning, and relearning.

That most people can succeed in higher education, given the opportunity and support.

That the goal of all formal learning systems is to assist people to become more self-directed, and independent learners so that they increasingly take responsibility for what they learn and how they learn it.

That education is active, not passive, and that true learning leads to change and self-action.

That there are many ways to learn and to teach, and that different people learn in different ways, and that the same people learn in different ways for different knowledge of tasks.

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Appendix E

Wagner's Factors

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Profile of population served

Number of students served

Student motivation for taking DE course

Course completion

Course satisfaction

Media services for faculty

Media services for students

On-line library services

Cost of course delivery for technology based courses

Computer network used

Pre/post course attitudes of students

Pre/post course attitudes of faculty

Academic programs delivered

Faculty Support Services inventory

Library services inventory

Teaching evaluations

Student Age

Student Gender

Targeted audience served

Attitudes toward technology for direct instruction

Student self-esteem

Student learning style

Student learning strategies

Course grades

GPA

Barriers to student success

Learning incentives

Faculty incentives

Student guides

Faculty selection guidelines

Technology inventory

E-mail for students

Voice Mail of students

800 numbers

Site facilitator training

Cost of delivering technology supported courses

Bulletin boards used

Telecom project evaluation

Outreach needs assessment

Outreach evaluation

delivery site profile

Student support services inventory

Profile of region served

Degrees provided

Courses provided

Technical proficiency

Attitudes toward teaching with technology

Technology used per course

Student major

Residential distance from campus

Student enrollment projection

Student technical proficiency

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Attitudes regarding technology for instruction

General technology inventories

Student test scores

Assignment completion

Competency testing

Technology preferences

Course outlines

Course evaluation guidelines

Media/Technology guidelines

Instructional design guidelines

Course development guidelines

Technology based course summaries

Number of faculty involved in distance education

Retention of faculty

E-mail for faculty

Voice mail for faculty/staff

On-line registration

On-line academic advising

Library resource inventory

Book/supply procurement

Faculty rank of technical effectiveness

Faculty rank of technical preferences

Mission statement

System description

Telecommunications implementation plan

Technology inventory

Programs provided

Professional preparation of faculty

Rank (of faculty)

Tenure status

Teaching style

Full time/Part time student status

Student demographics

Syllabus guides

Course selection outlines

Course content analysis

Course revision guides

Evaluation guidelines

Technical proficiency

Faculty use of technology for teaching

Faculty participation on technology based teaching

On-line financial aid advising

Off-campus site facilitator

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Appendix F

Martin L. Bink, et al. Factors and Research

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Attitudinal

Instructor/Instruction

Technology

Course Management

At-site Personnel

Promptness of Material Delivery

Support Services

Out-of-Class Contact with Instructor

College/Course Related

Workload of Course

Number of Prior Televised Courses Taken

Year in College

Demographic Items

Income

Socioeconomic Status

Age

Gender

Traditional Predictor Item

Grade Point Average (GPA)

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Research

Biner, P.M. "The Development of an Instrument to Measure Student Attitudes Toward Televised Courses." The American Journal of Distance Education, 7(1) pp. 62-73, 1993.

Biner, P.M., Dean, R.S., and Mellinger, A.E. "Factors Underlying Distance Learner Satisfaction with Televised College-Level Courses." The American Journal of Distance Education, 8(1) pp. 61-70, 1994.

Cookson, P.S. "Research on Learners and Learning in Distance Education: A Review." The American Journal of Distance Education, 3(2) pp. 22-34, 1989.

Souder, W.E. 1993. "The Effectiveness of Traditional vs. Satellite Delivery in the Management of Technology Master's Degree Programs." The American Journal of Distance Education, 7(1) pp. 37-53, 1993.

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Appendix G

Additional Research Studies

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Biner, P. M. (1993). The development of an instrument to measure student attitudes toward televised courses. The American Journal of Distance Education, 7 (1), 10-21.

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Greenberg, J. S. (1981). Expectancy theory predictions of completion behavior and achievement in correspondence education. Unpublished doctoral dissertation, The Pennsylvania State University.

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Pryor, B. W. (1985) . Increasing user acceptance of teleconferencing: a model for understanding and changing user behaviors. Teleconferencing and Electronic Communication, IV, 199-209.

Robinson, R. S. (1985) . An investigation of technological innovation: Interactive television. Anaheim, CA: Annual Convention for the Association for Educational Communications and Technology. (ERIC Document Reproduction Services No. ED 256 331)

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Appendix H

Expert Panel Letter

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August 6, 1995

Dr. Becky S. Duning

Campus Box 178

1229 University Ave

The University of Colorado -- Boulder

Boulder, CO 80309-0178

Dear Professor Duning:

I would appreciate your assistance in gathering data on distance learning and its comparison to the traditional classroom. I would appreciate your assistance in gathering data on distance learning and its comparison to the traditional classroom. I am a Ph.D. Candidate in Urban Services / Higher Education at Old Dominion University. My dissertation topic is the development of a model for assessing the quality of learning in distance education. The basis for assessment will be three domains of learning (affective, cognitive, and conative) and the ethical domain of distance education. To identify the factors important to the quality of learning in each of the domains, a likert-type questionnaire has been developed based on previous studies of distance learning and a thorough review of the distance education literature.

An important part of the validation of the questionnaire is a critical review by those experienced in the field of distance education. Your name was prominent during my review of the distance education literature and confirmed and recommended by Dr. Anne

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Raymond-Savage, vice-president of Academic Affairs at Old Dominion and a member of my dissertation committee.

Your completion of the questionnaire and critique of its content, clarity, and organization would provide valuable input in the preparation of this questionnaire for administering to distance education classes. Your assistance will be appreciated and should only take 20 to 30 minutes of your time. In addition, I will be happy to share the research results with you if so desired. For your convenience, a stamped, self-addressed envelope is enclosed..

Sincerely,

Cal Lassetter

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Appendix I

Surveyed Classes Schedule

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MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	8-8:50 **ECI 300**		8-8:50 **ECI 300**	
10-12:45 **COUN 491** **TTN**	8-9:15 **FIN 331**			
10-10:50 **ECON 302**	9:30-10:45 **FIN 331**	10-10:50 **ECON 302**		10-10:50 **ECON 302**

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MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
12-12:50 **PSYC 405U**		12-12:50 **PSYC 405U**		12-12:50 **PSYC 405U**
1-3:45 **ECON 302** **TTN**				
		4:15-7:00 **FIN 331** **TTN**		4:15-7:00 **PSYC 405U** **TTN**
		4:20-7:05 **COUN 491**		

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Appendix J

Variables Identified in Previous Research

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1. Age (of Student)
2. Discussion with knowledgeable person
3. Ability to disagree without offending
4. Opportunity to do additional work
5. Satisfaction from completing challenging task
6. Personal evaluation more important than inst.
7. Having trouble finishing assignments
8. Making more commitments than can fulfill
9. Do most interesting first, most distasteful last
10. Rather do well on limited work than mediocre
11. Perform better on objective tests, not essay
12. Frequent participation of students elicited
13. Instructor uses student names
14. Instructor initiated student contact
15. Course satisfaction
16. Pre/Post course attitudes of students
17. Number of faculty involved
18. Pre-test / Post-test
19. Instructional Design
20. Lectures by articulate expert
21. Q&A Sessions in small groups
22. Opportunity for individual assistance
23. Listening to someone explain concepts
24. Having divergent opinions expressed by peers
25. Opportunity to ask questions in class
26. Frequent tests over small parts of course
27. Definite weekly schedule
28. Detailed outline of course expectations
29. Participating in group discussions with instructor
30. Well organized presentations from instructor
31. Being member of small class
32. Having assigned readings in a good text
33. Having small group discussions with peers
34. Being member of a large class
35. Having a detailed study guide
36. Taking few exams over large sections of course
37. Having library references readily available
38. Able to see instructor as they teach
39. Instructor able to see students while teaching
40. Having classes move too slowly
41. Need instructor evaluation to measure progress
42. Instructor is prompt on-line
43. Instructor has natural delivery
44. Instructor is spontaneous
45. Appropriate use of visual aids
46. Frequent change of pace of instruction

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47. Concludes with shout summaries
48. Instructor evaluations
49. Professional preparation of faculty
50. Instructor rank
51. Program guides
52. Student learning style
53. Instructor technical proficiency
54. Course development guidelines
55. Course grades
56. Technology used in course
57. Grade point average
58. Course content analysis
59. Faculty selection guidelines
60. Faculty use of technology for teaching
61. Technology inventory
62. Student test scores
63. Faculty participation in technology teaching
64. Competency testing
65. Instructional design guidelines
66. Course development guidelines
67. Level of Education
68. Time of Day
69. Attitude
70. Technology reliability
71. Opportunity to apply course concepts in 'real life'
72. 'Entertaining' instructor
73. Guest experts for special aspects of course
74. Receiving course information in a timely manner
75. Having long class rather than short classes
76. Having late afternoon classes (after 4pm)
77. Having evening classes
78. Having morning classes
79. Able to stick to job until finished
80. Learning ability more than adequate for curriculum
81. Strong motivation, need little assistance
82. Turning in work on time or ahead
83. Learn better when competing with others
84. Need pressure of scheduled tests and assignments
85. Student is a self-starter
86. Student is dependable
87. Student is very cooperative individual
88. Motivated by desire not to fail, not by success
89. Learning for learning's sake has no appeal
90. Student motivation for taking courses
91. Attitudes toward technology for instruction
92. Student self-esteem
93. Student rank of technology used in course
94. Learning incentives

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95. Student assignment completion
96. Freedom to proceed at own rate
97. Being required to figure out concepts on own
98. Preference to study alone
99. Student can learn as much on own as in class
100. Student impression on other people important
101. Take courses because of employer
102. College courses require a college atmosphere
103. Course completion rate
104. Student graduation rate
105. Student persistence rate
106. Cost efficiency and cost effectiveness
107. Student post-graduate performance
108. Profile of population served
109. Academic programs delivered
110. Number of students served
111. Outreach needs assessment
112. Library services inventory
113. Outreach implementation plans
114. Telecommunications implementation plans
115. Student course completion
116. Outreach evaluations
117. Technology inventory available (Fax, etc.)
118. Telecommunications needs assessment
119. Programs provides
120. Institution accreditation
121. Student gender
122. Student support services inventory
123. Media services for students
124. Targeted audience served
125. Profile of region served
126. On-line library services
127. Degrees provided
128. Instructor tenure status
129. Cost of course delivery
130. Courses provided
131. Instructor full-time/part-time status
132. Faculty recruitment guidelines
133. Student demographics
134. Course selection outlines
135. Barriers to student success
136. Residential distance from campus
137. Student enrollment projections
138. Attitudes concerning technology for instruction
139. General technology inventories
140. E-mail for students
141. On-line financial aid counseling
142. Voice mail for students

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143.Off-campus site facilitator

144.Access to 800 numbers

145.Cost of delivering courses

146.Course evaluation guidelines

147.Bulletin boards used

148.On-line registration

149.On-line academic advising

150.Book/supply procurement

151.Seeing demonstration of course principles

152.Student skill development

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Appendix K

Variables by Domain

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Affective Domain Variables

1. Age (of Student)
2. Discussing material with knowledgeable person
3. Ability to disagree without offending
4. Take advantage of opportunity to do additional work
5. Gaining satisfaction from completing challenging task
6. Personal evaluation more important than instructor's
7. Having trouble finishing assignments
8. Making more commitments than can be fulfilled
9. Do most interesting first, most distasteful last
10. Rather do well on limited work than mediocre on larger work
11. Perform better on objective tests, not essay
12. Frequent participation of students elicited
13. Instructor uses student names
14. Telephone based, instructor initiated student contact
15. Course satisfaction
16. Pre/Post course attitudes of students
17. Number of faculty involved in distance education

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Cognitive Domain Variables

1. Pre-test / Post-test
2. Instructional Design
3. Lectures by articulate expert
4. Q&A Sessions in small groups
5. Opportunity for individual assistance
6. Listening to someone explain difficult concept
7. Having divergent opinions expressed by peers
8. Opportunity to ask questions in class
9. Frequent tests over small parts of course
10. Definite weekly schedule
11. Detailed outline of course expectations
12. Participating in group discussions with instructor
13. Well organized presentations from instructor
14. Being member of small class
15. Having assigned readings in a good text
16. Having small group discussions with peers
17. Being member of a large class
18. Having a detailed study guide
19. Taking few exams over large sections of course
20. Having library references readily available
21. Able to see instructor as they teach
22. Instructor able to see students while teaching
23. Having classes move too slowly
24. Need instructor evaluation to measure progress
25. Instructor is prompt on-line
26. Instructor has natural delivery
27. Instructor is spontaneous
28. Appropriate use of visual aids
29. Frequent change of pace of instruction
30. Concludes with summaries of basic concepts
31. Instructor evaluations
32. Professional preparation of faculty
33. Instructor rank
34. Program guides
35. Student learning style
36. Instructor technical proficiency
37. Course development guidelines
38. Course grades
39. Technology used in course
40. Grade point average
41. Course content analysis
42. Faculty selection guidelines
43. Faculty use of technology for teaching
44. Technology inventory
45. Student test scores
46. Faculty participation in technology teaching
47. Competency testing
48. Instructional design guidelines
49. Course development guidelines

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Conative Domain Variables

1. Level of Education
2. Time of Day
3. Attitude
4. Technology reliability
5. Opportunity to apply course concepts in 'real life
6. 'Entertaining' instructor
7. Guest experts for special aspects of course
8. Receiving course information in a timely manner
9. Having one long rather than several short classes
10. Having late afternoon classes (after 4pm)
11. Having evening classes
12. Having morning classes
13. Able to stick to job until finished
14. Learning ability more than adequate for curriculum
15. Strong motivation, need little assistance from inst.
16. Turning in work on time or ahead
17. Learn better when competing with others
18. Need pressure of scheduled tests and assignments
19. Student is a self-starter
20. Student is dependable
21. Student is very cooperative individual
22. Motivated by desire not to fail, not by success
23. Learning for learning's sake has no appeal
24. Student motivation for taking courses
25. Attitudes toward technology for direct instruction
26. Student self-esteem
27. Student rank of technology used in course
28. Learning incentives
29. Student assignment completion

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Ethical Domain Variables

1. Freedom to proceed at own rate
2. Being required to figure out concepts on own
3. Preference to study alone
4. Student can learn as much on own as in class
5. Student impression on other people important
6. Take courses because of pressure from employer
7. College courses require a college atmosphere
8. Course completion rate
9. Student graduation rate
10. Student persistence rate
11. Cost efficiency and cost effectiveness
12. Student post-graduate performance
13. Profile of population served
14. Academic programs delivered
15. Number of students served
16. Outreach needs assessment
17. Library services inventory
18. Outreach implementation plans
19. Telecommunications implementation plans
20. Student course completion
21. Outreach evaluations
22. Technology inventory available (Fax, E-Mail, etc.)
23. Telecommunications needs assessment
24. Programs provides
25. Institution accreditation
26. Student gender
27. Student support services inventory
28. Media services for students
29. Targeted audience served
30. Profile of region served
31. On-line library services
32. Degrees provided
33. Instructor tenure status
34. Cost of course delivery for technology based course
35. Courses provided
36. Instructor full-time/part-time status
37. Faculty recruitment guidelines
38. Student demographics
39. Course selection outlines
40. Barriers to student success
41. Residential distance from campus
42. Student enrollment projections
43. Attitudes concerning technology for instruction
44. General technology inventories
45. E-mail for students
46. On-line financial aid counseling
47. Voice mail for students
48. Off-campus site facilitator
49. 800 numbers
50. Cost of delivering technology supported courses

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51. Course evaluation guidelines
52. Bulletin boards used
53. On-line registration
54. On-line academic advising
55. Book/supply procurement

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Appendix L

Survey Questionnaire

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Directions: Following are items describing behaviors or events that may have had an impact on your overall learning experience in college courses. Rate each item using the scale provided.

	significant impact	considerable impact	some impact	little impact	no impact	not applicable
STUDENT RELATED						
1. Students ages (older or younger than you).	5	4	3	2	1	0
2. Opportunity to discuss material with knowledgeable peer.	5	4	3	2	1	0
3. Opportunities provided for extra credit.	5	4	3	2	1	0
4. Personal satisfaction from completing challenging task.	5	4	3	2	1	0
5. Assignments were easy to complete.	5	4	3	2	1	0
6. A personal preference for objective rather than essay tests.	5	4	3	2	1	0
7. Other student's satisfaction with course.	5	4	3	2	1	0
8. Interesting and informative lectures.	5	4	3	2	1	0
9. There were opportunities to ask questions in class.	5	4	3	2	1	0
10. Having small group discussions with peers.	5	4	3	2	1	0
11. Student able to see instructor as they teach.	5	4	3	2	1	0
12. Opportunity to apply course concepts in 'real life' setting.	5	4	3	2	1	0
13. Strong motivation, needs little assistance from instructor.	5	4	3	2	1	0
14. Turning in work on time or ahead.	5	4	3	2	1	0
15. Learn better when competing with others.	5	4	3	2	1	0
16. Student motivated by desire not to fail, not desire to succeed.	5	4	3	2	1	0
17. Learning for learning's sake has no appeal to student.	5	4	3	2	1	0
18. Student motivation for taking distance education courses.	5	4	3	2	1	0
19. Student attitude toward technology for direct instruction.	5	4	3	2	1	0
20. Student free to proceed at own rate.	5	4	3	2	1	0
21. Student preference to study alone.	5	4	3	2	1	0
22. Student can learn as much on own as in class.	5	4	3	2	1	0
23. Taking courses because of pressure from employer.	5	4	3	2	1	0

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INSTRUCTOR RELATED (Your answers should reflect your entire college experience, not just this instructor.)	significant impact	considerable impact	some impact	little impact	no impact	not applicable
1. The instructor provides learning incentives for students.	5	4	3	2	1	0
2. The instructor is able to actively involve students in participating.	5	4	3	2	1	0
3. The instructor addresses students by name.	5	4	3	2	1	0
4. The instructor will call student on phone to discuss class.	5	4	3	2	1	0
5. The instructor is prompt on-line.	5	4	3	2	1	0
6. The instructor makes appropriate use of visual aids.	5	4	3	2	1	0
7. The instructor frequently changes of pace of instruction.	5	4	3	2	1	0
8. The instructor concludes with short summaries of basic concepts.	5	4	3	2	1	0
9. The instructor provides detailed evaluations.	5	4	3	2	1	0
10. The instructor is well prepared.	5	4	3	2	1	0
11. The instructor provides for various student learning styles.	5	4	3	2	1	0
12. The instructor is proficient in the use of technology for teaching.	5	4	3	2	1	0
13. The instructor was available for individual assistance.	5	4	3	2	1	0
14. The instructor allows divergent opinions to be expressed by students.	5	4	3	2	1	0
15. The instructor follows definite syllabus.	5	4	3	2	1	0
16. Instructor provides detailed outline of procedures and expectations.	5	4	3	2	1	0
17. The instructor has well-organized presentations.	5	4	3	2	1	0
18. The instructor provided a detailed study guide/course-pak.	5	4	3	2	1	0
19. Instructor full-time/part-time status.	5	4	3	2	1	0
20. Instructor attitude concerning technology for instruction.	5	4	3	2	1	0
21. Instructor gender.	5	4	3	2	1	0
22. Instructor experience.	5	4	3	2	1	0

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	significant impact	considerable impact	some impact	little impact	no impact	not applicable
COURSE RELATED(Your answers should reflect your entire college experience, not just this course.)						
1. The time commitments for the course are reasonable.	5	4	3	2	1	0
2. There were frequent tests covering material.	5	4	3	2	1	0
3. Opportunities to participate in group discussions with instructor.	5	4	3	2	1	0
4. Being in a small class. (25 or less)	5	4	3	2	1	0
5. Having assigned readings in a good text.	5	4	3	2	1	0
6. Being in a large class. (More than 25)	5	4	3	2	1	0
7. Time of Day course presented.	5	4	3	2	1	0
8. Receiving course information in a timely manner (Handouts, etc.).	5	4	3	2	1	0
9. Having one long class rather than several short classes during week.	5	4	3	2	1	0
10. Having late afternoon classes (after 4pm).	5	4	3	2	1	0
11. Having evening classes.	5	4	3	2	1	0
12. Having morning classes.	5	4	3	2	1	0
13. College courses require a college atmosphere.	5	4	3	2	1	0
14. Course grades are provided in timely manner.	5	4	3	2	1	0
15. Course completion rate.	5	4	3	2	1	0
16. Student mix.	5	4	3	2	1	0
17. Appropriate technology used in course.	5	4	3	2	1	0
18. Proficient application of technology.	5	4	3	2	1	0
19. Guest experts used for special aspects of course.	5	4	3	2	1	0
20. Pressure of scheduled tests and assignments.	5	4	3	2	1	0

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	significant impact	considerable impact	some impact	little impact	no impact	not applicable
UNIVERSITY RELATED						
1. Student graduation rate.	5	4	3	2	1	0
2. Cost efficiency.	5	4	3	2	1	0
3. Student post-graduate performance.	5	4	3	2	1	0
4. Diversity of student population.	5	4	3	2	1	0
5. Academic programs delivered by distance education.	5	4	3	2	1	0
6. Number of students served by distance education.	5	4	3	2	1	0
7. Quality of library services availability to student.	5	4	3	2	1	0
8. Institution accreditation of distance education programs.	5	4	3	2	1	0
9. Media service availability for students.	5	4	3	2	1	0
10. Residential distance from campus.	5	4	3	2	1	0
11. E-mail availability for students.	5	4	3	2	1	0
12. On-line financial aid counseling for students.	5	4	3	2	1	0
13. Voice mail for students.	5	4	3	2	1	0
14. Off-campus site facilitator available.	5	4	3	2	1	0
15. Student access to 800 numbers.	5	4	3	2	1	0
16. Computer bulletin board availability to students.	5	4	3	2	1	0
17. Availability of on-line registration.	5	4	3	2	1	0
18. Availability of on-line academic advising.	5	4	3	2	1	0
19. Ease of book/supply procurement for students.	5	4	3	2	1	0

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Appendix M

ANOVA Results

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		Campus[a]			TTN Sites[b]		
		M	SD		M	SD	F
C1	Time Commitments	3.86	0.81	C1	3.90	0.83	0.08
C10	Late Afternoon	2.74	1.51	C10	2.75	1.54	0.04
C11	Evening	2.74	1.58	C11	2.90	1.55	0.31
C12	Morning	3.40	1.42	C12	3.53	1.27	0.31
C13	College Atmosphere	3.30	1.31	C13	3.33	1.31	0.04
C14	Timely Grades	3.79	1.12	C14	3.75	1.16	0.29
C15	Completion Rate	3.44	1.24	C15	3.53	1.15	0.33
C16	Student Mix	3.55	6.71	C16	3.46	6.84	0.46
C17	Appropriate Technology	3.07	1.33	C17	3.22	1.24	0.40
C18	Proficient App of Tech	3.34	2.66	C18	3.75	3.50	0.69
C19	Guest Experts	3.10	1.35	C19	3.22	1.31	0.34
C2	Frequent Tests	3.56	0.83	C2	3.57	0.77	0.34
C20	Test Pressure	3.84	1.05	C20	3.85	0.98	0.01
C3	Group Discussions	3.50	1.12	C3	3.58	1.08	0.19
C4	Small Class	3.67	1.34	C4	3.65	1.32	0.00
C5	Good Text	3.73	1.12	C5	3.74	1.17	0.16
C6	Large Class	3.05	1.31	C6	3.14	1.26	0.39
C7	Time of Day	3.71	1.23	C7	3.93	1.15	0.90
C8	Timely Materials	4.15	0.82	C8	4.19	0.79	0.26
C9	Long Classes	3.20	1.35	C9	3.26	1.36	0.19
I1	Incentives	3.68	0.94	I1	3.74	1.01	0.13
I10	Well-Prepared	4.29	0.87	I10	4.31	0.96	0.21
I11	Learning Styles	3.36	1.19	I11	3.62	1.11	0.13
I12	Technology Proficiency	3.36	1.17	I12	3.54	1.03	0.81

(Table Continues)

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		Campus[a]			TTN Sites[b]		
		M	SD		M	SD	F
I13	Individual Assistance	3.96	1.11	I13	4.05	1.04	0.18
I14	Divergent Opinions	3.93	0.97	I14	4.05	0.92	0.45
I15	Follows Syllabus	3.72	1.10	I15	3.88	1.03	0.35
I16	Detailed Outline	3.97	0.95	I16	4.04	1.07	0.20
I17	Well-Organized	4.14	0.91	I17	4.12	0.99	0.74
I18	Provides Study Pak	3.84	1.13	I18	3.89	1.12	0.09
I19	Full-time/Part-Time	2.64	1.53	I19	2.62	1.60	0.00
I2	Actively Involve	3.78	0.94	I2	3.77	0.91	0.02
I20	Attitude on Technology	2.73	1.40	I20	2.88	1.33	0.51
I21	Gender (Inst)	1.45	1.13	I21	1.46	1.25	0.18
I22	Experience	3.88	1.27	I22	3.90	1.33	0.12
I3	Uses Names	3.43	1.25	I3	3.52	1.20	0.14
I4	Call Students	1.80	1.54	I4	1.95	1.60	0.31
I5	Prompt On-Line	2.23	1.69	I5	2.44	1.70	0.45
I6	Visual Aids	3.43	1.11	I6	3.41	1.10	0.24
I7	Changes Pace	3.27	1.14	I7	3.28	1.11	0.59
I8	Summaries	3.68	1.21	I8	3.89	1.11	0.18
I9	Detailed Evaluations	3.26	1.23	I9	3.33	1.26	0.15
S1	Student Ages	2.17	1.03	S1	2.17	1.05	0.28
S10	Groups w/ Peers	3.19	1.26	S10	3.11	1.29	0.32
S11	See Instructor	3.95	0.99	S11	3.98	0.92	0.44
S12	Real Life	3.94	0.91	S12	3.89	0.93	0.11
S13	Strong Motivation	3.37	1.15	S13	3.57	1.01	0.22
S14	On-time Homework	3.77	1.05	S14	3.84	1.08	0.13
S15	Learn by Competing	2.70	1.33	S15	2.80	1.33	0.89
S16	Avoid Failure	2.61	1.43	S16	2.73	1.39	0.22

(Table Continues)

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		Campus[a]			TTN Sites[b]		
		M	SD		M	SD	F
S17	Learning Appeal	1.97	1.38	S17	1.86	1.41	0.21
S18	Motivation for Class	1.67	1.54	S18	1.67	1.55	0.32
S19	Student attitude (technology)	2.43	1.52	S19	2.65	1.45	0.28
S2	Discuss w/ peer	3.36	1.12	S2	3.51	1.03	0.69
S20	Stu Free to Proceed	3.10	2.65	S20	3.35	3.58	0.61
S21	Study Alone	3.43	1.19	S21	3.44	1.25	0.02
S22	Learn on Own	2.70	1.33	S22	2.88	1.42	0.00
S23	Employer Pressure	0.83	1.18	S23	0.80	1.15	0.08
S3	Extra Credit	2.88	1.24	S3	2.93	1.24	0.31
S4	Satisfaction w/ job	4.13	0.91	S4	4.14	0.93	0.00
S5	Easy Assignments	2.76	1.14	S5	2.81	1.21	0.10
S6	Objective Tests	3.17	1.31	S6	3.20	1.28	0.02
S7	Other Student Satisfaction	2.34	1.23	S7	2.32	1.29	0.20
S8	I&I Lectures	4.22	0.96	S8	4.12	1.03	0.59
S9	Ask Questions	3.80	0.97	S9	3.79	1.02	0.07
U1	Grad Rate	3.16	1.46	U1	3.17	1.51	0.02
U10	Distance from Campus	3.32	1.50	U10	3.36	1.48	0.03
U11	E-Mail Availability	2.92	4.31	U11	2.64	1.48	0.19
U12	On-line Financial Aid	2.64	1.74	U12	2.88	1.70	0.69
U13	Voice Mail for Students	2.24	1.65	U13	2.37	1.66	0.17
U14	Site Facilitator	2.20	1.68	U14	2.36	1.71	0.23
U15	Access to 800 Numbers	2.29	1.72	U15	2.57	1.81	0.92
U16	Bulletin Board	2.43	1.66	U16	2.77	1.61	0.49
U17	On-line Registration	2.83	1.74	U17	3.12	1.62	0.83
U18	On-line Advising	2.57	1.73	U18	2.94	1.66	0.43
U19	Book Procurement	3.61	1.39	U19	3.79	1.36	0.74
U2	Cost Efficiency	3.98	1.23	U2	3.98	1.27	0.00

(Table Continues)

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		Campus[a]			TTN Sites[b]		
		M	SD		M	SD	F
U3	Post Grad Performance	3.05	1.53	U3	3.07	1.48	0.02
U4	Student Pop Diversity	3.12	1.33	U4	2.99	1.45	0.85
U5	Number of DE Pgms	2.19	1.49	U5	2.28	1.40	0.11
U6	Number of DE Students	2.14	1.51	U6	2.22	1.43	0.17
U7	Quality of Lib Services	3.92	1.09	U7	3.88	1.14	0.16
U8	DE Accreditation	2.65	1.60	U8	2.85	1.49	0.47
U9	Media Availability	2.91	1.45	U9	2.89	1.43	0.58

[a] $n = 167$, [b] $n = 87$

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Autobiographical Statement

George Calvin Lassetter, III was born in Newnan, Georgia on June 25, 1951. He graduated from the United States Naval Academy in 1973 with a Bachelors Degree in Mathematics, from Golden Gate University in 1979 with a Masters in Public Administration, and from Old Dominion University in December, 1995 with a Ph.D. in Urban Services.

In addition to owning his own company, Mr. Lassetter has been an adjunct faculty member at Saint Leo's College for 10 years. He is currently serving as the Vice-president of the Board of Directors of Goodwill Industries of Hampton Roads and is an active Rotarian.

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