

THE RELATIONSHIP OF SELECTED PERSONAL CHARACTERISTICS OF E-FACULTY  
TO THEIR PERCEIVED TECHNOLOGICAL KNOWLEDGE

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## **DEDICATION**

**For my maternal grandparents,  
Geneva Wells Hobson and Albert Leo Hobson,  
whom I loved and greatly miss.**

**To my paternal grandparents,  
Eddie Lee Drummond Clark and Charles Henry Clark,  
whom I loved without ever knowing.**

**Mom and Dad,  
I could not have asked for better parents. You have been a foundation of information, love  
and support all of my life. I love you and in my enlightened state I have decided that you  
both have to live forever. By the way, thank you for giving me my sisters!**

**What a family I have!**

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## TABLE OF CONTENTS

DEDICATION .....	ii
ACKNOWLEDGEMENTS .....	iii
LIST OF TABLES .....	x
LIST OF FIGURES .....	xiii
ABSTRACT .....	xiv
CHAPTER I: OVERVIEW.....	1
Statement of the Problem.....	6
Purpose and Research Questions .....	6
Significance of the Study .....	9
Clarifications and Definitions .....	10
CHAPTER II: REVIEW OF RELATED LITERATURE .....	12
Conceptual Basis.....	13
Distance Learning .....	14
E-learning.....	15
Asynchronous Versus Synchronous .....	16
Comparisons of Face-to-Face (Traditional/Classroom) Learning and E-learning on Learning Outcomes .....	17
Challenges E-learning Presents .....	19
Procedural Uncertainties .....	19
Digital Divide.....	20
Technological Knowledge and Skills .....	21
Cultural Issues.....	22
Instructional Design .....	23
Other E-learning Instructional Design Considerations .....	23
E-learning Industry Standards .....	26
Technological Development of E-faculty.....	27
How E-faculty Learned to Teach Online .....	27
Anxiety Concerning Time Requirements of Technological Development.....	28
Certifications or Standards for E-faculty Technological Development.....	28
Critical Technical Skills for E-faculty .....	30
Skills Currently Possessed by E-faculty .....	31
Need for Continuous Professional Technological Development.....	31
Factors Potentially Related to the Perceived Technology Knowledge of E-faculty.....	35
Self-directed Learning .....	35
Self-efficacy Levels .....	36
Technology Anxiety Levels.....	37
Level of Support for E-instruction .....	38

Personal and Demographic Variables Related to the Technological Development of E-faculty.....	39
Summary.....	41
CHAPTER III: METHODOLOGY .....	45
Population and Sample .....	45
Target and Accessible Population.....	45
Identification of Research Universities in the SREB with Carnegie “Very High Research Activities” (RU/VH) Classification .....	46
Initial Estimates of the Number of Universities Needed to Achieve the Minimum Sample Size.....	46
Extrapolation of Initial Sample Data to Determine the Approximate Number of E-faculty and Students in All SREB Carnegie RU/VH Universities.....	49
Minimum Sample Size Determination.....	50
Instrumentation .....	52
Reliability of Existing Scales.....	53
Scale Development for the Clark-Kotrlik E-faculty Technology Development Scale and the Level of Support for E-instruction Scale.....	55
Face and Content Validity of the Instrument and Scales.....	57
Data Collection .....	59
Data Analysis.....	62
Research Question One.....	62
Research Question Two .....	63
Research Question Three .....	64
Research Question Four.....	65
Research Question Five .....	66
CHAPTER IV: FINDINGS .....	68
Research Question One: Selected Personal and Demographic Characteristics of Respondents.....	68
Research Question Two: Institutional Support.....	71
Research Question Three: Identification of Selected Characteristics of Respondents.....	73
Research Question Four: Relationship Between Perceived Technology Knowledge and Selected Variables.....	89
Research Question Five: Model for Perceived Technology Knowledge of E-faculty .....	91
CHAPTER V: SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS.....	97
Summary.....	97
Purpose and Research Questions .....	97
Summary of Methodology .....	100
Summary of Findings.....	101
Research Question One: Selected Personal and Demographic Characteristics of Respondents.....	101
Research Question Two: Institutional Support.....	102
Research Question Three: Selected Characteristics of Respondents.....	103

Research Question Four: Relationship Between Perceived Technology Knowledge and Selected Variables .....	104
Research Question Five: Model for Perceived Technology Knowledge of E-faculty.....	105
Conclusions.....	106
Research Question One.....	106
Research Question Two .....	107
Research Question Three .....	107
Research Question Four.....	108
Research Question Five .....	109
Recommendations.....	110
REFERENCES .....	116
APPENDIX A: LSU IRB EXEMPT STATUS APPROVAL .....	129
APPENDIX B: PERSONAL CHARACTERISTICS ITEMS.....	130
APPENDIX C: CLARK-KOTRLIK E-FACULTY TECHNOLOGY DEVELOPMENT SCALE©.....	131
APPENDIX D: CLARK-KOTRLIK PERCEIVED LEVEL OF SUPPORT FOR E-INSTRUCTION SCALE© .....	133
APPENDIX E: BARTLETT-KOTRLIK INVENTORY OF SELF-DIRECTED LEARNING SCALE© .....	134
APPENDIX F: KOTRLIK-REDMANN TEACHER SELF-EFFICACY SCALE .....	140
APPENDIX G: KOTRLIK-REDMANN TECHNOLOGY ANXIETY SCALE (SHORT FORM).....	141
APPENDIX H: REQUEST FOR PARTICIPATION BY CONTENT EXPERT .....	142
APPENDIX I: E-MAIL DIRECTIONS GIVEN TO CONTENT EXPERTS FOR CONTENT VALIDITY RATING.....	143
APPENDIX J: E-FACULTY TECHNOLOGY DEVELOPMENT SURVEY AS SENT TO CONTENT EXPERTS FOR CONTENT VALIDITY RATING (SCALE 1).....	144
APPENDIX K: E-FACULTY TECHNOLOGY DEVELOPMENT SURVEY AS SENT TO CONTENT EXPERTS FOR CONTENT VALIDITY RATING (SCALE 2).....	145
APPENDIX L: E-FACULTY TECHNOLOGY DEVELOPMENT SURVEY AS SENT TO CONTENT EXPERTS FOR CONTENT VALIDITY RATING (SCALE 3).....	146
APPENDIX M: E-FACULTY TECHNOLOGY DEVELOPMENT SURVEY AS SENT TO CONTENT EXPERTS FOR CONTENT VALIDITY RATING (SCALE 4).....	152

APPENDIX N: E-FACULTY TECHNOLOGY DEVELOPMENT SURVEY AS SENT TO CONTENT EXPERTS FOR CONTENT VALIDITY RATING (SCALE 5) .....	153
APPENDIX O: E-FACULTY TECHNOLOGY DEVELOPMENT SURVEY AS SENT TO CONTENT EXPERTS FOR CONTENT VALIDITY RATING (SCALE 6) .....	154
APPENDIX P: RESEARCH MODEL AS SENT TO CONTENT EXPERTS .....	156
APPENDIX Q: CONTENT EXPERT RATINGS OF PERSONAL CHARACTERISTICS ITEMS .....	157
APPENDIX R: CONTENT EXPERT RATINGS OF LEVEL OF SUPPORT FOR E-INSTRUCTION SCALE .....	158
APPENDIX S: CONTENT EXPERT RATINGS OF BARTLETT-KOTRLIK INVENTORY OF SELF-DIRECTED LEARNING SCALE.....	159
APPENDIX T: CONTENT EXPERT RATINGS OF KOTRLIK-REDMANN TECHNOLOGY ANXIETY SCALE (SHORT FORM).....	161
APPENDIX U: CONTENT EXPERT RATINGS OF KOTRLIK-REDMANN TEACHER SELF-EFFICACY SCALE (SHORT FORM) .....	162
APPENDIX V: CONTENT EXPERT RATINGS OF CLARK-KOTRLIK E-FACULTY TECHNOLOGY DEVELOPMENT©.....	163
APPENDIX W: E-MAIL SENT TO PILOT POPULATION TO INVITE THEM TO PARTICIPATE IN FORTHCOMING STUDY .....	164
APPENDIX X: E-MAIL INVITATION SENT TO E-FACULTY PILOT POPULATION FOR PARTICIPATION IN PILOT STUDY .....	165
APPENDIX Y: DIRECTIONS FOR EACH OF THE SECTIONS OF THE E-FACULTY TECHNOLOGY DEVELOPMENT SURVEY .....	166
APPENDIX Z: E-MAIL INVITATION SENT TO PILOT POPULATION NON-RESPONDENTS FOR PARTICIPATION IN PILOT STUDY .....	167
APPENDIX AA: E-MAIL INVITATION SENT TO SAMPLE POPULATION TO INVITE THEIR PARTICIPATION IN THE FORTHCOMING STUDY.....	168
APPENDIX BB: E-MAIL INVITATION SENT TO SAMPLE POPULATION FOR PARTICIPATION IN STUDY .....	169
APPENDIX CC: REMINDER E-MAIL INVITATION SENT TO SAMPLE POPULATION FOR PARTICIPATION IN STUDY .....	170
APPENDIX DD: E-MAIL INVITATION SENT TO SAMPLE POPULATION NON-RESPONDENTS FOR PARTICIPATION IN STUDY .....	171

APPENDIX EE: ACADEMIC DEPARTMENTS REPORTED BY E-FACULTY IN SAMPLE.....	172
APPENDIX FF: DIRECTIONS FOR CONTENT EXPERTS FOR THE WEIGHTING OF THE PERCEIVED LEVEL OF SUPPORT SCALE.....	176
APPENDIX GG: WEIGHTING FORM FOR PERCEIVED LEVEL OF SUPPORT FOR E-INSTRUCTION SCALE AS SENT TO CONTENT EXPERTS.....	177
APPENDIX HH: CONTENT EXPERT WEIGHTINGS OF CLARK-KOTRLIK PERCEIVED LEVEL OF SUPPORT FOR E-INSTRUCTION SCALE .....	178
VITA.....	179

## LIST OF TABLES

TABLE 1. ENROLLMENT OF PUBLIC SOUTHERN REGIONAL EDUCATION BOARD UNIVERSITIES RATED BY THE CARNEGIE FOUNDATION (2006) AS DOCTORATE-GRANTING RESEARCH UNIVERSITIES WITH A VERY HIGH RESEARCH LEVEL .....	47
TABLE 2. TOTAL ENROLLMENT AND NUMBER OF E-FACULTY MEMBERS FROM PUBLIC CARNEGIE CLASSIFIED DOCTORATE-GRANTING RESEARCH UNIVERSITIES WITH VERY HIGH RESEARCH ACTIVITY IN THREE RANDOMLY CHOSEN STATES FROM THE SOUTHERN REGIONAL EDUCATION BOARD .....	49
TABLE 3. CALCULATION OF THE AVERAGE NUMBER OF STUDENTS PER E-FACULTY IN THE RANDOM CLUSTER SAMPLE .....	49
TABLE 4. CALCULATION OF AN ESTIMATE OF E-FACULTY IN THE SOUTHERN REGIONAL EDUCATION BOARD .....	50
TABLE 5. COCHRAN’S (1977) SAMPLE SIZE FORMULA FOR 5 AND 7 POINT SCALES.....	51
TABLE 6. INDEPENDENT SAMPLES T-TEST COMPARING E-MAIL TO TELEPHONE RESPONSES ON SELECTED VARIABLES.....	62
TABLE 7. SELECTED PERSONAL AND DEMOGRAPHIC CHARACTERISTICS OF E-FACULTY MEMBERS FROM PUBLIC CARNEGIE CLASSIFIED DOCTORATE-GRANTING RESEARCH UNIVERSITIES WITH VERY HIGH RESEARCH ACTIVITY IN THREE RANDOMLY CHOSEN STATES FROM THE SOUTHERN REGIONAL EDUCATION BOARD.....	69
TABLE 8. PERCEIVED LEVEL OF SUPPORT AS MEASURED BY SELECTED VARIABLES REPORTED BY E-FACULTY.....	72
TABLE 9. WEIGHTINGS OF ITEM IMPORTANCE IN THE CLARK-KOTRLIK PERCEIVED LEVEL OF SUPPORT FOR E-INSTRUCTION SCALE .....	75
TABLE 10. NUMBER AND PERCENT OF E-FACULTY IN EACH LEVEL OF SUPPORT CATEGORY ON THE CLARK-KOTRLIK PERCEIVED LEVEL OF SUPPORT FOR E-INSTRUCTION SCALE .....	76
TABLE 11. E-LEARNING FACULTY RESPONSES TO THE ITEMS IN THE BISL© SUBSCALES .....	78
TABLE 12. E-FACULTY RESPONSES TO THE ITEMS IN THE KOTRLIK-REDMANN TECHNOLOGY ANXIETY SCALE.....	85

TABLE 13. E-FACULTY RESPONSES TO THE ITEMS IN THE KOTRLIK- REDMANN TEACHER SELF-EFFICACY SCALE .....	86
TABLE 14. RESPONSES TO THE ITEMS IN THE CLARK-KOTRLIK E-FACULTY TECHNOLOGY DEVELOPMENT SCALE .....	87
TABLE 15. CORRELATIONS OF CHARACTERISTICS OF E-FACULTY MEMBERS FROM PUBLIC CARNEGIE CLASSIFIED DOCTORATE-GRANTING RESEARCH UNIVERSITIES WITH VERY HIGH RESEARCH ACTIVITY IN THREE RANDOMLY CHOSEN STATES FROM THE SOUTHERN REGIONAL EDUCATION BOARD WITH THE PERCEIVED TECHNOLOGY KNOWLEDGE OF E-FACULTY .....	90
TABLE 16. MODEL SUMMARY FOR THE FORWARD MULTIPLE REGRESSION ANALYSIS OF THE CLARK-KOTRLIK E-FACULTY TECHNOLOGY DEVELOPMENT SCALE .....	94
TABLE 17. ANOVA SUMMARY FOR THE FORWARD MULTIPLE REGRESSION ANALYSIS OF THE DEPENDENT VARIABLE PERCEIVED TECHNOLOGY KNOWLEDGE WITH THE INDEPENDENT VARIABLES TECHNOLOGY ANXIETY, TEACHER SELF-EFFICACY AND PERCEIVED LEVEL OF SUPPORT .....	95
TABLE 18. STANDARDIZED AND UNSTANDARDIZED COEFFICIENTS FOR THE VARIABLES INCLUDED IN THE FORWARD MULTIPLE REGRESSION ANALYSIS OF THE CLARK-KOTRLIK E-FACULTY TECHNOLOGY DEVELOPMENT SCALE .....	95
TABLE 19. EXCLUDED VARIABLES, STANDARDIZED COEFFICIENTS, T VALUES, SIGNIFICANT LEVELS, PARTIAL CORRELATIONS, TOLERANCE LEVELS AND VARIANCE INFLATION FACTORS (VIF) FOR THE FORWARD MULTIPLE REGRESSION ANALYSIS OF CLARK-KOTRLIK E-FACULTY TECHNOLOGY DEVELOPMENT SCALE .....	96
TABLE 20. PERSONAL CHARACTERISTICS ITEMS.....	130
TABLE 21. CLARK-KOTRLIK E-FACULTY TECHNOLOGY DEVELOPMENT SCALE (CKEDS©) .....	131
TABLE 22. CLARK-KOTRLIK PERCEIVED LEVEL OF SUPPORT FOR E-INSTRUCTION SCALE (CKLOS©).....	133
TABLE 23. BARTLETT-KOTRLIK INVENTORY OF SELF-DIRECTED LEARNING SCALE (BISL©) (SHORT FORM) .....	134
TABLE 24. KOTRLIK-REDMANN TEACHER SELF-EFFICACY SCALE (KRTES).....	140

TABLE 25. KOTRLIK-REDMANN TECHNOLOGY ANXIETY SCALE (KRTAS) (SHORT FORM) .....	141
TABLE 26. PERSONAL CHARACTERISTICS ITEMS.....	144
TABLE 27. CLARK-KOTRLIK PERCEIVED LEVEL OF SUPPORT FOR E- INSTRUCTION SCALE .....	145
TABLE 28. BARTLETT-KOTRLIK INVENTORY OF SELF-DIRECTED LEARNING SCALE (BISL©) (SHORT FORM) .....	146
TABLE 29. KOTRLIK-REDMANN TECHNOLOGY ANXIETY SCALE (KRTAS).....	152
TABLE 30. KOTRLIK-REDMANN TEACHER SELF-EFFICACY SCALE (KRTES).....	153
TABLE 31. CLARK-KOTRLIK E-FACULTY TECHNOLOGY DEVELOPMENT SCALE (CKEDS©) .....	154
TABLE 32. CONTENT EXPERT RATINGS OF PERSONAL CHARACTERISTICS ITEMS.....	157
TABLE 33. CONTENT EXPERT RATINGS OF LEVEL OF SUPPORT FOR E- INSTRUCTION SCALE .....	158
TABLE 34. CONTENT EXPERT RATINGS OF BARTLETT-KOTRLIK INVENTORY OF SELF-DIRECTED LEARNING SCALE (BISL©) (SHORT FORM) .....	159
TABLE 35. CONTENT EXPERT RATINGS OF KOTRLIK-REDMANN TECHNOLOGY ANXIETY SCALE (KRTAS) (SHORT FORM).....	161
TABLE 36. CONTENT EXPERT RATINGS OF KOTRLIK-REDMANN TEACHER SELF-EFFICACY SCALE (KRTES) (SHORT FORM) .....	162
TABLE 37. CONTENT EXPERT RATINGS OF CLARK-KOTRLIK E-FACULTY TECHNOLOGY DEVELOPMENT (CKEDS©).....	163
TABLE 38. ACADEMIC DEPARTMENTS REPORTED BY E-FACULTY MEMBERS FROM PUBLIC CARNEGIE CLASSIFIED DOCTORATE-GRANTING RESEARCH UNIVERSITIES WITH VERY HIGH RESEARCH ACTIVITY IN THREE RANDOMLY CHOSEN STATES FROM THE SOUTHERN REGIONAL EDUCATION BOARD .....	172
TABLE 39. CONTENT EXPERT WEIGHTINGS OF CLARK-KOTRLIK PERCEIVED LEVEL OF SUPPORT FOR E-INSTRUCTION SCALE (CKLOS©).....	178

## LIST OF FIGURES

FIGURE 1. PERCEIVED TECHNOLOGY KNOWLEDGE FOR E-FACULTY RESEARCH MODEL .....	44
FIGURE 2. PERCEIVED TECHNOLOGY KNOWLEDGE FOR E-FACULTY – WORKING MODEL .....	52
FIGURE 3. TECHNOLOGY DEVELOPMENT FOR E-FACULTY – WORKING MODEL .....	156

## ABSTRACT

This study investigated the technological development of e-faculty at five randomly selected Carnegie classified (2006) Doctorate-Granting Research Universities with very high research activity (RU/VH) in the Southern Regional Education Board (SREB). The majority of e-faculty report that they do not have release time/reduced teaching load for preparing web-based materials/courses, nor do they have graduate or teaching assistants available for assisting with web-based learning. However, a little over half of them reported having instructional designers or curriculum developers to help with the designing of web-based materials and a large majority reported having adequate institutional research resources (library holdings that are accessible by web and technical support). E-faculty reported that student technical support resources are offered in almost all cases and over two-thirds (76.35%) reported that those resources were offered seven days a week. The technical support resources for e-faculty were also offered in almost all cases, but only 63.77% reported the resource was available to them seven days a week. A large majority of e-faculty report that they do not receive sources of funding for e-learning course technology training/conferences. However, almost half of them (44.50%) report that the funding that they receive for e-learning technology events/work is adequate. The self-learning subconstructs of the BISL© describe e-faculty most of the time. E-faculty perceive that they have moderate technology knowledge, good teaching self-efficacy and minor technology anxiety. Three variables, technology anxiety, self-efficacy and perceived level of support explain a large amount of the variance (over half) in perceived technology knowledge of e-faculty. Therefore, as technology anxiety decreases and self efficacy and perceived level of support increase, the perceived technology knowledge of e-faculty increases.

## CHAPTER I: OVERVIEW

Technological changes are happening constantly! Is it possible to keep up the pace? Internet, communication, and transportation advances are breaking down the “distance” between the countries of the world. The rapid advancement of technology started after the personal computer hit the market. With rapidly extending capabilities and long distance communication making networked personal computers particularly valuable, their sales soared. This development caused all sorts of competition for the privilege of meeting the huge demand that resulted. In effect, it also boosted the huge jumps in technology that began to surface. With the demand so high, the competition forced large amounts of money into development, production and hiring/creating of experts in the field (D'Amico & Judy, 1994).

The proliferation of the need for more technologically advanced products calls for a more skilled workforce and the new technology with advanced automation features greatly reduces the need for lower skilled workers. Thus, the boom in the creation of technology has affected the manufacturing fields by lowering the number of workers needed in the factories (D'Amico & Judy, 1994). Most new jobs in the United States require a higher skill set and the lower-skill jobs will be automated or outsourced to other countries. These new jobs will also be more service oriented as the exportation of factory type jobs, those dealing with the production of goods, to other countries rises. The majority of the service oriented jobs will require a more highly educated and technologically savvy workforce (D'Amico & Judy, 1994). A professional will need to be continually able to learn and change as the pace of technology continues to advance (Locatis & Weisberg, 1997).

E-learning fits into the workforce environment where lifelong learning has become a necessity in order to keep up with the changing climate of the workforce. It is essential that ways to learn also move with the times and can provide this learning on-demand, as needed.

Traditional colleges and universities will need to stay on the cutting edge of innovation and technology to stay competitive with the increasing popularity of the on-demand, easy access e-learning education provided by online universities like DeVry University and the University of Phoenix (Ortmann, 2001).

Online courses have been available since 1989 (Olsen, 2002). One of the criticisms of professors at traditional universities who teach online courses is that they are learning as they are teaching, which often results in an experience for the students that is less than ideal (Olsen, 2002). Some professors say that insufficient time or greater interest in research relegates teaching to a lower category of importance for them. Although the administration might be attempting to stress the importance of teaching, the perception is that tenure and promotion tracks do not really value undergraduate teaching (Boyer Commission, 2001). It is standard practice with online universities (University of Maryland University College, University of Phoenix, etc.) to put their instructors through an online training program. In some online universities, after the new instructor has gone through this course, they are teamed with an experienced online instructor who helps them get started (Olsen, 2002).

In 1999, The National Survey of Information Technology in Higher Education found that of the 557 two- and four-year degree-granting universities surveyed, 47% of the institutions offered at least one course entirely over the Internet (Council for Higher Education Accreditation, 1999). Online learning is the major form of distance learning in community colleges (Johnson et al., 2004). The popularity of online learning has gone beyond the collegiate level, becoming quite popular in secondary education circles. The reason that it is becoming popular for this group is that it allows students access to courses or teachers that they do not have at their current location. Secondary students also enjoy, like adults, the freedom to work within a

more flexible schedule; they can take a required or advanced placement (AP) class online and still keep taking the dance class at school. A nonprofit Michigan Virtual High School had 7,700 individuals enrolled through distance education in 2004 (Cable News Network, 2005).

In the past several years, online learning has been exploding in popularity. In a review of online learning in the K-12 environment as of July 2005, there were cyber schools (and/or online programs at the district level) in almost every state and programs for online learning statewide in 21 states (Watson, 2005). The growth rate of students taking courses and the courses being offered are staggering in most statewide programs, “. . . with programs experiencing consistent growth of 50 percent to 100 percent per year. The largest statewide programs are Utah’s Electronic School (more than 35,000 students) and Florida Virtual School (more than 33,000 course registrations and 21,000 students)” (Watson, 2005, p. 11).

The impacts of distance learning on higher education include growth of offerings of credit-bearing courses, the appearance of new providers of higher education and the emergence of partnerships between institutions and the corporate sector for support services (Eaton, 2001). In several universities, online enrollments increased or doubled in a year. In 2001, electronic learning was mostly being exported by the United States, the United Kingdom and Australia (Eaton, 2001).

A survey conducted by the Center for Educational Research & Innovation addressed the kind and amount of online learning happening at 19 higher education institutions from around the world. The study defined five different levels of involvement that the institutions could have: 1. none or trivial, 2. web supplemented (outlines, e-mail, etc.), 3. web dependent (discussions, assignments, etc.), 4. mixed mode (online assignments, reduced campus attendance is required) and 5. fully online (Center for Educational Research and Innovation, 2005). Only one of the

institutions could be described as teaching 100% online at present with another institution planning to be at 100% within three years. All of the institutions plan on either increasing their online delivery or sustaining their current high one. Another institution was offering most courses online and intended to offer face-to-face or online learning as a choice for all of their classes within three years. The amount that the universities were online using a ranked scale (1=none, 5=100%) was rated (2003/2004) and compared to where they were three years before (2000/2001) and where they anticipated being in three years (2006/2007). The amount of change ranged from 7% to 51% in their movement toward a more e-learning university between 2000/2001 and 2003/2004; from 11% to 78% change was anticipated between 2003/2004 and 2006/2007 (Center for Educational Research and Innovation, 2005).

Because of the Internet, all of the facets of globalization (scientific, cultural, educational, etc.) are making impacts on institutions regardless of their chosen mode of delivery. The realities that this new global world will bring about will necessitate “. . . deep and radical changes in their organizational models, in their learning and research processes, and particularly in the formation of executive and academic teams” (Armengol, 2002, pp. 192-193). Instead of using current technology to mimic existing teaching styles, it should be used to enhance teaching (Kenny, 1998). Amazing advancements in technology are allowing educational interactions that were once thought impossible. With the correct software and hardware, an individual educator can work with a group or an individual student or colleague through the use of two-way audio and video communication (synchronously or asynchronously), collaborative teaching and cooperative learning projects. The National Council for Accreditation of Teacher Education (NCATE) created one set of standards for teachers which outline the need for suitable use of technology in the classroom. Unfortunately, teachers seem to share a concern over the lack of

time they have with which to acquire the technological skills that they need (Norton, McRobbie, & Cooper, 2000). They will need to keep up with new technologies, new ways to use technology, the hardware and/or software required to put it to use, advances in education, advances in their field and new ways to inspire their participants to reach their goal. For technical prowess, time is an important factor. Many teachers might not have basic computing skills (Galusha, 1997), making that time even more necessary.

Most colleges and universities are dealing with the issues that are arising from the fast-paced, technology-driven, information demanding society with its increasingly diverse workforce (Asoodeh & Bonnette, 2006). “Significant technology usage...is a desideratum in structurally adaptive colleges committed to meeting student and client needs” (Amey & VanDerLinden, 2003, p. 85). With the widespread usage of newer mobile wireless technologies, e-learning might even go so far as to become mobile learning or m-learning (Kim, Mims, & Holmes, 2006).

In this new environment, e-faculty will be responsible for creating conditions conducive to learning, and will be expected to interact with the individual learners during their learning process. This will include monitoring the progress of the learner and changing strategies as needed to keep them engaged and productive. In addition to being a subject matter expert, e-faculty will also need to have technology and instructional skills, counseling skills and knowledge of the workings of group dynamics. It is relatively new for professionals to have to keep up with technology and its learning applications (Baldwin, 1998). Baldwin stated,

Thus, I find that I am once again in an uncomfortable stage - too old to be completely at ease with technology, yet too young to ignore it. The fact is, technology is gradually transforming higher education and the work of the academic profession (Baldwin, 1998, p.7).

In addition, Cookson offered these observations about e-learning:

. . . many universities that previously eschewed earlier forms of correspondence and homestudy are leapfrogging lower level applications to offer courses entirely online. Instead of books and other readings, all text is conveyed via either the Internet or CD-ROM disks. Either streamed or non-streamed audio and video replace audio and videotapes. Interaction among students and between the instructor and students occurs through e-mail, listservs, or computer conferences. Significant restaffing and utilisation of instructional teams (comprising instructors, visual designers, editors, instructional designers, and web programmers) are required (Cookson, 2000, pp. 72-73).

### **Statement of the Problem**

Is the learning curve induced by the technological boom impeding progress? In order for professionals to achieve the goal of staying abreast of the learning curve they must continually develop their technological skills. The professional must also have access to training or information in order to continually maintain, hone and advance those skills. This is particularly true in web-based environments. In order for e-faculty to be effective in their online environments, it is essential that they are continually expanding their technological abilities or technological development. Technological development is a course of action that should be taken in order to keep web-based learning professionals contemporary. A need exists to investigate the technological development of e-faculty and variables that may be related to that development.

### **Purpose and Research Questions**

The purpose of this study was to determine whether perceived technology knowledge of e-faculty is related to their: self-efficacy, technology anxiety level, self-directed learning level (as defined by the 11 subscales of Bartlett-Kotrlik Inventory of Self-Learning) & their perceived level of support for e-instruction. The research questions addressed in this study were:

1. What are selected personal and demographic characteristics of e-faculty in Carnegie classified (2006) Doctorate-granting Research Universities with very high research activity (RU/VH) in the Southern Regional Education Board (SREB)? Particularly,

what is their gender, age, academic rank, academic department, existence of training at organization, clock hours of formal training (instructional training received by e-faculty on topics specific to skills relevant to teaching web-based courses) received in the last two years and clock hours of self-study training in the last two years (self-taught instructional training by e-faculty on topics specific to skills relevant to teaching web-based courses).

2. What is the level of institutional support for e-faculty in Carnegie classified RU/VH universities in the SREB as perceived by e-faculty? Particularly, describe their perceived level of support on following aspects:
  - Release Time/Reduced Teaching Load (time allotted to prepare web-based materials/courses)
  - Graduate/teaching assistants: graduate or teaching assistants to help specifically with e-learning
  - Instructional designers/curriculum developers to help with the designing of web-based materials
  - Existence of adequate web-based institutional research resources: to help specifically with e-learning courses (library holdings that are accessible by web and technical support)
  - Technical support: existence of technical support resources available for the students (computer help desk, web/e-course help desk, hours available)
  - Availability of web-based computer technical support resources for students (seven days a week)

- Technical support: existence of technical support resources available for the professionals (computer help desk, web/e-course help desk, hours available)
  - Availability of web-based computer technical support resources for professionals (seven days a week)
  - Existence of sources of funding for e-learning course technology training/conferences
  - Adequacy of funding for e-learning technology events/work
3. What are selected characteristics of e-faculty, including the following:
- Level of support for e-instruction as measured by the weighted Clark-Kotrlik Perceived Level of Support for E-instruction Scale© (CKLOS) (2007) created for this study
  - Perceived technology knowledge level of e-faculty as measured by the Clark-Kotrlik E-faculty Technology Development Scale© (CKEDS) (2007)
  - Self-directed learning level of e-faculty as measured by subscales of the short form of the Bartlett-Kotrlik Inventory of Self-Learning (BISL©) (1999)
  - Technology anxiety level of e-faculty as defined by the technology anxiety scale from Kotrlik & Redmann (KRTAS) (2006)
  - Self-efficacy of e-faculty based on the teacher self-efficacy scale from the Kotrlik & Redmann (KRTES) (2002) study
4. Does a relationship exist between perceived technology knowledge of e-faculty as defined by the Clark-Kotrlik E-faculty Technology Development Scale (CKEDS) and the following variables:
- Age

- Academic Rank
  - Self-efficacy of e-faculty as defined by the teacher self-efficacy scale from the Kotrlik & Redmann (2002) study
  - Technology anxiety level of e-faculty as defined by the technology anxiety scale from Kotrlik & Redmann (2006)
  - Self-directed learning level as defined by the subscales of the short form of the Bartlett-Kotrlik Inventory of Self-Learning (BISL©)
  - Perceived level of support as defined by the Clark-Kotrlik Perceived Level of Support for E-instruction Scale designed for this study
5. Does a model exist that explains the variance in the perceived technology knowledge of e-faculty? The potential explanatory variables that were used for this analysis are: self-efficacy, technology anxiety level, time management, extrinsic motivation, external support, performance and self-efficacy of work, peer learning, supportive workplace, attitude toward technology, other performance rating, goal setting, help seeking, intrinsic motivation, level of support for e-instruction, training for e-instruction, age, gender and academic rank.

### **Significance of the Study**

Because of the rapid advance of technology, revealing relationships between an individual's self-efficacy, technology anxiety level, time management, extrinsic motivation, external support, performance and self-efficacy of work, peer learning, supportive workplace, attitude toward technology, other performance rating, goal setting, help seeking, intrinsic motivation, level of support for web-based learning, training for e-instruction, age, gender, academic rank and their perceived technology knowledge could benefit both potential e-faculty

and the institution or organization which desires to hire them. The knowledge of the relationships that exist between these variables and the perceived technology knowledge of e-faculty would be beneficial to institutions or organizations by providing a model for the perceived technology knowledge of e-faculty. The continual advancement of technological skills and knowledge is a must if e-faculty are going to be successful in the transfer of knowledge to their students through electronic media. The purpose of this study is to investigate the status of e-faculty towards technological knowledge development. It makes sense that the more comfortable e-faculty are with the tools through which the class will be created, the more they will be able to take advantage of them.

### **Clarifications and Definitions**

For the purpose of this study, “e-learning,” “e-faculty,” “e-students,” “e-instruction” “technological development” and “technology knowledge” were defined by the author as follows:

**E-learning** refers to courses which are taught over the Internet and require no actual on-campus presence.

**E-faculty** were those university faculty who teach e-learning courses.

**E-students** were those students attending university e-learning courses.

**E-instruction** refers to web-based instruction.

**Technological development** is the continual advancement of technological knowledge that could keep e-faculty current with the continual advancements and changes in the technological landscape and prove useful in their pursuit of e-learning.

**Technology knowledge** is the familiarity or understanding gained through the experience or study of subject matter and skills in the area of technology that will prove useful in their pursuit of e-learning endeavors.

The “Internet” is the infrastructure that allows the “World Wide Web” to exist and the WWW is the actual content. Although there is technically a difference, in this study, the words “Internet” and “Web” or “WWW” will be considered equivalent and used interchangeably.

## **CHAPTER II: REVIEW OF RELATED LITERATURE**

This literature review is comprised of information set forth to identify the current body of knowledge on the technological development of e-faculty. There will be a discussion of the conceptual base of the study, after which the following topics will be discussed: distance learning, e-learning, comparisons of face-to-face (traditional/classroom) learning and e-learning on learning outcomes, challenges e-learning presents, e-learning instructional design considerations, e-learning industry standards, technological development of e-faculty and factors that might affect the technological development of e-faculty. Factors that might affect the technological development of e-faculty are self-efficacy, technology anxiety level, time management, extrinsic motivation, external support, performance and self-efficacy of work, peer learning, supportive workplace, attitude toward technology, other performance rating, goal setting, help seeking, intrinsic motivation, level of support for e-learning, training for e-instruction, age, gender, and academic rank. A summary of the literature will follow and conclude the chapter. With current advances in technology, the information on the technological aspects of this study is ancient history almost as soon as it is written. Therefore, the investigator did not take into account many of the articles about computer instruction that described and discussed problems that dealt specifically with technology only a few years ago; they were already obsolete. Actual research, as opposed to professional opinion articles, in the area of e-learning and particularly the technological development of e-faculty is very limited; therefore, much of this review of literature is comprised of literature that is closely related, such as the integration of technology into the classroom, even though, the author acknowledges, it is not e-learning.

## Conceptual Basis

Constructivist theory calls traditional roles in education into question, pushing the student and teacher to work together to achieve learning rather than just give and receive information (Cook-Sather, 2001). Papert takes this theory of active construction of knowledge and adds another dimension. “Constructionism” says that active construction of knowledge is more effective when the participants are working on something personally meaningful (Papert, 1991).

Knowledge building communities, as discussed by Scardamalia and Bereiter in the realm of Computer Supported Intentional Learning Environments (CSILE), involves the teachers as a part of the educational group in the process of expanding their current knowledge (1991). In 1994, Salomon discussed the concept of “distributed cognition.” This concept relates that a person’s intelligence and cognition are not inherent properties of an individual, but the results of their interaction with others and their surroundings (Salomon, 1994). With a vision of computer networks as the new medium for the construction of learning, Resnick put the idea of “knowledge building communities” and “distributed cognition” together. Resnick extends constructionist theory into “distributed constructionism.” As Resnick describes it, “distributed constructionism” declares that knowledge building communities evolve well through collaboration and co-design/creation of both content and ideas meaningful to the participant. Online courses can easily be used to support distributed constructionism. For example, they can discuss topics over forums, blogs, bulletin boards or e-mail and they can collaborate on projects from papers and web pages to game creation (Resnick, 1996).

The “Cognitive Flexibility Theory,” also based on constructivist theories, is considered particularly useful for interactive technology deployment (Kearsley, 1998). The theory deals with the “. . . ability to spontaneously restructure one’s knowledge, in many ways, in adaptive response to radically changing situational demands” (Spiro & Jehng, 1990, p. 165).

It seems obvious that only through more research or study can e-faculty find out about all of the options available to them. This becomes particularly important in e-learning where the methods are relatively new and ever-changing. “Only through broader exposure can individuals be made aware of the range of possible instructional materials and methods, sense those that they feel more comfortable with, and also to adapt to alternative or unfamiliar approaches” (Sadler-Smith & Smith, 2004, p. 406). An expanded constructivist approach to learning that involves the teacher and learners adaptively responding to their environments and working together to create learning seems appropriate for a study concerning the technological development of e-faculty, considering technology as the teacher and e-faculty as the learners (Sadler-Smith & Smith, 2004).

### **Distance Learning**

The idea behind distance education is that the teacher and the learner are separated for most, if not all, of the teaching-learning process. This process is considered to involve both the learning process and the teaching process, regardless of the students’ absence from the center of learning (Harrison, 1999). Distance learning, then, includes online learning, which is “. . . the ability to electronically ‘reach out and touch’ knowledge and learning materials” (Masie, 1997, p. 163). There are those who believe that traditional distance education, like that of the paper-based correspondence courses, will soon be extinct as computer infrastructure support grows stronger and the advantages of online instruction become more apparent (Carr-Chellman & Duchastel, 2000). Students are being offered more and more choices about where, when and how they wish to learn. If institutions wish to thrive they must respond and offer a more diverse set of learning options. This response will help ensure that the institution will continue to be a social focal point for all members of the academic community (Harrison & Dugdale, 2002).

As the 21st century begins, this vision of distance learning has changed and the delivery of education now extends to commercial centers. Along with personal productivity software, Windows environments, local area networks, client/server computing, the Internet, intranets, and extranets has come the introduction of personal digital assistants (PDA), as well as other mobile and wireless technologies. These technological advances have enabled electronic commerce systems; anytime, anyplace data retrieval and updating; education; professional development; and the rapid growth of e-learning, which is one of the major components of distance learning (Wentling, Waight & King, 2002).

### **E-learning**

Computer-mediated classrooms: faculty and students engage with each other through keyboards and monitors, relying heavily on the written word rather than face-to-face exchange; Separation in time between communications: teachers and students depend on asynchronous modes of communication rather like e-mail exchanges; and Availability of services online: student services such as advising, counseling, mentoring and library services are integrated with the online teaching and learning environment (Eaton, 2001, p. 9).

E-learning is respected as a valuable tool for the delivery of learning. It provides the learner with the ability to experience learning anytime they want at any place they want. This anytime, anywhere learning is a huge advantage (Okamoto, 2001). The Internet provides a different type of culture that must be dealt with if one is going to teach online. The students in these courses are scoring well overall, they seem to enjoy the diversity and flexibility, and they also enjoy the speed at which some of their work is returned (especially international students). One of the drawbacks, however, is that some students are not as comfortable with online communication. Online learning/teaching forces students to interact differently with each other and with teachers/trainers. Those students that master this new communication method and use it effectively tend to form closely knit online communities that enhance the learning experience

(Carswell, Thomas, Petre, Price, & Richards, 2000). Many believe that online instruction is only as good as the teaching method, teacher, or support given to the class (Palloff & Pratt, 1999).

### **Asynchronous Versus Synchronous**

With synchronous delivery strategy, everyone can meet together in the online classroom or e-learning environment and work together at appointed times on projects in their own individual locations, whereas, with an asynchronous delivery, learners complete work in the e-learning environment at whatever time they choose (still at their own individual locations) rather than meeting in the e-learning environment at a certain time (Dooley, Kelsey & Lindner, 2003). A study done at five campuses of a southeastern community college on distance faculty, traditional faculty and division chairs showed significant differences between distance and classroom faculty on the preference of delivery modes for e-learning environments. An asynchronous mode of learning was preferred by 42 percent of the distance faculty, while only 14 percent preferred a synchronous mode and 28 percent of the distance faculty preferred a mixture of the two modes of learning. The synchronous mode of learning was preferred by 43 percent of classroom faculty, of whom only 10 percent preferred asynchronous learning environments and 9 percent preferred a mixed mode of learning environments (O'Quinn & Corry, 2004). A study was done on the satisfaction of students with a doctoral degree offered online. The authors found that the study supported the delivery of lessons both synchronously and asynchronously, since the students did not seem to have a preference for one design over the other. Some contend that synchronous delivery more closely models the traditional classroom, but both asynchronous and synchronous delivery options can be a successful part of online learning strategies (Ellis, 1997).

### **Comparisons of Face-to-Face (Traditional/Classroom) Learning and E-learning on Learning Outcomes**

There have been several studies that compared the effects of traditional versus online learning that did not find significant differences in the learning levels of students. A study involving a statistics class made up of 38 undergraduate students registered in the School of Nursing at a large Midwestern university was examined for differences between online and face-to-face learners on final grades and on student satisfaction. The study showed no significant differences in student learning as indicated by their final grades ( $t(36)=1.42$ ). However, the study showed significant differences in 7 of the 16 items used to determine the level of student satisfaction. Even though the results showed that there was no significant difference in the grades between the online and traditional course, the results did show that students in the online course were less satisfied with the course (Summers, Waigandt, & Whittaker, 2005).

In 2004, a study was published with data collected from a larger study of online and traditional education classes. Students from English Composition traditional and online classes in the spring of 2002 made up the participants in this study. The study showed no significant difference in learning between the different environments. However, the study showed that being in the online class had a positive effect on participation and satisfaction (Finlay, Desmet, & Evans, 2004).

In an experimental study conducted on 33 Social Statistics students at California State University, online students scored an average of 20 points higher ( $p < 0.001$ ) than traditional students (Schutte, 1996). In a comparison of two sections of an undergraduate human growth and development course, the web-based distance learning students did as well as, or better, than those in the face-to-face section (Barnett-Queen & Zhu, 1999).

In 2002, Kekkonen-Moneta and Moneta found the factual learning outcomes of students from their study involving a lecture version and an interactive online version of an introductory computing course were not significantly different overall ( $F(2,408) = 0.488, p < 0.615$ ). They did, however, find that there was a significant difference in the results of the questions that tested applied-conceptual learning ( $F(2,408) = 18.163, p < 0.001$ ). They reported that their findings suggested that the use of well designed interactive web-based learning modules created higher-order learning outcomes (Kekkonen-Moneta & Moneta, 2002).

A study of computer science students who were all at least 22 years of age or older (non-traditional students) found no significant differences ( $U = 65.50, p = 0.25$ ) in the academic performance between the online and traditional groups users. This study also examined learning styles and found a significant difference ( $\chi^2[3] = 9.2, p < 0.05$ ) between the online and traditional groups. Most of the students that enrolled in the online course had Converger learning styles, whereas most of the students in the traditional course had an assimilator learning style (Buerck, Malmstrom, & Peppers, 2003).

A meta-analysis in 2002 found a slight preference for a traditional education format ( $r = 0.031$ ). The largest effect was seen ( $r = 0.078$ ) as information was added to the offered instruction in the form of full audio/visual interaction, although it should be noted that the effect size for this relationship is negligible according to the guidelines for interpreting correlation coefficients by Hopkins (1997). Overall, the findings in the meta-analysis support that distance learning, when compared to traditional face-to-face courses, does not diminish student satisfaction (Allen, Bourhis, Burrell, & Mabry, 2002).

As in the traditional classroom, instructional design is of supreme importance. Instructional designers must integrate learner-centered and self-directed approaches for distance

learning. Learner-centered instruction encompasses many characteristics and delivery methods that could result in effective teaching and learning (Dooley, Kelsey, & Lindner, 2003).

### **Challenges E-learning Presents**

The ability of e-faculty to appreciate and respond to the challenges that are facing higher education in this e-learning environment will influence the quality of future higher education (Eaton, 2001). Brown notes:

The ultimate burden may rest on educators to become as knowledgeable as possible concerning technology and its use with and by specific populations. This knowledge will provide educators and schools the ability to equip all students in an equitable manner (Brown, 2000, p. 186).

### **Procedural Uncertainties**

Electronic access also means that additional opportunities can present themselves, like cross-institutional degrees. A student could be simultaneously taking classes online from the University of Massachusetts and Louisiana State University from their den in Arizona (Eaton, 2001). How will degrees like this be handled?

Some institutions have agreements for students in their online courses. These agreements can establish hardware and software requirements and/or prerequisites that the students need to have in order to enroll in e-learning courses (Brooks, 2003). Online instructors must also be prepared for students that have not familiarized themselves with the requirements for their particular course. They might combat this by creating a list of requirements that has to be agreed upon in order to take the course. This list could include things like the computer hardware, software and skills necessary to work in the online environment (Abramov & Martkovich, 2002).

With the different skills e-faculty require (e.g., content specialization, instructional design, technological), a team approach sounds promising. A qualitative study done at the University of Manitoba, involving a purposive sample of 11 members of the faculty, found an

Interdisciplinary Team Model successful, particularly in developing courses in the graduate program. With this model, team members met on a regular basis while developing a course and then again after the course delivery phase to deal with issues that had arisen (Care & Scanlan, 2001). The team was made up of a content specialist, instructional designer, student representatives, media specialists, a distance education director and an external faculty member. These members learned from one another, gained new knowledge from one another and appreciated strengths that others brought to the table (Care & Scanlan, 2001).

Another procedural uncertainty that e-learning faces are questions that are complicating the political relationship between higher education and the federal government. Their combined understanding of what qualifies as higher education and the use of federal money is being questioned. Currently, institutions are autonomous, and the government allows for self-regulation of the quality of higher education (Eaton, 2001).

### **Digital Divide**

In 1995, the Markle Foundation conducted a study that showed a divergence in online society that closely resembled normal society. Cultural and racial lines formed a noticeable separation between groups of people. James Katz, who conducted the Markle Foundation study, coined the “digital divide” as the difference between those online and those that were not online (CNET News.com Staff, 1997). Gender, age, socio-economic status and education have all been established as factors in the digital divide (Broos & Roe, 2006).

Concerning at-risk students and technologies, three categories appear to be creating a barrier to equivalent access. These categories are physical access, pedagogy and instruction (Brown, 2000). Teachers not feeling well prepared to use educational technology in the classroom is particularly a problem in schools with a lower economic status. Swain and Pearson narrowed the large scope of the digital divide to “. . . the use of technology by schools based on

ethnicity and socioeconomic status” (2003, p. 327) for their discussion of their findings in the literature. These findings revealed that there were three areas where faculty could influence the digital divide in their classrooms: “. . . frequencies of use, the differences in students’ experiences with respect to computer use, and technology professional development for teachers” (Swain & Pearson, 2003, p. 327). Becker found that one of the characteristics of exemplary teachers was that they worked in “. . . school districts that had invested heavily in staff development and on-site staff support for computer-using teachers” (2000, p. 281).

### **Technological Knowledge and Skills**

Some universities create separate divisions of administration to handle e-learning courses. If the departments still handle all the details of departmental philosophy, course content, format, etc., and the e-learning division just establishes a policy, then the instructor is forced to walk a thin line between their department and the administrative division. This sort of complication arises in response to universities’ attempts to standardize and make the format of e-learning courses more efficient (Ershler, 2003). The e-learning policy is very important. For new online instructors, this policy could give them a framework in which to work. Often, there may be little guidance other than a policy to plan their courses around. With motivation (and if resources are available), a novice e-learning instructor might be able to view other courses to explore effective teaching models and get some concept of what the end course should look like (Ershler, 2003). Particular training and development is also necessary to keep up with a rapidly changing online learning environment. Skills identified by the instructors as pertinent to the effective and proficient use of technology are needed (Crumpacker, 2001).

## **Cultural Issues**

The unrestricted potential of web-based learning to span the globe pushes the designers of such courses to use knowledge of other cultures during creation. Just as having a different learning style might impede a learner, so might having a different cultural background. Culture is infused into learning. When planning for courses, the instructor or designer should be structuring the data to meet the needs of a diverse population; they should also be concerned with task design and communication channels that might be appropriate to this population (McLoughlin, 2000). In cultures like China where students are supposed to learn whatever the teacher or the book conveys to them, following a course that is set up in a style that encourages self-directed learning would be challenging (Lee, 2004).

Carey, Chisholm and Irwin observed:

This growing expectation in higher education for computer expertise and competence must be tempered by an awareness of students' disparate access, dissimilar experiences and varying attitudes towards computers. Course requirements, while maintaining quality and rigor, should not unfairly disadvantage those with limited computer expertise. International students from developing nations, as well as our own students with limited access, need training and expanded access to the technology, technical support while learning, and instructional methods that match their preferred learning environment (Carey, Chisholm, & Irwin, 2002, p. 233).

In theory, Internet access to online courses is without boundary; there is no time or place requirement. The learner can study what they want, when and how they choose. The Internet “. . . can be used as both: process support-during the design and development of a course-and as product support-as a platform to embed and deliver the course” (Nikolova & Collis, 1998, p. 60). When traditional courses are just transposed to electronic media, there can be some unfortunate consequences for the resulting online course. Without separate design considerations, many of the opportunities available to online courses could be lost (Carr-Chellman & Duchastel, 2000).

## **Instructional Design**

In 1997, Dunderstadt referred to children as members of the digital generation, because of their access to and immersion in computers, video games and electronic media. More and more of the students entering college today fit into this category. Faculty might find that they must become designers for a new style of learners, creating situations for the learners to interact and learn in (Dunderstadt, 1997). “The requirement which is implicit in much flexible learning design, namely that all learners need to exhibit a degree of self-direction, suggests that particular instructional, learning and support strategies need to be adopted to facilitate the achievement of self-direction” (Sadler-Smith & Smith, 2004, p. 399). Failing to address learners’ preferences could lead to less than optimal performance, because the learners then tend to have less motivation and engagement in the learning process. E-faculty will need to be equipped with the skills to adapt their courses to meet the needs of students such as these (Sadler-Smith, Allinson, & Hayes, 2000).

## **Other E-learning Instructional Design Considerations**

Considerations, such as advertising, sometimes tend to receive top priority and placement on e-learning sites/pages and the quality of online programs can suffer (Carr-Chellman & Duchastel, 2000). Advertisements tend to be distracting to the student and may even manage to cause course information to be overlooked. Some educators are using the least amount of technology they possibly can. Technological minimalism is defined as “. . . the unapologetic use of minimum levels of technology, carefully chosen with precise attention to their advantages and limitations, in support of well-defined instructional objectives” (Collins, 1999, p. 9). The supporters of minimalism have concerns over the lack of valid studies that prove that more technology, like streaming video, actually enhances the learning process. They point out that the hardware and software necessary to run all the elaborate technologies are expensive and so is the

training required on behalf of both the teacher and the learner (Collins & Berge, 2000). Any content that is potentially too rich for online delivery can be stored on and accessed by DVD (Greenberg, 2002). However, in this case, a DVD player (for the computer or otherwise) must be on the course requirements list and still might cause additional problems with individual access (the digital divide).

Course design can be a technical challenge for instructors and learners. Often, in universities where web-based training is utilized, there is an autonomous department that deals with the technical side of these courses. These technicians are often in the position of providing support for both faculty and students in a course. In a study which attempted to collect the unique perspective of this group, the technicians from six academic components of the University of Texas System found that the faculty needed more training (Cheurprakobkit, Hale, & Olson, 2002). Even though the technical department seemed to feel that the web-based courses were going well, overall they felt that web-based courses needed to be supported more comprehensively by the university. The technicians found the teachers to be only “minimally technology literate” (Cheurprakobkit et al., 2002, p. 251). However, they believed them to be willing to learn. The findings suggest that the technicians thought the faculty could use more training on the use of hardware, software (particularly specialized software programs) and design components (Cheurprakobkit et al., 2002). “The overwhelming opinion of those faculty members interviewed was: technically oriented courses are much more difficult to replicate electronically” (Sumrall, 2002, p.6).

The Technology Education and Copyright Harmonization Act (TEACH Act) was passed by Congress in 2002. It completely revised the copyright law so that online educators would be able to use content in their online courses that was copyrighted as long as they remained in the

boundaries of the law. This would keep them from having to pay royalties or get permission from the owner of the copyright (Crews, 2002). The idea was to make the same material that is available for instructors to use in the classroom available for their use in online courses as well. Hutchinson believes that they did not achieve this result. She points out the vague and confusing jargon which causes uncertainty and prevents many institutions from taking advantage of the Act. To combat some of the problems associated with this Act, she suggests “. . . setting guidelines for terms such as ‘reasonable and limited’ and for what constitutes technological protection measures that ‘reasonably prevent’ unauthorized retention and dissemination of copyrighted works” (Hutchinson, 2003, p. 17). Pushing the boundaries with one course might be the way to test where the line will be drawn. It could be very expensive for an institution to launch something in all of their courses that might be questionable. The reward for finding the bounds of the law would be the ability to grant more use of copyrighted material online. This could significantly enhance the educational opportunities available to the educational institution (Hutchinson, 2003).

The design of the course, particularly the learning activities, is crucial. “By engaging users in learning activities, immersion may make important concepts and relationships more salient and memorable, helping users to build more accurate mental models” (Salzman, Dede, Loftin, & Chen, 1999, p. 4). There are a multitude of ways to use technology to present materials for courses on the Internet. Factors that could influence the choices might include the instructor’s knowledge, budget, the topic being presented, the instructor’s technique or preference and the infrastructure of the institution. For instance, just having enough knowledge of the technology to know to pay attention to the industry standards can help the instructor create a productive and fluid online environment (Aoki & Pogroszewski, 1998).

## **E-learning Industry Standards**

The standards used in e-learning began to be developed in 1988 by the Aviation Industry Computer Based Training CBT Committee (AICC). Many of the guidelines for learning technology are specifically for aviation, but they also developed industry standards for Computer-Managed Instruction (CMI). These standards were implemented by the e-learning community and form the basis for SCORM or Shareable Content Object Reference Models (Collier & Robson, 2002). The industry standards by AICC created specifications that defined how the tracking data should be exchanged between learning management systems (LMS) and interactive content. AICC had adapted this specification for delivery on the World Wide Web in the late 1990s (Bersin & Associates, 2003).

IMS is a non-profit global learning consortium made up of more than 50 vendors, agencies, institutions, content providers, publishers and other associations. IMS allows for those with competing interests and decision-making criteria to cooperate with each other to create realistic requirements for interoperability and reusability (IMS Global Learning Consortium, 2006a).

The Advanced Distributed Learning (ADL) initiative, which uses IMS specifications, is a program set up by the U.S. Department of Defense and the Office of the Under Secretary of Defense for Personnel and Readiness (OUSD P&R) to create guidelines needed for large-scale development and implementation of distributed learning. It is a forum for collaborations between government, academia and industry to accelerate effective e-learning (Advanced Distributed Learning, 2005). The ADL uses IMS specifications and provides input into the IMS specification process (IMS Global Learning Consortium, 2006b).

ADL is involved in the continual evolution of SCORM. SCORM is a compilation of standards and specifications to provide a comprehensive set of e-learning abilities that allow for

the accessibility, interoperability and reusability of e-learning content (Dodds, 2006). This set of standards and specifications deals with two important issues. First, it deals with interoperability, which is the ability to efficiently exchange information between content and the learning management system (LMS). Secondly, considering the content, it deals with reusability and content sharing (Bersin & Associates, 2003). SCORM incorporates IMS metadata standards, and allows for content from different vendors' learning management systems to be passed to other vendors' systems without any problems (Dodds, 2006). There are five organizations that are closely affiliated with ADL and are important to the ever-evolving specifications for SCORM. Those organizations are AICC, IMS, Institute of Electrical and Electronics Engineers (IEEE) Learning Technology Standards Committee (LTSC) and Alliance of Remote Instructional Authoring & Distribution Networks for Europe (ARIADNE) (Dodds, 2006).

### **Technological Development of E-faculty**

#### **How E-faculty Learned to Teach Online**

In 2001, Armstrong could not find studies that observed how faculty members learn to teach at a distance. Her qualitative study sought to discover from the faculty's perspective how they learned and improved their use of instructional design, technology and andragogy “. . . for teaching at a distance in contrast to participating in required training or faculty development activities” (Armstrong, 2001, p.2). The results highlighted six themes:

- Institutional and personal influences stimulate faculty members to initiate their learning projects.
- People are the main channel to finding resources.
- The availability, accessibility, variety, and visibility of resources in the local institutional environment affects the quantity (variety) of learning methods used.

- The learning methods used vary with experience, gender, and institution; however, overall, learning by doing was the most important strategy used.
- Learning success is assessed primarily by student outcomes supplemented by student evaluations.
- Faculty members who continue to teach at a distance and switch to a different mode of instructional technology appear to use multiple learning methods when multiple local resources are available (Armstrong, 2001, pp. 2-3).

### **Anxiety Concerning Time Requirements of Technological Development**

Faculty members are also anxious about having time to learn the techniques and skills necessary for the successful use of technology in the classroom (Ndahi, 1999), which is normal, considering that most are expected to stay up-to-date with their individual subject matter field. Training initiatives must be long-term and developmentally sequenced to provide novice teachers with the building blocks to construct integrated technological environments (Farenga & Joyce, 2001). Those pioneering the wild world of web-based courses need to have motivation to continually learn as the technological revolution plows along (Cheurprakobit et al., 2002). In 1998, Betts asked faculty and deans at George Washington University (GWU) an open-ended question about e-faculty development programs. Three general recommendations surfaced:

. . . (1) faculty would like support for course development (e.g., financial, administrative, and technical support); (2) faculty are interested in seminars that focus on skill development, the use of new technologies, designing courses, teaching strategies, and on the educational merit of distance education techniques (e.g., hands-on training, coaching, access to technology, tutorials, guided practices, and pilot tests); and (3) faculty would like release time for training (Betts, 1998, pp. 3-4).

### **Certifications or Standards for E-faculty Technological Development**

Csapo went looking for ways to increase technology skills and the marketability of those skills. “Certification has become an important measurement for employers in validating the

knowledge and skills of employees, especially in IT” (Csapo, 2002, p. 47). In Europe, they have a certification known as the European/International Computer Driving License (ECDL/ICDL) which is their standard for employers and those who desire employment. It is achieving worldwide recognition and usage and is a good example of how standards can be effective in establishing competency levels (Csapo, 2002). Eaton expounds on the issue of e-faculty accreditation:

Accreditors can either insist that a quality faculty exists only when the distance learning environment requires a faculty role identical to that of faculty in site-based environments, or accreditors can rethink the definition of “quality faculty” and articulate new or modified expectations that are appropriate to electronic communities of learning (Eaton, 2001, p.14).

It has become increasingly important for educators to stay on top of the changing technologies. Some institutions are striving to keep their educators on top of the learning curve by establishing guidelines. The Colorado Department of Education established three areas of technology skills needed by teachers and school library media specialists. These three areas are: basic operational skills for technology and computers, ability to use technology skills for personal and professional advancements and skills for integrating technology into their classrooms (Colorado Department of Education, 1999). In 1999, the State of Connecticut established three levels of educational technology competencies for their teachers that were based on the International Society for Technology in Education (ISTE) (2000) and very similar to the areas of technology skills developed by the Colorado Department of Education. In 2001, they modified their three level model by developing a performance assessment for their Level 1 competencies which include basic computer skills and the use of typical productivity software. The development and validation research also describes how teacher technology competence or accuracy scores are related to teacher self-efficacy. The study participants included 61 teachers from two metropolitan school districts. Scores from the Level 1 performance measure were

found to be a valid and reliable means of assessing teacher educational technology competence. Their research showed positive correlations ( $r = 0.54$ ) to ( $r = -0.58$ ) between competency in educational technology and three variables representing self-efficacy. Correlations between technology competency and self-efficacy scores were generally higher at posttest than at pretest, which implied that the teachers' assessments of their own technology skills align more closely with the performance measure of these skills after they have taken an assessment designed to measure these skills (Archambault, Kulikowich, Brown, & Rezendes, 2002). A study was conducted on inservice and preservice teachers using a variety of instruments including computer competency surveys. After two weeks of collaborative professional development learning activities, the teachers showed increases (from pre to posttests) in their ability to use multimedia-based technology in all categories tested (basic computer skills,  $t = 5.02$ ,  $p < 0.001$ ; word processing,  $t = 5.48$ ,  $p < 0.001$ ; database,  $t = 4.73$ ,  $p < 0.001$ ; spreadsheet,  $t = 5.30$ ,  $p < 0.001$ ) (Cleland, Wetzel, & Zambo, 1999).

### **Critical Technical Skills for E-faculty**

In a study of 1,700 college staff and administrators drawn from the American Association of Community Colleges with a response rate of 54%, 81.6% believe that the technological competence of faculty is important or very important (Amey & VanDerLinden, 2003). Teachers and students involved in online teaching and learning at Southeastern Louisiana University (SLU) found the ability to use e-mail effectively the only critical e-learning technical skill ( $M = 2.70$ ). However, only four technical skills were given as choices in the survey. One of the other three, the technical skill of using online chat, was ranked "very important" ( $M = 1.84$ ). The last two technical skills, an ability to develop simple Web pages ( $M = 1.45$ ) and higher level Web page development skills ( $M = 0.59$ ), were both ranked useful (Guillot, 2003).

E-mail is such a vital part of communication in online environments that it needs to be mastered by the online educator (Abramov & Martkovich, 2002). To work with web-based instructional features, teachers are required to have moderate to advanced computer programming skills; however, this is becoming less necessary with the continuing development of web course software (Cookson, 2000).

A Delphi study identified 95 statements about computer competencies that should be included in business teacher education curricula. These competencies were grouped in five categories: computer hardware, software, computer programming, computer integration, and general computer knowledge. Even though the author suggested that the study be replicated, he cautioned that the foundation should be continually updated as technology and the trends of education change (McCoy, 2001).

### **Skills Currently Possessed by E-faculty**

In a qualitative study done in 2002 on teachers' perceptions of a professional development distance learning course, Broady-Ortmann (2002) found that it was clear that the teachers lacked technological training. No other current studies addressing the e-instruction technology skills of faculty were found. Modern perceptions on faculty knowledge have been negligent in their omission of a domain of knowledge directly related to technology (Guerrero, 2005).

### **Need for Continuous Professional Technological Development**

Although a lot of money has been invested in technology infrastructure, not much has been invested in professional development (Farenga & Joyce, 2001). A professional, continuous learning community is created by the group of educators just entering the workforce all the way through veteran educators as they struggle to adapt to the myriad of technological changes occurring in higher education. This focus on developing the intellectual "brainware" is necessary

to keep up with advances of the hardware and software in the technology revolution (Farenga & Joyce, 2001). Farenga and Joyce expanded on the need for faculty to become proficient with technology:

Nationally, educators face continuing demands from politicians, policy-makers, and public constituencies to become proficient with technology to make it an integral part of their teaching repertoire. Computer technologies are slated for an important role in the efforts to improve the educational system (e.g., curriculum delivery, electronic collaboration, data base retrieval, classroom management). (Farenga & Joyce, 2001, p.315)

A five-step hierarchical process was created by Rieber & Welliver in order to merge the use of technology in the classroom with integration into the instruction. The five steps were familiarization, utilization, integration, orientation, reorientation and evolution (Rieber & Welliver, 1989). The Kotrlik-Redmann Technology Integration Model© has similar concepts with its four-phase approach. The four steps outlined in their model are exploration, experimentation, adoption and advanced integration (Kotrlik, Redmann, & Douglas, 2003). A mixed methodology study on technology adoption and integration suggested that faculty preferred peer support as a professional development option (Nicolle, 2005).

A study on P-12 educators from all 50 states found that technology experience improved their attitudes on technology. As their training and practice increased, they were more likely to optimize the use of technology in their classrooms and more expedient in doing so (Casey, Harris, & Rakes, 2005). Building on the technological knowledge and capabilities of faculty and developing new ways to do so is becoming an obstacle for those in charge of the professional development of faculty. There are means such as a WWW portal set up for faculty development which would be perfect for a collaborative environment to build technological skills in aspiring faculty (Sherer, Shea, & Kristensen, 2003).

Wenglinsky wrote a report about 6,227 fourth graders and 7,146 eighth graders. His study compiled information from data obtained from the 1996 National Assessment of Educational Progress (NAEP) about the access to computers at home and school, the frequency of computer use for math in school, professional development of math teachers in computer use and the ways computers are used in instruction at school. The results indicated that higher mathematics scores were related to adequate access to computer technology along with teachers trained in technology use and the use of computers to learn higher order concepts. Students have different learning experiences with computers and that these experiences can be categorized by ethnic groups, unequal socio-economic status and geographic locations (Wenglinsky, 1998).

Wenglinsky notes:

While minority, poor, and urban students are no less likely to use computers at school frequently, frequency of use is not associated with gains in achievement or social environment. Yet minority, poor, and urban students are less likely to receive exposure to computers for higher-order learning, and poor and urban students are less likely to have teachers who have received professional development on technology use. Thus, where technology matters, there are significant inequities; only where technology does not matter have these inequities been successfully erased (Wenglinsky, 1998, p. 32).

These results should have educators questioning: what factors influence these inequities?

Some causes might incorporate curriculum problems, lack of funding for technology or differences in the teacher's level of expertise to educational technology (Wenglinsky, 1998).

In a study done on students' interest in taking online courses, students ranked audio, graphics, video, text and self-evaluated test questions, respectively. The rankings were in response to the question, "If a course were designed to help you learn best, how would the information be presented" (Boyd & Murphrey, 2001, p. 33). It would, therefore, seem prudent for e-faculty to have the skills or knowledge of software that would make creating an online environment suitable for premium learning (Boyd & Murphrey, 2001). In a K-12 study involving the investigation on technology support and student computer use, the hours spent teaching

teachers about computers predicted students' mean computer usage per academic subject (Fuller, 2000).

Clay lists not learning the technology as one of the five common mistakes new distance instructors make. By becoming skillful in the use of the technologies the instructor can move beyond the basic features to take full advantage of the success of their courses. Technology mastery could also allow the instructor to quickly make adjustments to their course, thus saving themselves a lot of time (Clay, 1999).

Online instructors must have enough technological savvy to help support student learning, regardless of the differing access levels of their students (Dooling & Case, 1997). Understanding students use of technology and developing broader uses to promote higher level thinking will help identify the knowledge and skills that faculty require to expand their technological knowledge foundation (Yohon & Zimmerman, 2006). We are in the information age, a time of knowledge, where our growing technologies are changing the way we amass, manipulate and pass on knowledge. New technologies have made the limitations of space and time almost obsolete (Dunderstadt, 1997). Dooley, Kelsey and Lindner discuss some of the factors that make technological development of e-faculty necessary:

The training on technology for faculty ... was not sufficient, but different hardware/software and variation in support personnel make this extremely difficult. Perhaps the program should specify certain hardware /software requirements and use assessment techniques to determine the technical competence of learners prior to the start of the coursework (Dooley et al., 2003, p. 50).

With all of the focus on getting the institutional infrastructure for supporting web-based learning, only a small amount of research has been done on the technological skill needs of the instructors that will be working in these wired environments. They will need these skills to adjust technological devices for curricular content, teaching styles and methods (Hilty, et al., 2006). It

is therefore imperative that some attention be focused on the technical acumen of potential online instructors (Kagima & Hausafus, 2001).

### **Factors Potentially Related to the Perceived Technology Knowledge of E-faculty**

#### **Self-directed Learning**

“The art and science of working with children is labeled ‘pedagogy’ from the Greek stem ‘paid’ or child and ‘agogus’ meaning guiding or leading” (O’Dell, 1997, p. 45). This theory is seen by some as a leader-directed approach to learning (O’Dell, 1997). The concept of andragogy as described by Knowles implies that the older a learner is, the less learners need to be directed in their learning. Learners are motivated on their own (Knowles, 1990). It is widely accepted that Malcolm Knowles is credited with the concept of the self-guided learner (O’Dell, 1997). During an interview with Hatcher, Knowles said that he believed a self-directed learner to be a person who “. . . perceives it is his or her primary responsibility to carry out personal learning projects or programs with the help of a facilitator and other resources” (1997). Bartlett suggests that self-directed learning should be considered as a way for the secondary business educators in his study to keep themselves up to date when they are in the workforce (Bartlett, 2000).

One instrument used to measure an individuals’ ability to pursue self-directed learning is the Oddi Continuing Learning Inventory (OCLI). The theoretical basis of the OCLI relies on the learning habits of a person with the learning behaviors of initiative and resolution through a variety of methods over time. The internal consistency of the 24-item scale was 0.88 (Oddi, 1985). Another scale investigating self-directedness is the Self-Directed Learning Readiness Scale or SDLRS. This scale moved beyond description by comparing and predicting self-direction against other variables. It is a scale designed to measure the extent to which a person

perceives that they possess skills and attitudes that are often linked with self-directedness in learning. Guglielmino reported an internal reliability score of ( $r = 0.87$ ) on the SDLRS (Guglielmino, 1978). Finally, the Bartlett-Kotrlik Inventory of Self-Learning (BISL©) was designed to measure the self-directed learning of professionals in workplace environments. The BISL© instrument had a reliability of  $\alpha=0.91$  and factor loadings that supported strong validity (Bartlett & Kotrlik, 1999).

There are some who believe the delineations between pedagogy and andragogy are not really necessary. Cheng found that “. . . findings reinforce the possibility of generalization of ideas and theories developed from adult organizations to a context of classrooms in primary schools” (Cheng, 1994). In an interview, Knowles said that by 2020, all learning would be founded on the concepts of self-directed learning (Hatcher, 1997). Newstrom and Lengnick-Hall came up with a revision to the pedagogical and andragogical teaching paradigms. Their contingency approach is designed to look at adults that are being trained as a mixed group of individuals that require different approaches to learning. They believe that the training program should be designed to fit the needs of the individual (1991). Self-directed learning is an idea of learning that encompasses self-instruction through independence in learning in any learning environment. This makes it a good fit for e-learning environments (Sadler-Smith & Smith, 2004).

### **Self-efficacy Levels**

People need to believe that they will succeed at a task in order to undertake challenge. Bandura pointed out that a person or group of people that shared the same basic traits or talents could have completely different opinions of the worth of these gifts (Bandura, 1997). Many state Bandura as the reference point for self-efficacy; however, Dellinger’s study in 2001 showed that, at least for a group of teachers in Louisiana, his theories were not error-proof.

Integration of new technologies in the classroom by the teacher could be related to their self-efficacy in regards to coping with instructional problems. Modeling technology helps pre-service teachers confidence levels with technology (Pope, Hare, & Howard, 2005). Heppner used the Problem Solving Inventory (PSI) to compare the teacher's self-efficacy which related their problem solving ability to actual skills. The PSI uses a problem solving confidence scale, an approach avoidance scale and a personal control to make this assessment (Heppner, 1982).

Archambault, Kulikowich, Brown and Rezendes found substantial correlations ( $r = 0.54$ ) to ( $r = -0.58$ ) between competency in educational technology and three variables representing self-efficacy (Archambault et al., 2002). A study on inservice and preservice teachers showed that the self-efficacy of the teachers increased as a result of professional development on multimedia-based technology ( $F(2,64) = 16.40, p < 0.001$ ) (Cleland et al., 1999). These findings support the need for instructor training and development in the interest of advancing the quality of online education and that self-efficacy of teachers might be related to that development. Another variable of interest in this study is the technology anxiety levels of teachers.

### **Technology Anxiety Levels**

The implementation of hardware without the training to accompany it has caused anxiety in many professionals (Budin, 1999). Berg and Muilenburg (2000) identified "threatened by technology" as one of 10 barriers that needed to be overcome to achieve successful distance education. They pointed out that people feared that technology might be lowering the need for teachers and that "... feeling intimidated by technology may also threaten an instructor's sense of competence or authority" (Cho & Berg, 2002, p. 8).

Kotrlik, Redmann and Douglas found technology anxiety to have mixed results as a predictor of the integration of technology in studies conducted with different groups of Louisiana

educators. Douglas, Kotrlik, and Redmann found that technology anxiety was negatively related with technology integration achieved by adult education, marketing, and agriscience teachers; as technology anxiety increased, technology integration decreased (Kotrlik & Redmann, 2005; Kotrlik, Redmann & Douglas, 2003; Redmann, Kotrlik & Douglas, 2003). Technology anxiety was not related to the technology integration achieved by business education teachers (Redmann & Kotrlik, 2004). The fact that technology anxiety was a significant predictor of technology integration in secondary classroom instruction indicates that there is a possibility that technology anxiety may also be related to the use of technology by e-learning faculty.

### **Level of Support for E-instruction**

Another factor that may be related to the technological development of e-faculty is the level of administrative support they receive. In a study of 1,700 college staff and administrators, institutional support services were a problem for part-time faculty which were described as not having the access to or possibly not being on campus to receive these services (Amey & VanDerLinden, 2003). The highest percentage (88) of the participants gave “. . . technology support for instructional and administrative processes” an important or very important rating. Main issues that were identified included the following: faculty overload, professional development, copyright, release time and part-time faculty (Amey & VanDerLinden, 2003). Faculty overload was described by the never-ending job e-instruction created and students in possible expectations of 24-7 access (Amey & VanDerLinden, 2003). Professional development was further defined as how online technical expertise and rethinking the role of faculty in teaching/learning demands new approaches to course design and development (Baldwin, 1998). Copyright encompasses courses and ideas; contract release time encompasses “time for development of on-line courses and for professional development around technology issues” (Amey & VanDerLinden, 2003, p. 87).

The fact that there is an instructional technologist does not mean that the faculty can completely lean on that individual when it comes to delivering their courses. Faculty should be capable enough in technology to recognize and identify the pluses and minuses of different technologies and be able to choose the appropriate delivery device for particular lessons (Gunawardena, 1990). As faculty teach and develop online more, they need less time to prepare, and although it takes longer, their need for financial and collegial support eventually decreases as well (Pachnowski & Jurczyk, 2003). Beyond technical assistance, if there are a large number of students, instructional assistants might be necessary to reinforce the instructor (Cookson, 2000). Support services can range from creating graphics and uploading course materials to developing online quizzes and could include a student assistant, depending on the size of the staff and the availability of resources (Clay, 1999). The willingness of the potential online instructor to learn should also be considered (Cheurprakobkit et al., 2002). To convince teachers to teach an online course, a reduced teaching load, financial support and training might be particularly important to faculty (Parker, 2003).

### **Personal and Demographic Variables Related to the Technological Development of E-faculty**

**Gender.** A study involving 130 students from an assortment of undergraduate oral communications courses at a large Midwestern university focused on relationships among communication technologies, communication and writing apprehension and computer anxiety. Significant differences were reported between gender groups on computer conference/video conferencing and on computer anxiety scores. Women reported more computer anxiety than men ( $F = 4.51, p = 0.05$ ) and scored lower than men on the computer communication factor ( $F = 6.97, p = 0.01$ ) (McDowell & Schuelke, 1998). In a 1999 study, although both genders reported

that computer technology helped with productivity, women rated even higher than men ( $t = 2.15$ ,  $p = 0.05$ ) (Ray, Sormunen & Harris, 1999).

In a 1999 study, Bartlett and Kotrlik found gender, job tenure and salary to be significantly related to self-directed learning levels of business professionals. Gender is discussed often in the literature with mixed results. In a qualitative study, gender was found to make a difference in how faculty learn and improve their use on technology (Armstrong, 2001). In a study on the comparisons of faculty perceptions from analytical program areas and faculty perceptions from program areas that were less analytical on use and applicability of selected aspects of distance education, Sumrall found there were no significant differences between gender and positive attitudes toward distance education as defined by two subscales: institutional factors ( $t = 1.0$ ,  $p = 0.32$ ) and course related factors ( $t = 1.8$ ,  $p = 0.24$ ) (Sumrall, 2002). A study based on the Technology Assistance Model (TAM) showed differences between genders on factors that affect the e-learning acceptance of employees from six international companies in Taiwan. Men were found to have rated computer self-efficacy ( $F = 14.41$ ), perceived usefulness of e-learning ( $F = 9.49$ ), perceived ease of use ( $F = 14.10$ ) and behavioral intention to use e-learning ( $F = 5.32$ ) higher than women. Women were influenced more by their observations or views of computer self-efficacy and ease of use (Ong & Lai, 2006).

**Age.** Atkins and Vasu found age to be somewhat related ( $r = -0.22$ ,  $p = 0.005$ ) to the knowledge of technology as self-reported on the Teaching with Technology Instrument (TTI). The negative relationship may point to younger teachers being more computer literate (Atkins & Vasu, 2000). In three undergraduate institutions in North Dakota, age was found to be substantially predictive ( $t = -0.57$ ,  $p < 0.05$ ) of faculty's level of computer use (Corwin & Marcinkiewicz, 1998). In 2002, a study was conducted on factors that influence faculty attitudes

toward and perceptions of distance education subject areas. Sumrall found there were no significant differences between age and positive attitudes toward distance education as defined by two subscales: institutional factors ( $r = 0.05$ ,  $p = 0.320$ ) and course related factors ( $r = 0.04$ ,  $p = 0.481$ ) (Sumrall, 2002).

**Academic Rank.** A concern of faculty is that there is a lack of scholarly respect for those who teach online. This could affect their tenure and promotion (O'Quinn & Corry, 2002). The emphasis placed on research does not encourage faculty to put effort into creating teaching approaches that are technology based (Bates, 2000). When scholarly goals are in high demand it is not always easy to create a collaborative community (Szabo & Sobon, 2003)

**Training for E-instruction.** Arbaugh's study found that the online experience of instructors was not a predictor of learning. He believes that this lends credence to the notion that behaviors that help decrease the "distance" between the student and the instructor, called "immediacy behaviors," may be more important than technological prowess in online course success prediction (Arbaugh, 2001). Communication is considered to be one of the main factors that diminish the amount of distance between the instructor and the learner although the most important factor seems to be that the students feel that the instructor is "out there" somewhere (Woods & Ebersole, 2003). O'Quinn and Corry found that more faculty who teach e-learning courses had received training than those who only taught traditional face-to-face courses (2002).

### **Summary**

A review of the literature has shown that the adaptive, all-inclusive teaching/learning process delineated by constructivist theories is appropriate to the rapidly changing e-learning environment. E-learning, which is a component of the broader area of distance learning, potentially allows for the delivery of learning, synchronously or asynchronously, at anytime or any place. It is a relatively new learning avenue with questions still open for debate. Those

questions surround the issues of higher education qualifications, regulations and cross-institutional degrees. Those questions are still being resolved and will continue to be issues of concern for e-learning into the near future while this form of learning is finding its niche.

Can a course that has been taught in a traditional classroom be moved to an e-learning environment satisfactorily? Literature addressing this question seems to indicate that e-learning classrooms can be as effective as traditional classrooms as long as attention is paid to the design considerations and instructional strategies. The combination of the lack of a random sample and the lack of validity and reliability information on the surveys used makes the results from the Barnett-Queen and Zhu study questionable (1999). Although there were some differences seen, Schutte's study (1996) showed online learners scoring higher than those of traditional learners, no effect size was reported so it is unknown how significant that difference might have been. Overall, it seems that depending on the class, instructor or subject matter the results might vary slightly, but on the whole they do not show a significant difference.

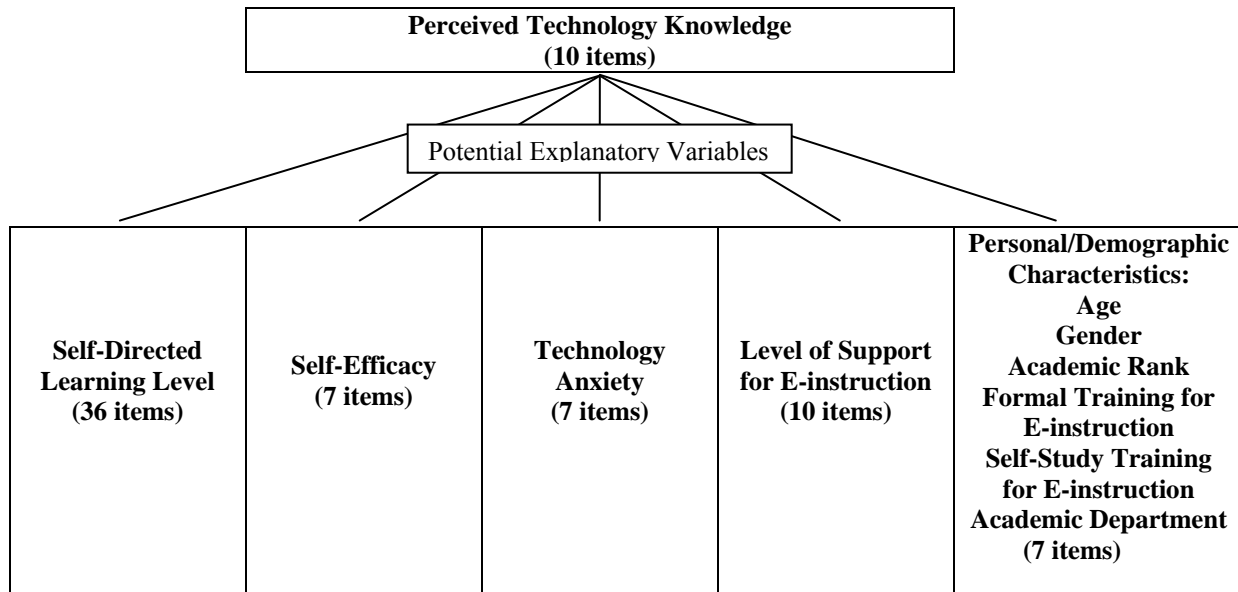
E-learning is evolving and, as it does so, it is facing some challenges. There are some questions on what and how much should be listed as requirements for taking e-learning courses. Is a team approach to e-learning feasible or can the instructor design and teach the course? What kind of technological support would the instructor who taught without the benefit of an entire team need? The digital divide is a huge issue for equivalence in e-learning which deals with those who are online and those who are not online because of issues like gender, race, socioeconomic status and level of education. Finally, e-learning must try to incorporate cultural differences that span the globe.

Design considerations include the situations best suited for interaction and learning online, being aware of cultural differences in the online environment, differing equipment and

levels of knowledge, what kind and amount of content is appropriate for the course being taught and what content is safe from copyright laws. Following industry standards such as SCORM and IMS metadata help to ensure the smooth integration of content to courses. Continual technological development increases the exposure of e-faculty to such standards and helps to keep them informed.

Not much is known about the current status of technological development of e-faculty. There is some discussion over whether there should be a qualification like the European/International Computer Driving License (ECDL/ICDL) which would effectively establish competency levels in those who wished to teach in an e-learning environment. More technological development is called for and integration models show that exposure to technology and working with technology is a process that results in educators being more likely to use technology in their classrooms. The same is true for e-faculty. If they are exposed to more technology they may be more prepared to adapt and change their courses to best accomplish their objectives. The instruments that were found in the literature supplied information and variables of interest, but were not appropriate for this study. The studies by Casey, Harris, and Rakes (2005) and Cleland, Wetzel, and Zambo (1999) did not include a lot of information which made it difficult to establish the quality of the study, so the results were presented with caution. No information was given on the survey instrument from Amey and VanDerLinden (2003) and Betts (1998) discussed a pilot study but did not list any results. Although, the lack of information is unfortunate, the researcher believes the studies to provide useful background for the study. A majority of the studies were not generalizable back to the population, but they were the best of the studies pertaining to this body of knowledge. Many studies list the technological development of e-faculty as advantageous to e-learning, but not much information on the current

status of that development. The little that is known is that there is a wide range of technological knowledge found in faculty which makes providing adequate and appropriate training more challenging (Ropp, 1999). There is a need for a well designed and more comprehensive study to investigate the technological development of e-faculty and the variables that might influence that development. A model created by this review of literature which presents a graphic representation of the design of the study is shown below (Figure 1).



**Figure 1. Perceived technology knowledge for E-faculty Research Model**

## CHAPTER III: METHODOLOGY

### Population and Sample

A population of e-faculty in higher education was not readily accessible in an appropriate format for use in this study. Therefore, a process for identifying the sample and estimating the approximate size of the population, explained in detail over the next few pages, was used. The process occurred in the following order:

- The target and accessible population for this study was identified.
- The research universities in the Southern Regional Education Board (SREB) with the Carnegie “very high research activities” (RU/VH) classification were identified (The Carnegie Foundation for the Advancement of Teaching [Carnegie Foundation], 2006).
- Initial estimates were used to select the number of universities needed to achieve the minimum sample size and a cluster sample containing the minimum estimated number of universities was drawn.
- Using the actual number of faculty and students from the universities initially selected, this data was extrapolated to determine the approximate number of faculty and students in all SREB Carnegie RU/VH universities.
- Finally, the number of faculty and students in the SREB Carnegie RU/VH universities was used to determine the final minimum sample size for the study.

#### Target and Accessible Population

The target and accessible population ( $N=1602$ ) for this study consists of those faculty who:

1. were employed by one of the public Carnegie Foundation (2006) classified Doctorate-granting Research Universities with very high research activity (RU/VH) in U.S. states from the Southern Regional Education Board (SREB), and
2. taught at least one completely online distance education course in the fall of 2006.

### **Identification of Research Universities in the SREB with Carnegie “Very High Research Activities” (RU/VH) Classification**

Lists of classifications for universities were obtained from the Carnegie Foundation (2006) website. The list for Doctorate-granting Universities, which is defined as institutions that grant at least 20 doctoral degrees in a year, has three levels. These levels are “Research Universities with very high research activities” (RU/VH), “Research Universities with high research activities” (RU/H) and “Doctoral/Research Universities” (DRU). Universities with the Carnegie classification RU/VH were chosen for this study because these universities have the resources to produce the highest quality of education available and may also be more likely to have the resources needed to deliver quality e-learning courses (Kuh & Hu, 2001).

The Southern Regional Education Board (SREB) is an agreement between 16 states which work toward the achievement of 12 education goals set for the southern region. The states in the SREB were used to identify a group of southern states that could be used in defining a population for this study. The RU/VH universities in the SREB that met the intent for this study are listed in Table 1.

### **Initial Estimates of the Number of Universities Needed to Achieve the Minimum Sample Size**

The computation of an estimate of the population of e-faculty in public universities classified as RU/VH by Carnegie in the SREB was necessary for the calculation of a sample size for this study. Initially, the researcher conservatively estimated that each university would have approximately 80 e-faculty. This estimate was based on the researchers’ knowledge of the

number of e-faculty at three universities with which she was familiar. According to Hair, Black, Babin, Anderson, and Tatham (2006), the factor analyses included in the study required at

Table 1. Enrollment of Public Southern Regional Education Board Universities Rated by the Carnegie Foundation (2006) as Doctorate-Granting Research Universities with a Very High Research Level

University	Enrollment (2006)
The University of Texas at Austin	50,377
University of Florida	47,993
Texas A&M University	44,435
University of South Florida	42,238
Florida State University	38,431
University of Maryland at College Park	34,933
University of Georgia	33,405
Louisiana State University	32,241
North Carolina State University	29,957
The University of Tennessee	27,792
Virginia Polytechnic Institute and State University	27,619
University of North Carolina at Chapel Hill	26,878
University of Kentucky	25,686
University of South Carolina - Columbia	25,596
University of Virginia - Main Campus	23,341
University of Delaware	21,238
Georgia Institute of Technology	16,841
University of Alabama at Birmingham	16,693
Total Enrollment in Southern Regional Education Board	565,694

least 180 e-faculty respondents which was based on a minimum of five faculty for each item in the largest scale used in the study, which was the Bartlett-Kotrlík Inventory of Self-Learning (BISL©) scale which had 36 items ( $5 \times 36 = 180$ ). Additional steps in the sample determination process described below were designed to ensure that the minimum returned sample size according to Cochran's (1977) sample size formula was attained. Using a 50% response rate ( $180 / 0.50 = 360$ ), it was determined that a minimum of five universities would be needed to achieve the minimum sample size of 360. The researcher used the Carnegie foundation website to access an accurate list of all RU/VH universities in the SREB states. The enrollment for each

SREB RU/VH university was obtained from the Carnegie website (Carnegie Foundation, 2006) (Table 1).

States, along with all universities in that state that met the Carnegie Foundation RU/VH criteria, were randomly selected until at least five universities were identified. Three states were randomly selected from the SREB for inclusion in this study: Louisiana, Alabama and Florida. States were used as the first level of selection in this cluster selection process because of the variance that may exist in the states with multiple RU/VH universities among the missions and programs of the universities in a given state, which could impact their use and support of e-learning; the researcher decided that the selection of all RU/VH universities in a state would substantially mitigate any effect due to varying missions. A representative from each of the five universities was contacted to obtain information on the identity of e-faculty, specifically, those e-faculty who had taught online courses in the fall of 2006. The website of each university was searched to ensure that all of the courses taught by e-faculty in the fall of 2006 were identified. Each e-faculty member and their e-mail address was catalogued. The total enrollment of the five universities ( $N = 503$ ) in the random cluster sample used in this study was then identified (see Table 2) and complete listings of e-faculty for the universities selected were developed. The total enrollment and the number of e-faculty by state and university is listed in Table 2.

The total enrollment of the random cluster sample was then divided by the number of e-faculty in the random cluster sample. The resulting number (353) is the average number of students per e-faculty in the cluster as further illustrated in Table 3. This average number of students per e-faculty in the cluster sample helps create a basis from which to extrapolate an estimated population of e-faculty in all of the SREB Carnegie classified (2006) RU/VH universities.

Table 2. Total Enrollment and Number of E-faculty Members from Public Carnegie Classified Doctorate-Granting Research Universities with Very High Research Activity in Three Randomly Chosen States from the Southern Regional Education Board

States Randomly Selected From the Southern Regional Education Board (SREB)	Public Universities in Alabama, Louisiana and Florida Rated by the Carnegie Foundation as Doctorate-Granting Research Universities with a Very High Research Level (RU/VH)	Total Enrollment (2006)	Number of E-faculty Members (2006)
Alabama	University of Alabama at Birmingham	16,693	87
Florida	University of Florida	47,993	79
	University of South Florida	42,238	196
	Florida State University	38,431	95
Louisiana	Louisiana State University	32,241	46
Total		177,596	503

Table 3. Calculation of the Average Number of Students Per E-faculty in the Random Cluster Sample

Formulas	Explanation of Formula Abbreviations
$\frac{TE_{CS}}{EFAC_{CS}} = S / EFAC_{CS}$	TE <sub>CS</sub> = Total Enrollment in random cluster sample EFAC <sub>CS</sub> = Number of E-faculty in random cluster sample
$\frac{177,596}{503} = 353$	S / EFAC <sub>CS</sub> = Average Number of Students Per E-faculty in the random cluster sample

**Extrapolation of Initial Sample Data to Determine the Approximate Number of E-faculty and Students in All SREB Carnegie RU/VH Universities.**

The average number of students per e-faculty member in the cluster sample was then divided into the total enrollment of the RU/VH public universities in the SREB to provide an estimate of the population of e-faculty in all of the SREB Carnegie classified (2006) RU/VH universities as shown in Table 4. This resulted in an estimate of 1,602 e-faculty in the SREB RU/VH institutions. This estimate of the population was used to determine if the minimum sample size calculated with Cochran’s formula (1977) needed adjustment.

Table 4. Calculation of an Estimate of E-faculty in the Southern Regional Education Board

Formulas	Explanation of Formula Abbreviations
$\frac{TE_{SREB}}{S/EFAC_{CS}} = EFAC_{SREB}$	S / EFAC <sub>CS</sub> = Average Number of Students per E-faculty in the random cluster sample
$\frac{565,694}{353} = 1,602$	TE <sub>SREB</sub> = Total Enrollment in Southern Regional Education Board EFAC <sub>SREB</sub> = Estimated Number of E-faculty in the Southern Regional Education Board

### Minimum Sample Size Determination

The estimate of the total number of e-faculty in SREB RU/VH institutions was used to determine the sample size required for this study using Cochran’s formula (1977), using the following sampling values:

- *t*-value for *alpha* = 0.05: 1.96
- Estimate of Standard Deviation: 0.83 (calculated by dividing the number of standard deviations with an alpha level of 0.05 (6) by the number of points on the scale (5/6 = 0.83 for 5 point scales; 7/6 = 1.17 for 7 point scales)
- Estimate of acceptable error: 0.03

The calculation of minimum sample size was undertaken to ensure that the sample size was adequate to infer to the population. These calculations are presented in Table 5. There are five or seven points on the primary scales used in this study. The population of e-faculty in the 16 SREB states has been estimated at 1,602. For a population of 1,602 the required sample size for both five and seven point scales is 119. Sample size adjustments were made because the required return sample size is more than 5% of the population. The revised adjusted minimum

returned sample size is 111. Using a 50% return rate, the minimum sample size for the study based on collecting data for 5 and 7 point scales is 221 (Cochran, 1977).

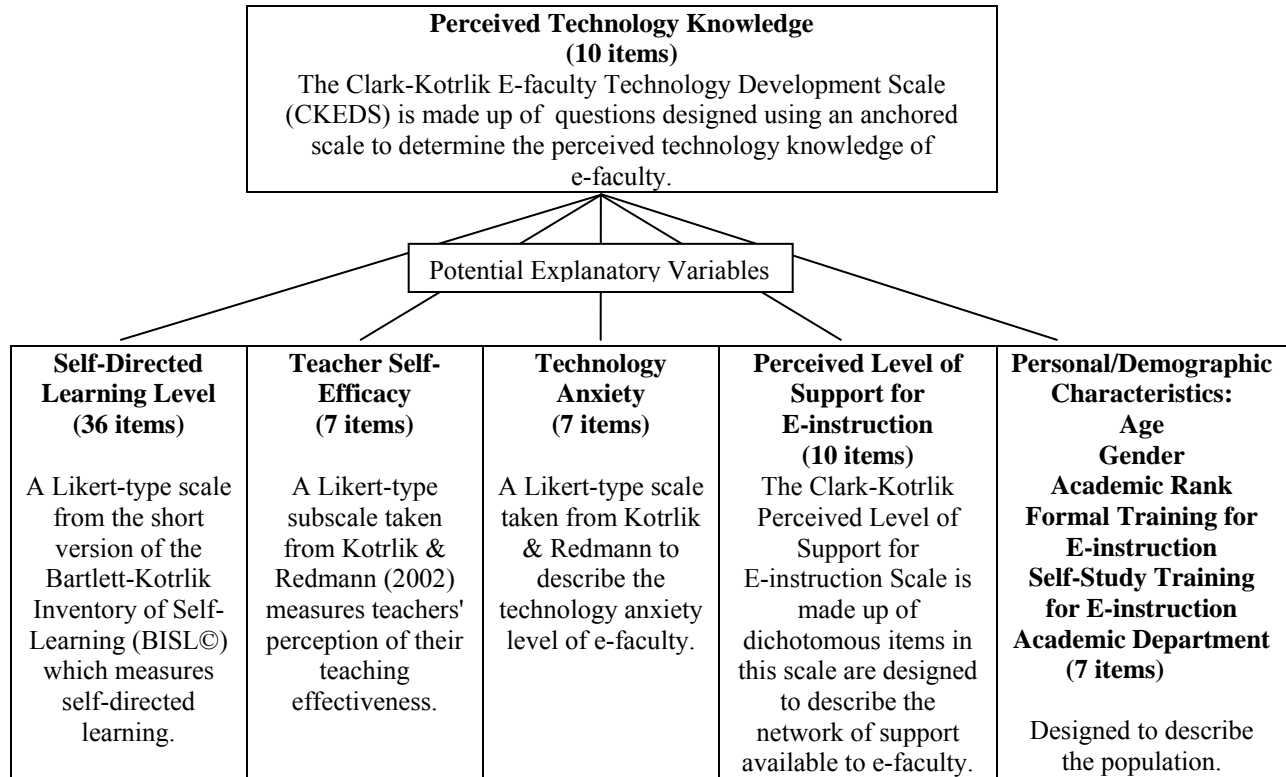
Another consideration in determining the minimum returned sample size is the number of observations necessary to conduct factor analyses on the scale results. Since the largest scale in the study has 36 items and Hair et al. (2006) recommend a minimum of 5 observations per item is necessary to conduct factor analysis, a minimum of 180 returned observations (5\*36) is required for the factor analyses, which is more than the 111 determined using Cochran’s formula. As a result, considering a 50% response rate and a minimum returned sample size of 180, a sample size of 360 was identified as the basis needed for the study, with this sample size meeting both the factor analysis and minimum sample size requirements. Since the total enrollment of the sample cluster previously identified ( $N = 503$ ) also met both the factor analysis and minimum sample size requirements, the sample size of 503 was used for the study. Prior to study initiation, implementation of this study was approved by obtaining exempt status (approval #E3539 Appendix A) from the Louisiana State University Institutional Review Board for Human Subject Protection (LSU IRB).

Table 5. Cochran’s (1977) Sample Size Formula for 5 and 7 point scales

Formulas	Explanation of Formula Abbreviations
For 5 point scales: $n = \frac{(t)^2 \times (s)^2}{(d)^2} = \frac{(1.96)^2 \times (0.833)^2}{(0.15)^2} = 119$	$n$ = required minimum returned sample size $t$ = alpha level for $p=0.05$ $s$ = estimate of standard deviation in the population (number of points on the scale divided by the number of standard deviations that will encompass 95% of the observations) $d$ = acceptable margin of error for the mean (number of points on the scale multiplied by the margin of error acceptable to the researcher) $n_a$ =adjusted minimum returned sample size
For 7 point scales: $n = \frac{(t)^2 \times (s)^2}{(d)^2} = \frac{(1.96)^2 \times (1.167)^2}{(0.21)^2} = 119$	
Adjusted returned sample size: $n_a = \frac{n}{1 + \left(\frac{n}{N}\right)} = \frac{119}{1 + \left(\frac{119}{1602}\right)} = 111$	

## Instrumentation

The review of literature did not reveal an existing instrument that would satisfy the needs of this study. The E-faculty Technology Development Survey was developed using questions that addressed the research model that was created for this study which is shown in Figure 2.



**Figure 2. Perceived technology knowledge for E-faculty – Working Model**

A web-based questionnaire was designed to collect the data needed for the study. The variables gender, age, academic rank, academic department, training availability, formal training for e-instruction and self-study training for e-instruction along with the construct training for e-instruction, were selected from the literature as personal characteristics (Appendix B). These variables were all designed to give a more adequate view of the population being studied and their history of technological training for e-learning.

Two scales were developed for this study (discussed on following pages):

1. the Clark-Kotrlik E-faculty Technology Development Scale (CKEDS) (Appendix C) is a 10 question scale designed to determine the current e-instruction knowledge of e-faculty; and
2. the Clark-Kotrlik Perceived Level of Support for E-instruction Scale (CKLOS) (Appendix D) which is a 10 dichotomous item scale designed to describe the different type and level of support available to e-faculty.

Three scales from other studies were also used in this study (discussed on following pages):

1. 11 subscales from the shortened version of the self directed learning level scale (36 items) from the Bartlett-Kotrlik Inventory of Self-Learning (BISL©) (Appendix E) designed to measure self-directed learning;
2. the teacher self-efficacy scale which is a seven question scale from Kotrlik & Redmann (2002) (Appendix F) designed to describe the self-perceived teaching effectiveness of e-faculty; and
3. the technology anxiety scale which is a seven question scale from Kotrlik & Redmann (Appendix G) designed to describe the technology anxiety of teachers.

### **Reliability of Existing Scales**

The original BISL© instrument had an exemplary reliability coefficient of  $\alpha=0.91$  according to the standards proposed by Robinson, Shaver & Wrightman's in their Standards for Reliability (1991) and factor loadings that supported strong reliability. The researcher was concerned that the large number of questions in the BISL© survey would result in adding 56 questions (the original BISL© instrument) to the number of questions in the other surveys. Therefore, she contacted the original authors with those concerns and found that a shorter version of the BISL© already existed. This version had been previously created and tested by the original authors who confirmed high levels of validity and reliability, but did not provide specific

technical data other than to assert that the results were in accordance with the original instrument. The author indicated confirmatory factor analysis was conducted, however, the data was lost in a move from one university to another. The factor structure and reliability were assessed in this study.

A short form of the self-anxiety scale from Kotrlik & Redmann was obtained from the authors. This short form was also requested due to the concerns the researcher had over the large amount of questions in the overall survey. The original form of the survey contained 12 questions. An initial but incomplete analysis with a data set of 402 observations revealed exemplary reliability of 0.97 (according to Robinson et al., 1991) on the 12 item scale. The short form of the scale contained only seven items with sampling adequacy of 0.93 and a total variance explained by the items in the scale of 79%; the reliability of  $\alpha = 0.96$  was exemplary according to Robinson et al. (1991).

The self-efficacy scale, which was also taken from Kotrlik & Redmann (2002), was found to have a reliability of  $\alpha = 0.90$ , again an exemplary reliability level according to Robinson et al. (1991). The self-efficacy scale has meritorious Kaiser-Meyer-Olkin measurement of sampling adequacy ( $MSA = 0.89$ ) which was used to assess the degree of intercorrelations among the variables and the appropriateness of factor analysis (Hair et al., 2006). The total variance explained by the items in the scale is 64%. A minimum factor loading of 0.71 or higher existed for all items in the scale which is very good according to Comrey (1973) who proposed the following guidelines for interpreting factor loadings: loadings > 0.71 excellent, loadings > 0.63 very good, loadings > 0.55 good, loadings > 0.45 fair, and loadings > 0.32 poor. Good face and content validity on both scales was established by a panel of experts.

## **Scale Development for the Clark-Kotrlik E-faculty Technology Development Scale and the Level of Support for E-instruction Scale**

Two scales were created for this study: the Clark-Kotrlik E-faculty Technology Development Scale (CKEDS) and the Clark-Kotrlik Level of Support for E-instruction Scale (CKLOS). The creation of these instruments is discussed in the following paragraphs. For both of these scales, Cronbach's alpha was calculated and then interpreted according to the set of descriptors proposed by Robinson, Shaver & Wrightman's Standards for Reliability (1991).

CKEDS. The CKEDS was developed after an investigation of the literature. It is a 10 item Likert-type scale. Although there were not any scales that tested for e-instruction technological knowledge, which is the focus of the scale created for this study, some constructs for the CKEDS scale were gleaned from instruments that tested for teaching with technology skills or technological knowledge.

The Teaching with Technology Instrument (TTI) had constructs which were found useful in creating the CKEDS (Atkins & Vasu, 1998). The three constructs of the TTI are: “. . . (1) writing and communication, (2) information access and management, and (3) construction and multimedia” (Atkins & Vasu, 1998, p. 37). The main reasons the actual questions of the TTI were not useful were that the questions did not directly address e-learning technology and were too detailed on specific software abilities. The current study is more interested in whether the user is knowledgeable on selected aspects of technology use.

The Global Assessment of Technology in Education Scale (GATE) is another scale found in the literature (Joyce & Farenga, 1997). Although most of this scale is not relevant to the CKEDS, it does have one question on the confidence level of faculty using certain software and hardware. This question, covering 17 items, was considered when formulating questions for the CKEDS. It asked about faculty confidence levels for running various software applications and

using various telecommunications. Questions 1, 2 and 3 of the CKEDS are loosely based on this question.

These two instruments (TTI and GATE) helped identify some possible ideas for constructs and questions, but information on the validity or reliability of these instruments could not be found. The performance assessment for the Level 1 competencies of the state of Connecticut ( $\alpha = 0.78$ ) provided similar information as that of the GATE and the TTI (Archambault et al., 2002). Thus, it mainly helped create the first 3 questions of the CKEDS. So, although some ideas were gleaned from these three studies, the CKEDS was created by the researcher from topics of web-based technological skills mentioned in the literature, personal input from being an e-faculty educator and information from other faculty and recommendations from other individuals. Reviewing the information garnered from these instruments, the performance assessment for the Level 1 competencies of the state of Connecticut and the literature on e-learning standards, the researcher established three important constructs on which to create the scale. Those constructs for e-learning were: knowledge of basic software and functions – 3 items (word processors, e-mail, spreadsheets, databases and web-based databases), knowledge of content creation software – 3 items (Microsoft Frontpage, VRML, learning objects, etc) and knowledge of collaborative learning tools – 3 items (learning portals, teleconferencing, chat rooms, etc.).

CKLOS. The constructs on which the CKLOS is based were found in the literature. Those constructs were time for course creation, availability of support services for both e-students and e-faculty (in e-learning courses it is important that support be available 24 hours, 7 days a week), help in the form of a graduate or teaching assistant, institutional research resources and funding for e-learning course technology training/conferences or events. The researcher created questions

to ascertain information on these topics mostly from the literature, but also with input from faculty.

### **Face and Content Validity of the Instrument and Scales**

Five experts in the area of online learning and course design, identified through the literature of the field, were contacted by telephone or e-mail (see Appendix H) and asked to assist in establishing the content validity of the research instrument. The intent of the researcher when selecting content experts was to find professionals in different areas of expertise in the online arena. All of the experts have doctoral degrees. One of the experts was in the Educational Human Resource Development field from Texas A & M, one of the experts from an honors college in Maryland is in Instructional Systems Development and another was a director of distance education and technology. Another expert was a professor and consultant with an interest in using gaming to learn and one expert was in computer information systems and has done research on computer skills for educators. A sixth individual, an associate dean in Liberal Arts that hosts a website devoted to e-learning, was selected as an expert and used primarily as a consultant. All of these individuals have e-learning as a primary focus or specialization.

Once these experts were identified, an e-mail was sent to them thanking them for their agreement to participate and explaining the directions for the rating of the instrument (see Appendix I). Included in this e-mail were the E-faculty Technology Development Survey with a place for the content experts ratings (Appendix J-O) and a copy of the research model created for this study to help the content experts put the survey in perspective (Appendix P). The content experts were asked to rate the relevancy of each of the items in all six scales in the instrument. In addition, they were invited to make suggestions on the items. Although four of the scales had been validated in previous studies, they had not been validated with the population for this study.

The content experts rated the items on a four point scale and the content validity index (CVI) was calculated for each item and the instrument as a whole (Rubio, Berg-Weger, Tebb, Lee & Rauch, 2003). The scale included the following choices: not relevant, fairly relevant, relevant, or very relevant. These responses allowed the researcher the opportunity to fine tune the instrument and possibly eliminate potential distracters preceding the pilot study (Rubio et al., 2003). The number of experts that rated the item as relevant or very relevant was divided by the total number of experts evaluating the instrument. In order to calculate a CVI for the entire survey, the CVI levels for each item were added together and then averaged. The ratings by the content experts are shown in Appendix Q through Appendix V. The 0.80 standard CVI rating recommended by Davis (1992) was used to confirm content validity.

A pilot study was conducted only using the universities in Georgia and Tennessee that meet the qualifications established by Carnegie (RU/VH) chosen for this study. The University of Georgia reported 18 e-faculty and The University of Tennessee reported 38 e-faculty. The total number of e-faculty for the pilot study was 56. The data collection for the pilot study took place through the Internet. One week prior to the delivery of the survey, an e-mail letter was sent to the participants of the study advising them of the study and informing them that they would be receiving an e-questionnaire soon (Appendix W). This e-mail was used to let the e-faculty recipients know that they were in the pilot portion of the study and was used to establish the validity of the e-mail addresses obtained for them. One week later, an e-mail was sent explaining the instructions and inviting participants to fill out the survey, along with a link to the survey (Appendix X). Directions were included in the web-based version of the survey at the beginning of each section (Appendix Y). Eight days following the delivery of the e-mail survey, reminder e-mails were sent to those participants who had not responded. There were 20 respondents to the

survey. The week following the reminder e-mails, a random group of non-respondents was selected and e-mails were sent to them to ask for their participation in the study (Appendix Z). Two days following this e-mail campaign, any in that group that had still not responded were contacted by phone and requested to participate in the online study. The return rate after two e-mailings and the e-mail/telephone follow-up was 50% (28 of 56). Minor changes to wording and format of the web-based instrument were made by the researcher based on her analysis of the findings from the pilot study, comments from the content experts and advice from the graduate committee.

### **Data Collection**

A meta-analysis of response rates to web-based surveys involving 68 surveys from 49 studies found elevated response rates with the number of contacts, the use of personalized contact letters and the use of precontact (Cook, Heath & Thompson, 2000). In a study devoted to adding to the knowledge base dealing with the use of web-based surveys, four recommendations concerning the maximization of response rate in web-based surveys were made. First, it was recommended that the pilot testing should be more rigorous than it would be for a paper based model (particularly with regard to functionality across various platforms, versions of software, etc.). This recommendation was addressed by testing the web-based survey using multiple browsers and by using WebSurveyor ([www.websurveyor.com](http://www.websurveyor.com)) which had established standards for interoperability. Next, that the responder should be afforded the same ability to pause their work and come back to it later that a person filling out a paper model would. WebSurveyor included this feature. Third, alternatives should be provided for those who are technologically challenged. This recommendation was not a concern since the study targeted e-faculty. Finally, it was recommended that ISPs for smaller areas should be contacted to figure out if any problems

with access can be avoided (Mertler, 2003). This recommendation was also not a concern since the study targeted e-faculty.

Websurveyor, a survey tool targeted towards businesses, was chosen after a thorough search of online survey tools was conducted by the researcher. The ability to use a random number generator to select a random part of the population, automate replies and non-response follow-up e-mails were all considered as desirable attributes for the selection of this software. The assurance that Websurveyor offers of data security and confidentiality, a responsible survey hosting service with dependable survey software and a reactive team of survey experts. In addition, two especially desirable benefits offered by this software were the ability to pause while filling out the survey and going back to it later and the ability to show the progress of the individual on the bottom of each page. Websurveyor is listed on the Safe Harbor directory by the International Trade Federation of the United States Commerce Department. The company has been recognized for its commitment to business excellence and to civic and social responsibility, integrity and ethical conduct (Vovici Corporation, 2006). During this study, Websurveyor and its partner Perseus (a development corporation) renamed their company Vovici ([www.vovici.com](http://www.vovici.com)) (Bailor, 2007). A fee of \$495 was paid for a one year subscription for the use of the software to host the creation and delivery of one survey by the researcher to an unlimited amount of participants, with unlimited e-mail campaigns (e-mail letter campaign, pilot e-mail campaign, pilot non-response e-mail campaign, sample population e-mail letter campaign, etc.).

The data collection took place through the Internet. One week prior to the delivery of the survey, an e-letter was sent to the participants of the study advising them of the study and informing them that they would be receiving an e-questionnaire soon (Appendix AA). This e-letter was also used to establish the validity of the e-mail addresses obtained for the e-faculty.

Any e-mail addresses that were determined to be invalid were further researched and identified when possible. Because of frame errors 53 participants were removed from the sample of 503, leaving an accessible sample size of 450. One week later, an e-mail was sent (Appendix BB) explaining the instructions and inviting participants to fill out the survey, along with a link to the survey. Directions were included in the web-based version of the E-Faculty Technology Development Survey at the beginning of each section (Appendix Y). Eight days following the delivery of the e-mail survey, reminder e-mails were sent to those participants who had not responded (Appendix CC). The week following the reminder e-mails, a random group of 40 non-respondents was selected and e-mails were sent to them (Appendix DD) to ask for their participation in the study. An oversampling was done in order to get at least 20 responses from non-respondents, so 40 non-respondents were actually selected and contacted for this follow-up portion of the study. Two days following this e-mail campaign, any in that group (the 40 randomly selected non-respondents) that had still not responded were contacted by phone and requested to participate in the online study. The return rate after two e-mailings and the e-mail/telephone follow-up was 48.4% (218 of 450). An independent  $t$  test was conducted to determine if the sample of e-mail/phone follow-up respondents differ significantly from those who responded to the first two waves of e-mail. The variables used in these analyses were all variables listed in Table 6. The test compared the variance in the responses of the returned sample ( $n = 196$ ) to the variance in the responses of the e-mail/telephone follow-up sample ( $n = 22$ ). No significant differences existed ( $p < 0.05$ ) between the original e-mailings and the e-mail/telephone follow-up groups for the variables of interest. Therefore, the data collected from the Internet survey was considered to be representative of all e-faculty in SREB in Carnegie classified RU/VH universities. Since the two groups filled out the same Internet survey, the data

from the e-mail/telephone follow-up was added to the data previously collected and the combined data was used for all further analyses.

Table 6. Independent Samples *t*-Test Comparing E-mail to Telephone Responses on Selected Variables

Variable	E-mail Respondents			E-mail/ Telephone Respondents			Levene's Test for Equality of Variances		<i>t</i> -test for Equality of Means		
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>F</i>	<i>p</i>	<i>t</i>	<i>df</i>	<i>p</i>
	Kotrlík-Redmann Technology Anxiety Scale Mean <sup>a</sup>	1.78	0.60	190	1.89	0.82	22	7.27	.008	-0.18	24
Clark-Kotrlík E-faculty Technology Development Scale Mean	3.37	0.78	179	3.23	0.57	20	.22	.641	-0.20	197	0.840
Kotrlík-Redmann Teaching Efficacy Scale Mean	3.86	0.66	192	3.99	0.77	21	.26	.613	-0.84	211	0.404
Time Management	6.30	0.67	194	6.37	1.18	22	.53	.466	-0.56	214	0.578
Extrinsic Motivation	6.47	0.77	192	6.48	1.33	21	.24	.627	-0.06	211	0.955
External Support	4.83	1.59	195	5.30	1.53	21	1.02	.313	-1.53	214	0.128
Performance and Self-Efficacy of Work <sup>a</sup>	6.67	0.36	191	6.51	1.17	21	9.25	.003	0.55	20	0.591
Peer Learning	5.20	1.37	195	5.21	1.50	21	.01	.913	-0.26	214	0.795
Supportive Workplace	5.47	1.35	193	5.85	1.58	22	.14	.714	-1.33	213	0.186
Attitude Toward Technology	6.20	0.77	196	6.20	1.25	22	2.49	.116	-0.40	216	0.691
Other Performance Rating	6.26	0.88	194	6.23	1.35	21	.72	.397	0.01	213	0.992
Goal Setting	6.27	0.63	192	6.25	0.99	21	2.36	.126	0.21	211	0.832
Help Seeking	6.18	1.03	190	6.41	0.58	19	3.54	.061	-0.86	207	0.391
Intrinsic Motivation	6.34	0.67	189	6.41	0.81	20	.88	.349	-0.48	207	0.634
Perceived Technology Support Score	16.38	5.94	196	15.45	5.44	22	.04	.842	0.56	216	0.575

<sup>a</sup>Equal variances not assumed

### Data Analysis

The data that is collected for this study was entered and analyzed. The data for each research question was analyzed in the manner described below.

#### Research Question One

Research question one addressed selected personal and demographic characteristics of e-faculty in the RU/VH universities in the SREB. Particularly, these questions determined their

gender, age, academic rank, academic department, existence of training at organization, clock hours of formal training (instructional training received by e-faculty on topics specific to skills relevant to teaching web-based courses) received in the last two years and clock hours of self-study training in the last two years (self-taught instructional training by e-faculty on topics specific to skills relevant to teaching web-based courses). The nominal variables gender and availability of training for e-instruction and the ordinal variable academic rank were reported using frequencies and percentages. The interval variables age, clock hours of formal training received in the last two years and clock hours of self-study training in the last two years were reported using means and standard deviations. For the variable, clock hours of formal training, the choice “200 or more” was calculated as 200.

### **Research Question Two**

Research Question two addressed the status of institutional support for e-faculty in Carnegie classified RU/VH universities in the SREB as perceived by e-faculty. The following items used to define that status are all ordinal variables and were measured and described using frequencies and percentages:

- Release Time/Reduced Teaching Load (time allotted to prepare web-based materials/courses)
- Graduate/teaching assistants: graduate or teaching assistants to help specifically with e-learning
- Instructional designers/curriculum developers to help with the designing of web-based materials

- Existence of adequate web-based institutional research resources: to help specifically with e-learning courses (library holdings that are accessible by web and technical support)
- Technical support: existence of technical support resources available for the students (computer help desk, web/e-course help desk, hours available)
- Availability of web-based computer technical support resources for students (seven days a week)
- Technical support: existence of technical support resources available for the professionals (computer help desk, web/e-course help desk, hours available)
- Availability of web-based computer technical support resources for professionals (seven days a week)
- Existence of sources of funding for e-learning course technology training/conferences
- Adequacy of funding for e-learning technology events/work

### **Research Question Three**

Research Question three addressed selected characteristics of e-faculty, including the following:

- Level of support for e-instruction as measured by the weighted Clark-Kotrlik Perceived Level of Support for E-instruction Scale (CKLOS) created for this study
- Perceived technology knowledge level of e-faculty as measured by the Clark-Kotrlik E-faculty Technology Development Scale (CKEDS)
- Self-directed learning level of e-faculty as measured by subscales of the short form of the Bartlett-Kotrlik Inventory of Self-Learning (BISL©)

- Technology anxiety level of e-faculty as defined by the technology anxiety scale from Kotrlik & Redmann (KRTAS) (2006)
- Self-efficacy of e-faculty based on the teacher self-efficacy scale from the Kotrlik & Redmann (KRTES) (2002) study

All items were treated as interval in nature and were reported using means and standard deviations for each item in each scale. Grand means and standard deviations were reported for each scale or subscale. Although confirmatory factor analysis was not conducted, the exploratory factory analysis used in this study appears to indicate that the constructs from the short form of the BISL© are appropriate for the data from this study.

#### **Research Question Four**

Research Question four addressed whether or not a relationship exists between the perceived technology knowledge of e-faculty as defined by the Clark-Kotrlik E-faculty Technology Development Scale (CKEDS) and the following variables:

- Age
- Academic Rank
- Self-efficacy of e-faculty as defined by the teacher self-efficacy scale from the KRTES
- Technology anxiety level of e-faculty as defined by the technology anxiety scale from the KRTAS
- Self-directed learning level as defined by the subscales of the short form of the BISL©
- Perceived level of support as defined by the CKLOS designed for this study

Pearson Product-moment correlations were used to report the existence of correlations and statistically significant correlations were interpreted using the descriptors proposed by Davis (1971).

### **Research Question Five**

Research Question five addressed whether or not selected variables explain a significant proportion of the variance in the perceived technology knowledge of e-faculty. The potential explanatory variables that were used for this analysis were: extrinsic motivation, external support, performance and self-efficacy of work, peer learning, supportive workplace, attitude toward technology, other performance rating, goal setting, help seeking, intrinsic motivation, self-efficacy, technology anxiety level, self-directed learning level, perceived level of support for e-instruction, training for e-instruction, age, gender and academic rank.. The data were analyzed by running a forward multiple regression analysis. The alpha level was set *a priori* at 0.05. The recommended ratio of observations per variables of 10:1 was observed (Hair et al., 2006).  $R^2$  was calculated and then used to interpret the effect size using the descriptors by Cohen (1988). Tests of the assumptions underlying multiple regression were conducted based on recommendations by Hair et al. (2006). The following tests were conducted:

1. Forward regression analysis.
2. Test for violation of assumptions made in regression (linearity of relationship between criterion and predictor variables, homoscedasticity, normality) by examining scatterplots of studentized residuals against predicted variables, studentized residuals against predicted criterion values with a null plot, normal probability plot for data and residual plots.
3. Test for collinearity through the use of the condition index (greater of variance for two or more coefficients), tolerance values and VIF.

4. Test for individual influential observations (i.e., detecting outliers) by examining centered leverage values (values greater than  $\frac{2(p+1)}{n}$  for sample sizes larger than 50 may be influential),  $dfbetas$  by plotting them, checking to see if Cook's distance value is greater than 1 and a scatterplot of standardized predicted value versus dependent variable with regression line. The purpose was to find observations that stand outside of the general pattern of the data of observations that will heavily influence the results of the regression (Hair et al., 2006). Once an observation was seen to have violated the assumptions or acted as an influential party it was acknowledged and removed. These procedures resulted in the removal of 27 outliers prior to running the multiple regression analysis.

## CHAPTER IV: FINDINGS

The purpose of this study was to determine whether perceived technology knowledge of e-faculty is related to their: self-efficacy, technology anxiety level, self-directed learning level (as defined by the 11 subscales of Bartlett-Kotrlik Inventory of Self-Learning) & their perceived level of support for e-instruction. This study also sought to determine what factors might be related to the perceived technology knowledge of e-faculty. Responses were obtained from 218 out of 450 (48.4%) of the e-faculty at five randomly selected Carnegie classified (2006) Doctorate-granting Research Universities with very high research activity (RU/VH) in the Southern Regional Education Board (SREB).

### **Research Question One: Selected Personal and Demographic Characteristics of Respondents**

Research question one sought to describe the following characteristics of e-faculty in Carnegie classified (2006) Doctorate-granting Research Universities with very high research activity (RU/VH) in the Southern Regional Education Board (SREB): gender, age, academic rank, academic department, existence of training at organization, clock hours of formal training received in the last two years (instructional training received by e-faculty on topics specific to skills relevant to teaching web-based courses) and clock hours of self-study training in the last two years (self-taught instructional training by e-faculty on topics specific to skills relevant to teaching web-based courses). This data can be seen in Table 7.

Females comprised a majority of the e-faculty (62.8%,  $n = 137$ ) that responded to the survey with males comprising 37.2% ( $n = 81$ ). The ages of the e-faculty ranged from 23 to 72 years. The mean age of all e-faculty was 48.79 ( $SD = 10.61$ ). A majority of the respondents (40.38%,  $n = 86$ ) were between the ages of 51 and 60. The second highest group of respondents

Table 7. Selected Personal and Demographic Characteristics of E-faculty Members from Public Carnegie Classified Doctorate-Granting Research Universities with Very High Research Activity in Three Randomly Chosen States from the Southern Regional Education Board

Variable	Variable Category	<i>N</i>	Valid %	<i>M</i>	<i>SD</i>
Gender	Male	81	37.20		
	Female	137	62.80		
	Total	218	100.00		
Age				48.79	10.61
	23-30	15	7.04		
	31-40	37	17.37		
	41-50	50	23.47		
	51-60	86	40.38		
	61-70	24	11.27		
	71-72	1	0.47		
	Total Responses	213	100.00		
	Missing	5			
	Total in Sample	218			
Academic Rank	Instructor	85	38.99		
	Assistant Professor	38	17.43		
	Associate Professor	44	20.18		
	Professor	42	19.27		
	Other	9	4.13		
	Total	218	100.00		
Availability of Training	No	20	9.22		
	Yes	197	90.78		
	Total Responses	217	100.00		
	Missing	1			
	Total in Sample	218			
Clock Hours of Formal Training				37.40	42.49
	1-20	126	58.70		
	21-40	17	8.10		
	41-60	11	5.20		
	61-80	3	1.40		
	81-100	55	25.70		
	101-200 or more <sup>a</sup>	2	0.90		
	Total Responses	214	100.00		
	Missing	4			
Total in Sample	218				
Clock Hours of Self-Study				5.80	6.92
	0	8	3.70		
	1-10	173	80.00		
	11-20	25	11.60		
	21-30	6	2.80		
	31-40	4	1.90		
	Total Responses	216	100.00		
	Missing	2			
	Total in Sample	218			

<sup>a</sup>Responses indicating “200 or more” were treated as 200 in all calculations.

(23.47%,  $n = 50$ ) were between the ages of 41 and 50. Five participants did not respond to the age inquiry (Table 7).

The largest single group of the respondents were Instructors (38.99%,  $n = 85$ ), with the other academic ranks represented being Associate Professor (20.18%,  $n = 44$ ), Professor (19.27%,  $n = 42$ ), Assistant Professor (17.43%,  $n = 38$ ) and Other (4.13%,  $n = 9$ ). The majority reported that training was available to 197 (90.78%) of the e-faculty with only 20 (9.22%) reporting that training was not available to them at their organization. Only two (0.9%) e-faculty members indicated that they had 200 or more hours of formal training in the past two years, for the purposes of this study responses indicating “200 or more” were calculated as 200. This represented all of those that fit into the 101 to 200 or more category. The selection by two participants of 200 or more hours, especially with all numbers up to that choice being available and none being selected between 100 and 200 or more, seemed slightly questionable. The researcher considered removing these two subjects, but considering the choices available to the participant, decided that these numbers were feasible and could just be representative of the variety of formal training experiences. E-faculty members ( $n = 55$ , 25.70%) indicated that they had received 81 to 100 hours of formal training, which was the next highest number of hours of formal training identified by the participants. The largest group of e-faculty ( $n = 126$ , 58.70%) listed between 1 to 20 hours of formal training. This data can be seen in Table 7.

The respondents reported a minimum of 1 hour of formal training and a maximum of 200 hours or more of formal training in the past two years with a mean of 37.40 ( $SD = 42.49$ ,  $N = 214$ ). The respondents reported a minimum of 0 hours of self-study and a maximum of 40 hours of self-study with a mean of 5.80 ( $SD = 6.92$ ,  $N = 216$ ). There were 8 (3.70%) e-faculty that reported zero self-study training in the past two years. The majority of the respondents (80.0%,  $n$

= 173) reported that they had engaged in only 1-10 hours of self-study over the past two years. The highest number of hours spent in self-study training in the past two years was 31 to 40 hours reported by 4 (1.90%) e-faculty members (Table 7).

The academic departments reported by the respondents ranged from Accounting to Women's Studies (See Appendix EE). The largest group was from Nursing (8.72%,  $n = 19$ ), with the second largest group from the College of Information (4.59%,  $n = 10$ ). English (4.13%,  $n = 9$ ) came in third on the list of academic departments followed closely by Library & Information Science (3.67%,  $n = 8$ ), Special Education (3.67%,  $n = 8$ ) Health Services Administration (2.75%,  $n = 6$ ) and Sociology (2.29%,  $n = 5$ ). There were 6 academic departments: Criminology, Economics, Education, School of Teaching & Learning, Secondary Education and Statistics that were all listed the same number of times (1.38%,  $n = 3$ ). For this study, the lowest number of e-faculty per department were two e-faculty members each (0.92%) in 21 academic departments and one (0.46%) member each in 91 academic departments.

### **Research Question Two: Institutional Support**

Research question two sought to describe the level of institutional support for e-faculty in Carnegie classified RU/VH universities in the SREB as perceived by e-faculty. Release time/reduced teaching loads to prepare web-based materials/courses was reported by 15.60% of e-faculty ( $n = 34$ ) (see Table 8). Over two-thirds of e-faculty (77.52%,  $n = 169$ ) reported that they do not have graduate or teaching assistants available to help with e-learning. More than half of e-faculty (54.59%,  $n = 119$ ) reported that they had instructional designers or curriculum developers to help with the design of web-based materials while 45.41% of e-faculty ( $n = 99$ ) reported that they did not. Over two-thirds of e-faculty (84.40%,  $n = 184$ ) confirmed the existence of institutional research resources available to help them specifically with e-learning courses.

Table 8. Perceived Level of Support as Measured by Selected Variables Reported by E-Faculty

Variable	Response	<i>F</i>	%
Are web-based computer technical support resources available for you?	Yes	207	94.95
	No	11	5.05
	Total	218	100.00
Are web-based computer technical support resources available for your students?	Yes	203	93.12
	No	15	6.88
	Total	218	100.00
Are adequate web-based institutional research resources available to help you specifically with e-learning courses (e.g., library holdings that are accessible by web, technical support, etc)?	Yes	184	84.40
	No	34	15.60
	Total	218	100.00
If so, are these web-based resources available to your students seven days a week?	Yes	155	76.35
	No	48	23.65
	Total	203	100.00
If so, are these web-based resources available to you seven days a week?	Yes	132	63.77
	No	75	36.23
	Total	207	100.00
Do you have instructional designers/curriculum developers to help with the design of web-based materials?	Yes	119	54.59
	No	99	45.41
	Total	218	100.00
Do you receive adequate funding for e-learning course technology events/work?	Yes	97	44.50
	No	121	55.50
	Total	218	100.00
Do you have any sources of funding for e-learning course technology training/conferences?	Yes	64	29.36
	No	154	70.64
	Total	218	100.00
Do you have a graduate or teaching assistant to help you specifically with e- learning?	Yes	49	22.48
	No	169	77.52
	Total	218	100.00
Do you have release time/reduced teaching load to prepare web-based materials/courses?	Yes	34	15.60
	No	184	84.40
	Total	218	100.00

The respondents reported that their students had web-based computer technical support resources available to them almost all the time (93.12%,  $n = 203$ ). Of those that had web-based computer technical support resources available for their students, 76.35% of e-faculty ( $n = 155$ ) reported that it was offered 7 days a week. Almost all e-faculty had web-based computer technical support resources available to them (94.95%,  $n = 207$ ), however, of those that had web-based computer technical support resources available to them only 63.77% ( $n = 132$ ) had access to web-based computer technical support resources 7 days a week. Funding for e-learning course technology training/conferences was only reported in 29.36% of the cases ( $n = 64$ ) and over half of the respondents did not feel they received adequate funding for e-learning course technology events /work (55.5%,  $n = 121$ ). However, 44.5% ( $n = 97$ ) of the respondents reported that the funding that they received for e-learning course technology events /work is adequate (Table 8).

### **Research Question Three: Identification of Selected Characteristics of Respondents**

Research question three sought to find out what selected characteristics of e-faculty were, particularly with respect to their perceived level of support as measured by the weighted Clark-Kotrlik Perceived Level of Support Scale created for this study, self-directed learning level of e-faculty as measured by individual subscales of the Bartlett-Kotrlik Inventory of Self-Learning (BISL©), their technology anxiety level as measured by the technology anxiety scale from Kotrlik & Redmann (2006), the self-efficacy of e-faculty based on the teacher self-efficacy scale from the Kotrlik & Redmann (2002) study and the perceived technology knowledge of e-faculty based on the Clark-Kotrlik E-faculty Technology Development Scale (CKEDS) which was created for this study.

**Perceived Level of Support for E-instruction.** In addition to describing e-faculty on their responses to individual items measuring their perceived level of support for e-instruction,

the researcher developed an overall institutional perceived level of support for e-instruction score for the respondents. After considering advice given by both content experts and the graduate committee, the researcher decided to weight the individual items on the Clark-Kotrlík Perceived Level of Support for E-instruction Scale (CKLOS) before attempting to come up with a score for the entire instrument. In order to do this, she had the items on CKLOS weighted individually by the five content experts that had previously been asked to assist in establishing the content validity of the research instrument. The same content experts identified in chapter three were sent an e-mail which requested their participation in weighting the items on the scale and provided instructions on how to weight the items (Appendix FF). The form for weighting the items on the scale was sent as an attachment to the e-mail (Appendix GG). The content experts were asked to weight the items by allocating 25 points over the nine items in the CKLOS. These points were defined from 1 (barely important) to 5 (extremely important). The weights recommended for each item by the five experts (Appendix HH) were then averaged. The average obtained for each item was then used as that item's weighted value (see Table 9). One person weighting the items allotted 27 points instead of 25. The researcher decided to keep the scores, which increased the average possible maximum score to 25.4, because it was perceived to have an overall minor impact on the weighting of the scale.

Question number two was split into two questions (questions 2 and 3) as shown in Appendix D based on input from the content experts in the instrument development stage. The researcher made the decision to apply the same weight to the two questions as the content experts had recommended for question number two because the two questions sought information on human resources that had very similar functions. The weighted value of question two was 3.0, so both questions 2 and 3 were given weights of 3.0 points, which increased the potential maximum

weighted value of the items in the scale from 25.4 points for the 9 items to 28.4 points for the final 10 items.

The weighted scores for each of the items in the scale were summed and represent the perceived level of support for e-instruction an e-faculty member receives (ranging from a minimum value of 0 for those e-faculty who did not perceive that they received any of the support listed in Table 9, to a maximum of 28.4 for those faculty who reported they received all of the support listed). In order to interpret the perceived level of support for e-learning scores, the researcher took the mean ( $M = 16.08$ ) and standard deviation ( $SD = 5.80$ ) of the respondents on the weighted overall perceived level of support for e-learning score and created an interpretive scale. The researcher divided the scale into six categories based on the theoretical distribution of the normal curve which indicates that the majority of scores are encompassed by three standard

Table 9. Weightings of Item Importance in the Clark-Kotrlik Perceived Level of Support for E-instruction Scale

Scale/Items	Weighted Averages
4. Are adequate web-based institutional research resources available to help you specifically with e-learning courses (e.g., library holdings that are accessible by web, technical support, etc)?	3.4
1. Do you have release time/reduced teaching load to prepare web-based materials/courses?	3.2
2. Do you have a graduate or teaching assistant to help you specifically with e-learning? <sup>a</sup>	3.0
3. Do you have instructional designers/curriculum developers to help with the design of web-based materials? <sup>a</sup>	3.0
7. Are web-based computer technical support resources available for you?	2.8
8. If so, are these web-based resources available to you seven days a week?	2.8
10. Do you receive adequate funding for e-learning course technology events/work?	2.6
5. Are web-based computer technical support resources available for the students?	2.6
9. Do you have any sources of funding for e-learning course technology training/conferences?	2.6
6. If so, are these web-based resources available to your students seven days a week?	2.4
Total Points Possible If Respondents Indicated They Had All Resources Listed Available to Them:	28.4

<sup>a</sup>Question number two was split into two questions (questions 2 and 3) as shown in Appendix D based on input from the content experts in the instrument development stage. The researcher made the decision to apply the same weight to the two questions as the content experts had recommended for question number two because the two questions sought information on human resources that had very similar functions.

deviations above and below the mean. The researcher constructed an interpretive scale as discussed in the following statements. The mean was interpreted as “average.” The mean plus one standard deviation created the interpretive category “above average,” between one and two standard deviations created the interpretive category “high” and more than two standard deviations above the mean created the interpretive category “very high.” The mean minus one standard deviation created the interpretive category “below average,” between one and two standard deviations created the interpretive category “low” and more than two standard deviations below the mean created the interpretive category “very low.” The following interpreted scale was developed: very low < 4.48, low = 4.49-10.28, below average = 10.29-16.07, above average = 16.08-21.87, high = 21.88-27.67, very high > 27.68. This scale was used to categorize and interpret scores on the Clark-Kotrlík Perceived Level of Support for E-instruction Scale (Table 10). Based on these interpretation guidelines, 12.56% of e-faculty ( $n =$

Table 10. Number and Percent of E-faculty in Each Level of Support Category on the Clark-Kotrlík Perceived Level of Support for E-instruction Scale

Support Levels	Frequency	Percent
Very Low	6	3.14
Low	18	9.42
Below Average	56	29.32
Above Average	64	33.51
High	44	23.04
Very High	3	1.57
Total	191	100.00

Note. A normal curve was constructed using the mean and standard deviation of the scale ( $M=16.80$ ,  $SD=5.80$ ) and values were assigned that coincided with each standard deviation away from the mean. The following scale was created and used to categorize and interpret scores on the Clark-Kotrlík Perceived Level of Support for E-instruction Scale: very low <4.48, low= 4.49-10.28, below average=10.29-16.07, above average=16.08-21.87, high=21.88-27.67, very high >27.68.  $N= 191$ .

24) perceived that they had low or very low support, 29.32% of e-faculty ( $n = 56$ ) perceived that they had below average support, 33.51% of e-faculty ( $n = 64$ ) perceived that they had above

average support and 24.61% of e-faculty ( $n = 47$ ) perceived that they had high or very high support.

**Bartlett-Kotrlík Inventory of Self-Learning.** There are 11 subscales on the short form of the BISL© which were interpreted using the Standards for Reliability by Robinson, et al. (1991) listed here: Exemplary  $> 0.80$ , Extensive  $0.70 - 0.79$ , Moderate  $0.60 - 0.69$ , Minimal  $< 0.60$ . The reliability for each subscale was: exemplary for Time Management ( $\alpha = 0.84$ ), moderate for Extrinsic Motivation ( $\alpha = 0.69$ ), extensive for External Support ( $\alpha = 0.77$ ), exemplary for Performance and Self-Efficacy of Work ( $\alpha = 0.87$ ), exemplary for Peer Learning ( $\alpha = 0.81$ ), extensive for Supportive Workplace ( $\alpha = 0.77$ ), extensive for Attitude Toward Technology ( $\alpha = 0.79$ ), exemplary for Other Performance Rating ( $\alpha = 0.90$ ), moderate for Goal Setting ( $\alpha = 0.65$ ), exemplary for Help Seeking ( $\alpha = 0.90$ ) and exemplary for Intrinsic Motivation ( $\alpha = 0.85$ ) (Robinson, et al., 1991). The items of the BISL© are organized for discussion by the subscales established by Bartlett and Kotrlík (2000).

The item or subscale means for each scale were interpreted using the following scoring system:  $M = 1.00-1.49$  - Not True of Me Most of the Time,  $M = 1.50-2.49$  - Often Not True of Me,  $M = 2.50-3.49$  - Seldom Not True of Me,  $M = 3.5-4.49$ - Undecided,  $M = 4.50-5.49$ - True of Me,  $M = 5.50-6.49$  - Often True of Me,  $M = 6.50-7.00$  - True of Me Most of the Time. The e-faculty reported that it is often true of them ( $M = 6.38$ ,  $SD = 0.83$ ) that they take time to read about new materials in their field of study. The e-faculty reported that it is often true of them ( $M = 6.42$ ,  $SD = 0.76$ ) that they take time to learn new material in their field. The e-faculty reported that it is often true of them ( $M = 6.14$ ,  $SD = 0.91$ ) that they take time to finish learning the new material that they study. The e-faculty reported that it is often true of them ( $M = 6.43$ ,  $SD = 1.12$ ) that it is important to them that others can see that they are effective at what they do. The

Table 11. E-learning Faculty Responses to the Items in the BISL© Subscales

Subscale/Items	Factor Loading	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MSA</i>	$\alpha$	Reliability Rating <sup>a</sup>	Eigen-values	% of Variance
<b>Time Management</b>		<b>216</b>	<b>6.31</b>	<b>0.73</b>	<b>0.68</b>	<b>0.84</b>	<b>Exemplary</b>	<b>2.30</b>	<b>76.59</b>
2. I take time to learn new material in my field.	0.91		6.42	0.76	0.64				
1. I take time to read about new materials in my field of study.	0.91		6.38	0.83	0.64				
3. I take time to finish learning the new material that I study.	0.80		6.14	0.91	0.90				
<b>Extrinsic Motivation</b>		<b>213</b>	<b>6.47</b>	<b>0.83</b>	<b>0.61</b>	<b>0.69</b>	<b>Moderate</b>	<b>1.95</b>	<b>65.12</b>
5. I want my peers to respect me and my work.	0.88		6.68	0.80	0.57				
4. It is important to me that others can see that I am effective at what I do.	0.86		6.43	1.12	0.58				
6. I enjoy receiving praise for my work.	0.65		6.29	1.18	0.81				
<b>External Support</b>		<b>216</b>	<b>4.88</b>	<b>1.59</b>	<b>0.66</b>	<b>0.77</b>	<b>Extensive</b>	<b>2.11</b>	<b>70.21</b>
7. My administrator provides time for me to learn information related to my job.	0.89		5.29	1.63	0.61				
9. My administrator provides support by being a source of information.	0.79		4.71	1.99	0.72				
8. My administrator provides funding for me to learn information related to my job.	0.83		4.64	2.09	0.67				
<b>Performance and Self-Efficacy of Work</b>		<b>212</b>	<b>6.66</b>	<b>0.48</b>	<b>0.87</b>	<b>0.87</b>	<b>Exemplary</b>	<b>3.7</b>	<b>61.67</b>
14. It's my responsibility to learn new material for my job.	0.73		6.74	0.56	0.88				
11. I perceive myself as having strong work related knowledge.	0.87		6.71	0.60	0.85				
10. I'm certain I can learn new skills my job requires.	0.82		6.66	0.62	0.90				
13. I am successful in my job.	0.85		6.64	0.63	0.84				
12. I keep up with my duties.	0.74		6.63	0.70	0.87				
15. I'm confident I can understand the most complex material in my job.	0.70		6.58	0.57	0.91				

(table con'd)

Subscale/Items	Factor Loading	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MSA</i>	$\alpha$	Reliability Rating <sup>a</sup>	Eigen-values	% of Variance
<b>Peer Learning</b>		<b>216</b>	<b>5.21</b>	<b>1.38</b>	<b>0.71</b>	<b>0.81</b>	<b>Exemplary</b>	<b>2.20</b>	<b>73.20</b>
16. When learning material for my job, I often try to explain the material to colleagues.	0.82		5.70	1.24	0.77				
17. My co-workers encourage me to learn new work-related material.	0.87		5.02	1.70	0.68				
18. I'm involved with peer learning when I learn at work.	0.87		4.92	1.84	0.69				
<b>Supportive Workplace</b>		<b>215</b>	<b>5.51</b>	<b>1.37</b>	<b>0.65</b>	<b>0.77</b>	<b>Extensive</b>	<b>2.07</b>	<b>69.06</b>
19. My organization encourages opportunities to learn.	0.85		5.80	1.49	0.63				
20. My supervisors/administrators encourage me to learn new topics related to my job.	0.89		5.43	1.73	0.60				
21. I have the power to make changes in my workplace.	0.74		5.30	1.72	0.78				
<b>Attitude Toward Technology</b>		<b>218</b>	<b>6.21</b>	<b>0.82</b>	<b>0.66</b>	<b>0.79</b>	<b>Extensive</b>	<b>2.13</b>	<b>70.86</b>
24. I regularly read materials on the Internet.	0.76		6.44	0.81	0.78				
23. I prefer to use technology in my job.	0.90		6.25	1.01	0.61				
22. I prefer to use computers to learn new material.	0.86		5.93	1.10	0.64				
<b>Other Performance Rating</b>		<b>215</b>	<b>6.26</b>	<b>0.92</b>	<b>0.72</b>	<b>0.90</b>	<b>Exemplary</b>	<b>2.50</b>	<b>83.37</b>
26. My immediate supervisor would rate me as excellent on my work evaluations.	0.89		6.36	0.96	0.80				
25. Colleagues in my organization would rate me excellent in my job performance.	0.91		6.22	0.98	0.73				
27. My department colleagues would rate me excellent in my job performance.	0.94		6.19	1.08	0.67				
<b>Goal Setting</b>		<b>213</b>	<b>6.27</b>	<b>0.67</b>	<b>0.63</b>	<b>0.65</b>	<b>Moderate</b>	<b>1.79</b>	<b>59.64</b>
30. In my job, I can identify new materials I need to learn.	0.72		6.43	0.75	0.68				
29. I strive to fulfill all goals I set even though some are difficult.	0.83		6.37	0.78	0.60				
28. I set goals to learn new materials.	0.76		6.00	1.06	0.64				

(table con'd)

Subscale/Items	Factor Loading	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MSA</i>	$\alpha$	Reliability Rating <sup>a</sup>	Eigen-values	% of Variance
<b>Help Seeking</b>		<b>209</b>	<b>6.20</b>	<b>1.00</b>	<b>0.73</b>	<b>0.90</b>	<b>Exemplary</b>	<b>2.49</b>	<b>82.82</b>
33. I try to identify colleagues I can ask for help if necessary.	0.87		6.31	1.07	0.85				
31. When I can not understand material for this job, I will ask another colleague for help.	0.93		6.14	1.17	0.68				
32. When learning new material for my job, I ask others to clarify concepts that I don't understand.	0.93		6.14	1.09	0.69				
<b>Intrinsic Motivation</b>		<b>209</b>	<b>6.35</b>	<b>0.68</b>	<b>0.70</b>	<b>0.85</b>	<b>Exemplary</b>	<b>2.32</b>	<b>77.23</b>
34. In my job, I prefer tasks that arouse my curiosity, even if they are difficult to learn.	0.88		6.49	0.66	0.69				
35. In my job, I prefer tasks that challenge me so I can learn new things.	0.92		6.45	0.71	0.65				
36. In my job, I choose tasks that I can learn from, even if they don't guarantee a reward.	0.84		6.26	0.85	0.79				

Note. The following scale was used for all subscale items: 1=Not True of Me Most of the Time, 2= Often Not True of Me, 3=Seldom Not True of Me, 4=Undecided, 5= True of Me, 6=Often True of Me, 7=True of Me Most of the Time. The item or subscale means for each scale were interpreted using the following scoring system: Mean=1.00-1.49: Not True of Me Most of the Time, Mean= 1.50-2.49: Often Not True of Me, Mean=2.50-3.49: Seldom Not True of Me, Mean=3.5-4.49: Undecided, Mean=4.50-5.49: True of Me, Mean=5.50-6.49: Often True of Me, Mean=6.50-7.00: True of Me Most of the Time. The *N*, *M*, *SD*,  $\alpha$ , Eigenvalue and % variance explained in bold are the Grand Mean and Standard Deviation for the scale. Factor analysis conducted using principal component analysis with Varimax rotation.

<sup>a</sup>According to the following scale: Exemplary >0.80, Extensive 0.70- 0.79, Moderate 0.60- 0.69, Minimal <0.60 (Robinson, et al., 1991).

e-faculty reported that it is true of them most of the time ( $M = 6.68$ ,  $SD = 0.80$ ) that they want their peers to respect them and their work. The e-faculty reported that it is often true of them ( $M = 6.29$ ,  $SD = 1.18$ ) that they enjoy receiving praise for their work. The e-faculty reported that it is true of them ( $M = 5.29$ ,  $SD = 1.63$ ) that their administrator provides time for them to learn information related to their job. The e-faculty reported that it is true of them ( $M = 4.64$ ,  $SD = 2.09$ ) that their administrator provides funding for them to learn information related to their job. The e-faculty reported that it is true of them ( $M = 4.71$ ,  $SD = 1.99$ ) that their administrator provides support by being a source of information. The e-faculty reported that it is true of them

most of the time ( $M = 6.66, SD = 0.62$ ) that they are certain that they can learn new skills their job requires (Table 11). The e-faculty reported that it is true of them most of the time ( $M = 6.71, SD = 0.60$ ) that they perceive themselves as having strong work related knowledge. The e-faculty reported that it is true of them most of the time ( $M = 6.58, SD = 0.57$ ) that they are confident that they can understand the most complex material in their job. The e-faculty reported that it is true of them most of the time ( $M = 6.64, SD = 0.63$ ) that they are successful in their job. The e-faculty reported that it is true of them most of the time ( $M = 6.74, SD = 0.56$ ) that it is their responsibility to learn new material for their job. The e-faculty reported that it is true of them most of the time ( $M = 6.63, SD = 0.70$ ) that they keep up with their duties. The e-faculty reported that it is often true of them ( $M = 5.70, SD = 1.24$ ) that when learning material for their job, they often try to explain the material to colleagues. The e-faculty reported that it is true of them ( $M = 5.02, SD = 1.70$ ) about the statement “My co-workers encourage me to learn new work-related material.” The e-faculty reported that it is true of them ( $M = 4.92, SD = 1.84$ ) about the statement “I’m involved with peer learning when I learn at work.” The e-faculty reported that it is often true of them ( $M = 5.80, SD = 1.49$ ) that their organization encourages opportunities to learn. The e-faculty reported that it is true of them ( $M = 5.43, SD = 1.73$ ) that their supervisors/administrators encourage them to learn new topics related to my job. The e-faculty reported that it is true of them ( $M = 5.30, SD = 1.72$ ) that they have the power to make changes in their workplace. The e-faculty reported that it is often true of them ( $M = 5.93, SD = 1.10$ ) that they prefer to use computers to learn new material. The e-faculty reported that it is often true of them ( $M = 6.25, SD = 1.01$ ) that they prefer to use technology in their job. The e-faculty reported that it is often true of them ( $M = 6.44, SD = 0.81$ ) that they regularly read materials on the Internet. The e-faculty reported that it is often true of them ( $M = 6.22, SD = 0.98$ ) that their

colleagues in their organization would rate them excellent in their job performance (Table 11). The e-faculty reported that it is often true of them ( $M = 6.36, SD = 0.96$ ) that their immediate supervisor would rate them as excellent on their work evaluations. The e-faculty reported that it is often true of them ( $M = 6.19, SD = 1.08$ ) that their department colleagues would rate them excellent in their job performance. The e-faculty reported that it is often true of them ( $M = 6.00, SD = 1.06$ ) that they set goals to learn new materials. The e-faculty reported that it is often true of them ( $M = 6.37, SD = 0.78$ ) that they strive to fulfill all goals they set even though some are difficult. The e-faculty reported that it is often true of them ( $M = 6.43, SD = 0.75$ ) that in their job, they can identify new materials that they need to learn. The e-faculty reported that it is often true of them ( $M = 6.14, SD = 1.17$ ) that when they can not understand material for their job, they will ask another colleague for help. The e-faculty reported that it is often true of them ( $M = 6.14, SD = 1.09$ ) that when learning new material for my job, they ask others to clarify concepts that they don't understand. The e-faculty reported that it is often true of them ( $M = 6.31, SD = 1.07$ ) that they try to identify colleagues that they can ask for help if necessary. The e-faculty reported that it is often true of them ( $M = 6.49, SD = 0.66$ ) that in their job, they prefer tasks that arouse their curiosity, even if they are difficult to learn. The e-faculty reported that it is often true of them ( $M = 6.45, SD = 0.71$ ) that in their job, they prefer tasks that challenge me so they can learn new things. The e-faculty reported that it is often true of them ( $M = 6.26, SD = 0.85$ ) that in their job, they choose tasks that they can learn from, even if they don't guarantee a reward (Table 11).

Using principal component analysis with Varimax rotation, an exploratory factor analysis was conducted to determine if the factor structure established by Bartlett & Kotrlik (2000) also existed with the data from this study. Factor loadings on all subscales were interpreted using the

following guidelines by Comrey (1973): loadings > 0.71 excellent, loadings > 0.63 very good, loadings > 0.55 good, loadings > 0.45 fair and loadings > 0.32 poor. The Kaiser-Meyer-Olkin measurement of sampling adequacy (*MSA*) was used to assess the degree of intercorrelations among the variables and the appropriateness of factor analysis. The *MSA* is interpreted by the following guidelines: *MSA* > 0.80 meritorious, 0.70-0.79 middling, 0.60-0.69 mediocre, 0.50-0.59 miserable, < 0.50 unacceptable (Hair, et al., 2006). The Time Management subscale had an excellent minimum factor loading of 0.80 and a mediocre *MSA* = 0.68. The Extrinsic Motivation subscale had a very good factor loading of 0.65 and a mediocre *MSA* = 0.61. The External Support subscale had an excellent minimum factor loading of 0.79 and a mediocre *MSA* = 0.66. The Performance and Self-Efficacy of Work subscale had a very good minimum factor loading of 0.70 and a meritorious *MSA* = 0.87. The Peer Learning subscale had an excellent minimum factor loading of 0.82 and a middling *MSA* = 0.71. The Supportive Workplace subscale had an excellent minimum factor loading of 0.74 and a mediocre *MSA* = 0.65. The Attitude Toward Technology subscale had an excellent minimum factor loading of 0.76 and a mediocre *MSA* = 0.66. The Other Performance Rating subscale had an excellent minimum factor loading of 0.89 and a middling *MSA* = 0.72. The Goal Setting subscale had an excellent minimum factor loading of 0.72 and a mediocre *MSA* = 0.63. The Help Seeking subscale had an excellent minimum factor loading of 0.87 and a middling *MSA* = 0.73. The Intrinsic Motivation subscale had an excellent minimum factor loading of 0.84 and a middling *MSA* = 0.70 (Table 11).

The Time Management subscale had a mean of 6.31 (*SD* = 0.73) which indicates that good time management is a quality that e-faculty report is often true of them. The Extrinsic Motivation subscale had a mean of 6.47 (*SD* = 0.83) is a quality that e-faculty report as often true of them. The External Support subscale which had a mean of 4.88 (*SD* = 1.59) and an extensive

reliability consisted of qualities that e-faculty reported as true of them. The Performance and Self-Efficacy of Work subscale which had a mean of 6.66 ( $SD = 0.48$ ) and an exemplary reliability. E-faculty respondents find that the characteristics that make up the Performance and Self-Efficacy of Work subscale are true of them most of the time. The Peer Learning subscale which had a mean of 5.21 ( $SD = 1.38$ ) included of qualities that e-faculty reported as true of them. The Supportive Workplace subscale which had a mean of 5.51 ( $SD = 1.37$ ), was made up of qualities that e-faculty reported as often true of them. The Attitude Toward Technology subscale, with a mean of 6.21 ( $SD = 0.82$ ), was made up of qualities that e-faculty reported as often true of them. The Other Performance Rating subscale, which had a mean of 6.26 ( $SD = 0.92$ ), was made up of qualities that e-faculty reported as often true of them. The Goal Setting subscale which had a mean of 6.27 ( $SD = 0.67$ ) and a moderate reliability, consisted of qualities that e-faculty reported as often true of them. The Help Seeking subscale which had a mean of 6.20 ( $SD = 1.00$ ), was made up of qualities that e-faculty reported as often true of them. The Intrinsic Motivation subscale, which had a mean of 6.35 ( $SD = 0.68$ ), was made up of qualities that e-faculty reported as often true of them (Table 11).

**Kottrlik-Redmann Technology Anxiety Scale.** The technology anxiety scale (Table 12) had an exemplary reliability ( $\alpha = 0.90$ ) (Robinson, et al., 1991) and a meritorious  $MSA = 0.88$  (Hair, et al., 2006). The means of each item were interpreted using the following scoring system:  $M = 1.00-1.49$ : No Anxiety,  $M = 1.50-2.49$ : Minor Anxiety,  $M = 2.50-3.49$ : Moderate Anxiety,  $M = 3.5-4.49$ : Moderately High Anxiety,  $M = 4.50-5.00$ : Very High Anxiety. The e-faculty have minor anxiety when they are faced with new technology ( $M = 1.87$ ,  $SD = 0.76$ ), think about their technology skills compared to the skills of other teachers ( $M = 1.63$ ,  $SD = 0.72$ ), try to learn technology related skills ( $M = 1.77$ ,  $SD = 0.75$ ), try to understand new technology ( $M = 1.83$ ,  $SD$

= 0.76), try to use technology ( $M=1.80$ ,  $SD = 0.79$ ), fear they may break or damage the technology they are using ( $M=1.71$ ,  $SD = 0.90$ ) and hesitate to use technology for fear of making mistakes they cannot correct ( $M=1.84$ ,  $SD = 0.83$ ) (Table 12).

Table 12. E-faculty Responses to the Items in the Kotrlik-Redmann Technology Anxiety Scale

Scale/Items	Factor Loading	<i>M</i>	<i>SD</i>
<b>Technology Anxiety Scale from Kotrlik &amp; Redmann (2006)</b>		<b>1.78</b>	<b>0.63</b>
How anxious do you feel when you are faced with using new technology?	0.86	1.87	0.76
How anxious do you feel when you hesitate to use technology for fear of making mistakes you cannot correct?	0.69	1.84	0.83
How anxious do you feel when you try to understand new technology?	0.91	1.83	0.76
How anxious do you feel when you try to use technology?	0.87	1.80	0.79
How anxious do you feel when you try to learn technology related skills?	0.92	1.77	0.75
How anxious do you feel when you fear you may break or damage the technology you are using?	0.53	1.71	0.90
How anxious do you feel when you think about your technology skills compared to the skills of other teachers?	0.80	1.63	0.72

Note. The following scale was used for these items: 1= No Anxiety, 2= Minor Anxiety, 3= Moderate Anxiety, 4= Moderately High Anxiety, 5= Very High Anxiety. The means for each scale were interpreted using the following scoring system: Mean= 1.00-1.49: No Anxiety, Mean= 1.50-2.49: Minor Anxiety, Mean= 2.50-3.49: Moderate Anxiety, Mean= 3.5-4.49: Moderately High Anxiety, Mean= 4.50-5.00: Very High Anxiety.  $N=199$ , % variance explained =65.43, Eigenvalue =4.58,  $\alpha=0.90$ . The *M* and *SD* denoted by boldface type are the Grand Mean and Standard Deviation for the scale.  $N=212$ .

A factor analysis was conducted in order to discover any underlying constructs that might be present. A principal component analysis with Varimax rotation was used to conduct the factor analysis. The short form of the technology anxiety scale had factor loadings which indicate that one item loaded as fair and all other items loaded as very good or excellent on this factor (Comrey, 1973). The scale had a mean of 1.78 ( $SD = 0.63$ ) which indicates that the respondents have minor technology anxiety (Table 12).

**Kotrlik-Redmann Teacher Self-Efficacy Scale.** The scale (Table 13) had an exemplary reliability ( $\alpha= 0.91$ ) (Robinson, et al., 1991) and a mediocre  $MSA = 0.68$  (Hair, et al., 2006). The means of each item were interpreted using the following scoring system:  $M = 1.00-1.49$ :

Strongly Disagree,  $M = 1.50-2.49$ : Disagree,  $M = 2.50-3.49$ : Undecided,  $M = 3.5-4.49$ : Agree,  $M = 4.50-5.00$ : Strongly Agree. The e-faculty agree that they are: among the best teachers at their school ( $M = 3.93$ ,  $SD = 0.79$ ), effective in teaching the content in their courses ( $M = 4.39$ ,  $SD = 0.62$ ) and a role model for other teachers in their school ( $M = 3.60$ ,  $SD = 0.90$ ). The e-faculty also agree that: their students would rate them as one of the best teachers they have ever had ( $M = 3.91$ ,  $SD = 0.82$ ), their students would evaluate their courses as excellent ( $M = 4.05$ ,  $SD = 0.81$ ), their department head would say that they are one of the best teachers in their department ( $M = 3.70$ ,  $SD = 0.91$ ) and that the other teachers in their school would say that they are one of the best teachers at their school ( $M = 3.54$ ,  $SD = 0.87$ ) (Table 13).

Table 13. E-faculty Responses to the Items in the Kotrlik-Redmann Teacher Self-Efficacy Scale

Scale/Items	Factor Loading	<i>M</i>	<i>SD</i>
<b>Teacher Self-Efficacy Scale from Kotrlik &amp; Redmann (2002)</b>		<b>3.87</b>	<b>0.67</b>
I am effective in teaching the content in my courses.	0.72	4.39	0.62
My students would evaluate my courses as excellent.	0.82	4.05	0.81
I am among the best teachers at my school.	0.83	3.93	0.79
My students would rate me as one of the best teachers they have ever had.	0.88	3.91	0.82
My department head would say that I am one of the best teachers in this department.	0.84	3.70	0.91
I am a role model for other teachers in my school.	0.77	3.60	0.90
The other teachers in my school would say that I am one of the best teachers at this school.	0.84	3.54	0.87

Note. The following scale was used for these items: 1= Strongly Disagree, 2= Disagree, 3= Undecided, 4= Agree, 5= Strongly Agree. The means for each scale were interpreted using the following scoring system: Mean= 1.00-1.49: Strongly Disagree, Mean= 1.50-2.49: Disagree, Mean= 2.50-3.49: Undecided, Mean= 3.5-4.49: Agree, Mean= 4.50-5.00: Strongly Agree. % variance explained= 66.05, Eigenvalue= 4.62,  $\alpha = 0.91$ . The *M* and *SD* denoted by boldface type are the Grand Mean and Standard Deviation for the scale.  $N = 213$ .

A factor analysis was conducted in order to discover any underlying constructs that might be present. A principal component analysis with Varimax rotation was used to conduct the factor analysis. The self-efficacy scale had factor loadings on all items above 0.71 which indicated that all items loaded excellent on this factor (Comrey, 1973). All items in this scale were worded in superlative language—strongly agreeing with the statements in this scale would indicate the e-

faculty perceived they were excellent in their teaching effectiveness. The scale had a mean of 3.87 ( $SD = 0.67$ ) which indicates that the e-faculty perceive they are good teachers (Table 13).

**Clark-Kotrlik E-faculty Technology Development Scale.** The Clark-Kotrlik E-faculty Technology Development scale had an exemplary reliability ( $\alpha = 0.88$ ) (Robinson, et al., 1991) and a meritorious  $MSA = 0.85$  (Hair, et al., 2006) (Table 14). The means of each item were

Table 14. Responses to the Items in the Clark-Kotrlik E-faculty Technology Development Scale

Scale/Items	<i>M</i>	<i>SD</i>	Factor Loadings
<b>Clark-Kotrlik E-faculty Technology Development Scale (CKEDS)</b>	<b>3.37</b>	<b>0.77</b>	
How knowledgeable are you about the following?			
Electronic Mail (E-mail)	4.62	0.60	0.55
Learning Management Systems (e.g., Blackboard, WebCT, Moodle, Sakai) or Learning Portals	4.21	0.89	0.65
Software that can be used to create or link to web-based learning content creation ((word processing software (e.g., Word, Word Perfect and/or Write, etc.), Spreadsheet Software (e.g. Lotus, Excel and/or Appleworks, etc.), Database Management Systems (e.g. dBase, Appleworks and/or Access, etc.))	3.91	1.01	0.68
Collaborative Learning Tools (e.g., chat rooms, threaded discussion forums, wikis, blogs)	3.71	1.18	0.76
Web-based Databases (e.g., ERIC, Ingenta, netLibrary, Lexis Nexis, Web of Knowledge and/or Ebsco Host, etc.)	3.61	1.10	0.57
Whiteboard Spaces, Bulletin Boards	3.30	1.28	0.73
E-learning Content Creation software packages (e.g., Macromedia Authorware, Dreamweaver Adobe Acrobat and/or Microsoft FrontPage, etc.)	2.99	1.25	0.77
Streaming Media (e.g., Teleconferencing, podcasting)	2.85	1.30	0.72
Languages that can be used to create or link to e-learning content creation (e.g., XML, HTML and/or VRML, etc.)	2.25	1.19	0.75
Learning Objects (e.g., Knowledge Objects) and/or Shareable Courseware (or Content) Object Reference Models (SCORM)	2.03	1.19	0.70

Note. The following scale was used for these items: 1= Not At All, 2= Slightly, 3= Moderately, 4= Very, 5= Extremely. The means for each scale were interpreted using the following scoring system: Mean= 1.00-1.49: Not At All Knowledgeable, Mean= 1.50-2.49: Slightly Knowledgeable, Mean= 2.50-3.49: Moderately Knowledgeable, Mean= 3.5-4.49: Very Knowledgeable, Mean= 4.50-5.00: Extremely Knowledgeable.  $N = 199$ , % variance explained= 47.94, Eigenvalue= 4.79,  $\alpha = 0.88$ . The *M* and *SD* denoted by boldface type are the Grand Mean and Standard Deviation for the scale.  $N = 199$ .

interpreted using the following scale devised for this study: 1.00-1.49 - Not At All

Knowledgeable, Mean= 1.50-2.49 – Slightly Knowledgeable, Mean= 2.50-3.49 – Moderately

Knowledgeable, Mean= 3.5-4.49 – Very Knowledgeable and Mean= 4.50-5.00 - Extremely Knowledgeable. The respondents were extremely knowledgeable about e-mail ( $M = 4.62$ ,  $SD = 0.60$ ). They reported being very knowledgeable about web-based databases ( $M = 3.61$ ,  $SD = 1.10$ ), software that can be used to create or link to web-based learning content creation ( $M = 3.91$ ,  $SD = 1.01$ ), collaborative learning tools ( $M = 3.71$ ,  $SD = 1.18$ ) and learning management tools ( $M = 4.21$ ,  $SD = 0.89$ ). The respondents reported being moderately knowledgeable about e-learning content creation software packages ( $M = 2.99$ ,  $SD = 1.25$ ), whiteboard spaces, bulletin boards ( $M = 3.30$ ,  $SD = 1.28$ ) and streaming media ( $M = 2.85$ ,  $SD = 1.30$ ). E-faculty reported that they were only slightly knowledgeable about languages that can be used to create or link to e-learning content creation ( $M = 2.25$ ,  $SD = 1.19$ ) and Learning Objects and/or Shareable Content Object Reference Models ( $M = 2.03$ ,  $SD = 1.19$ ). Overall, e-faculty reported that they perceived that they were only moderately knowledgeable about e-instruction technology knowledge (Table 14).

A factor analysis was conducted in order to discover any underlying constructs that might be present. A principal component analysis with Varimax rotation was used to conduct the factor analysis. The factor loadings of the items on the Clark-Kotrlík E-faculty Technology Development Scale (CKEDS) were good, very good and excellent on one factor according to Comrey's (1973) guidelines for interpreting factor loadings: loadings  $> 0.71$  (accounting for 50% of the variance) excellent, loadings  $> 0.63$  (accounting for 40% of the variance) very good, loadings  $> 0.55$  (accounting for 30% of the variance) good, loadings  $> 0.45$  (accounting for 20% of the variance) fair and loadings  $> 0.32$  (accounting for 10% of the variance) poor. The two factor model showed that two subconstructs may exist in the CKEDS, but the researcher chose to use the single factor model since all items loaded higher on the single factor model than on the

two factor model, the variance explained by the single factor model (47.94%) was very good according to Comrey (1973) and the original design of the CKEDS was based on a single factor. The scale had a mean of 3.37 ( $SD = 0.77$ ) which indicated that e-faculty perceived that they had moderate overall technology knowledge (Table 14).

#### **Research Question Four: Relationship Between Perceived Technology Knowledge and Selected Variables**

Research question four sought to determine if a relationship existed between perceived technology knowledge of e-faculty as defined by the Clark-Kotrlik E-faculty Technology Development Scale (CKEDS) and the following variables: age, academic rank, self-efficacy of e-faculty as defined by the teacher self-efficacy scale from the Kotrlik & Redmann (2002) study, technology anxiety level of e-faculty as defined by the technology anxiety scale from Kotrlik & Redmann (2006), self-directed learning level as defined by the 11 subscales of the Bartlett-Kotrlik Inventory of Self-Learning (BISL©) and the perceived level of support for e-instruction as defined by the Clark-Kotrlik Perceived Level of Support Scale designed for this study. Pearson product moment correlations and a Point Bi-serial correlation were used to measure the relationships. The following descriptors were used to interpret the correlation coefficients: 0.01-0.09 negligible association, 0.10-0.29 low association, 0.30-0.49 moderate association, 0.50-0.69 substantial association and 0.70 or higher as a very strong association (Davis, 1971). Table 15 presents the results of the correlational analyses discussed below. The statistically significant relationships found were as follows:

- The teacher self-efficacy scale had a low association ( $r = 0.18, p = 0.012$ ) with the perceived technology knowledge of e-faculty. This low association suggests that as teacher self-efficacy increases, perceived technology knowledge tends to increase.

- The technology anxiety scale ( $r = -0.50, p < 0.001$ ) showed a substantial negative association with the perceived technology knowledge of e-faculty. This substantial negative association suggests that as technology anxiety increases, perceived technology knowledge decreases.

Table 15. Correlations of Characteristics of E-faculty Members from Public Carnegie Classified Doctorate-Granting Research Universities with Very High Research Activity in Three Randomly Chosen States from the Southern Regional Education Board with the Perceived Technology Knowledge of E-faculty

Variable	<i>N</i>	<i>r</i>	<i>p</i>
Intrinsic Motivation- subscale of BISL©	192	0.32	< 0.001
Attitude Toward Technology- subscale of BISL©	199	0.29	< 0.001
Clark-Kotrlík Perceived Level of Support Scale	199	0.20	0.005
Time Management - subscale of BISL©	197	0.18	0.012
Kotrlík-Redmann Teacher Self-Efficacy Scale	194	0.18	0.012
Academic Rank <sup>a</sup>	199	0.16	0.021
Goal Setting - subscale of BISL©	194	0.15	0.033
Performance and Self-Efficacy of Work- subscale of BISL©	194	0.13	0.067
Peer Learning- subscale of BISL©	198	0.13	0.06
Other Performance Rating- subscale of BISL©	196	0.09	0.199
Supportive Workplace- subscale of BISL©	196	0.04	0.542
Age	195	0.01	0.948
External Support- subscale of BISL©	197	0.01	0.934
Help Seeking- subscale of BISL©	191	-0.05	0.463
Extrinsic Motivation- subscale of BISL©	194	-0.06	0.416
Kotrlík-Redmann Technology Anxiety Scale	193	-0.50	< 0.001

<sup>a</sup> Point bi-serial correlation.

- Academic Rank ( $r_{pb} = 0.16, p = 0.021$ ) showed a low association with the perceived technology knowledge of e-faculty. This low association suggests that as academic rank increases, perceived technology knowledge increases.
- Of the subscales that make up the self-directed learning level by Bartlett-Kotrlík, four were found to be significantly related to e-faculty perceived technology knowledge: Time Management ( $r = 0.18, p = 0.012$ ) showed a low association which suggests that as time management increases, perceived technology knowledge increases; Attitude Toward Technology ( $r = 0.29, p < 0.001$ ) showed a low association which

suggests that as attitude toward technology increases, perceived technology knowledge increases; Goal Setting ( $r = 0.15, p = 0.033$ ) showed a low association with the perceived technology knowledge of e-faculty which suggests that as goal setting increases, perceived technology knowledge increases; and Intrinsic Motivation ( $r = 0.32, p < 0.001$ ) showed a moderate association with the perceived technology knowledge of e-faculty, which suggests that as time management increases, perceived technology knowledge increases.

- The rest of the subscales of the BISL©: Extrinsic Motivation ( $r = -0.06, p = 0.416$ ), External Support ( $r = 0.01, p = 0.934$ ), Performance and Self-Efficacy of Work ( $r = 0.13, p = 0.067$ ), Peer Learning ( $r = 0.13, p = 0.060$ ), Supportive Workplace ( $r = 0.04, p = 0.542$ ), Other Performance Rating ( $r = 0.09, p = 0.199$ ) and Help Seeking ( $r = -0.05, p = 0.463$ ) were not significantly related to the perceived technology knowledge of e-faculty.
- The Clark-Kotrlík Perceived Level of Support Scale was found to have a low association ( $r = 0.20, p = 0.005$ ) with the perceived technology knowledge of e-faculty which suggests that as the perceived level of support of e-faculty increases, perceived technology knowledge increases (see Table 15) (Davis, 1971).

#### **Research Question Five: Model for Perceived Technology Knowledge of E-faculty**

Research question five sought to discover if a model existed that explained the variance in the perceived technology knowledge of e-faculty. The following potential explanatory variables were used for this analysis: the 11 subscales of the BISL© (time management, extrinsic motivation, external support, performance and self-efficacy of work, peer learning, supportive workplace, attitude toward technology, other performance rating, goal setting, help seeking and

intrinsic motivation), self-efficacy, technology anxiety level, perceived level of support for e-instruction, training for e-instruction, age and academic rank. A forward multiple regression analysis with an *alpha* level set *a priori* at 0.05 was conducted to uncover how well these potential explanatory variables explained the technological development of e-faculty.

The number of observations was inadequate to include all 16 variables in the regression analysis. Based on the recommendation by Hair et al. (2006) that a minimum of 15 observations is required in forward regression analysis for each potential explanatory variable, 240 observations was required to utilize all 16 variables in the analysis. Since there were not enough observations to satisfy this recommendation, the decision was made to include only those variables in the regression analysis for which a statistically significant correlation existed with the dependent variable, perceived technology knowledge. This decision was based on the belief that if a simple linear correlation between a potential explanatory variable and the dependent variable did not exist, it was doubtful that the variable would explain any practically significant amount of the variance in the regression analysis.

The Pearson product-moment correlation coefficients (Table 15) revealed that the independent variables of age, extrinsic motivation, external support, performance and self-efficacy of work, peer learning, supportive workplace, other performance rating and help seeking were not significantly related to the dependent variable. These variables were removed from the analysis because there was a minimal chance that they would explain a practically significant proportion of the variance in perceived technological knowledge. The variables academic rank, time management, attitude toward technology, goal seeking, intrinsic motivation, self-efficacy, perceived level of support and technology anxiety were found to be significantly correlated to

perceived technology knowledge. These eight variables were used as potential explanatory variables in the forward multiple regression analysis.

For appropriate sample size to run a multiple regression analysis, 15 to 20 observations per independent variable is desired (Hair, et al., 2006). The number of observations available to run a multiple regression analysis ( $N = 152$ ) was determined to be appropriate with eight potential explanatory variables. The perceived technology knowledge of e-faculty, a continuous variable, was the dependent variable in the analysis. All data was examined for outliers through the use of standardized (ZRESID) and studentized residuals (SRESID). Pedhazur (1997) and Hinkle, Wiersma and Jurs (1998) advocated scrutiny of standardized residual values above the absolute value of 2.0 (1997). Hair, et al. suggest that standardized residual values over the absolute value of 2.5 are suspect (2006). In this analysis, the researcher decided to remove any significant standardized residuals (greater than 2.00 in absolute value) from the analysis as recommended by Hinkle, Wiersma and Jurs (1998). This removal of cases resulted in an improvement in the variance explained by the regression model from 38% to 57%. The studentized residual was analyzed by visual examination of residual plots (Hair, et al., 2006). Analysis of outliers was also conducted through an examination of influential observations. Any Cook's D values greater than 1 and leverage values greater than 0.5 would have been viewed as influential data, but none existed. A plot of regression standardized residuals was constructed to test for the assumptions of normality, linearity and homoscedasticity within the analysis. A linear shape developed which suggested the data is distributed normally. The VIF values were all under 5.3 and the tolerance levels were above 0.19, thus no multicollinearity existed in the regression model (Table 19) (Hair, et al., 2006).

Three independent variables entered into the regression model with perceived technology knowledge as the dependent variable: technology anxiety, self-efficacy and perceived level of support. The first of the independent variables to enter the model was technology anxiety. It explained 44% of the variance in the perceived technology knowledge scores. When self-efficacy was added to the model another 8.5% of the variance was explained; when level of support was added another 4.4% of the variance in the dependent variable was explained. The forward regression model, with the independent variables: technology anxiety, self-efficacy and perceived level of support explained a total of 57.3% of the variance in the perceived technology knowledge of e-faculty (see Table 16). This model registered a large effect size ( $R^2 = 0.57$ ) according to Cohen's standards for interpreting effect sizes:  $R^2 > 0.0196$  – small effect size,  $R^2 > 0.1300$  medium effect size and  $R^2 > 0.2600$  – large effect size (Cohen, 1988).

The ANOVA analysis shows that the linear combination of technology anxiety, self-efficacy and perceived level of support explained a statistically significant ( $F = 65.74, p < 0.001$ ) portion of variance of the dependent variable. Using these three variables in the model decreases the squared error by 57% (Tables 16 & 17).

Table 16. Model Summary for the Forward Multiple Regression Analysis of the Clark-Kotrlík E-faculty Technology Development Scale

Model	<i>R</i>	<i>R</i> <sup>2</sup>	<i>Adjusted R</i> <sup>2</sup>	<i>S.E.E.</i>	Change Statistics		
					<i>R</i> <sup>2</sup> Change	<i>F</i> Change	<i>Sig. F</i> Change
1 <sup>a</sup>	0.67	0.44	0.44	0.52	0.44	118.75	< 0.001
2 <sup>b</sup>	0.73	0.53	0.52	0.48	0.09	26.67	< 0.001
3 <sup>c</sup>	0.76	0.57	0.56	0.46	0.05	16.11	< 0.001

<sup>a</sup>Variable included in the Regression Model: Kotrlík-Redmann Technology Anxiety Scale.

<sup>b</sup>Variables included in the Regression Model: Kotrlík-Redmann Technology Anxiety Scale, Kotrlík-Redmann Teacher Self-Efficacy Scale.

<sup>c</sup>Variables included in the Regression Model: Kotrlík-Redmann Technology Anxiety Scale, Kotrlík-Redmann Teacher Self-Efficacy Scale, Clark-Kotrlík Perceived Level of Support Scale.

Note. Regression model based on overall scale mean of dependent variable.

Table 17. ANOVA Summary for the Forward Multiple Regression Analysis of the Dependent Variable Perceived Technology Knowledge with the Independent Variables Technology Anxiety, Teacher Self-Efficacy and Perceived Level of Support

Model	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Regression	41.85	3	13.95	66.22	< 0.001
Residual	31.18	148	0.21		
Total	73.03	151			

Note. Regression model based on overall scale mean of dependent variable.

The entry of the variable technology anxiety with a negative *beta* value ( $\beta = -0.67$ ) suggests that if e-faculty have a high level of technology anxiety they tend to have a lower perceived technology knowledge. The entry of the variable teacher self-efficacy with a positive *beta* value ( $\beta = 0.29$ ) suggests that if e-faculty have a high level of teacher self-efficacy they tend to have a high perceived technology knowledge. The entry of the variable perceived level of support with a positive *beta* value ( $\beta = 0.21$ ) suggests that if e-faculty have a high amount of perceived level of support they tend to have a high perceived technology knowledge (Table 18).

Table 18. Standardized and Unstandardized Coefficients for the Variables Included in the Forward Multiple Regression Analysis of the Clark-Kotrlík E-faculty Technology Development Scale

Model	Unstandardized Coefficients		Standardized Coefficients	<i>t</i>	<i>p</i>
	<i>B</i>	<i>SE</i>	$\beta$		
(Constant)	3.21	0.27		12.12	< 0.001
Technology Anxiety	-0.79	0.06	-0.67	-12.29	< 0.001
Teacher Self-Efficacy	0.29	0.06	0.29	5.35	< 0.001
Perceived Level of Support	0.03	0.01	0.21	3.93	< 0.001

Note. Regression model based on overall scale mean of dependent variable.

Out of the remaining five variables that were entered into the initial regression, none achieved the criteria for entry into the regression model which was statistical significance of the partial correlation at the 0.05 level. In addition, all of the variables in the model remain

statistically significant, which implies that no more variables need to be considered for addition or removal and the model is final (Tables 18 & 19).

Table 19. Excluded Variables, Standardized Coefficients, t Values, Significant Levels, Partial Correlations, Tolerance Levels and Variance Inflation Factors (VIF) for the Forward Multiple Regression Analysis of Clark-Kotrlik E-faculty Technology Development Scale

Variables Excluded from Final Model	<i>Beta In</i>	<i>t</i>	<i>p</i>	<i>Partial Correlation</i>	<i>Collinearity Statistics</i>	
					<i>Tolerance</i>	<i>VIF</i>
Academic Rank	-0.00	-0.01	0.989	-0.00	0.91	1.11
Attitude Toward Technology	0.02	0.40	0.690	0.03	0.88	1.14
Intrinsic Motivation	0.02	0.31	0.757	0.03	0.87	1.15
Goal Setting	0.02	0.33	0.741	0.03	0.97	1.03
Time Management	0.05	0.90	0.368	0.07	0.97	1.03

## **CHAPTER V: SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS**

### **Summary**

Chapter five presents a summary of the purpose of the study, research questions and an overview of the methodology used in the completion of the study. Also, a summary of the findings will be presented along with conclusions and recommendations for further research.

### **Purpose and Research Questions**

The purpose of this study was to determine whether the perceived technology knowledge of e-faculty is related to their: self-efficacy, technology anxiety level, self-directed learning level (as defined by the 11 subscales of Bartlett-Kotrlik Inventory of Self-Learning) and their perceived level of support for e-instruction. This study also sought to determine what factors might be related to the perceived technology knowledge of e-faculty. The research questions addressed in this study were:

1. What are selected personal and demographic characteristics of e-faculty in Carnegie classified (2006) Doctorate-granting Research Universities with very high research activity (RU/VH) in the Southern Regional Education Board (SREB)? Particularly, what is their gender, age, academic rank, academic department, existence of training at organization, clock hours of formal training (instructional training received by e-faculty on topics specific to skills relevant to teaching web-based courses) received in the last two years and clock hours of self-study training in the last two years (self-taught instructional training by e-faculty on topics specific to skills relevant to teaching web-based courses).

2. What is the level of institutional support for e-faculty in Carnegie classified RU/VH universities in the SREB as perceived by e-faculty? Particularly, describe their perceived level of support on following aspects:
- Release Time/Reduced Teaching Load (time allotted to prepare web-based materials/courses)
  - Graduate/teaching assistants: graduate or teaching assistants to help specifically with e-learning
  - Instructional designers/curriculum developers to help with the designing of web-based materials
  - Existence of adequate web-based institutional research resources: to help specifically with e-learning courses (library holdings that are accessible by web and technical support)
  - Technical support: existence of technical support resources available for the students (computer help desk, web/e-course help desk, hours available)
  - Availability of web-based computer technical support resources for students (seven days a week)
  - Technical support: existence of technical support resources available for the professionals (computer help desk, web/e-course help desk, hours available)
  - Availability of web-based computer technical support resources for professionals (seven days a week)
  - Existence of sources of funding for e-learning course technology training/conferences
  - Adequacy of funding for e-learning technology events/work

3. What are selected characteristics of e-faculty, including the following:
  - Level of support for e-instruction as measured by the weighted Clark-Kotrlik Perceived Level of Support for E-instruction Scale created for this study
  - Perceived technology knowledge level of e-faculty as measured by the Clark-Kotrlik E-faculty Technology Development Scale (CKEDS)
  - Self-directed learning level of e-faculty as measured by subscales of the short form of the Bartlett-Kotrlik Inventory of Self-Learning (BISL©)
  - Technology anxiety level of e-faculty as defined by the technology anxiety scale from Kotrlik & Redmann (KRTAS) (2006)
  - Self-efficacy of e-faculty based on the teacher self-efficacy scale from the Kotrlik & Redmann (KRTES) (2002) study
  
4. Does a relationship exist between perceived technology knowledge of e-faculty as defined by the Clark-Kotrlik E-faculty Technology Development Scale (CKEDS) and the following variables:
  - Age
  - Academic Rank
  - Self-efficacy of e-faculty as defined by the teacher self-efficacy scale from the Kotrlik & Redmann (2002) study
  - Technology anxiety level of e-faculty as defined by the technology anxiety scale from Kotrlik & Redmann (2006)
  - Self-directed learning level as defined by the subscales of the short form of the Bartlett-Kotrlik Inventory of Self-Learning (BISL©)

- Perceived level of support as defined by the Clark-Kotrlik Perceived Level of Support for E-instruction Scale designed for this study
5. Does a model exist that explains the variance in the perceived technology knowledge of e-faculty? The potential explanatory variables that were used for this analysis were: the 11 subscales of the BISL© (time management, extrinsic motivation, external support, performance and self-efficacy of work, peer learning, supportive workplace, attitude toward technology, other performance rating, goal setting, help seeking, intrinsic motivation), self-efficacy, technology anxiety level, level of support for e-instruction, training for e-instruction, age and academic rank.

### **Summary of Methodology**

The target population for this study were 503 e-faculty from five randomly selected Carnegie classified RU/VH universities in the SREB. After frame errors were removed, the accessible population was 450 e-faculty. A total of 218 e-faculty participated in the study.

The E-faculty Technology Development Survey was created to meet the needs of this study by combining parts of three scales that were found in the literature with two scales that were created for this study. A section to describe personal characteristics was also included. The parts of the survey are listed as follows: personal and demographic characteristics, Clark-Kotrlik Perceived Level of Support for E-instruction Scale (CKLOS©), eleven subscales from the short form of the Bartlett-Kotrlik Inventory of Self-Directed Learning Scale (BISL©), the short form of the Kotrlik-Redmann Technology Anxiety Scale (KRTAS), the Kotrlik-Redmann Teacher Self-Efficacy Scale (KRTES) and the Clark-Kotrlik E-faculty Technology Development Scale (CKEDS© ) (see Appendices B-G).

Five content experts were selected from a review of the literature to review the E-faculty Technology Development Survey. These experts were selected from professionals in different

areas in expertise in the online arena. The data analysis indicated that there was 80% agreement among the experts on the content validity of items included on the E-faculty Technology Development Survey. This rating meets the standard set forth by Davis which indicate that the items on the survey are relevant to the technological development of e-faculty (1992).

Suggestions by the content experts and/or the committee on the scales used in the study caused the researcher to decide to reword one question into two and add a question to the demographic scale. This feedback also led to the decision of the researcher to reword several questions and add a question on the Clark-Kotrlik Perceived Level of Support for E-Instruction Scale. Other suggestions made by the graduate committee and content experts led the researcher to decide to weigh the items on the CKLOS. The weightings for the CKLOS were derived from the ratings of five content experts.

The pilot study was conducted on the 56 e-faculty from the only universities in Georgia and Tennessee that meet the qualifications established by Carnegie (RU/VH) chosen for this study. After meeting with the graduate committee and analyzing the results of the pilot study, some final revisions were made to the survey before it was submitted to the sample population for data collection. The researcher used the statistical program SPSS to analyze the data from the study.

### **Summary of Findings**

#### **Research Question One: Selected Personal and Demographic Characteristics of Respondents.**

Research question one sought to discover what the selected characteristics of e-faculty in Carnegie classified (2006) Doctorate-granting Research Universities with very high research activity (RU/VH) in the Southern Regional Education Board (SREB) were, particularly with regards to their gender, age, academic rank, academic department, existence of training at

organization, clock hours of formal training received in the last two years (instructional training received by e-faculty on topics specific to skills relevant to teaching web-based courses) and clock hours of self-study training in the last two years (self-taught instructional training by e-faculty on topics specific to skills relevant to teaching web-based courses). Findings indicate that the majority of the respondents were females with an average age of 49. A majority of the respondents reported that they held a rank of Assistant, Associate or Full Professor. This still left a rather large number of respondents (38.99%) that defined themselves as Instructors and a small number (4.13%) that defined themselves as Other. Almost all of the respondents reported that they had training available to them and all reported that they had had at least one hour of formal training for web-based instructional skills development or improvement in the past 2 years (excluding the four participants that did not respond to this item). The respondents reported a mean of 37 hours of formal training, yet only a mean of 6 hours of self-study training for web-based instructional skills development or improvement in the past 2 years. There were 122 academic departments listed by the respondents, ranging from Accounting to Women's Studies.

### **Research Question Two: Institutional Support**

Research question two sought to describe the perceived level of institutional support for e-faculty in Carnegie classified RU/VH universities in the SREB as perceived by e-faculty. This was achieved by describing the following aspects of institutional support: release time/reduced teaching load (time allotted to prepare web-based materials/courses), graduate/teaching assistants: graduate or teaching assistants to help specifically with e-learning, instructional designers/curriculum developers to help with the designing of web-based materials, existence of adequate web-based institutional research resources: to help specifically with e-learning courses (library holdings that are accessible by web and technical support), existence of technical support resources available for the students (computer help desk, web/e-course help desk, hours

available), availability of web-based computer technical support resources for students (seven days a week), existence of technical support resources available for the professionals (computer help desk, web/e-course help desk, hours available), availability of web-based computer technical support resources for professionals (seven days a week), existence of sources of funding for e-learning course technology training/conferences and adequacy of funding for e-learning technology events/work. The majority of e-faculty report that they do not have release time/reduced teaching load for preparing web-based materials/courses, nor do they have graduate or teaching assistants available for assisting with web-based learning. However, a little over half of them reported having instructional designers or curriculum developers to help with the designing of web-based materials and a large majority reported having adequate institutional research resources (library holdings that are accessible by web and technical support). E-faculty reported that student technical support resources are offered in almost all cases and over two-thirds (76.35%) reported that those resources were offered seven days a week. The technical support resources for e-faculty were also offered in almost all cases, but only 63.77% reported the resource was available to them seven days a week. A large majority of e-faculty report that they do not receive sources of funding for e-learning course technology training/conferences. However, almost half of them (44.50%) report that the funding that they receive for e-learning technology events/work is adequate.

### **Research Question Three: Selected Characteristics of Respondents**

Research question three sought to find out what selected characteristics of e-faculty were, particularly with respect to their self-directed learning level of e faculty as measured by the eleven subscales of the short form of the Bartlett-Kotrlik Inventory of Self-Learning (BISL©), their technology anxiety level of e-faculty as defined by the technology anxiety scale from Kotrlik & Redmann (2006), the self-efficacy of e-faculty based on the self-efficacy scale from

the Kotrlik & Redmann (2002) study and the technological development of e-faculty based on the Clark-Kotrlik E-faculty Technology Development Scale (CKEDS) which was created for this study.

Performance and self-efficacy of work is reported as true of e-faculty most of the time ( $M = 6.66$ ,  $SD = 0.48$ ). Time Management ( $M = 6.31$ ,  $SD = 0.73$ ), Extrinsic Motivation ( $M = 6.47$ ,  $SD = 0.83$ ), Supportive Workplace ( $M = 5.51$ ,  $SD = 1.37$ ), Attitude Toward Technology ( $M = 6.21$ ,  $SD = 0.82$ ), Other Performance Rating ( $M = 6.26$ ,  $SD = 0.92$ ), Goal Setting ( $M = 6.27$ ,  $SD = 0.67$ ), Help Seeking ( $M = 6.20$ ,  $SD = 1.00$ ) and Intrinsic Motivation ( $M = 6.35$ ,  $SD = 0.68$ ) are all qualities of self-learning that e-faculty reported as often true of them. Peer learning is listed as true of them ( $M = 5.21$ ,  $SD = 1.38$ ). E-faculty reported that external support is true of them ( $M = 4.88$ ,  $SD = 1.59$ ). E-faculty reported only moderate technology knowledge development ( $M = 3.37$ ,  $SD = 0.77$ ). E-faculty agreed that they have good teaching self-efficacy ( $M = 3.87$ ,  $SD = 0.67$ ). E-faculty reported having minor technology anxiety ( $M = 1.78$ ,  $SD = 0.63$ ).

#### **Research Question Four: Relationship Between Perceived Technology Knowledge and Selected Variables**

Research question four sought to discover if a relationship exists between perceived technology knowledge of e-faculty as defined by the Clark-Kotrlik E-faculty Technology Development Scale (CKEDS) and the following variables: self-efficacy of e-faculty as defined by the self-efficacy scale from the Kotrlik & Redmann (2002) study, technology anxiety level of e-faculty as defined by the technology anxiety scale from Kotrlik & Redmann (2006), self-directed learning level as defined by the Bartlett-Kotrlik Inventory of Self-Learning (BISL©) and the perceived level of support for e-instruction as defined by the Clark-Kotrlik Perceived Level of Support Scale designed for this study. A low association ( $r = 0.18$ ,  $p = 0.012$ ) existed between the Clark-Kotrlik E-faculty Technology Development Scale (CKEDS) and the self-

efficacy of e-faculty. The technology anxiety scale ( $r = -0.50, p < 0.001$ ) showed a substantial negative association with the Clark-Kotrlík E-faculty Technology Development Scale which suggests that if technology anxiety is high, perceived technology knowledge will be low. Of the subscales that make up the self-directed learning level by Bartlett-Kotrlík, only four were found to be significantly related to the Clark-Kotrlík E-faculty Technology Development Scale: Time Management ( $r = 0.18, p = 0.012$ ) Attitude Toward Technology ( $r = 0.29, p < 0.001$ ) and Goal Setting ( $r = 0.15, p = 0.033$ ) all showed a low association with the perceived technology knowledge of e-faculty, while the fourth, Intrinsic Motivation ( $r = 0.32, p < 0.001$ ), showed a moderate association with the perceived technology knowledge of e-faculty. The Clark-Kotrlík Perceived Level of Support Scale was also found to have a statistically significant relationship, which according to Davis (1971) descriptors would be a low association ( $r = 0.19, p = 0.006$ ), with the Clark-Kotrlík E-faculty Technology Development Scale.

#### **Research Question Five: Model for Perceived Technology Knowledge of E-faculty**

Research question five sought to discover if a model existed that explained the variance in the perceived technology knowledge of e-faculty, particularly with regard to the following potential explanatory variables: self-efficacy, technology anxiety level, self-directed learning level, perceived level of support, training for e-instruction, age, gender and academic rank. The multiple regression analysis revealed that three variables entered into the regression equation. Technology Anxiety, self-efficacy and perceived level of support entered the regression equation to explain 57% of the variance in the dependent variable with a statistically significant reduction in error ( $F = 65.74, p < 0.001$ ).

The variable technology anxiety appeared as the first predictor of e-faculty perceived technology knowledge scores, explaining 44% of the variance in the CKEDS scores. Self-efficacy entered the model next, bringing the amount of variance explained in the CKEDS scores

to 52%. Finally, perceived level of support was added into the regression model bringing the amount of variance explained in the CKEDS scores to 57%, which is a large effect size according to Cohen (1988).

### **Conclusions**

For clarity, the following conclusions are presented with respect to their research question.

#### **Research Question One**

Research question one sought to discover selected characteristics of e-faculty in Carnegie classified (2006) Doctorate-granting Research Universities with very high research activity (RU/VH) in the Southern Regional Education Board (SREB). The majority of e-faculty are female close to 49 years of age. The largest single category of e-faculty are instructors, which may suggest that teaching these courses at Carnegie Foundation (2006) RU/VH universities is left to graduate students which seems to support some of the concerns found in the literature for teaching online. This could be due to the concern found in the literature of the time requirements (Ndahi, 1999; Amey & VanDerLinden, 2003), the lack of scholarly respect for those that teach online (O'Quinn & Corry, 2002) and the heavy research being done or required by the professors at these institutions (Bates, 2000). A large majority of e-faculty have training available to them and have had at least a little formal training for web-based instructional skills development or improvement in the past two years. Formal training far exceeds the amount of self-study training for web-based instructional skills development or improvement done by e-faculty over the last two years. The amount of formal training disagrees with previous research where it was found that teachers lack technological training, as reported by Broady and Ortmann (2002). However, the amount of self-study training would definitely support the findings by Broady and Ortmann.

E-faculty members work in a variety of academic departments ranging from Accounting to Women's Studies, with the largest group representing Nursing.

### **Research Question Two**

Research question two sought to describe the perceived level of institutional support for e-faculty in Carnegie classified RU/VH universities in the SREB as perceived by e-faculty. The majority of e-faculty do not have release time/reduced teaching load to prepare web-based materials/courses and do not have graduate or teaching assistants available to help specifically with e-learning, the absence of which might hinder performance (Cookson, 2000). It is possible that the lack of teaching assistants might be due to many of the e-faculty being instructors rather than professors. More than half of e-faculty have instructional designers or curriculum developers to help with the design of web-based materials for their courses, which is considered beneficial (Care & Scanlan, 2001). Most e-faculty have access to web-based institutional research resources. Almost all students of e-faculty have technical support and most of the time those resources are available to the students 7 days a week. Most e-faculty have technical support resources available to them, many of them 7 days a week. The availability of technical support resources for both students and faculty should be available when they are needed (Carey, Chisholm & Irwin, 2002). Less than one-third of e-faculty have sources of funding for e-learning course technology training or conferences. Over half of e-faculty feel that the funding they receive for e-learning course technology work or events is not adequate. These sources of funding and conferences are crucial to collaboration with other colleagues which is seen as one of the main ways to locate needed sources of information (Armstrong, 2001).

### **Research Question Three**

Research question three sought to find out what the selected characteristics of e-faculty were, particularly with respect to the self-directed learning level of e-faculty as measured by the

eleven subscales of the short form of the Bartlett-Kotrlik Inventory of Self-Learning (BISL©), their technology anxiety level of e-faculty as defined by the technology anxiety scale from Kotrlik & Redmann (2006), the self-efficacy of e-faculty based on the self-efficacy scale from the Kotrlik & Redmann (2002) study and the perceived technological knowledge of e-faculty based on the Clark-Kotrlik E-faculty Technology Development Scale (CKEDS) which was created for this study. It was concluded that the self-learning subconstructs of the BISL© describe e-faculty most of the time. The literature reminds us that in order to stay on the cutting edge, universities will have to be prepared to respond to the overwhelming desire for easy, instantaneous learning (Ortmann, 2001; Kim, Mims, & Holmes, 2006; Wentling, Waight, & King, 2002). It was concluded that e-faculty perceive that they have moderate technology knowledge, which would be slightly at odds with the minimal competency discussed in the literature (Cheurprakobkit et al., 2002). It was concluded that e-faculty also perceive that they have good teaching self-efficacy and minor technology anxiety.

#### **Research Question Four**

Research question four sought to discover if a relationship exists between perceived technology knowledge of e-faculty as defined by the Clark-Kotrlik E-faculty Technology Development Scale (CKEDS) and the following variables: self-efficacy of e-faculty as defined by the teacher self-efficacy scale from the Kotrlik & Redmann (2002) study, technology anxiety level of e-faculty as defined by the technology anxiety scale from Kotrlik & Redmann (2006), self-directed learning level as defined by the Bartlett-Kotrlik Inventory of Self-Learning (BISL©) and the level of support for e-instruction as defined by the Clark-Kotrlik perceived level of support for e-instruction scale designed for this study. A low association exists between the perceived technology knowledge of e-faculty and the self-efficacy of e-faculty. Technology anxiety showed a substantial negative association with perceived technology knowledge which

suggests that as technology anxiety increases, perceived technology knowledge will decrease. Time Management, Attitude Toward Technology and Goal Setting all have a low association with the perceived technology knowledge of e-faculty, meaning that as Time Management, Attitude Toward Technology or Goal Setting increase, perceived technology knowledge development will also increase. Intrinsic Motivation has a moderate association with the perceived technology knowledge of e-faculty, therefore, as Intrinsic Motivation increases, perceived technology knowledge increases. The fact that almost all of the constructs measured by the subscales making up self-directed learning are associated with perceived technology knowledge supports the inspiration from the literature that self-directed learning is appropriate for e-learning situations (Sadler-Smith & Smith, 2004). Perceived level of support has a low association with perceived technology knowledge; as the perceived level of support of e-faculty increases, perceived technology knowledge increases as well.

### **Research Question Five**

Research question five sought to discover if a model existed that explained the variance in the perceived technology knowledge of e-faculty. Three variables, technology anxiety, self-efficacy and perceived level of support explain a large amount of the variance (over half) in perceived technology knowledge of e-faculty. Therefore, as technology anxiety decreases and self-efficacy and perceived level of support increase, the perceived technology knowledge of e-faculty increases. This negative association of technology anxiety with perceived technology knowledge mimics the relationship of technology anxiety with technology integration in multiple technology integration studies (Kotrlik & Redmann, 2005; Kotrlik, Redmann & Douglas, 2003; Redmann, Kotrlik & Douglas, 2003). This study found that an increase in self-efficacy is related to an increase in perceived technology knowledge. This finding is supported by studies in the literature such as: self-efficacy increasing as professional development on multimedia-based

technology increased (Cleland et al., 1999) and strong correlations being found between educational technology competency and self-efficacy (Archambault et al., 2002). Level of support has been cited multiple times in the literature as an important or motivating factor in the professional development of online instructors (Amey & VanDerLinden, 2003; Parker, 2003). The fact that level of support has been cited as a motivating factor in the professional development of online instructors supports the findings of this study which show that an increase in the perceived level of support of e-faculty is related to an increase in the perceived technology knowledge of e-faculty.

### **Recommendations**

The findings of this study show that current e-faculty perceive that they are moderately knowledgeable about technology. Considering that they are teaching through a technological medium, this result is not surprising. With all the continual changes that are taking place, it seems difficult for faculty to keep up with the myriad of roles they have to play: instructional designer, subject matter expert, technological guru, cultural liaison, etc. It would seem to be prudent to keep e-faculty involved in technology as much as possible. Even if they are not engaged in formal training, general exposure to the technology could reduce technology anxiety and boost the likelihood that they will feel inclined to keep learning or trying the newer technologies as they are developed (Sadler-Smith & Smith, 2004). It is recommended that e-faculty be exposed to technology based on the finding that a decrease in technology anxiety is related to an increase in the perceived technology knowledge of e-faculty. Adding “new technologies” as a topic at faculty meetings with a different faculty member presenting a technological device or use for a technological device at each meeting might help accomplish a reduction in technology anxiety.

This study contributes to the literature by revealing the status of e-faculty technology knowledge development. In order to improve the quality of e-learning, skills necessary for the creation of reactive and responsive content are required. This idea is in line with the literature which discusses having the skills required to control the technological devices necessary to produce quality learning (Hilty et al., 2006). This study found that decreases in e-faculty technology anxiety and increases in self-efficacy and perceptions of support for e-learning were related to an increase in e-faculty perceptions of technology knowledge. It is recommended that actions should be taken such as surrounding e-faculty with technology, facilitating collaboration among colleagues whenever possible and generally making use of technology a positive experience in any way possible. This might be achieved by sending all information (vital and otherwise) through e-mail, text message or website, using an online departmental messaging system and offering meetings through web seminar.

Cognitive Flexibility Theory (Spiro & Jehng, 1990) is the basis for the idea behind the e-faculty member who ascribes to continual technological enhancement as a part of the changing world and the continuity of education for life and work. When technology is perceived as a teacher, then all who use it become the learners, with teachers and learners working as more of a team and responding to changes as they occur to create learning. An expanded constructivist theory seemed appropriate for a study concerning the technological knowledge development of e-faculty (Sadler-Smith & Smith, 2004). It is recommended that further investigation be done to see if this broad constructivist approach is, indeed, the best approach for e-learning, or if there is another theory or approach that would be better suited.

It is important that e-faculty and the e-learning endeavors or initiatives they undertake perceive that they are being supported. Support for e-learning and e-faculty as reported in the

literature is a vital component to the health of the e-learning endeavor (Ershler, 2003). This study found that increases in the perceived technology knowledge of e-faculty are related to increases in the perceived level of support for e-faculty. Technology knowledge increases could potentially help create the skills faculty need to implement instructional design necessary to meet the demands and needs of online learners (Baldwin, 1998; Cheurprakobkit et al., 2002). It is recommended that directors, department heads and other academic administrators support e-learning endeavors. This could be accomplished by offering release time or reduced teaching loads for e-faculty, graduate or teaching assistants to help specifically with e-learning and funding for e-learning course technology training/conferences.

Regardless of the fact that technological training is suggested as necessary in the literature, there are no recent studies that actually prove it is necessary (Broady-Ortmann, 2002; Csapo, N., 2002). It is not all that surprising that e-faculty found themselves to have moderate technology knowledge in this study. An individual would find it difficult to not consider themselves to be at least moderately qualified if they were currently teaching or had taught an online course. Whether they actually have moderate technology knowledge was not tested in this study. It is recommended that the actual knowledge of e-faculty be tested. Testing their knowledge might be accomplished by establishing a technological qualification for e-faculty. Of course, the existence of a required qualification might reduce faculty interest in teaching online courses. However, the main goal of this research is to increase the quality of online courses, which could be facilitated by a requiring a technical qualification of online instructors. If the creation of a technical qualification puts a substantial limitation on the number of instructors willing to teach online then finding incentives to help motivate this group might be critical.

Offering online skills qualification training online for e-faculty might be a way to increase the ease and accessibility of increasing the technological knowledge of the instructors.

Even though the e-faculty were found to have moderate overall technological knowledge in this study, they were found to be only slightly knowledgeable about languages that can be used to create or link to e-learning content creation (e.g., XML, HTML and/or VRML, etc.). It appears that there might be a need for some basic technical e-learning qualifications for faculty that teach online. Even teachers not teaching online should have computer skills that would amount to mainstream technical skills (McCoy, 2001). It is recommended that a study be conducted to find out if a relationship exists between certain technological skills or knowledge and quality of instruction. This might be accomplished by examining the relationship of technology skills scores of e-faculty to student satisfaction and grades. This study might help clear up whether certain technology knowledge really helps improve the quality of instruction in the online classroom or whether it is just perceived as an important quality.

This study found an amount of formal training large enough to conflict with the previous research finding that teachers lack technological training, as reported by Broady and Ortmann (2002). However, the small amount of self-study training was supported by Broady and Ortmann's findings. It is recommended that additional research be done to determine the amount of training required to prepare e-faculty to produce quality e-learning experiences. This might be accomplished by looking at the relationship of student satisfaction and grades to the amount of training obtained by e-faculty. It is also recommended that research be conducted to determine the modes of training that are the most appropriate to improve e-faculty technology knowledge and to determine the quality of existing formal training. A study might be done using different modes of training as independent variables and a competency test as the dependent variable in

order to help identify the mode of training most appropriate to improve technology knowledge. The quality of existing formal training might be determined by using a pre and post test study design.

This study found only a small amount of self-study training among e-faculty. Continuing to offer and encourage participation in formal training is necessary, but it is recommended that more be done to facilitate self-study training. Only by expanding their knowledge can they become more aware of their options and become more adaptive to the changes required of them in online learning courses. Learning through self-study training is a great fit for the e-learning environment (Sadler-Smith & Smith, 2004). Improving technological knowledge should become part of a natural way of life for e-faculty. One way to accomplish encouraging self-study might be to set up a user friendly homepage for the use of e-faculty with links to search engines, free online tutorials and other resource material.

This study found that an increase in the self-efficacy of e-faculty is related to an increase in e-faculty technology knowledge. It is recommended that sources of funding for e-learning course technology training or conferences be increased. Increasing sources of funding for e-learning course technology training or conferences could benefit the technology knowledge of e-faculty by increasing familiarity with technology, increasing camaraderie and connections for information with other e-faculty and creating a more blended learning community (Farenga & Joyce, 2001). Creating a professional organization with e-faculty as the focus could help achieve this endeavor and could potentially provide a stronger voice to e-learning professionals.

Concerning methodological recommendations for future studies, researchers should utilize broad classifications for academic departments and force the respondent to choose from that selection of classifications or choose to omit the academic department variable. The process

of categorizing departments entered by respondents in a text field, rather than being chosen from a list, is difficult because of the multitude of ways departments and other academic units are categorized and organized at different universities.

Another recommendation for future research methodology, particularly with regards to replication of this study, would be to eliminate the option of “other” for academic rank. In this particular study, part of the criteria for the population of the study was having taught an online course in the fall of 2006. This would mean that all of the participants would have at least fit into the category of “instructors.” In practice, a few respondents listed themselves as instructors even though they were listed as professors on their university web site. It also might be interesting to further investigate who had graduate assistants; the low number of e-faculty with graduate assistants might be related to the relatively high number of instructors as opposed to professors in this sample of e-faculty.

The final methodological recommendation addresses the length of the research instrument used in this study. Over 20 respondents completed all of the e-questionnaire up to the last one or two scales. This appeared to indicate that the e-questionnaire may have been too long. If this instrument is used in future studies, researchers should either shorten the instrument, which means that some variables included in this study could not be included in future studies, or find ways to motivate the respondents to complete the entire instrument.

## REFERENCES

- Advanced Distributed Learning. (2005). *About ADL*. Alexandria, VA: Advanced Distributed Learning. Retrieved August 31, 2006, from <http://www.adlnet.gov/aboutadl/index.cfm>
- Abramov, L., & Martkovich, N. (2002, February). Making teachers feel contented with online courses. *USDLA Journal*, *16*(2), 17. Retrieved May 5, 2006, from [http://www.usdla.org/html/journal/FEB02\\_Issue/article03.html](http://www.usdla.org/html/journal/FEB02_Issue/article03.html)
- Allen, M., Bourhis, J., Burrell, N., & Mabry, E. (2002). Comparing student satisfaction with distance education to traditional classrooms in higher education: A meta-analysis. *The American Journal of Distance Education*, *16*(2), 83-97.
- Amey, M., & VanDerLinden, K. (2003). The use of technology: Institutional issues. *The NEA Almanac of Higher Education* (pp. 85-95). Washington, D.C.: National Education Association.
- Aoki, K., & Pogroszewski, D. (1998, Fall). Virtual university reference model: A guide to delivering education and support services to the distance learner. *Online Journal of Distance Learning Administration*, *1*(3), 16. Retrieved January 26, 2004, from <http://www.westga.edu/~distance/aoki13.html>
- Arbaugh, J. B. (2001, December). How instructor immediacy behaviors affect student satisfaction and learning in Web-based courses. *Business Communication Quarterly*, *64*(4), 42-54.
- Archambault, F. X., Jr., Kulikowich, J. M., Brown, S. W., & Rezendes, G. J. (2002, April 4). *Developing performance assessments to measure teacher competency in the use of educational technology*. Paper presented at the annual meeting of the American Educational Research Association. Retrieved on January 22, 2007, from [http://eric.ed.gov/ERICDocs/data/ericdocs2/content\\_storage\\_01/0000000b/80/0d/f9/06.pdf](http://eric.ed.gov/ERICDocs/data/ericdocs2/content_storage_01/0000000b/80/0d/f9/06.pdf)
- Armengol, M. C. (2002). The impact of globalization on the Ibero-American virtual university. *Higher Education in Europe*, *XXVII*(3), 187-196.
- Armstrong, R. D. (2001). Faculty strategies for learning to teach at a distance with instructional technology. *DEOSNEWS*, *11*(1), 10. State College, Pennsylvania: The American Center for the Study of Distance Education, The Pennsylvania State University. Retrieved January 26, 2004, from [http://www.ed.psu.edu/acsde/deos/deosnews/deosnews11\\_1.asp](http://www.ed.psu.edu/acsde/deos/deosnews/deosnews11_1.asp)
- Asoodeh, M. M., & Bonnette, R. (2006). Interdisciplinary facilities that support collaborative teaching and learning. *AACE Journal*, *14*(1), 63-75.
- Atkins, N. E., & Vasu, E. S. (2000). Measuring knowledge of technology usage and stages of concern about computing: A study of middle school teachers. *Journal of Technology and Teacher Education*, *8*(4), 279-302.

- Atkins, N. E., & Vasu, E. S. (1998, May). The teaching with technology instrument: Effectively measuring where teachers are and planning for staff development. *Learning and leading with technology*, 25(8), 35-39.
- Bailor, C. (2007, April 3). Perseus|WebSurveyor Remonikers. *Destination CRM.com*. Retrieved June 20, 2007 from <http://www.destinationcrm.com/articles/default.asp?articleid=6811>
- Baldwin, R. G. (1998). Technology's impact on faculty life and work. *New Directions for Teaching and Learning*, Winter(76), 7-21.
- Bandura, A. (1997). *Self-efficacy: The exercise of control* (p. 604). New York: W. H. Freeman.
- Barnett-Queen, T., & Zhu, E. (1999, September 1). *Distance education: Analysis of learning preferences in two sections of undergraduate HBSE-like human growth and development course: Face-to face and web-based distance learning*. Paper presented at the 3rd annual meeting of the Technology Conference for Social Work Education and Practice. Retrieved January 16, 2007 from <http://www.cc.utah.edu/~jy1415/techconf/Docs/papers/Barnett-queen.htm>
- Bartlett, J. E. (2000). Analysis of Self-Directed Learning in Secondary Business Educators. (Doctoral Dissertation, Louisiana State University, 2000). *Dissertation Abstracts International* 60(09), 3245. (UMI NO. 9945700)
- Bartlett, J. E., & Kotrlik, J. W. (1999). Development of a self-directed learning instrument for use in work environments. *Journal of Vocational Education Research*, 24(4), 185-208.
- Bates, A. W. (2000). *Managing technological change: Strategies for academic leaders*. San Francisco: Jossey Bass.
- Becker, H. J. (2000). How exemplary computer-using teachers differ from other teachers: Implications for realizing the potential of computers in schools. *Contemporary Issues in Technology and Teacher Education* [Online serial], 1(2), 274-293. (Originally published in *Journal of Research on Computing in Education*, 26(3), 291-321.)
- Berge, Z. L., & Muilenburg, L.Y. (2000). Barriers to distance education as perceived by managers and administrators: Results of a survey. In Melanie Clay (Ed.). (2000). *Distance Learning Administration Annual 2000*. Retrieved January 22, 2007 from [http://www.emoderators.com/barriers/man\\_admin.shtml](http://www.emoderators.com/barriers/man_admin.shtml)
- Bersin & Associates (2003). *The NETg standards plus strategy: The industry's leading solution for end-to-end enterprise e-learning solutions*. [White paper]. Oakland, CA: Author:. Retrieved March 13, 2004, from <http://learning.sheshunoff.com/files/InteroperabilityNETg1.pdf#search=%22e-learning%20standards%20today%20bersin%20%26%20associates%22>
- Betts, K. S. (1998, Fall). An institutional overview: Factors influencing faculty participation in distance education in postsecondary education in the United States: An institutional study.

- Online Journal of Distance Learning Administration*, 1(3), 14. Retrieved January 7, 2004, from <http://westga.edu/~distance/betts13.html>
- Boyd, B. L., & Murphrey, T. P. (2001). Interest in online leadership education and implications for instructional design strategies. *Journal of Agricultural Education*, 42(1), 28-37.
- Boyer Commission. (2001). Reinventing undergraduate education: Three years after the Boyer report. *The Boyer commission on educating undergraduates in the research university* (pp. 1-33). Menlo Park, CA: Carnegie Foundation for the Advancement of Teaching.
- Broady-Ortmann, C. (2002, Fall). Teachers' perceptions of a professional development distance learning course: A qualitative case study. *Journal of Research on Technology in Education*, 35(1), 107-116. Retrieved January 22, 2007 from EBSCOhost.
- Broos, A., & Roe, K. (2006). The digital divide in the computer generation: ICT-exclusion among adolescents. Retrieved on January 22, 2007, from <https://repository.libis.kuleuven.be/dspace/handle/1979/388?mode=simple&dc=description&dcAttr=abstract&dcLang=en>
- Brooks, L. (2003, Winter). How the attitudes of instructors, students, course administrators, and course designers affects the quality of an online learning environment. *Online Journal of Distance Learning Administration*, VI(IV), 8. Retrieved on January 22, 2007, from <http://www.westga.edu/~distance/ojdla/winters64/brooks64.htm>
- Brown, M. R. (2000, May/June). Access, Instruction, and Barriers: Technology issues facing students at risk. *Remedial and Special Education*, 21(3), 182-192.
- Budin, H. (1999). The computer enters the classroom. *Teachers College Record*, 100(3), 656-669.
- Buerck, J. P., Malmstrom, T., & Peppers, E. (2003). Learning environments and learning styles: Non-traditional student enrollment and success in an Internet-based versus a lecture-based computer science course. *Learning Environments Research*, 6, 137-155.
- Cable News Network. (2005, March 3). Distance learning becoming part of school life. *CNN Education*. Retrieved December 2, 2005, from <http://www.cnn.com/2005/EDUCATION/03/03/distance.education.ap/index.html>
- Care, W. D., & Scanlan, J. M. (Summer 2001). Planning and managing the development of courses for distance delivery: Results from a qualitative study. *University of West Georgia*, IV(II), 11. Retrieved January 6, 2007 from <http://www.westga.edu/~distance/ojdla/summer42/care42.html>
- Carey, J. M., Chisholm, I. M., & Irwin, L. H. (2002, September). The impact of access on perceptions and attitudes towards computers: An international study. *Education Media International*, 39(3/4), 223-235.

- The Carnegie Foundation for the Advancement of Teaching. (2006). *The Carnegie classification of institutions of higher education*. Stanford, CA: Author. Retrieved on January 24, 2007 from <http://www.carnegiefoundation.org/classifications/index.asp>
- Carr-Chellman, A., & Duchastel, P. (2000). The ideal online course. *British Journal of Educational Technology*, 31(3), 229-241.
- Carswell, L., Thomas, P., Petre, M., Price, B., & Richards, M. (2000). Distance education via the Internet: The student experience. *British Journal of Educational Technology*, 31(1), 29-46.
- Casey, H. B., Harris, J. L., & Rakes, G. C. (2005, June). *Why change? Addressing teacher concerns toward technology*. Paper presented at the Twenty-fifth Annual National Educational Computing Conference.
- Center for Educational Research and Innovation. (2005, September). E-learning provision and enrolments [enrollments]. In Center for Educational Research and Innovation. (2005, September). *E-learning in tertiary education: Where do we stand?* (Vol. 4, pp. 35-70). Paris, France: Organization for Economic Co-operation and Development. Retrieved January 22, 2007, from <http://titania.sourceoecd.org/vl=9919718/cl=11/nw=1/rpsv/ij/oecdthemes/99980029/v2005n4/s1/p11>
- Cheng, Y. C. (1994). Teacher leadership style: A classroom level study. *Journal of Educational Administration*, 32(3), 54-71.
- Cheurprakobkit, S., Hale, D. F., & Olson, J. N. (2002). Technicians' perceptions about web-based courses: The University of Texas System experience. *The American Journal of Distance Education*, 16(4), 245-258.
- Cho, S. K., & Berge, Z. L. (2002) Overcoming barriers to distance training and education. *USDLA Journal*, 16(1). Retrieved on January 22, 2007, from [http://www.usdla.org/html/journal/JAN02\\_Issue/article01.html](http://www.usdla.org/html/journal/JAN02_Issue/article01.html)
- Clark, M. C., & Kotrlik, J. W. (2007). *Clark-Kotrlik E-faculty Technology Development Scale* © (CKEDS). Baton Rouge, LA: Louisiana State University.
- Clark, M. C., & Kotrlik, J. W. (2007). *Clark-Kotrlik Perceived Level of Support for E-Instruction Scale* © (CKLOS). Baton Rouge, LA: Louisiana State University.
- Clay, M. (1999, Fall). Development of training and support programs for distance education instructors. *Online Journal of Distance Learning Administration*, II(III), 7. Retrieved January 22, 2007, from <http://www.westga.edu/~distance/clav23.html>
- Cleland, J.V., Wetzal, K., & Zambo, R. (1999). Science integrated with mathematics using language arts technology: A model for collaborative professional development. *The Journal of Computers in Mathematics and Science Teaching*, 18(2), 157-172.

- CNET News.com Staff. (1997, March 14). *Society's digital divide*. CNET News.com. Retrieved January 18, 2007, from [http://news.com.com/2102-1023\\_3-278007.html?tag=st.util.print](http://news.com.com/2102-1023_3-278007.html?tag=st.util.print)
- Cochran, W. G. (1977). *Sampling techniques* (3<sup>rd</sup> ed.). New York, NY: Wiley.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2<sup>nd</sup> ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Collier, G., & Robson, R. (2002). *E-learning interoperability standards*. [White Paper]. Palo Alto, CA: Sun Microsystems, Inc. Retrieved August 31, 2006, from [www.sun.com/products-n-solutions/edu/whitepapers/pdf/eLearning\\_Interoperability\\_Standards\\_wp.pdf](http://www.sun.com/products-n-solutions/edu/whitepapers/pdf/eLearning_Interoperability_Standards_wp.pdf)
- Collins, M. P. (1999). I know my instructional technologies, it's the learners that perplex me. *American Journal of Distance Education*, 13(1), 8-23.
- Collins, M. P., & Berge, Z. L. (2000, November/December). Technological minimalism in distance education. *The Technology Source*. (November/December). Retrieved August 14, 2006, from [http://technologysource.org/article/technological\\_minimalism\\_in\\_distance\\_education/](http://technologysource.org/article/technological_minimalism_in_distance_education/)
- Colorado Department of Education (1999). Colorado technology competency guidelines for classroom teachers and school library media specialists. *Educational Telecommunications Unit Colorado Department of Education*. Retrieved January 29, 2007, from <http://www.cde.state.co.us/edtech/download/tgui.pdf>
- Comrey, A. L. (1973). *A first course in factor analysis*. New York, NY: Academic Press.
- Cook, C., Heath, F., & Thompson, R. L. (2000). A meta-analysis of response rates in web- and Internet-based surveys. *Educational and Psychological Measurement*, 60, 821-836.
- Cook-Sather, A. (2001). Unrolling roles in techno-pedagogy: Toward new forms of collaboration in traditional college settings. *Innovative higher Education*, 26(2), 121-139.
- Cookson, P. S. (2000). Implications of Internet technologies for higher education: North American perspectives. *Open Learning*, 15(1), 71-80.
- Corwin, T., & Marcinkiewicz, H. (1998, February 18-22). Prediction of and differences in computer use when universally available. *Proceedings of Selected Research and Development Presentations at the National Convention of the Association for Educational Communications and Technology* (p. 6). 20th, St. Louis, MO: Research and Theory Division.
- Council for Higher Education Accreditation. (1999 April). *Distance learning in higher education* (Issue Brief No.3, pp. 1-14). Washington, DC: The Institute for Higher Education Policy.
- Crews, K. D. (2002, September 30). *New copyright law for distance education: The meaning and importance of the TEACH Act*. Indianapolis, IN: Indiana University School of Law.

Retrieved January 22, 2007 from <http://www.ala.org/ala/washoff/WOissues/copyrightb/distanceed/teachsummary.pdf#search=%22crews%20copyright%20law%20distance%20education%22>

Crumpacker, N. (2001, Winter). Faculty pedagogical approach, skill, motivation in today's distance education milieu. *Online Journal of Distance Learning Administration, IV(IV)*, 12. Retrieved January 22, 2007, <http://www.westga.edu/~distance/ojdla/winter44/crumpacker44.html>

Csapo, N. (2002, August). Certification of computer literacy. *T.H.E. Journal*, 30(1), 46-51.

D'Amico, C., & Judy, R. W. (1994). *Workforce 2020: Work and workers in the 21st century*. Indianapolis, IA: Hudson Institute.

Davis, L. (1992). Instrument review: Getting the most from your panel of experts. *Applied Nursing Research*, 5(4), 194-197.

Dellinger, A. M. (2001). A study of the measurement and sources of teachers' self and collective efficacy beliefs in professional learning environments. (Doctoral Dissertation, Louisiana State University, 2001). *Dissertation Abstracts International*, 62(07), 2387. (UMI No. 3021424)

Dodds, P. (2006, August 18). In S. E. Thropp (Ed.), *Sharable Content Object Reference Model (SCORM) 2004 3rd Edition*. Alexandria, VA: Advanced Digital Learning. Retrieved August 31, 2006, from <http://www.adlnet.gov/scorm/20043ED.cfm>

Dooley, K. E., Kelsey, K. D., & Lindner, J. R. (2003). Doc@distance: Immersion in advanced study and inquiry. *Quarterly Review of Distance Education*, 4, 43-50.

Dooling, J. O., & Case, K. I. (1997, Winter/Spring). Integrating technology into teacher preparation programs. *Teaching Education*, 8, 9-14.

Dunderstadt, J. J. (1997, August). The future of the university in an age of knowledge. *Journal of Asynchronous Learning Networks (JALN)*, 1(2), 78-88.

Eaton, J. S. (2001). Distance learning: Academic and political challenges for higher education accreditation. *Council for Higher Education Accreditation Monograph Series 001, 1*, 1-21.

Ellis, B. (1997, October). Virtual classroom technologies for distance education: The case for on-line synchronous delivery. *Distance Education Solutions*. Paper presented at North American Web Developers Conference. Retrieved January 7, 2004, from <http://www.deac.om/solution/naweb97.htm>

Ershler, J. (2003, April). Policy development considerations for administrators and instructors of distance learning programs. *Journal of the United States Distance Learning Association*, 17(2), 1-4.

- Farenga, S.J., & Joyce, B. A. (2001). Hardware versus brainware: Where are technology dollars being invested? *Journal of Technology and Teacher Education*, 9(3), 313-319.
- Finlay, W., Desmet, C., & Evans, L. (2004). Is it the technology or the teacher? A comparison of online and traditional English composition classes. *Journal of Educational Computing Research*, 31(2), 163-180.
- Fuller, H. L. (2000). First teach their teachers: Technology support and computer use in academic subjects. *Journal of Research on Computing in Education*, 32(4), 511-537.
- Galusha, J. M. (1997). Barriers to learning in distance education. *Interpersonal Computing and Technology*, 5(3-4), 6-14.
- Greenberg, J. (2002, January 1). A hybrid system for delivering web based distance learning and teaching material. *Masters Abstracts International Humboldt University of Berlin, Germany*.
- Guerrero, S. M. (2005). Teacher knowledge and a new domain of expertise pedagogical technology knowledge. *Journal of Educational Computing Research*, 33(3), 249-267.
- Guglielmino, L. M. (May 1, 1978). Development of the self-directed learning readiness scale (Doctoral dissertation, University of Georgia). *Dissertation Abstracts International*, 38(11).
- Guillot, F. A. (May 2003). Teacher and student perceptions of online instructional methodology in higher education: An explanatory mixed-method study (Doctoral dissertation, Louisiana State University and Agricultural and Mechanical College). *Dissertation Abstracts International*, 154. (etd-06152004-123008)
- Gunawardena, C. (1990). Integrating telecommunications systems to reach distance learners. *The American Journal of Distance Education*, 4(3), 38-46. Retrieved from [www.ajde.com/Contents/vol4\\_3.htm](http://www.ajde.com/Contents/vol4_3.htm)
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis* (6<sup>th</sup> ed.). Upper Saddle River, NJ: Prentice Hall.
- Harrison, A., & Dugdale, S. (2002, December). The SANE research project: Its implications for higher education. *Planning for Higher Education*, 31(2), 33-42.
- Harrison, N. (1999). *How to design self-directed and distance learning programs*. New York: McGraw Hill.
- Hatcher, T. G. (1997). An interview with Malcolm Knowles. *Training & Development*, 51(2), 37-43.
- Heppner, P. P., & Petersen, C. H. (1982). The development and implications of a personal problem-solving inventory. *Journal of Consulting in Clinical Psychology*, 29, 66-75.

- Hilty, D. M., Benjamin, S., Briscoe, G., Hales, D. J., Boland, R. J., Luo, et al. (2006, December). APA Summit on medical student education task force on informatics and technology: Steps to enhance the use of technology in education through faculty development, funding and change management. *Academic Psychiatry, 30* (1),444-450.
- Hinkle, D. E., & Wiersma, W., & Jurs, S. G. *Applied statistics for the behavioral sciences* (4<sup>th</sup> ed.). Boston, MA: Houghton Mifflin Company.
- Hopkins, W. G. (1997). *New view of statistics*. Retrieved August 23, 2002 from <http://www.sportsci.org/resource/stats/effectmag.html>.
- Hutchinson, K. H. (2003, December). The TEACH Act: Copyright law and online education. *New York University Law Review, 78*(6), 37.
- IMS Global Learning Consortium. (2006a). *Background*. Lake Mary, FL: Author. Retrieved August 31, 2006, <http://www.imsglobal.org/background.html>
- IMS Global Learning Consortium. (2006b). *Collaborations*. Lake Mary, FL: Author. Retrieved August 31, 2006, from <http://www.imsglobal.org/collaboration.html>
- International Society for Technology in Education (ISTE). (2000). *National Educational Technology Standards for Students: Connecting Curriculum and Technology*. Eugene, OR: Author.
- Johnson, S. D., Benson, A. D., Duncan, J., Shinkareva, O. N., Taylor, G. D., & Treat, T. (2004). Internet-based learning in postsecondary career and technical education. *Journal of Vocational Education Research, 29*(2), 101-119.
- Joyce, B. & Farenga, S. (1997, June 15). *Global assessment of technology in education scale* (GATE, 1997). (ED 412 920). Retrieved January 31, 2006 from [http://eric.ed.gov/ERICDocs/data/ericdocs2/content\\_storage\\_01/0000000b/80/22/de/20.pdf](http://eric.ed.gov/ERICDocs/data/ericdocs2/content_storage_01/0000000b/80/22/de/20.pdf)
- Kagima, L. K., & Hausafus, C. O. (2001). The central element in instructional technology integration. *Journal of Family and Consumer Sciences, 93*(4), 33-36.
- Kearsley, G. (1998). *Explorations in learning and instruction: The theory into practice database*. Retrieved on January 22, 2007, from <http://www.gwu.edu/~tip/spiro.html>
- Kekkonen-Moneta, S., & Moneta, G. B. (2002). E-learning in Hong-Kong: Comparing learning outcomes in online and lecture versions of an introductory computing course. *British Journal of Educational Technology, 33*(4), 423-433.
- Kenny, R. W. (1998). Reinventing undergraduate education: A blueprint for America's research universities. *The Boyer commission on educating undergraduates in the research university* (pp. 1-46). Stonybrook, NY: The Carnegie Foundation for the Advancement of Teaching.
- Kim, S. H., Mims, C. & Holmes, K. P. (2006). An introduction to current trends and benefits of mobile wireless technology use in higher education. *AACE Journal, 14*(1), 77-100.

- Knowles, M. (1990). *The adult learner: A neglected species*, 4<sup>th</sup> edition. Gulf Publishing Co., Houston, Texas.
- Kotrlik, J. W., & Redmann, D. H., (2005). Extent of technology integration in instruction by adult basic education teachers. *Adult Education Quarterly*, 55(3), 200-219.
- Kotrlik, J. W., & Redmann, D. H. (2006). *Kotrlik-Redmann Technology Anxiety Scale (KRTAS)*. Baton Rouge, LA: Louisiana State University.
- Kotrlik, J. W., & Redmann, D. H., (2002). *Kotrlik-Redmann Technology Integration Model*<sup>®</sup>. Baton Rouge, LA: Louisiana State University.
- Kotrlik, J. W., Redmann, D. H., & Douglas, B. B. (2003). Technology integration by agriscience teachers into the teaching/learning process. *Journal of Agricultural Education*, 44(3), 78-90.
- Kuh, G. D. & Hu, S. (2001, Jan.-Feb.). Learning productivity at research universities. *The Journal of Higher Education*, 72 (1), 1-28.
- Lee, D. (2004). Web-based instruction in China: Cultural and pedagogical implications and challenges. *Educational Technology Research & Development*, 52(1), 101-105.
- Locatis, C., & Weisberg, M. (1997). Distributed learning and the Internet. *Contemporary Education*, 68(Winter), 100-103.
- Masie, E. (1997). *The computer training handbook: Strategies for helping people learn technology* (2nd ed). Minneapolis, MN: Lakewood Books.
- McCoy, R. W. (2001). Computer competencies for the 21st century information systems educator. *Information Technology, Learning, and Performance Journal*, 19(2), 21-35.
- McDowell, E. E. & Schuelke, L. D. (1998). *An investigation of relationships among technology experiences, communication apprehension, writing experiences and computer anxiety*. Paper presented at the Annual Meeting of the National Communication Association (84<sup>th</sup>, New York, NY. November 21-24, 1998. Retrieved on January 19, 2007 from [http://www.eric.ed.gov/ERICDocs/data/ericdocs2/content\\_storage\\_01/0000000b/80/11/33/ad.pdf](http://www.eric.ed.gov/ERICDocs/data/ericdocs2/content_storage_01/0000000b/80/11/33/ad.pdf)
- McLoughlin, C. (2000). Cultural maintenance, ownership, and multiple perspectives: Features of Web-based delivery to promote equity. *Journal of Educational Media*, 25(3), 229-241.
- Mertler, C. A. (2003). Patterns of response and nonresponse from teachers to traditional and web surveys. *Practical Assessment, Research & Evaluation*, 8(22). Retrieved October 12, 2006 from <http://PAREonline.net/getvn.asp?v=8&n=22>.
- Ndahi, H. (1999). Utilization of distance learning technology among industrial and technical teacher education faculty. *Journal of Industrial Teacher Education*, 36(4), 21-37.

- Newstrom, J. W., & Lengnick-Hall, M. L. (1991). One Size Does Not Fit All. *Training & Development*, 45(6), 43-48.
- Nicolle, P. S. (2005). *Technology adoption into teaching and learning by mainstream university faculty: A mixed methodology study revealing 'how, when, why and why not'*. (Doctoral dissertation, Louisiana State University and Agricultural and Mechanical College, 2005.) Retrieved on January 22, 2007 from [http://etd.lsu.edu/docs/available/etd-07112005-163713/unrestricted/Nicolle\\_dis.pdf](http://etd.lsu.edu/docs/available/etd-07112005-163713/unrestricted/Nicolle_dis.pdf)
- Nikolova, I., & Collis, B. (1998). Flexible learning and design of instruction. *British Journal of Educational Technology*, 29(1), 59-72.
- Norton, S., McRobbie, C., & Cooper, T. (2000). Exploring secondary mathematics teachers' reasons for not using computers in their teaching: Five case studies. *Journal of Research on Computing in Education*, 33(1), 87-109.
- O'Dell, I. (1997). Delivering leisure programs to adults. *The Journal of Physical Education, Recreation & Dance*, 68(6), 45.
- Oddi, L. (1985). Development and validation of an instrument to identify self-directed continuing learners. *Adult Education Quarterly* 36, 97-107.
- Okamoto, T., Cristea, A., & Kayama, M. (2001). Future integrated learning environments with multimedia. *Journal of Computer Assisted Learning*, 17, 4-12.
- Olsen, F. (2002, November 1). Phoenix Rises: The university's online program attracts students, profits, and praise. *The Chronicle of Higher Education*, 49(10), A29.
- Ong, C., & Lai, J. (2006). Gender differences in perceptions and relationships among dominants of e-learning acceptance. *Computers in Human Behavior* 22, 816-829.
- O'Quinn, L., & Corry, M. (2002, Winter). Factors that deter faculty from participating in distance education. *Online Journal of Distance Education Administration*, V(IV). Retrieved January 22, 2007, from <http://www.westga.edu/~distance/ojdla/winter54/Quinn54.html>
- O'Quinn, L., & Corry, M. (2004, August). Faculty preferences for course delivery: Distance and traditional settings. *International Journal of Instructional Technology and Distance Learning*, 1(8), 17. Retrieved April 11, 2006, from [http://www.itdl.org/Journal/Aug\\_04/index.htm](http://www.itdl.org/Journal/Aug_04/index.htm)
- Ortmann, A. (2001). Capital romance: Why wall street fell in love with higher education. *Education Economics*, 9(3), 293-311.
- Pachnowski, L., & Jurczyk, J. (2003, Fall). Perceptions of faculty on the effect of distance learning technology on faculty preparation time. *Online Journal of Distance Education Administration*, VI(III). Retrieved on January 22, 2007 from <http://www.westga.edu/~distance/ojdla/fall63/pachnowski64.html>

- Palloff, R. M., & Pratt, K. (1999). *Building learning communities in cyberspace: Effective strategies for the online classroom*. San Francisco: Jossey-Bass Publishers.
- Papert, S. (1991). Situating construction. In I. Harel & S. Papert (Eds.), *Constructionism*. Norwood, NJ: Ablex Publishing.
- Parker, A. (2003). Motivation and incentives for distance faculty. *Online Journal of Distance Learning Administration*, 6(3). Retrieved on January 22, 2007, from <http://www.westga.edu/~distance/ojdla/fall63/parker63.htm>
- Pedhazur, E. J. (1997). *Multiple regression in behavioral research: Explanation and prediction* (3<sup>rd</sup> ed.). Fort Worth, TX: Harcourt Brace College Publishers.
- Vovici Corporation. (2006, September 19). *Perseus and WebSurveyor Awarded CRM Rising Star Award: Customer feedback leaders recognized for gaining more market share, raising the bar in customer-centric solutions and initiative* (Vovici Press Releases). Dulles, Virginia: Author. Retrieved on November 17, 2006 from <http://www.vovici.com/news/press-release.asp?c=818>
- Pope, M., Hare, D. & Howard, E. (2005). Enhancing Technology Use in Student Teaching: A Case Study. *Journal of Technology and Teacher Education*, 13(4), 573-618.
- Ray, C. M., Sormunen, C., & Harris, T. M. (1999, Spring). Men's and women's attitudes toward computer technology: A comparison. *Office Systems Research Journal*, 17(1),1-8.
- Redmann, D. H., & Kotrlik, J. W. (2004, Spring/Summer). Technology integration into the teaching-learning process by business education teachers. *Delta Psi Epsilon Journal*, 46(2), 76-91.
- Redmann, D. H., Kotrlik, J. W., & Douglas, B. B. (2003, Spring). Factors related to technology integration in instruction by marketing education teachers. *Journal of Career and Technical Education*, 19(2), 29-46.
- Resnick, M. (1996). Distributed constructionism. In Proceedings of the International Conference on the Learning Sciences. Association for the Advancement of Computing in Education, Northwestern University. Retrieved on January 22, 2007, from <http://llk.media.mit.edu/papers/Distrib-Construc.html>
- Rieber, L. P., & Welliver, P. W (1989). Infusing educational technology into mainstream educational computing. *International Journal of Instructional Media*, 16(1), 21-32.
- Robinson, J.P., Shaver, P. R., & Wrightman, L. S.(1991). Criteria for scale selection and evaluation. In J. P. Robinson, P. R. Shaver & L. S. Wrightsman (Eds.) *Measures of personality and social psychological attitudes* (pp. 1-16). New York: Academic Press.
- Ropp, M. M. (1999, Summer). Exploring individual characteristics associated with learning to use computers in preservice teacher preparation. *Journal of Research on Computing in Education*, 31(4), 402-424.

- Rubio, D., Berg-Weger, M., Tebb, S., Lee, E., & Rauch, S. (2003). Objectifying content validity: conducting a content validity study in social work research. *Social Work Research, 27*(2), 94-104.
- Sadler-Smith, E., Allinson, C. W., & Hayes, J. (2000). Cognitive style and learning preferences: Some implications for CPD. *Management Learning, 31*, 239-256.
- Sadler-Smith, E., & Smith, P. J. (2004). Strategies for accommodating individuals' styles and preferences in flexible learning programmes. *British Journal of Educational Technology, 35*(4), 395-412.
- Salomon, G. (Ed.) (1994). *Distributed cognition*. Cambridge, UK: Cambridge University Press.
- Salzman, M. C., Dede, C., Loftin, R. B., & Chen, J. (1999). A model for understanding how virtual reality aids complex conceptual learning. *Presence: Teleoperators and Virtual Environments, 8*(3), 293-316.
- Scardamalia, M., & Bereiter, C. (1991). Higher levels of agency for children in knowledge building: A challenge for the design of new knowledge media. *The Journal of the Learning Sciences, 1*(1), 37-68.
- Schutte, J. G. (1996). *Virtual teaching in higher education: The new intellectual superhighway or just another traffic jam?* Retrieved August 15, 2006, from British Library pages: <http://pages.britishlibrary.net/blwww3/education/schutte1.htm>
- Sherer, P. D., Shea, T. P., & Kristensen, E. (Spring 2003). Online communities of practice: A catalyst for faculty development. *Innovative Higher Education, 27*(3), 183-194.
- Spiro, R. J., & Jehng, J. (1990). Cognitive flexibility and hypertext: Theory and technology for the non-linear and multi-dimensional reversal of complex subject matter. D. Nix & R. Spiro (Eds). *Cognition, Education, and Multimedia*. Hillsdale, NJ: Erlbaum.
- Summers, J. J., Waigandt, A., & Whittaker, T. A. (2005, Spring). A comparison of student achievement and satisfaction in an online versus a traditional face-to-face statistics class. *Innovative Higher Education, 29*(3), 233-250.
- Sumrall, J. (2002). *Factors which influence faculty attitudes and perceptions of distance education in analytical subject areas*. (Doctoral dissertation, Louisiana State University and Agricultural and Mechanical College), (etd-0416102-142714). Retrieved on January 22, 2007, from [http://etd.lsu.edu/docs/available/etd-0416102-142714/unrestricted/Sumrall\\_dis.pdf](http://etd.lsu.edu/docs/available/etd-0416102-142714/unrestricted/Sumrall_dis.pdf)
- Swain, C., & Pearson, T. (2003, Spring). Educators and technology standards: Influencing the digital divide. *Journal of Research on Technology in Education, 34*(3), 326-335.
- Szabo, M., & Sobon, S. A. (2003, Spring). A case study of institutional reform based on innovation diffusion theory through instructional technology. *Canadian Journal of*

*Learning and Technology*, 29(2). Retrieved on January 22, 2007, from [http://www.cjlt.ca/content/vol29.2/cjlt29-2\\_art-3.html](http://www.cjlt.ca/content/vol29.2/cjlt29-2_art-3.html)

Watson, J. (2005, October). *Keeping pace with K-12 online learning: A review of state-level policy and practice*. (p. 131). Naperville, IL: Learning Point Associates, North Central Regional Educational Laboratory (NCREL).

Wenglinsky, H. (1998, September). *Does it compute: The relationship between educational technology and student achievement in Mathematics*. Princeton, NJ: Educational Testing Service. Retrieved January 25, 2007 from <ftp://ftp.ets.org/pub/res/technolog.pdf>

Wentling, T., Waight, C. L., & King, R. (2000). Foundations of HRD in a networked world. In *Human Resource Development and Information Technology: The Global Connection*. Boston: Kluwer Academic Publishers.

Woods, R., & Ebersole, S. (2003, Spring). Becoming a "communal architect" in the online classroom- integrating cognitive and affective learning for maximum effect in Web-based learning. *Online Journal of Distance Learning Administration*, VI(I), 16. Retrieved on April 16, 2006, from <http://www.westga.edu/~distance/ojdl/spring61/woods61.htm>

Yohon, T., & Zimmerman, D. (2006). An exploratory study of adoption of software and hardware by faculty in the liberal arts and sciences. *Journal of Technical Writing and Communication* 36(1), 9-27.

APPENDIX A: LSU IRB EXEMPT STATUS APPROVAL

IRB #: E3539 LSU Proposal #: \_\_\_\_\_

Revised: 10/04/2006

LSU INSTITUTIONAL REVIEW BOARD (IRB) for HUMAN RESEARCH SUBJECT PROTECTION

578-8692 FAX 6792 Office:203 B-1 David Boyd Hall

APPLICATION FOR EXEMPTION FROM INSTITUTIONAL OVERSIGHT

Unless they are qualified as meeting the specific criteria for exemption from Institutional Review Board (IRB) oversight, ALL LSU research/projects using living humans as subjects, or samples or data obtained from humans, directly or indirectly, with or without their consent, must be approved or exempted in advance by the LSU IRB. This Form helps the PI determine if a project may be exempted, and is used to request an exemption.

Instructions: Complete this form.

Exemption Applicant: If it appears that your study qualifies for exemption send:

- (A) Two copies of this completed form,
(B) a brief project description (adequate to evaluate risks to subjects and to explain your responses to Parts A & B),
(C) copies of all instruments to be used. If this proposal is part of a grant proposal include a copy of the proposal and all recruitment material.
(D) the consent form that you will use in the study. A Waiver of Written Informed Consent is attached and must be completed only if you do not intend to have a signed consent form.
(E) Certificate of Completion of Human Subjects Protection Training for all personnel involved in the project ( including students who are involved with testing or handling data) at http://cme.cancer.gov/clinicaltrials/learning/humanparticipant-protections.asp. (Unless already on file with the IRB.)

to: ONE screening committee member (listed at the end of this form)in the most closely related department/discipline or to IRB office.

If exemption seems likely, submit it. If not, submit regular IRB application. Help is available from Dr. Robert Mathews, 578-8692, irb@lsu.edu or any screening committee member.

Principal Investigator Myriah Clark Student? Y Y/N

Ph: 225/751/5328 E-mail\_mclar13@lsu.edu Dept/Unit School of Human Resource Education & Workforce Dev

If Student, name supervising professor Joe W Kotrlík Ph: 225.578.5753

Mailing Address 142 Old Forestry Bldg. Ph

Project Title AN ANALYSIS OF THE TECHNOLOGICAL DEVELOPMENT OF E-FACULTY

Agency expected to fund project N/A

Subject pool (e.g. Psychology Students) University E-Faculty in 3 States

Circle any "vulnerable populations" to be used: (children <18; the mentally impaired, pregnant women, the aged, other). Projects with incarcerated persons cannot be exempted.

I certify my responses are accurate and complete. If the project scope or design is later changed I will resubmit for review. I will obtain written approval from the Authorized Representative of all non-LSU institutions in which the study is conducted.

PI Signature Myriah Clark Date 2-7-2007 (no per signatures)

Screening Committee Action: Exempted [checked] Not Exempted Category/Paragraph 1

Reviewer Mathews Signature Robert Mathews Study Exempted by Date 2/8/07

Study exempted by Louisiana State University Institutional Review Board 203 B-1 David Boyd Hall

Louisiana State University Institutional Review Board 203 B-1 David Boyd Hall 225-578-8692

## APPENDIX B: PERSONAL CHARACTERISTICS ITEMS

Table 20. Personal Characteristics Items

Question Number	Question	Answers
1	What is your gender?	Male Female
2	What is your age?	Drop down list from 18 to 99
3	What is your academic rank?	Professor Associate Professor Assistant Professor Instructor Other
4	What is your academic department?	Fill in the blank
5	Is training available to you through your organization?	Yes No
6	How many clock hours have you spent in formal training for web-based instructional skills development or improvement in the past 2 years?	Drop down list 0 to 199, then 200 or more
7	How many clock hours have you spent in self-study for web-based instructional skills development or improvement in the past 2 years?	Drop down list 0, 1-10, 11-20, ...391-400

**APPENDIX C: CLARK-KOTRLIK E-FACULTY  
TECHNOLOGY DEVELOPMENT SCALE©**

Table 21. Clark-Kotrlík E-faculty Technology Development Scale (CKEDS©)

Question Number	Question: How knowledgeable are you about the following?	Answers
1	Electronic Mail (e-mail)	Not At All Slightly Moderately Very Extremely
2	Web-based Databases (e.g., ERIC, Ingenta, netLibrary, Lexis Nexis, Web of Knowledge, and/or Ebsco Host, etc.)	Not At All Slightly Moderately Very Extremely
3	Software that can be used to create or link to web-based learning content creation ((word processing software (e.g., Word, Word Perfect and/or Write, etc.), Spreadsheet Software (e.g. Lotus, Excel and/or Appleworks, etc.), Database Management Systems (e.g. dBase, Appleworks and/or Access, etc.))	Not At All Slightly Moderately Very Extremely
4	E-learning Content Creation software packages (e.g., Macromedia Authorware, Dreamweaver Adobe Acrobat, and/or Microsoft Frontpage, etc.)	Not At All Slightly Moderately Very Extremely
5	Languages that can be used to create or link to e-learning content creation (e.g., XML, HTML and/or VRML, etc.)	Not At All Slightly Moderately Very Extremely
6	Learning Objects (e.g., Knowledge Objects) and/or Shareable Courseware (or Content) Object Reference Models (SCORM)	Not At All Slightly Moderately Very Extremely
7	Whiteboard Spaces, Bulletin Boards	Not At All Slightly Moderately Very Extremely
8	Streaming Media (e.g., Teleconferencing, podcasting)	Not At All Slightly Moderately Very Extremely
9	Collaborative Learning Tools (e.g., chat rooms, threaded discussion forums, wikis, blogs)	Not At All Slightly Moderately Very Extremely

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<b>Question Number</b>	<b>Question: How knowledgeable are you about the following?</b>	<b>Answers</b>
10	Learning Management Systems (e.g., Blackboard, WebCT, Moodle, Sakai) or Learning Portals	Not At All Slightly Moderately Very Extremely

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**APPENDIX D: CLARK-KOTRLIK PERCEIVED LEVEL  
OF SUPPORT FOR E-INSTRUCTION SCALE©**

Table 22. Clark-Kotrlík Perceived Level of Support for E-Instruction Scale (CKLOS©)

Question Number	Question	Answers
1	Do you have release time/reduced teaching load to prepare web-based materials/courses?	Yes No
2	Do you have a graduate or teaching assistant to help you specifically with e- learning?	Yes No
3	Do you have instructional designers/curriculum developers to help with the design of web-based materials?	Yes No
4	Are adequate web-based institutional research resources available to help you specifically with e-learning courses (e.g., library holdings that are accessible by web, technical support, etc)?	Yes No
5	Are web-based computer technical support resources available for your students?	Yes No
6	If so, are these web-based resources available to your students seven days a week?	Yes No
7	Are web-based computer technical support resources available for you?	Yes No
8	If so, are these web-based resources available to you seven days a week?	Yes No
9	Do you have any sources of funding for e-learning course technology training/conferences?	Yes No
10	Do you receive adequate funding for e-learning course technology events/work?	Yes No

**APPENDIX E: BARTLETT-KOTRLIK INVENTORY OF SELF-DIRECTED  
LEARNING SCALE© (SHORT FORM)**

Table 23. Bartlett-Kotrlík Inventory of Self-Directed Learning Scale (BISL©) (Short Form)

<b>Question Number</b>	<b>Question</b>	<b>Answers</b>	<b>Info<sup>a</sup></b>
1	I take time to read about new materials in my field of study.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	TM
2	I take time to learn new material in my field.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	TM
3	I take time to finish learning the new material that I study.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	TM
4	It is important to me that others can see that I am effective at what I do.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	XtrnM
5	I want my peers to respect me and my work.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	XtrnM
6	I enjoy receiving praise for my work.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	XtrnM

<b>Question Number</b>	<b>Question</b>	<b>Answers</b>	<b>Info<sup>a</sup></b>
7	My administrator provides time for me to learn information related to my job.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	ExS
8	My administrator provides funding for me to learn information related to my job.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	ExS
9	My administrator provides support by being a source of information.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	ExS
10	I'm certain I can learn new skills my job requires.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	PSEW
11	I perceive myself as having strong work related knowledge.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	PSEW
12	I'm confident I can understand the most complex material in my job.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	PSEW

<b>Question Number</b>	<b>Question</b>	<b>Answers</b>	<b>Info<sup>a</sup></b>
13	I am successful in my job.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	P
14	It's my responsibility to learn new material for my job.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	P
15	I keep up with my duties.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	P
16	When learning material for my job, I often try to explain the material to colleagues.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	PL
17	My co-workers encourage me to learn new work-related material.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	PL
18	I'm involved with peer learning when I learn at work.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	PL

<b>Question Number</b>	<b>Question</b>	<b>Answers</b>	<b>Info<sup>a</sup></b>
19	My organization encourages opportunities to learn.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	SW
20	My supervisors/administrators encourage me to learn new topics related to my job.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	SW
21	I have the power to make changes in my workplace.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	SW
22	I prefer to use computers to learn new material.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	ATT
23	I prefer to use technology in my job.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	ATT
24	I regularly read materials on the Internet.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	ATT

<b>Question Number</b>	<b>Question</b>	<b>Answers</b>	<b>Info<sup>a</sup></b>
25	Colleagues in my organization would rate me excellent in my job performance.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	OPR
26	My immediate supervisor would rate me as excellent on my work evaluations.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	OPR
27	My department colleagues would rate me excellent in my job performance.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	OPR
28	I set goals to learn new materials.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	GS
29	I strive to fulfill all goals I set even though some are difficult.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	GS
30	In my job, I can identify new materials I need to learn.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	GS

<b>Question Number</b>	<b>Question</b>	<b>Answers</b>	<b>Info<sup>a</sup></b>
31	When I can not understand material for this job, I will ask another colleague for help.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	HS
32	When learning new material for my job, I ask others to clarify concepts that I don't understand.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	HS
33	I try to identify colleagues I can ask for help if necessary.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	HS
34	In my job, I prefer tasks that arouse my curiosity, even if they are difficult to learn.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	NtrnM
35	In my job, I prefer tasks that challenge me so I can learn new things.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	NtrnM
36	In my job, I choose tasks that I can learn from, even if they don't guarantee a reward.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	NtrnM

<sup>a</sup>Constructs measured: TM=Time Management, XtrnM=Extrinsic Motivation, ExS=External Support, PSEW=Performance and Self-Efficacy of Work, PL=Peer Learning, SW=Supportive Workplace, ATT=Attitude Toward Technology, OPR=Other Performance Rating, GS=Goal Setting, HS=Help Seeking, NtrnM=Intrinsic Motivation

## APPENDIX F: KOTRLIK-REDMANN TEACHER SELF-EFFICACY SCALE

Table 24. Kotrlik-Redmann Teacher Self-Efficacy Scale (KRTES)

Question Number	Question	Answers
1	I am among the best teachers at my school.	Strongly Disagree Disagree Undecided Agree Strongly Agree
2	I am effective in teaching the content in my courses.	Strongly Disagree Disagree Undecided Agree Strongly Agree
3	My students would rate me as one of the best teachers they have ever had.	Strongly Disagree Disagree Undecided Agree Strongly Agree
4	The other teachers in my school would say that I am one of the best teachers at this school.	Strongly Disagree Disagree Undecided Agree Strongly Agree
5	My students would evaluate my courses as excellent.	Strongly Disagree Disagree Undecided Agree Strongly Agree
6	I am a role model for other teachers in my school.	Strongly Disagree Disagree Undecided Agree Strongly Agree
7	My department head would say that I am one of the best teachers in this department.	Strongly Disagree Disagree Undecided Agree Strongly Agree

**APPENDIX G: KOTRLIK-REDMANN TECHNOLOGY  
ANXIETY SCALE (SHORT FORM)**

Table 25. Kotrlik-Redmann Technology Anxiety Scale (KRTAS) (Short Form)

Question Number	Question	Answers
1	How anxious do you feel when you are faced with using new technology?	No Anxiety Minor Anxiety Moderate Anxiety Moderately High Anxiety Very High Anxiety
2	How anxious do you feel when you think about your technology skills compared to the skills of other teachers?	No Anxiety Minor Anxiety Moderate Anxiety Moderately High Anxiety Very High Anxiety
3	How anxious do you feel when you try to learn technology related skills?	No Anxiety Minor Anxiety Moderate Anxiety Moderately High Anxiety Very High Anxiety
4	How anxious do you feel when you try to understand new technology?	No Anxiety Minor Anxiety Moderate Anxiety Moderately High Anxiety Very High Anxiety
5	How anxious do you feel when you try to use technology?	No Anxiety Minor Anxiety Moderate Anxiety Moderately High Anxiety Very High Anxiety
6	How anxious do you feel when you fear you may break or damage the technology you are using?	No Anxiety Minor Anxiety Moderate Anxiety Moderately High Anxiety Very High Anxiety
7	How anxious do you feel when you hesitate to use technology for fear of making mistakes you cannot correct?	No Anxiety Minor Anxiety Moderate Anxiety Moderately High Anxiety Very High Anxiety

## **APPENDIX H: REQUEST FOR PARTICIPATION BY CONTENT EXPERT**

Dr. (Content Experts Name),

I am a doctoral candidate at LSU in Baton Rouge, LA. I have identified you as someone who would make an excellent content expert for the survey instrument I will be using for my dissertation study. I would like to know if you would be interested? My dissertation is on the technological development of e-faculty.

Thank you for your time and consideration,

Myriah Clark  
(Contact Information)

**APPENDIX I: E-MAIL DIRECTIONS GIVEN TO CONTENT  
EXPERTS FOR CONTENT VALIDITY RATING**

Dr. (Content Experts Name),

February 8, 2007

Thank you for agreeing to review the E-faculty Technology Development Survey (made up of 6 scales). I have included a copy of the research model created for this study to put the survey in perspective. After reviewing the instrument please record your rating to the left of each item directly on the survey using the following scale:

(1) Not Relevant (2) Fairly Relevant (3) Relevant (4) Very Relevant

I would also encourage you to provide any additional comments regarding the item directly onto the instrument. You may return the survey to me electronically at [mclar13@lsu.edu](mailto:mclar13@lsu.edu).

Thank you for supporting this research project.

Sincerely,

Myriah Clark  
(Contact Information)

**APPENDIX J: E-FACULTY TECHNOLOGY DEVELOPMENT SURVEY AS SENT TO  
CONTENT EXPERTS FOR CONTENT VALIDITY RATING (SCALE 1)**

Table 26. Personal Characteristics Items

<b>Content Expert Rating</b>	<b>Question Number</b>	<b>Question</b>	<b>Answers</b>
	1	What is your gender?	Male Female
	2	What is your age?	1-9,0-9
	3	What is your academic rank?	Professor Associate Professor Assistant Professor Instructor Other
	4	Is training available to you through your organization?	Yes No
	5	How many clock hours of training geared toward web-based instructional skills have you taken in the past 2 years? <sup>a</sup>	Drop down list to 51 or more

Note. A question was added to this scale (question 4) as shown in Appendix B based on input from graduate committee.

<sup>a</sup>Question number five was split into two questions (questions 6 and7) as shown in Appendix B based on input from content experts.

**APPENDIX K: E-FACULTY TECHNOLOGY DEVELOPMENT SURVEY AS SENT TO  
CONTENT EXPERTS FOR CONTENT VALIDITY RATING (SCALE 2)**

Table 27. Clark-Kotrlik Perceived Level of Support for E-Instruction Scale

<b>Content Expert Rating</b>	<b>Question Number</b>	<b>Question</b>	<b>Answers</b>
	1	Is there time allotted for professional development related to web course development and management at your institution?	Yes No
	2	Do you have a graduate or teaching assistant to help you specifically with web-based learning? <sup>a</sup>	Yes No
	3	Are adequate institutional research resources available to help you specifically with web-based courses (e.g., library holdings that are accessible by web, technical support, etc)?	Yes No
	4	Are web-based computer technical support sources available for the students?	Yes No
	5	If so, are these services available to the students seven days a week?	Yes No
	6	Are web-based computer technical support sources available for you?	Yes No
	7	If so, are these services available to you seven days a week?	Yes No
	8	Do you have any sources of funding for web-based course technology training/conferences?	Yes No
	9	Do you receive adequate funding for web-based course technology events/work?	Yes No

Note. Wording of all items except question number seven were slightly reworded in the final instrument based on input from content experts.

<sup>a</sup>Question number two was split into two questions (questions 2 and 3) as shown in Appendix D based on input from content experts. The researcher made the decision to apply the same weight to the two questions as the content experts had recommended for question number two because the two questions sought information on human resources that had very similar functions.

**APPENDIX L: E-FACULTY TECHNOLOGY DEVELOPMENT SURVEY AS SENT TO  
CONTENT EXPERTS FOR CONTENT VALIDITY RATING (SCALE 3)**

Table 28. Bartlett-Kotrlík Inventory of Self-Directed Learning Scale (BISL©) (Short Form)

<b>Content Expert Rating</b>	<b>Question Number</b>	<b>Question</b>	<b>Answers</b>	<b>Info<sup>a</sup></b>
	1	I take time to read about new materials in my field of study.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	TM
	2	I take time to learn new material in my field.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	TM
	3	I take time to finish learning the new material that I study.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	TM
	4	It is important to me that others can see that I am effective at what I do.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	XtrnM
	5	I want my peers to respect me and my work.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	XtrnM
	6	I enjoy receiving praise for my work.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	XtrnM

<b>Content Expert Rating</b>	<b>Question Number</b>	<b>Question</b>	<b>Answers</b>	<b>Info<sup>a</sup></b>
	7	My administrator provides time for me to learn information related to my job.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	ExS
	8	My administrator provides funding for me to learn information related to my job.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	ExS
	9	My administrator provides support by being a source of information.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	ExS
	10	I'm certain I can learn new skills my job requires.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	PSEW
	11	I perceive myself as having strong work related knowledge.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	PSEW
	12	I'm confident I can understand the most complex material in my job.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	PSEW

<b>Content Expert Rating</b>	<b>Question Number</b>	<b>Question</b>	<b>Answers</b>	<b>Info<sup>a</sup></b>
	13	I am successful in my job.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	P
	14	It's my responsibility to learn new material for my job.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	P
	15	I keep up with my duties.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	P
	16	When learning material for my job, I often try to explain the material to colleagues.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	PL
	17	My co-workers encourage me to learn new work-related material.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	PL
	18	I'm involved with peer learning when I learn at work.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	PL

<b>Content Expert Rating</b>	<b>Question Number</b>	<b>Question</b>	<b>Answers</b>	<b>Info<sup>a</sup></b>
	19	My organization encourages opportunities to learn.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	SW
	20	My supervisors/administrators encourage me to learn new topics related to my job.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	SW
	21	I have the power to make changes in my workplace.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	SW
	22	I prefer to use computers to learn new material.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	ATT
	23	I prefer to use technology in my job.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	ATT
	24	I regularly read materials on the Internet.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	ATT

<b>Content Expert Rating</b>	<b>Question Number</b>	<b>Question</b>	<b>Answers</b>	<b>Info<sup>a</sup></b>
	25	Colleagues in my organization would rate me excellent in my job performance.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	OPR
	26	My immediate supervisor would rate me as excellent on my work evaluations.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	OPR
	27	My department colleagues would rate me excellent in my job performance.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	OPR
	28	I set goals to learn new materials.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	GS
	29	I strive to fulfill all goals I set even though some are difficult.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	GS
	30	In my job, I can identify new materials I need to learn.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	GS

<b>Content Expert Rating</b>	<b>Question Number</b>	<b>Question</b>	<b>Answers</b>	<b>Info<sup>a</sup></b>
	31	When I can not understand material for this job, I will ask another colleague for help.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	HS
	32	When learning new material for my job, I ask others to clarify concepts that I don't understand.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	HS
	33	I try to identify colleagues I can ask for help if necessary.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	HS
	34	In my job, I prefer tasks that arouse my curiosity, even if they are difficult to learn.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	NtrnM
	35	In my job, I prefer tasks that challenge me so I can learn new things.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	NtrnM
	36	In my job, I choose tasks that I can learn from, even if they don't guarantee a reward.	True of Me Most of the Time Often True of Me Seldom True of Me Undecided Seldom Not True of Me Often Not True of Me Not True of Me Most of the Time	NtrnM

<sup>a</sup>Constructs measured: TM=Time Management, XtrnM=Extrinsic Motivation, ExS=External Support, PSEW=Performance and Self-Efficacy of Work, PL=Peer Learning, SW=Supportive Workplace, ATT=Attitude Toward Technology, OPR=Other Performance Rating, GS=Goal Setting, HS=Help Seeking, NtrnM=Intrinsic Motivation

**APPENDIX M: E-FACULTY TECHNOLOGY DEVELOPMENT SURVEY AS SENT TO  
CONTENT EXPERTS FOR CONTENT VALIDITY RATING (SCALE 4)**

Table 29. Kotrlik-Redmann Technology Anxiety Scale (KRTAS)

<b>Content Expert Rating</b>	<b>Question Number</b>	<b>Question</b>	<b>Answers</b>
	1	How anxious do you feel when you are faced with using new technology?	No Anxiety Minor Anxiety Moderate Anxiety Moderately High Anxiety Very High Anxiety
	2	How anxious do you feel when you think about your technology skills compared to the skills of other teachers?	No Anxiety Minor Anxiety Moderate Anxiety Moderately High Anxiety Very High Anxiety
	3	How anxious do you feel when you try to learn technology related skills?	No Anxiety Minor Anxiety Moderate Anxiety Moderately High Anxiety Very High Anxiety
	4	How anxious do you feel when you try to understand new technology?	No Anxiety Minor Anxiety Moderate Anxiety Moderately High Anxiety Very High Anxiety
	5	How anxious do you feel when you try to use technology?	No Anxiety Minor Anxiety Moderate Anxiety Moderately High Anxiety Very High Anxiety
	6	How anxious do you feel when you fear you may break or damage the technology you are using?	No Anxiety Minor Anxiety Moderate Anxiety Moderately High Anxiety Very High Anxiety
	7	How anxious do you feel when you hesitate to use technology for fear of making mistakes you cannot correct?	No Anxiety Minor Anxiety Moderate Anxiety Moderately High Anxiety Very High Anxiety

**APPENDIX N: E-FACULTY TECHNOLOGY DEVELOPMENT SURVEY AS SENT TO  
CONTENT EXPERTS FOR CONTENT VALIDITY RATING (SCALE 5)**

Table 30. Kotrlik-Redmann Teacher Self-Efficacy Scale (KRTES)

<b>Content Expert Rating</b>	<b>Question Number</b>	<b>Question</b>	<b>Answers</b>
	1	I am among the best teachers at my school.	Strongly Disagree Disagree Undecided Agree Strongly Agree
	2	I am effective in teaching the content in my courses.	Strongly Disagree Disagree Undecided Agree Strongly Agree
	3	My students would rate me as one of the best teachers they have ever had.	Strongly Disagree Disagree Undecided Agree Strongly Agree
	4	The other teachers in my school would say that I am one of the best teachers at this school.	Strongly Disagree Disagree Undecided Agree Strongly Agree
	5	My students would evaluate my courses as excellent.	Strongly Disagree Disagree Undecided Agree Strongly Agree
	6	I am a role model for other teachers in my school.	Strongly Disagree Disagree Undecided Agree Strongly Agree
	7	My department head would say that I am one of the best teachers in this department.	Strongly Disagree Disagree Undecided Agree Strongly Agree

**APPENDIX O: E-FACULTY TECHNOLOGY DEVELOPMENT SURVEY AS SENT TO  
CONTENT EXPERTS FOR CONTENT VALIDITY RATING (SCALE 6)**

Table 31. Clark-Kotrlík E-Faculty Technology Development Scale (CKEDS©)

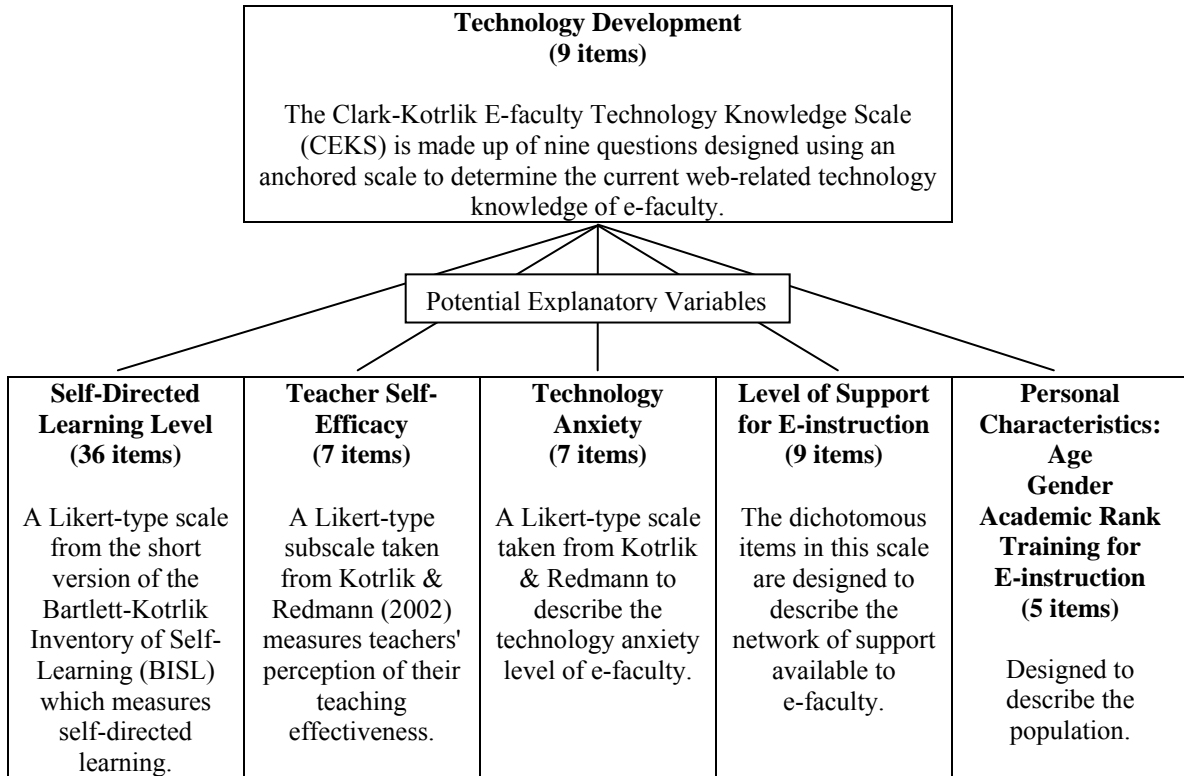
<b>Content Expert Rating</b>	<b>Question Number</b>	<b>Question: How knowledgeable are you about the following?</b>	<b>Answers</b>
	1	Electronic Mail (e-mail)	Not At All Slightly Moderately Very Extremely
	2	Web-based Databases (e.g., ERIC, Ingenta, netLibrary, Lexis Nexis, Web of Knowledge, and/or Ebsco Host, etc.)	Not At All Slightly Moderately Very Extremely
	3	Software that can be used to create or link to web-based learning content creation ((word processing software (e.g., Word, Word Perfect and/or Write, etc.), Spreadsheet Software (e.g. Lotus, Excel and/or Appleworks, etc.), Database Management Systems (e.g. dBase, Appleworks and/or Access, etc.))	Not At All Slightly Moderately Very Extremely
	4	Web-Based Learning Content Creation software packages (e.g., Macromedia Authorware, Dreamweaver Adobe Acrobat, and/or Microsoft Frontpage, etc.) <sup>a</sup>	Not At All Slightly Moderately Very Extremely
	5	Languages that can be used to create or link to web-based learning content creation (e.g., XML, HTML and/or VRML, etc.) <sup>a</sup>	Not At All Slightly Moderately Very Extremely
	6	Learning Objects (e.g., Knowledge Objects) and/or Shareable Courseware (or Content) Object Reference Models (SCORM)	Not At All Slightly Moderately Very Extremely
	7	Chat rooms, Threaded Discussions, Whiteboard Spaces, Bulletin Boards <sup>b</sup>	Not At All Slightly Moderately Very Extremely
	8	Streaming Media (e.g., Teleconferencing) <sup>a</sup>	Not At All Slightly Moderately Very Extremely

<b>Content Expert Rating</b>	<b>Question Number</b>	<b>Question: How knowledgeable are you about the following?</b>	<b>Answers</b>
	9	Collaborative Learning Network (e.g., Learning Portals) <sup>a</sup>	Not At All Slightly Moderately Very Extremely

<sup>a</sup>Question wording of item was slightly reworded in the final instrument based on input from graduate committee or content experts.

<sup>b</sup>Question number seven was split into two questions (questions 7 and 9) as shown in Appendix C based on input from content experts.

**APPENDIX P: RESEARCH MODEL AS SENT TO CONTENT EXPERTS**



**Figure 3. Technology Development for E-faculty – Working Model**

**APPENDIX Q: CONTENT EXPERT RATINGS OF PERSONAL CHARACTERISTICS ITEMS**

Table 32. Content Expert Ratings of Personal Characteristics Items

Question Number	Question	Content Expert #1	Content Expert #2	Content Expert #3	Content Expert #4	Content Expert #5	CVI Rating
5	Is training available to you through your organization?	4	4	4		4	1.00
3	What is your academic rank?	4	4	4		3	1.00
6	How many clock hours of training geared toward web-based instructional skills have you taken in the past 2 years? <sup>a</sup>	4	3	4		3	1.00
2	What is your age?	4	4	4		2	.75
1	What is your gender?	4	3	4		1	.75
4	What is your academic department? <sup>b</sup>						
6	How many clock hours have you spent in formal training for web-based instructional skills development or improvement in the past 2 years? <sup>a</sup>						
7	How many clock hours have you spent in self-study for web-based instructional skills development or improvement in the past 2 years? <sup>a</sup>						

<sup>a</sup>Question 6 was altered (split into two questions) on the suggestion of the graduate committee; the statement in row three was included in the pilot test and expert ratings process, while the statements in the last two rows were included in the final research instrument. <sup>b</sup>Question added on suggestion of committee.

## APPENDIX R: CONTENT EXPERT RATINGS OF LEVEL OF SUPPORT FOR E-INSTRUCTION SCALE

Table 33. Content Expert Ratings of Level of Support for E-Instruction Scale

Question Number	Question	Content Expert #1	Content Expert #2	Content Expert #3	Content Expert #4	Content Expert #5	CVI Rating
1	Do you have release time/reduced teaching load to prepare web-based materials/courses? <sup>a</sup>	4	4	3	4	3	1.00
6	Are web-based computer technical support resources available for you? <sup>a</sup>	3		4	4	3	1.00
8	Do you have any sources of funding for e-learning course technology training/conferences?	4		3	4	3	1.00
2	Do you have a graduate or teaching assistant to help you specifically with e-learning?	3		3	4	3	1.00
3	Are adequate web-based institutional research resources available to help you specifically with e-learning courses (e.g., library holdings that are accessible by web, technical support, etc)?	3		3	4	3	1.00
7	If so, are these web-based resources available to you seven days a week? <sup>a</sup>	3		3	4	3	1.00
10	Do you receive adequate funding for web-based course technology events/work?	4		3	3	3	1.00
4	Are web-based computer technical support resources available for the students? <sup>a</sup>	4		1	4	3	.75
5	If so, are these web-based resources available to your students seven days a week? <sup>a</sup>	3		1	4	3	.75
9	Do you have any sources of funding for e-learning course technology training/conferences? <sup>a</sup>						

<sup>a</sup>question reworded on advice from content experts; wording shown was used in the final research instrument.

**APPENDIX S: CONTENT EXPERT RATINGS OF BARTLETT-KOTRLIK INVENTORY  
OF SELF-DIRECTED LEARNING SCALE (BISL©) (SHORT FORM)**

Table 34. Content Expert Ratings of Bartlett-Kotrlik Inventory of Self-Directed Learning Scale (BISL©) (Short Form)

<b>Question Number</b>	<b>Question</b>	<b>Content Expert #1</b>	<b>Content Expert #2</b>	<b>Content Expert #3</b>	<b>Content Expert #4</b>	<b>Content Expert #5</b>	<b>CVI Rating</b>
13	It's my responsibility to learn new material for my job.	3	4	4	4	3	1.00
7	My administrator provides time for me to learn information related to my job.	3	4	3	4	3	1.00
8	My administrator provides funding for me to learn information related to my job.	3	3	3	4	4	1.00
18	My organization encourages opportunities to learn.	3	4	3	4	3	1.00
19	My supervisors/administrators encourage me to learn new topics related to my job.	3	4	3	4	3	1.00
9	I'm certain I can learn new skills my job requires.	3	4	3	3	3	1.00
28	In my job, I can identify new materials I need to learn.	3	3	3	4	3	1.00
21	I prefer to use technology in my job.	3	3	3	3	3	1.00
26	I set goals to learn new materials.	3	3	3	4	3	1.00
20	I have the power to make changes in my workplace.	3	3	3	3	3	1.00
31	I try to identify colleagues I can ask for help if necessary.	3	4	2	4	3	.80
10	I perceive myself as having strong work related knowledge.	2	3	4	3	3	.80
29	When I can not understand material for this job, I will ask another colleague for help.	3	3	2	4	3	.80
30	When learning new material for my job, I ask others to clarify concepts that I don't understand.	3	3	2	4	3	.80
11	I'm confident I can understand the most complex material in my job.	2	3	3	3	3	.80
16	My co-workers encourage me to learn new work-related material.	3	4	1	4	3	.80

Question Number	Question	Content Expert #1	Content Expert #2	Content Expert #3	Content Expert #4	Content Expert #5	CVI Rating
32	In my job, I prefer tasks that arouse my curiosity, even if they are difficult to learn.	3	3	2	3	3	.80
33	In my job, I prefer tasks that challenge me so I can learn new things.	3	3	2	3	3	.80
34	In my job, I choose tasks that I can learn from, even if they don't guarantee a reward.	3	3	2	3	3	.80
21	I prefer to use computers to learn new material.	3	3	1	4	3	.80
2	I take time to learn new material in my field.	2	4	4	1	3	.60
15	When learning material for my job, I often try to explain the material to colleagues.	2	3	2	4	3	.60
27	I strive to fulfill all goals I set even though some are difficult.	2	4	1	4	3	.60
1	I take time to read about new materials in my field of study.	2	3	4	1	3	.60
14	I keep up with my duties.	2	2	3	3	3	.60
12	I am successful in my job.	2	3	1	3	3	.60
17	I'm involved with peer learning when I learn at work.	3	2	1	4	3	.60
22	I regularly read materials on the Internet.	3	2	1	3	3	.60
8	My administrator provides support by being a source of information.	2	3	2	4	2	.40
3	I take time to finish learning the new material that I study.	2	2	4	1	3	.40
5	I want my peers to respect me and my work.	2	4	2	2	3	.40
23	Colleagues in my organization would rate me excellent in my job performance.	2	3	1	4	2	.40
24	My immediate supervisor would rate me as excellent on my work evaluations.	2	3	1	4	2	.40
25	My department colleagues would rate me excellent in my job performance.	2	3	1	4	2	.40
4	It is important to me that others can see that I am effective at what I do.	2	4	2	1	2	.20
6	I enjoy receiving praise for my work.	1	4	1	2	2	.20

**APPENDIX T: CONTENT EXPERT RATINGS OF KOTRLIK-REDMANN  
TECHNOLOGY ANXIETY SCALE (SHORT FORM)**

Table 35. Content Expert Ratings of Kotrlik-Redmann Technology Anxiety Scale (KRTAS) (Short Form)

<b>Question Number</b>	<b>Question</b>	<b>Content Expert #1</b>	<b>Content Expert #2</b>	<b>Content Expert #3</b>	<b>Content Expert #4</b>	<b>Content Expert #5</b>	<b>CVI Rating</b>
1	How anxious do you feel when you are faced with using new technology?	4	4	4	4	3	1.00
3	How anxious do you feel when you try to learn technology related skills?	4	4	4	4	3	1.00
4	How anxious do you feel when you try to understand new technology?	4	4	4	4	3	1.00
5	How anxious do you feel when you try to use technology?	4	3	4	4	3	1.00
7	How anxious do you feel when you hesitate to use technology for fear of making mistakes you cannot correct?	4	3	4	4	3	1.00
6	How anxious do you feel when you fear you may break or damage the technology you are using?	4	3	3	3	3	1.00
2	How anxious do you feel when you think about your technology skills compared to the skills of other teachers?	4	4	1	4	3	.80

**APPENDIX U: CONTENT EXPERT RATINGS OF KOTRLIK-REDMANN  
TEACHER SELF-EFFICACY SCALE (SHORT FORM)**

Table 36. Content Expert Ratings of Kotrlik-Redmann Teacher Self-Efficacy Scale (KRTES) (Short Form)

<b>Question Number</b>	<b>Question</b>	<b>Content Expert #1</b>	<b>Content Expert #2</b>	<b>Content Expert #3</b>	<b>Content Expert #4</b>	<b>Content Expert #5</b>	<b>Average per question</b>
2	I am effective in teaching the content in my courses.	3	4	4	3	3	1.00
5	My students would evaluate my courses as excellent.	3	4	4	3	2	.80
6	I am a role model for other teachers in my school.	4	4	3	3	2	.80
3	My students would rate me as one of the best teachers they have ever had.	3	4	3	3	2	.80
4	The other teachers in my school would say that I am one of the best teachers at this school.	3	4	3	3	2	.80
7	My department head would say that I am one of the best teachers in this department.	3	4	3	3	2	.80
1	I am among the best teachers at my school.	3	4	4	1	2	.60

**APPENDIX V: CONTENT EXPERT RATINGS OF CLARK-KOTRLIK  
E-FACULTY TECHNOLOGY DEVELOPMENT©**

Table 37. Content Expert Ratings of Clark-Kotrlik E-faculty Technology Development (CKEDS©)

<b>Question Number</b>	<b>Question</b>	<b>Content Expert #1</b>	<b>Content Expert #2</b>	<b>Content Expert #3</b>	<b>Content Expert #4</b>	<b>Content Expert #5</b>	<b>CVI Rating</b>
7	Chat rooms, Threaded Discussions, Whiteboard Spaces, Bulletin Boards	4	4	4	4	3	1.00
4	Web-Based Learning Content Creation software packages (e.g., Macromedia Authorware, Dreamweaver Adobe Acrobat, and/or Microsoft Frontpage, etc.)	4	3	4	4	3	1.00
6	Learning Objects (e.g., Knowledge Objects) and/or Shareable Courseware (or Content) Object Reference Models (SCORM)	4	3	4	4	3	1.00
9	Collaborative Learning Network (e.g., Learning Portals)	4	4	4	4	2	.80
5	Languages that can be used to create or link to web-based learning content creation (e.g., XML, HTML and/or VRML, etc.)	4	2	4	4	3	.80
1	Electronic Mail (e-mail)	4	3	4	1	3	.80
8	Streaming Media (e.g., Teleconferencing)	4	2	4	4	2	.60
2	Web-based Databases (e.g., ERIC, Ingenta, netLibrary, Lexis Nexis, Web of Knowledge, and/or Ebsco Host, etc.)	4	2	4	1	3	.60
3	Software that can be used to create or link to web-based learning content creation ((word processing software (e.g., Word, Word Perfect and/or Write, etc.), Spreadsheet Software (e.g. Lotus, Excel and/or Appleworks, etc.), Database Management Systems (e.g. dBase, Appleworks and/or Access, etc.))	4	2	4	1	3	.60

**APPENDIX W: E-MAIL SENT TO PILOT POPULATION TO INVITE  
THEM TO PARTICIPATE IN FORTHCOMING STUDY**

Dear Professors,

Next week I will be sending you a survey. I am conducting a research study in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Louisiana State University. The purpose of this study will be to determine whether the technology knowledge and skills of e-faculty are related to their instructional practices and self-perceived effectiveness in web-based instructional environments.

Your participation in the study will help me to establish the reliability and face validity of the instrument designed specifically for this study. I would like you to answer each question on the survey, but you have the right to leave any question unanswered if you choose. Your responses will be kept anonymous. I encourage you to participate in this research study. Thank you in advance for your support of my research project.

Sincerely,  
Myriah Clark  
Doctoral Candidate  
Louisiana State University

**APPENDIX X: E-MAIL INVITATION SENT TO E-FACULTY PILOT  
POPULATION FOR PARTICIPATION IN PILOT STUDY**

Dear Professors,

I am conducting a study as part of my graduate studies at LSU. The purpose of this study is to determine whether the technology development of e-faculty is related to their instructional practices and self-perceived effectiveness in web-based instructional environments. You will find the link to the survey at the bottom of this e-mail. It will take approximately 10 minutes to complete the survey. A progress meter at the bottom of each page will let you know how much of the survey you have completed.

Your participation in the study will help me to establish the reliability and face validity of the instrument designed specifically for this study. I hope you will answer each question on the survey. Your responses will be anonymous. Thank you for your support of my research. If you have questions e-mail me at [mclar13@lsu.edu](mailto:mclar13@lsu.edu) or call me at (phone number).

Sincerely,

Myriah Clark

<http://websurveoyr.com/l.dll/JGs61C8C6B6C7lcRD9U2456J.htm>

Note: Your privacy will be maintained and your responses will be kept confidential. You will not be identified in any way in research reports or presentations. By completing this web survey, you are agreeing to participate in this study.

## **APPENDIX Y: DIRECTIONS FOR EACH OF THE SECTIONS OF THE E-FACULTY TECHNOLOGY DEVELOPMENT SURVEY**

Personal Characteristics Items. Questions 1-7 relate to demographic data. Choose the response that best characterizes you.

Level of Support for E-instruction Scale. Questions 8-17 are designed to describe the network of support available to e-faculty. For each question, select the answer that best describes the level of support available to you as an e-faculty member.

Bartlett-Kotrlik Inventory of Self-Directed Learning Scale (BISL) (Short Form). Questions 18-53 are designed to measure self-directed learning. For each question, select the answer which best describes you.

Kotrlik-Redmann Technology Anxiety Scale (KRTAS). Questions 54-60 are designed to describe technology anxiety levels. For each question, please select the answer that describes your feelings the best.

Teacher Self-Efficacy Scale. Questions 61-67 are designed to describe teacher self-efficacy. For each question, choose the answer that describes you the best.

Clark-Kotrlik E-faculty Technology Development Scale (CKEDS). Question 68 is designed to describe the current e-instruction technology development of e-faculty. Please select the response for each category that best describes your knowledge of the item.

**APPENDIX Z: E-MAIL INVITATION SENT TO PILOT POPULATION  
NON-RESPONDENTS FOR PARTICIPATION IN PILOT STUDY**

Dear Professor (E-faculty member name),

I have noticed that you have not responded to the survey I am conducting as part of my graduate studies at LSU and wanted to attempt to sway you to participate again. The purpose of this study is to determine whether the technology development of e-faculty is related to their instructional practices and self-perceived effectiveness in web-based instructional environments. You will find the link to the survey at the bottom of this e-mail. It will take approximately 10 minutes to complete the survey. A progress meter at the bottom of each page will let you know how much of the survey you have completed.

Your participation in the study will help me to establish the reliability and face validity of the instrument designed specifically for this study. I hope you will answer each question on the survey. Your responses will be anonymous. Thank you for your support of my research. If you have questions e-mail me at [mclar13@lsu.edu](mailto:mclar13@lsu.edu) or call me at (phone number).

Sincerely, Myriah Clark

<http://websurveyor.com/1.dll/JGs61C8C6B6B5lyYD9U2457J.htm>

Note: Your privacy will be maintained and your responses will be kept confidential. You will not be identified in any way in research reports or presentations. By completing this web survey, you are agreeing to participate in this study. If you have questions about your rights as a study participant or other concerns, contact Robert C. Mathews, Institutional Review Board Chairman, 203 B-1 David Boyd Hall, (225) 578-8692.

**APPENDIX AA: E-MAIL INVITATION SENT TO SAMPLE POPULATION  
TO INVITE THEIR PARTICIPATION IN THE FORTHCOMING STUDY**

Dear Professor (E-faculty member name),

I am writing to ask you to participate in a study of the e-learning knowledge and skills of university e-faculty. The study will also address faculty perceptions of university support for e-learning. This study is being conducted as a part of my doctoral dissertation research at LSU.

I will send you the Internet link for the survey next week. I ask that you answer each question on the survey, but you have the right to leave any question unanswered if you choose. The survey will take about 10 minutes of your time and your responses will be kept anonymous. In appreciation for your assistance, I will send you a summary of the findings after analyzing the data gathered from the e-surveys.

Thank you in advance for your support of my dissertation research. Please let me know if you have questions.

Sincerely,  
Myriah Clark  
Doctoral Candidate  
Human Resource Education  
Louisiana State University

**APPENDIX BB: E-MAIL INVITATION SENT TO SAMPLE  
POPULATION FOR PARTICIPATION IN STUDY**

Dear Professor (E-faculty member name),

As my previous e-mail mentioned, I am writing to ask you to participate in a study of the e-learning knowledge and skills of university e-faculty. The study will also address faculty perceptions of university support for e-learning. This study is being conducted as a part of my doctoral dissertation research at LSU. You will find the link to the survey at the bottom of this e-mail. It will take approximately 10 minutes to complete the survey. A progress meter at the bottom of each page will let you know how much of the survey you have completed. I hope you will answer each question on the survey. Your responses will be anonymous. In appreciation for your assistance, I will send you a summary of the findings after analyzing the data gathered from the e-surveys.

Thank you for your support of my research! If you have questions e-mail me at [mclar13@lsu.edu](mailto:mclar13@lsu.edu) or call me at (phone number).

Sincerely,  
Myriah Clark  
Doctoral Candidate  
Human Resource Education  
Louisiana State University

<http://websurveyor.com/l.dll/JGs61C8D7C870IYD9XU2463J.htm>

Note: Your privacy will be maintained and your responses will be kept confidential. You will not be identified in any way in research reports or presentations. By completing this web survey, you are agreeing to participate in this study. If you have questions about your rights as a study participant or other concerns, contact Robert C. Mathews, Institutional Review Board Chairman, 203 B-1 David Boyd Hall, (225) 578-8692.

**APPENDIX CC: REMINDER E-MAIL INVITATION SENT TO  
SAMPLE POPULATION FOR PARTICIPATION IN STUDY**

Dear Professor (E-faculty member name),

I have noticed that you have not responded to the survey I am conducting as part of my doctoral dissertation research at LSU and wanted to attempt to convince you to participate again. I am writing to ask you to participate in a study of the e-learning knowledge and skills of university e-faculty. The study will also address faculty perceptions of university support for e-learning. You will find the link to the survey at the bottom of this e-mail. It will take approximately 10 minutes to complete the survey. A progress meter at the bottom of each page will let you know how much of the survey you have completed. I hope you will answer each question on the survey. Your responses will be anonymous. In appreciation for your assistance, I will send you a summary of the findings after analyzing the data gathered from the e-surveys.

Thank you for your support of my research! If you have questions e-mail me at [mclar13@lsu.edu](mailto:mclar13@lsu.edu) or call me at (phone number).

Sincerely,

Myriah Clark  
Doctoral Candidate  
Human Resource Education  
Louisiana State University

<http://websurveyor.com/1.dll/JGs61C8D7D9C81HD9PU2464J.htm>

Note: Your privacy will be maintained and your responses will be kept confidential. You will not be identified in any way in research reports or presentations. By completing this web survey, you are agreeing to participate in this study. If you have questions about your rights as a study participant or other concerns, contact Robert C. Mathews, Institutional Review Board Chairman, 203 B-1 David Boyd Hall, (225) 578-8692.

**APPENDIX DD: E-MAIL INVITATION SENT TO SAMPLE POPULATION  
NON-RESPONDENTS FOR PARTICIPATION IN STUDY**

Dear Professor (E-faculty member name),

This is my last round of data gathering and you have been randomly selected to participate. It is crucial to my study that I get your response. As my previous e-mail mentioned, I am writing to ask you to participate in a study of the e-learning knowledge and skills of university e-faculty. The study will also address faculty perceptions of university support for e-learning. This study is being conducted as a part of my doctoral dissertation research at LSU. You will find the link to the survey at the bottom of this e-mail. It will take approximately 10 minutes to complete the survey. A progress meter at the bottom of each page will let you know how much of the survey you have completed. I hope you will answer each question on the survey. Your responses will be anonymous. In appreciation for your assistance, I will send you a summary of the findings after analyzing the data gathered from the e-surveys.

Thank you for your support of my research! If you have questions e-mail me at [mclar13@lsu.edu](mailto:mclar13@lsu.edu) or call me at (phone number).

Sincerely,

Myriah Clark  
Doctoral Candidate  
Human Resource Education  
Louisiana State University  
<http://websurveyor.com/1.dll/JGs61C8D7C8B51bDk9U2461J.htm>

Note: Your privacy will be maintained and your responses will be kept confidential. You will not be identified in any way in research reports or presentations. By completing this web survey, you are agreeing to participate in this study. If you have questions about your rights as a study participant or other concerns, contact Robert C. Mathews, Institutional Review Board Chairman, 203 B-1 David Boyd Hall, (225) 578-8692.

**APPENDIX EE: ACADEMIC DEPARTMENTS  
REPORTED BY E-FACULTY IN SAMPLE**

Table 38. Academic Departments reported by E-faculty Members from Public Carnegie Classified Doctorate-Granting Research Universities with Very High Research Activity in Three Randomly Chosen States from the Southern Regional Education Board

Academic Department	Frequency	Percent
Nursing	19	8.72
College of Information	10	4.59
English	9	4.13
Library & Information Science	8	3.67
Special Education	8	3.67
Health Services Administration	6	2.75
Sociology	5	2.29
Criminology	3	1.38
Economics	3	1.38
Education	3	1.38
School of Teaching & Learning	3	1.38
Secondary Education	3	1.38
Statistics	3	1.38
Accounting	2	0.92
Childhood Education	2	0.92
Communication Sciences and Disorders	2	0.92
Criminal Justice	2	0.92
Engineering	2	0.92
Environmental Horticulture	2	0.92
Finance	2	0.92
Food Science & Human Nutrition	2	0.92
Graduate	2	0.92
Health Administration	2	0.92
Humanities	2	0.92
Information Technology	2	0.92
Interdisciplinary Humanities	2	0.92
Library	2	0.92
Library Science	2	0.92
Marketing	2	0.92
Measurement & Research	2	0.92
Physical Education & Exercise Science	2	0.92
Political Science	2	0.92
Psychology	2	0.92
School of Music	2	0.92
Accounting and IS	1	0.46
Adult & Elderly Nursing	1	0.46
Adult; Career & Higher Education	1	0.46

Academic Department	Frequency	Percent
Anthropology	1	0.46
Biology	1	0.46
Biology/Ecology	1	0.46
Business	1	0.46
Business Management	1	0.46
Chemical Engineering	1	0.46
Chemistry	1	0.46
Childhood Education & Literacy Studies	1	0.46
Childhood Education; Reading and Disability Services	1	0.46
Civil and Environmental Engineering	1	0.46
College of Business	1	0.46
College of Nursing	1	0.46
College of Nursing and Adjunct at College of Pharmacy	1	0.46
College of Nursing; Dept of Adult and Elderly Nursing	1	0.46
Communication Studies	1	0.46
Communications	1	0.46
Community & Family Health AND Child & Family Studies	1	0.46
Community Health; Outcomes and Systems	1	0.46
Community Mental Health Nursing	1	0.46
Composition	1	0.46
Computer Information Systems	1	0.46
Computer Science and Engineering	1	0.46
Critical Care	1	0.46
Curriculum and Instruction	1	0.46
Department of Critical Care - Respiratory Therapy Program	1	0.46
Department of Critical Care	1	0.46
Department of Education	1	0.46
Department of Health Administration	1	0.46
Dept of Continuing Education	1	0.46
Diagnostic and Therapeutic Sciences	1	0.46
Early Childhood/Elementary Education	1	0.46
Educational Psychology and Learning System	1	0.46
Educational Technology	1	0.46
Electrical	1	0.46
English and Humanities	1	0.46
Environmental Science	1	0.46
EPLS	1	0.46
Family-Child Health & Caregiving	1	0.46
Family and Child Health	1	0.46
Finance & Real Estate	1	0.46
Finance; Economics and Quantitative Methods	1	0.46
Fine Arts	1	0.46
Foreign Languages	1	0.46
Geology	1	0.46

Academic Department	Frequency	Percent
Global Health	1	0.46
Graduate Studies	1	0.46
Health Behavior	1	0.46
Health Information Management and education	1	0.46
Health Policy and Management	1	0.46
Health Services	1	0.46
Higher Education	1	0.46
History	1	0.46
Human Studies - Counselor Education	1	0.46
Human Studies	1	0.46
IMSE	1	0.46
Industrial Engineering	1	0.46
Info Science	1	0.46
Information	1	0.46
Information Studies	1	0.46
Instruction and Curriculum (education)	1	0.46
Instructional Systems	1	0.46
Justice Sciences	1	0.46
Law	1	0.46
Libraries	1	0.46
Library Information Science	1	0.46
Linguistics and Anthropology	1	0.46
LSU Libraries	1	0.46
Management	1	0.46
Mechanical Engineering	1	0.46
Medical Informatics	1	0.46
Medical Sociology	1	0.46
Medicine	1	0.46
Nursing-graduate	1	0.46
Nursing - Adult and Elderly	1	0.46
Nursing Graduate studies	1	0.46
Nutrition	1	0.46
Philosophy & Religion	1	0.46
Physical Education	1	0.46
School of Art and Art History	1	0.46
School of Library & Information Science	1	0.46
School of Library and Information Science	1	0.46
School of Nursing	1	0.46
School of Nursing Family Health and Caregiving	1	0.46
Science Education	1	0.46
Secondary Education - Instructional Technology	1	0.46
Teacher Ed	1	0.46
Tourism & Recreation	1	0.46
Women's Studies	1	0.46

	Academic Department	Frequency	Percent
Missing		2	
Total		218	100.0

**APPENDIX FF: DIRECTIONS FOR CONTENT EXPERTS FOR THE  
WEIGHTING OF THE PERCEIVED LEVEL OF SUPPORT SCALE**

Dr. (Content Experts Name),

I have had it pointed out by a content advisor and some members of my doctoral committee that the level of support scale should have weighted values for the questions depending on their importance to e-faculty. I have attached a weighting form for the support scale to this e-mail. The scores for this scale are not calculated individually, but will be summed and one number will be reported for the level of support an e-faculty member receives. I need you to weight the items in the scale using the instructions on the attached form. In appreciation for your assistance with this and the original ratings, I will send you a summary of the findings after analyzing the data gathered from the e-surveys when the study is complete.

Thank you for all of the help that you have provided with this project,

Myriah Clark

**APPENDIX GG: WEIGHTING FORM FOR PERCEIVED LEVEL OF SUPPORT  
FOR E-INSTRUCTION SCALE AS SENT TO CONTENT EXPERTS**

**Instructions:** Please weight each item in the “Support for E-Instruction” scale in the first column in the table. You have 25 points to be distributed across the nine items in the scale. Allocate from 1 to 5 points to each item based on the relative importance of that item to the support a faculty member receives for e-instruction, with the total points allocated equaling 25 points. If you find one question to be extremely important, you could give a rating of 5, however if you think that the item is barely important you could give it a rating of 1. The scores for this scale are not calculated individually, but will be summed and one number will be reported for the level of support an e-faculty member receives. The varied weights applied to each item should result in a more valid summed value for “Support for E-Instruction” received by each faculty member.

<b>Points Allocated</b>	<b>Question Number</b>	<b>Question</b>	<b>Answers</b>
	1	Is there time allotted for professional development related to web course development and management at your institution?	Yes No
	2	Do you have a graduate or teaching assistant to help you specifically with web-based learning?	Yes No
	3	Are adequate institutional research resources available to help you specifically with web-based courses (e.g., library holdings that are accessible by web, technical support, etc)?	Yes No
	4	Are web-based computer technical support sources available for the students?	Yes No
	5	If so, are these services available to the students seven days a week?	Yes No
	6	Are web-based computer technical support sources available for you?	Yes No
	7	If so, are these services available to you seven days a week?	Yes No
	8	Do you have any sources of funding for web-based course technology training/conferences?	Yes No
	9	Do you receive adequate funding for web-based course technology events/work?	Yes No
<b>25</b>		<b>TOTAL POINTS ALLOCATED</b>	

**APPENDIX HH: CONTENT EXPERT WEIGHTINGS OF CLARK-KOTRLIK  
PERCEIVED LEVEL OF SUPPORT FOR E-INSTRUCTION SCALE**

Table 39. Content Expert Weightings of Clark-Kotrlík Perceived Level of Support for E-Instruction Scale (CKLOS©)

Question Number	Questions	Content Expert #1	Content Expert #2	Content Expert #3	Content Expert #4	Content Expert #5	Averages Per Question
4	Are adequate web-based institutional research resources available to help you specifically with e-learning courses (e.g., library holdings that are accessible by web, technical support, etc)?	2	3	5	4	3	3.4
1	Do you have release time/reduced teaching load to prepare web-based materials/courses?	3	4	3	2	4	3.2
2	Do you have a graduate or teaching assistant to help you specifically with e-learning?	4	2	3	2	4	3.0
3	Do you have instructional designers/curriculum developers to help with the design of web-based materials?	4	2	3	2	4	3.0
7	Are web-based computer technical support resources available for you?	2	4	3	3	2	2.8
8	If so, are these web-based resources available to you seven days a week?	3	4	3	3	1	2.8
10	Do you receive adequate funding for e-learning course technology events/work?	5	2	3	1	2	2.6
5	Are web-based computer technical support resources available for the students?	1	3	1	5	3	2.6
9	Do you have any sources of funding for e-learning course technology training/conferences?	4	2	3	1	3	2.6
6	If so, are these web-based resources available to your students seven days a week?	1	3	1	4	3	2.4

Note. Question number two was split into two questions (questions 2 and 3) as shown in Appendix D based on input from the content experts. The researcher made the decision to apply the same weight to the two questions as the content experts had recommended for question number two because the two questions sought information on human resources that had very similar functions.

## VITA

Myriah Christin Clark is the daughter of George and Dianne Clark of Baton Rouge, Louisiana. She was born in Hodge, Louisiana and graduated from Scotlandville Magnet High School in Baton Rouge, Louisiana in 1990. She earned her B.S. degree in English in 1995 and her M.S. degree in Workforce Training and Development in 2000, with both degrees being awarded by the University of Southern Mississippi in Hattiesburg, Mississippi. She is certified to teach secondary English in Mississippi.

Myriah entered the Ph.D. program in Human Resource Education at Louisiana State University in 2000. She has participated in several professional internships and experiences including serving as a consultant team participant at Kohler Corporation, project management consultant and evaluator for the Gulf Coast Research Laboratory, webmaster for the Louisiana FFA Association and the Louisiana Vocational Agricultural Teachers Association, and as Editor and computer designer for a first aid manual for Southeastern Louisiana University. Myriah also worked as a publication assistant for the *Human Resource Development Review* and as a state law editor for the Louisiana Legislature. She has published one manuscript in *Louisiana Educational Technology* with her mentor, Dr. Cyndi Gaudet from the University of Southern Mississippi. She has taught online courses for the University of Southern Mississippi.