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Utility of the HPT Framework for Improving Distance Education in Nigeria

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Abstract

Utility of the HPT Framework for Improving Distance Education in Nigeria

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Abstract

The fusion of the Internet with instructional design, and curricula delivery methods eliminated transactional distance in online learning. However, distance education (DE) in Nigeria has not aligned its pedagogy to the new reality in technology. The purposes of this non-experimental, predictive, validity study were to determine faculty and administrators' perceived barriers and concerns to online adoption and to validate the behavior engineering model (BEM) instrument. Ninety-six respondents from four public universities in Nigeria completed the questionnaires. Descriptive statistics and structural equation modeling (SEM) were used respectively, to assess barriers and concerns militating against faculty and administrators' online adoption, as well as validate the survey instruments. For faculty and administrators, incentive, motive, knowledge and skills influenced DE adoption. Except for age, all demographic factors influenced faculty's concerns. Gender was observed to influence administrators' concern. "Level of online use" influenced neither faculty nor administrators' concerns. Technographic characteristics influenced faculty, but not administrators.' Though the BEM instrument was reliable in measuring faculty and administrator's stages of concern, however, the 6-factor BEM, tested at the 95% significant level, did not give a good fit. The study contributes to positive social change by identifying gaps to effective DE implementation, and recommended the appropriate interventions to transform the DE experience for students and their universities. The study also proposed the framework to fast track Nigeria's vision and mission for DE.

Dedication

“The wind blows where it wishes, and you hear its sound, but you do not know where it comes from or where it goes. So it is with everyone who is born of the Spirit.”

(John 3:8, The English Standard Version), December 19, 2016

This dissertation is dedicated to my wife and sister in Christ, Karen Ann, my encourager and a pillar of support. It is also dedicated to our daughter Ifolo, and our son, Chika Nwulu (MD). Thank you for sharing your life with me! I love you all forever! This work is also dedicated to the blessed memory of Dr. Jerome Conrad Fluth (My father-in-law) who sponsored the celebration of my Proposal Defense, by faith, with wild Buffalo Steaks prior to his commencement to Heaven.

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Many have inspired me through this long journey. I am most grateful to Dr. Mary Friend, our Program Director, for her compassion and deep desire to have all students succeed. You remain a worthy leader. Dr. Leslie Moller, my pioneer mentor, guided my work until ill health set in. I am thankful for your recovery! Thank you for your insight and friendship. Shalom! Thank you Dr. Jennifer Lapin for graciously taking over the Second Committee Member Baton without warning and so close to the final stage of my dissertation, after Dr. Moller left Walden. What can I say about Dr. Rob Foshay, my committee chair, you exude knowledge and experiential understanding of the educational issues of our time. You are an erudite indefatigable scholar, and humble at that, considering your scholarly pedigree. I am honored to be your mentee. Your depth of knowledge, versatility and your insight on our class discussions were very inspiring. My sincere appreciation goes to all Walden faculty, too numerous to mention, who shared their knowledge and experiences by way of facilitating learning. Thank you immensely, SEDL, and Dr. Roger Chevalier for giving permission for me to use your survey instruments. I am grateful to the “foot soldiers” in the national university system that supported my collaboration effort. Last but not least, my gratitude goes to Dr. ID Akinyemi for her brilliance in helping make statistical sense of my data analysis.

God bless you all!!

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Chapter 1: Introduction to the study.

Introduction

There is little disagreement among scholars that the Internet has opened up numerous possibilities for delivering information and provision of communication, nations and businesses have established higher education institutions, or modified the existing universities, to exploit the advantages of computer-mediated conferencing systems that are used to facilitate asynchronous and synchronous interaction among students, curriculum and the learning facilitator. These technology-based approaches to learning minimize the physical and psychological distances between the learner and the instructor (Hanna, 2003; Merisotis & Phipps, 2000).

In Nigeria, the setting of this study, all the postsecondary distance education (DE) institutions (under a dozen), use print technology to deliver DE courses – technology considered to be in the postal correspondence DE phase (Mckee, 2010; Anderson, 2012). This study investigated why Nigeria's postsecondary DE institutions are stuck in the postal phase while the majority of learners (68%) clamor for online delivery (Ofulue, 2011). The analytical framework of human performance technology (HPT) was assessed for its applicability to this problem.

In this chapter I describe the background to this study, the statement of the problem, the purpose of the study, the research questions, the theoretical framework, the nature of the study, the definitions of the study constructs, the assumptions, scope, delimitations, the limits of the study and finally, the significance of this study.

Background

In Nigeria, about a dozen of the postsecondary institutions engaged in DE have comparable laudable vision and mission proclamations mandated by the government: to provide "highly accessible and enhanced quality education…through a comprehensive reach that transcends all barriers…to provide functional, cost-effective, flexible learning, which adds lifelong value to quality education for all who seek knowledge" (NOUN, 2006, p. 4). However, vision and mission statements in the setting of this study do not always give the strategic direction that they are meant to provide. Oghojafor, Olayemi, Okolie, & Okonji (2011) found that "vision and mission statements in most Nigerian organizations, are mere 'slogans', which are used as public relation tools to deceive stakeholders into believing that the management is competent" (p. 4). If organizations are not careful about their raison d'ètre, their ability to carry out strategic planning is impaired; it becomes difficult for such organizations to pull together as a unified entity.

To understand why DE adoption is still lagging in Nigeria's postsecondary DE institutions, it was important to examine the barriers to DE adoption. Research needed to benchmark Nigeria's DE performance to align its processes, structures and management practices to conform to professional and international standards. The preceding suggested alignment might reveal other cogent performance gaps in DE as currently practiced in Nigeria.

Applying HPT strategies, particularly the behavior engineering model (BEM) to Nigeria's DE programs would expose the inherent gaps as well as ensure fruitful educational experiences for students; it would provide true access across socioeconomic classes as well as promote the use of innovative instructional approaches (Moller & Prestera, 2001). HPT was the best framework for this study because it provided the diagnostic tools for organizational, environmental, gap and cause analyses, which are required in order to select or design the appropriate intervention in any organization.

In this study, my aim was to analyze the root causes of the barriers to effective DE adoption by studying the appropriate variables: organizational support, environmental support, the work and the worker support. The goal was to identify the gaps

that prevented DE from being actualized in Nigeria's postsecondary institutions. Table 1 lists the core principles that guide HPT practitioners.

Table 1

Human Performance Technology Core Principles

1. HPT distinguishes between behavior (what someone does) and performance (measurable results achieved), and focuses primarily on performance.
2. Diagnosing performance problems involves measuring the gap between current and expected performance.
3. All performance problems stem from the worker, the environment, or a combination of both.
4. Processes depend on people to make them work, but people are not productive when they are in bad processes.
5. Organizations are open systems with inputs, outputs, processes, and feedback systems. Management, development, and systems functions affect all organizational performance. Management functions guide and control the organization's processes and people through feedback, coaching, reprimands, and incentives. Development functions improve the abilities and capabilities of workers through training, mentoring, and other developmental activities. Systems components are the variables in the work environment that affect performance such as work processes, standard operating procedures, policies, practices, feedback mechanisms, reward structures, etc.
6. Exemplary performance should be used to benchmark workflows, set optimal performance levels, etc.
7. Rather than seeing HPT solutions as expenses, they should be viewed as investments and return on investment ("ROI") calculated for all significant expenditures

Adapted from Rothwell (1996, pp. 30-32)

As fully discussed in Chapter 2, several studies, have looked at re-aligning DE within the HPT lens to determine the precise gaps and offer evidence-based solutions. Cooper (2007) sought to determine why a faculty member did or did not participate in DE. Maigo and Mei-yan (2010) combined cognitive motivator and HPT frameworks to investigate the current situation and the problems of primary school teachers' integrating technology-based instruction. Nijhuis and Collis (2005) investigated how teachers could stay in control of their schedules under the increased expectations of greater effectiveness and efficiency made possible by using Learning Management System (LMS). Moller and Prestera (2001) outlined the structure for

addressing online design, policy, best practices, and implementation from the human performance framework and the author's experience with instructional systems design.

Barbera and Linder-Van Berschot (2011) discussed a comprehensive model of online education that encompassed the personal characteristics of learners, instructors, instructional and institutional variables, and learning outcomes. Davis (2010) investigated the perceptions of online students and faculty about quality benchmarks for courses, institutional support, and course development, the teaching and learning process, course structure, student, faculty support, and evaluation and assessment. Bell (2008) developed knowledge and understanding of the multigenerational workforce as a way to achieve and maintain positive individual and organizational levels of performance in the twenty-first century workplace. All of these studies identified the HPT as viable, and a productive analytical framework for my research.

After examining these 7 studies listed above, I speculated about some gaps in DE as it is currently practiced in Nigeria:

1. Nobody had identified the barriers to successful implementation of DE in Nigeria.
2. An interactive technological educational experience for DE students in Nigeria is missing. This arises from learners' inability to interact with content, peers, and the instructor on a unified platform.
3. There is a dearth of DE access across geographic areas and socio-economic classes.
4. Not all stakeholders take ownership of the DE process.
5. Teachers cannot use innovative methods to deliver DE learning to benefit students.
6. An appropriate DE infrastructure is not available.

Statement of the problem

Rather than the suggested, hard, infrastructural constraints that hold back the expansion of e-learning in DE, Unwin et al. (2010) concluded that the "softer" dimensions of management, training, and the development of appropriate levels of expertise in e-learning design were the most important factors for the effective implementation of LMS.

Ofulue (2011), and Akande and Sofowora (2011) listed poverty, illiteracy, and the digital divide as the bane in actualizing 21st century DE in Nigeria. However, no study has examined the barriers to DE adoption in Nigeria using the HPT lens. Because HPT placed a premium on ensuring that the performer and their performance environment are enabled to produce the optimum outcome, HPT provided the necessary tools to examine the impact of faculty and administrators on DE adoption.

The researcher taking an HPT perspective in responding to the DE problems in Nigeria's postsecondary institutions supported Schifter (2000), who called for more research on faculty attitudes and the motivators and inhibitors that influenced faculty participation in DE. According to Schifter, knowledge of these factors enhanced the implementation of new and expanded DE programs as faculty and administrators were ultimately vested with the responsibility of implementing DE.

Since faculty and administrators held the potential to discover the factors that impacted DE adoption, the problem statement was as follows:

The potential of HPT as a framework for modeling the perceptions of faculty and administrators about the barriers to DE adoption in postsecondary institutions in Nigeria must be assessed.

Purpose of the Study

The purpose of this study was to use HPT framework (Van Tiem, 2004) to delineate the factors in the work environment and the performer inventory of behavior support functions that significantly impacted the adoption of DE. A root cause analysis of these institutions, using a widely accepted HPT framework, was conducted to determine the reasons for the gaps and the barriers to DE adoption. The root cause analysis was considered successful when it had sufficiently identified both the environmental and the repertory of behavior deficiencies in the surveyed postsecondary DE institutions in Nigeria. This study had three objectives:

1. To assess the effect the work environment and the range of worker behaviors have on faculty and administrator's performance.

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2. To determine the relationship between faculty and administrators most dominant concerns and their technographic characteristics in adopting online DE

3. To validate the BEM instrument with the SoCQ

Research Questions

The following research questions assumed that faculty's and the administrators' perceptions of barriers indicated the actual barriers:

1. What likely BEM factors as perceived by faculty influenced DE adoption in postsecondary DE institutions in Nigeria?

2. What likely BEM factors as perceived by administrators influenced DE adoption in postsecondary DE institutions in Nigeria?

3. Did faculty and administrator's demographic and techno graphic characteristics influence their stages of concerns in adopting online learning?

4. How well did the PROBE instrument predict faculty and administrator's stages of concern for DE adoption as scored by the SoCQ?

Conceptual Framework

HPT is a framework that is used to analyze and compare the present and the desired levels of individual and organizational performance, which is focused on organizational alignment. It uses cause analysis to determine what impact the

work environment (information, resources, and incentives) and the people (motives, individual capacity, and skills) have on performance to offer appropriate interventions (Van Tiem, 2004).

The HPT framework presented the best theoretical framework for studying postsecondary DE performance because it used results-oriented methods that guaranteed that DE efforts were focused on goals that aligned with the institution's mission (Moller & Prestera, 2001).

One widely used HPT model is the BEM, an analytical framework used to delineate the environmental and the performer's repertory of behavior support factors that significantly impacted the adoption of DE (Gilbert, 1978). The framework provided a method to assess the performance functions of all the component units that made up an organization to ensure that goals are aligned with the organization's mission. Though originally designed for the business sector, this analytical framework has been successfully applied in DE settings (Page, 2010; Maigo & Mei-yan, 2010).

According to Basaza, Milman, & Wright, (2010); & Bates, (2001) factors likely to affect faculty and administrators perception included intrinsic and extrinsic motivation, rewards, technology availability and usage, professional support, the quality of DE courses, student satisfaction and institutional policy.

The Concerns-Based Adoption Model (CBAM) was the second framework featured in this study: The Research and Development Center (RDCTE) researched strategies that addressed teacher's attitudes and how they perceived and reacted while implementing educational programs (Hall, George, & Rutherford; 1979)

The Concerns-Based Model (CBAM) is a framework used to determine individual teacher's emerging concerns as they participated in educational innovations and change development programs and practices in their schools (Hall, Wallace, & Dossett; 1973).

The CBAM is a practical model for measuring, describing, and explaining the change process teachers go through as they implement new technologies or instructional practices (Hall & Hord, 2011). Some change principles (supported by CBAM) that are applicable to my research include the following:

1. Success in innovation implementation requires a sustained process and should not be episodic.

2. The change process was an independent experience for each teacher.

3. Change was an individual, developmental process that occurred over time.

4. Using the appropriate strategies alleviated the difficulties encountered in the change process (Hall & Hord, 2011. pp. 6–16).

Concerns are affective domain responses by faculty to an innovation that encouraged or hindered the adoption of the innovation (Hall & Hord, 2011). The CBAM connected the change process, the innovation, and the individuals involved in the process (Hall & Hord, 2011). It has been used widely to study both K-12 and higher education environments (Donovan & Green, 2010; Saunders, 2012). The innovations have varied greatly between innovative products and processes. The CBAM focused on using the concerns of a population to garner the understanding and support that was needed for adoption of the innovation (Straub, 2009). Applying CBAM to faculty and administrators of postsecondary DE institutions yielded insights into faculty and administrators' potential reaction to the challenges of change, the facilitation of adoption, as well as how to maintain the change process (Hall & Hord, 2011).

Nature of the Study

This non-experimental, quantitative, predictive validity study was designed to provide a better understanding of the diverse but defined postsecondary implementation factors necessary to optimize DE adoption. Descriptive and inferential statistics were used to account for relationships and variances in perceptions among the surveyed subjects and the perceived factor items that impacted DE adoption (Creswell, 2005; Newman & Benz, 1998). The stages of concern questionnaire (Hall & Hord, 2011) was used to assess the readiness of faculty and administrators to adopt online learning, while the PROBE instrument, a six factor questionnaire was used to identify gaps in the range of worker support variables as well as the workers work environment was used to model barriers to adoption of DE.

This study was designed to model both the environmental variables and the repertory of behavior support variables that affected DE performance in Nigeria's postsecondary institutions. Gilbert's (1978) BEM, as modified by Hersey and Chevalier (2006), modeled information, resources, incentives, motives, individual capacity and skills. The PROBE instrument was used to gather data on these variables to discern barriers to adoption of DE. In addition, factor analysis was used to validate the clustering of the PROBE instrument items.

The faculty and administrators' scored the SoCQ (Hall, & Hord, 2011) and determined their concerns in readiness to adopt online DE. In addition, the demographic and the technographic characteristics of faculty and administrators, as they related to their stages of concerns, were evaluated. Thus, faculty and administrators concerns about online adoption, as measured by the SoCQ, was the dependent variable, while the faculty and administrators demographics and technographic variables were the independent variables.

A quantitative methodology was the most appropriate for this study because testing the hypotheses required the collection of numerical data that determined relationships between the independent variables and the dependent variable. The independent variables were faculty and administrators' demographics and technographics variables; the dependable variables were the six stages of faculty and administrator concerns (information, personal, management, consequences, collaboration and refocusing). The dependent variable was the stage of concern with the highest score on the SoCQ.

Descriptive and correlational statistics were used to analyze the survey data. Stepwise multiple regressions were used to determine the most dominant factors that acted as barriers to DE adoption. The overall predictive power of the model indicated the utility of the BEM for identifying barriers to adopting DE in the study's setting.

Population and Sample

Permission was granted to carry out the survey at four public universities in the southwest of Nigeria. These universities were diverse in their DE programs. They used mostly print and the postal medium to deliver their DE programs. This practice was representative of the population of universities for this study.

Both the socio-economic status and the ethnicity of the faculty and administrators in these universities were diverse and could easily be representative of the general university population in this region of the country.

Instruments

Gilbert's (1978) BEM modified by Hersey and Chevalier (2006) was adapted and used to design the questionnaire for this study. This same model was validated and successfully used by King, Jr. C. (2013) to determine why a gap existed in technology integration at a local high school. Ouinons, Ford, Sego, & Smith cited in Richey & Klein (2007) used the Probe instrument in a similar procedure consistent with the internal model validation methods for human performance.

The second survey instrument, the SoCQ, a data collection instrument on the concerns of individuals involved in an innovation (Hall & Hord, 2011) indicated that the correlation coefficients scores on the respective SoCQ stages ranged from .19 to .82.

Analysis Strategy

Descriptive statistics was used to analyze data collected with the BEM instrument. The mean, standard deviation, frequencies, and percentages were used to assess the faculty and administrators' perception of the environmental and repertory of behavior support factors that acted as barriers against online adoption in postsecondary DE.

The 35-item, seven-point Likert-type scale (SoCQ) was scored at the ordinal level. Respondents were requested to select each item with scores ranging from 0 (no significant concerns or readiness for technology adoption to 7 (very relevant concern or readiness to adopt technology). Response sums, on each of the five items stages of concern subscales represented the intensity of concern at the stage (George, Hall, & Stiegelbauer, 2008). To assess my research questions and the data collected through the SoCQ, statistical analyses included descriptive statistics, correlation analyses, and stepwise multiple regressions. I performed the statistical analyses with SPSS and used a probability (p) value of .05 or less for significance

testing. I worked in tandem with the directors of the postsecondary institutions to obtain the hard copy data collection survey materials from each of the participating universities.

Construct Definitions

Gilbert's (1978) BEM has 6 cells. Each cell was an important construct for this study:

Information: 1. Roles and performance expectations are clearly defined; employees are given relevant and frequent feedback about the adequacy of performance. 2. Clear and relevant guides were used to describe the work process. 3.The performance management system guided employee performance and development,

Resources: 1. Materials, tools and time needed to do the job were present. 2. Processes and procedures were clearly defined and enhanced individual performance if followed. 3. Overall physical and psychological work environment contributed to improved performance; work conditions were safe, clean, organized, and conducive to performance.

Incentives: 1. Financial and nonfinancial incentives are present; measurement and reward systems reinforced positive performance. 2. Jobs are enriched to allow for fulfillment of employee needs. 3. Overall work environment was positive, where employees believed they have opportunity to succeed; career development opportunities were present,

Knowledge and Skills: 1. Employees have the necessary knowledge, experience and skills to do the desired behaviors 2. Employees with the necessary knowledge, experience and skills are properly placed to use and share what they know. 3. Employees were cross-trained to understand each other's roles,

Capacity: 1. Employees have the capacity to learn and did what was needed to perform successfully. 2. Employees are recruited and selected to match the realities of the work situation. 3. Employees are free of emotional limitations that would interfere with their performance, and

Motives: 1. Motives of employees are aligned with the work and the work environment. 2. Employees desired to perform the required jobs. 3. Employees were recruited and selected to match the realities of the work situation.

Benchmark: “Benchmarking is a systematic process of comparing an organization to other organizations for the purposes of identifying better work methods and determining best practices. It helps define customer requirements, establish effective goals and objectives, develop true measures of productivity, and identify education and training needs for current and future employees” (Van Tiem, 2004).

Concerns: The composite representation of feelings, preoccupations, perceptions, thoughts, and considerations teachers have about an innovation or change process (Hall & Hord, 2011).

Root cause Analysis: - “Is the process of determining the root cause of past, present, and future performance gaps” (Van Tiem, 2004).

DE: “DE is planned learning that normally occurs in a different place from teaching, requiring special course design and instruction techniques, communication through various technologies, and special organizational and administrative arrangements” (Moore & Kearsley, 2005, p. 2).

Environmental Analysis: - “Is the process used to identify and prioritize the realities that support actual performance: organizational environment, work environment, work, and workers” (Van Tiem, 2004).

Environmental Scanning: - “Is a strategic planning technique for monitoring trends in the external environment of an organization. It involves observing, assessing, and documenting economic situations, political events, technical developments, and structural changes in similar organizations or industries” (Van Tiem, 2004).

Environmental Support Analysis: - “Seeks to define causes related to information (data, information, and feedback), instrumentation (environmental support, resources, and tools), and motivation (consequences, incentives, and rewards)” (Van Tiem, 2004).

Ergonomics: - “Is the study of how physical laws of nature affect the worker and the work environment” (Van Tiem, 2004).

Feedback: - “Information provided by others designed to help people adjust their behavior, continue successful performance, or establish goals” (Van Tiem, 2004).

Gap Analysis: - “Describes the difference between current results and consequences and desired results and consequences. It is the last step in the performance analysis process” (Van Tiem, 2004).

HPT: HPT is a professional field of study and application, the main purpose of which is to engineer systems that allow people and organizations to perform in ways that they and all stakeholders value (Van Tiem, 2004).

LMS: A Learning Management System (LMS) is software that automates the administration of training events. All Learning Management Systems manage the login of registers users, manage course catalogs, record data from learners, and provide reports to management. There used to be a distinction between Learning Management Systems and more powerful Integrated Learning Management Systems. That distinction has now disappeared. The term Learning Management System is now used to describe a wide range of applications that track student training and may or may not include functions such as:

- Authoring
- Classroom management
- Competency management
- Knowledge management
- Certification or compliance training
- Personalization
- Mentoring
- Chat
- Discussion boards (Hall, 2001)

Motivation: - The magnitude and direction of behavior (Keller, 1983), “Encourages behavior” (Van Tiem, 2004).

ODL: “Open learning and DE refers to approaches to learning that focus on freeing learners from constraints of time and place while offering flexible learning opportunities. For many students, open and distance learning (ODL) is a way of combining work and family responsibilities with educational opportunities” (UNESCO).

Online DE: “Internet-based distance learning is a field of education that focuses on the pedagogy, andragogy, technology, and instructional systems design that aim to deliver education to students who are not physically ‘on site’. Rather than attending courses in person, teachers and students may communicate at times of their own choosing by exchanging printed or electronic media, or through technology that allows them to communicate in real time and through other online media. DE courses that require a physical on-site presence for any reason including the taking of examinations are considered to be a hybrid or blended course of study” (Simonson, Smaldino, Albright, & Zvacek, 2011)

Organizational Analysis: - “Examines the organizational mission, vision, values, goals, and strategies” (Van Tiem, 2004).

Performance Analysis: - “Identifies and clarifies the problem or performance gap by focusing on three areas: desired performance state, actual performance state, and the gap between desired and actual performance. It looks at three levels – organization, process, and job/performer – and considers three variables – goals, design, and management” (Van Tiem, 2004).

Human Performance Technology (HPT): - “Analyzes performance problems and their underlying causes and describes exemplary performance and success indicators. PT identifies or designs interventions, implements them, and evaluates the results. It is the systematic process of linking business goals and strategies with the workforce responsible for achieving the goals” (Van Tiem, 2004).

Repertory of Behavior Analysis: - “Examines people-oriented factors that cause performance problems related to information (skills and knowledge), instrumentation (individual capacity), and motivation (motivation and expectation)” (Van Tiem, 2004).

Rewards: - "Rewards are designed to change and reinforce behavior through techniques such as public recognition, gift certificates, or vacations and travel based on meeting sales quotas" (Van Tiem, 2004).

Stages of concern (SoC): A progressive set of concerns that an individual goes through when confronted with change: Awareness, Informational, Personal, Management, Consequence, Collaboration and Refocusing (Hall & Hord, 2011).

Strategic Planning: - "The process by which an organization envisions its future and develops the necessary goals and procedures to achieve that vision" (Van Tiem, 2004).

Technographic Concerns: Attributes that relate to technology exposure and use (Mitra, Joshi, Kemper, Woods, & Gobble, 2006).

Assumptions

The government sponsored most postsecondary DE institutions in Nigeria; therefore, DE practice was susceptible to the endemic corruption found in government institutions. Another generic concern with surveys was response bias (telling you what you wanted to hear). Especially when a respondent's views conflicted with official policy, they might not trust you enough to be honest and open. The following five assumptions posed limitations to this study that I was aware of but could not control:

1. That the vision and mission of postsecondary DE institutions are non-negotiable and should guide both the strategic and day-to-day decisions of the institutions.

2. That the DE faculty, and the administrators have concerns about the environmental and repertory of behavior support as key factors for optimal performance.

3. That faculty and administrators' perceptions of barriers are assumed as the actual indicators of the barriers.

4. That faculty and administrators are familiar with the IHEP benchmarks and agreed with them.

5. That faculty and administrators completed the questionnaire honestly and without prejudice.

Scope and Delimitations

Data for the study was gathered from postsecondary institutions that provided DE in the South Western states of the country; this process might be geographically and culturally biased if the results of the study were used to make inferences that covered DE practices across the nation. This study did not have the financial or logistical capacity to cover DE survey across the whole country.

Apathy on the part of study participants was rife in the setting of the study and could be as a result of both personal and organizational challenges. This manifested in delays to completed survey, haphazard or refusal to fill-out the survey instrument.

Survey research was usually designed to collect data that was representative of a population. The researcher in survey research aimed to use information collected from the survey to extend the outcomes from the investigated sample back to the population within the appropriate error limits. However, the identified flaws in educational research include:

1. Disregard for sampling error when determining sample size, and
2. Disregard for response and nonresponse bias

I attributed other limitations to the change of behavior by research participants to the Hawthorne effect phenomenon. Finally, this study was limited by the assumption that faculty and administrators' perceptions of barriers are the actual indicators of what the barriers were.

Limitations

The provincial focus of the study in the South-west of Nigeria where the culture, personal and corporate attitude and investment in education is markedly different from the other regions of the country would be a concern if this study was extrapolated to the rest of the country. The sample size (146) for the study; a 66% and a 44% return and missing data ratios respectively, posed validity problems. Missing data were discarded while study results are restricted to the Southwest of Nigeria.

Significance of the Study

Through this study, the barriers to performance in Nigeria's postsecondary DE institutions were identified. The utility of the HPT framework for identifying barriers to performance in postsecondary DE was affirmed. The findings were expected to help established institutions to realign their practices where there were performance gaps, as well as to offer a roadmap for fresh DE startups. This research was the first (in its setting) to use HPT to evaluate performance barriers to improving DE in Nigeria. The study also suggested how to motivate teachers and administrators to integrate technology into DE delivery. Finally, the study confirmed the validity and the reliability of the BEM survey instrument, and provided additional reference source in the HPT field.

Implications for Social Change

The findings from this study provided the data needed to design an appropriate intervention that enabled faculty and administrators to support and participate in Desk Top Learning Platforms (DTLP) for DE. DTLPs would (a) reduce the effect of transactional distance; (b) extend DE reach across diverse geographical regions and socioeconomic classes, (c) promote the use of innovative instructional approaches, and (d) motivate students to engage with DE.

Summary and Transition

The fusion of the Internet with instructional design, and delivery eliminated transactional distance in online learning, and created ubiquitous learning possibilities that were unimaginable to past generations. With this new opportunity also came diverse challenges of how to both harness and harmonize technology and humans in the most effective way to achieve the desired pedagogic outcomes.

DE in Nigeria has not aligned with the new Internet reality, therefore, the purposes of this non-experimental, predictive, validity study were to: (a) Determine faculty and administrators' perceived barriers and concerns to online adoption from a HPT perspective. (b) Validate the BEM instrument using the SoCQ.

What is HPT and how does it work in tandem with other technologies to bring about improved organizational performance results? These questions were discussed in the literature review in chapter two. In Chapter 3, I described the methodology and the scope of the study; data collection, analysis and results are reported in chapter 4. Finally, the interpretation of the study outcome, the conclusions and the recommendations of the study were reported in Chapter 5.

Chapter 2: Literature Review

Introduction

Rather than the suggested, hard, infrastructural constraints that hold back the expansion of e-learning in DE, Unwin et al. (2010) concluded that the "softer" dimensions of management, training, and the development of appropriate levels of expertise in e-learning design were the most important factors for the effective implementation of LMS. Conversely, Ofulue (2011), and Akande and Sofowora (2011) listed poverty, illiteracy, and the digital divide as the bane in actualizing 21st century DE in Nigeria. However, no study has examined the barriers to DE adoption in Nigeria using the HPT lens. Because HPT focuses on the performer and their performance environment, HPT strategies are essential to discerning the barriers to work place 'worthy' performance.

This review of literature was conducted online using the following databases: ERIC, Educational Research Complete, Thoreau, Google Scholar, AltaVista, and ProQuest (All Dissertations), Academic Search Premier, Master FILE Premier, Business Source Premier, Communication and Mass Media Complete, as well as the Psychology and Behavioral Sciences Collection. The following terms were used to locate the literature: *HPT, improvement, educational technology, behavior engineering model, Gilbert's model, performance improvement, performance analysis, organizational performance, performance gap, performance cause analysis, ISPI, technology, postsecondary performance improvement, faculty performance, administrator's performance, faculty perception, administrators' perception, organizational change*. More than 50 peer-reviewed articles and over two-dozen textbooks were reviewed.

Overview of Postsecondary DE Institutions in Nigeria

Most postsecondary DE institutions in Nigeria have missions that provide access to functional education that is cost effective and flexible enough to provide lifelong learning to knowledge seekers. The National Open University of Nigeria (NOUN) and about half a dozen other DE centers located in the various government universities have comparable visions and missions to provide quality education to the teeming Nigerians of college age who are unable to secure spaces in the over-crowded conventional brick-and- mortar universities. However, these institutions lacked the organizational structure and relevant processes needed to accomplish their strategic initiatives (Ofoha & Awe, 2011; Okonkwo, 2012 & Adeyemi, 2011).

Students, potential employers of graduates, university administration, faculty, government regulators and the general public—whose taxes (commonwealth) financed these institutions—are the major stakeholders in Nigeria's postsecondary institutions. The stakeholders' perception of the quality of the DE program is invaluable to the institution's continued existence. The students at these institutions were the most critical of the stakeholders that had considerable influence over the DE institutions— and students' interests must be carefully considered.

The ability of postsecondary DE institutions students and faculty to interact with their external environment was hampered by inadequate communication hardware, software and know-how. According to Adeyemi (2011), most of the institutions were handicapped by low-level development of communication facilities, which is characteristic of Nigeria as a whole. Students did not have seamless access using computers and the Internet to interact with their teachers and other educational resources. Further hindrances to postsecondary institutions interacting with their critical stakeholders was due to the absence of guidance and counseling services to assist the students; unstructured course development and presentation platforms, inadequate organizational structure for student evaluation, and motivation (Adeyemi, 2011).

According to Ofoha and Awe (2011), DE quality was determined by the value of its learning materials, which was enhanced by the rigor of the work flow, policies and procedures embedded in the design and development of course materials. The dire situation of course material production at the National Open University of Nigeria (NOUN) was underscored by

Jegede (2009) when he said that, “There are delays and difficulties in developing and distributing materials to study centers and students and that resolving the situation is critical for the progression of the students and for the institution to fulfill its vision and mission” (p. 4). According to Okonkwo (2011) the course material imbroglio was the subject of NOUN’s Senate 2011 sitting “on the pioneer students who were at the University for about eight (8) years mainly due to non availability of course material.” (Senate Decision Extract 3).

Okonkwo (2011) lamented the difficulty in locating competent staff to produce quality course materials. She asserted that the university was under-staffed and that the available staffs were over worked. Some were assigned to serve in areas where they had neither professional training nor experience. Most of these staffs complained that their offices were hot and stuffy and therefore not conducive for mental engagement. Some staffs of the university were unable to observe their annual leave for several years thereby putting a great deal of pressure on the personnel’s capabilities (Ofulue, 2011; Dorothy Ofoha, & Awe, 2011).

Statement of the Problem

Unwin et al. (2010) concluded that the “softer” dimensions of management, training, and the development of appropriate levels of expertise in e-learning design were the most important factors for the effective implementation of LMS rather than the hard infrastructural constraints suggested to hold back the expansion of e-learning in DE.

Ofulue (2011), Akande & Sofowora (2011) listed poverty, illiteracy, and digital divide as the bane in actualizing e-learning DE in Nigeria. However, no study has examined the barriers to DE implementation in Nigeria within the HPT lens. Because HPT placed a premium on the performer and his or her performance environment for optimum outcome, the problem statement for this study was as follows: There is a need to assess the potential of HPT as a framework for modeling the environmental and repertory of behavior barriers to DE adoption in postsecondary institutions in Nigeria.

Purpose of the Study

The purpose of this study was to use HPT framework, Van Tiem (2004) to analyze four selected postsecondary institutions in southwest Nigeria to delineate the environmental and the performer repertory of behavior support functions that significantly impacted the adoption of DE. A root cause analysis of these institutions was conducted to determine the reasons for the gaps or barriers to DE adoption. The root cause analysis was considered successful when it sufficiently identified both the environmental and the repertory of behavior deficiencies in the surveyed postsecondary DE institutions in Nigeria. Another purpose of the study was to assess faculty and administrator's concerns in adopting online learning using the stages of concern questionnaire (SoCQ) of the CBAM (Hall & Hord, 2011) to assess faculty and administrator's concerns in adopting online learning. Faculty and administrator's techno graphic characteristics related to their exposure to, and use of technology (Mitra et al., 2006), and included factors such as experience with DE and professional development in the DE environment that were useful in predicting concerns that faculty demonstrated toward an innovation. In this study, techno graphic characteristics included attributes such as: faculty and administrator experiences and involvement with DE, active professional development activities, and faculty and administrators' self-reported DE savvy at the postsecondary level.

The Objectives of the Study

1. To assess the effect the work environment and the range of worker behaviors have on faculty and administrator's performance.
2. To determine the relationship between faculty and administrators most dominant concerns and their technographic characteristics in adopting online DE
3. To validate the BEM instrument with the SoCQ

In this chapter, I reviewed the current literature on HPT in the following order:

1. What is HPT?
2. Background and models of HPT,

3. Principles of HPT,

4. The BEM and

5. CBAM.

What is HPT?

Van Tiem (2004) described HPT as a professional field of study and application that focused on engineering systems that allowed people and organizations to perform in ways that all stakeholders valued. The International Society for Performance Improvement (ISPI) gave another perspective to the definition of HPT as a systematic approach to improving productivity and competence that provided strategies for solving problems, and realizing opportunities for individual performance. The HPT process involved selection; analysis, design, development, implementation, and evaluation of programs to most cost-effectively influence human behavior and accomplishment. HPT applied performance analysis, cause analysis, and intervention selection, to individuals, small groups, and large organizations (http://www.ispi.org/content.aspx? id=54).

Sample of Definitions of Human Performance Technology from the Past Thirty Years.

Author(s)	Definition	Key Terms
Gilbert (1978, p. 18)	Human competence is a function of worthy performance (W), which is a function of the rate of valuable accomplishments (A) to costly behavior (B).	* Accomplishment * Behavior * Competence
Ainsworth (1979, p. 5)	A cornerstone of performance technology is outcome signification-discovering valid, useful performance signification objectives and stating them in terms that are easily understood.	* Objective * Outcome
Stolovitch (1982, p. 16)	A field of endeavor that seeks to bring about changes to a system in such a way that the system is improved in terms of the achievements it values.	* Achievements * Change * System
Harless (In Geis, 1986, p. 1)	Human performance technology is the process of selection, anaylsis design, development, implementation, and evaluation of programs to most cost-effectively influence human behavior and accomplishment.	* Accomplishment * Behavior * Cost effective * Process
NSPI, via Coscarelli (1988, p. 8)	A set of methods and processes for solving problems – or realizing opportunities – related to the performance of people. It may be applied to individuals, small groups or large organizations.	* Processes * Realizing
Langdon (1991, p. 2)	Systematic application of identifying that a need exists to establish, maintain, extinguish, or improve performance in an individual or organization; defining the need; identifying, implementing, and networking appropriate interventions; and validating that the results are	* Establish * Extinguish * Improve * Maintain * Systematic

Table continues

true improvements.

Sample of Definitions of Human Performance Technology from the Past Thirty Years.

Author(s)	Definition	Key Terms
Stolovitch and Keeps (1992, p. 4; 1999,p. 5)	The application of what is known about human and organizational behavior to enhance accomplishments, economically and effectively in ways that are valued within the work setting. Thus HPT is a field of endeavor that seeks to bring about changes to a system, in such a way that the system is improved in terms of the achievement it values.	*Accomplishment * Change to a system * Human and organizational behavior
Rothwell (1996, p. 29)	Human Performance Enhancement (HPE) is the field focused on systhematically and holistically improving present and future work results achieved by people in organizational settings.	* Holistically * Present and future work * Systematically
O'Driscoll (1999, p. 97)	Systems thinking applied to human Resource activities. (1) Systematic, (2) systematic, (3) grounded in scientifically derived theories and the best empirical evidence available, (4) open to all means, methods, and media, and (5) focused on achievement that human performers and the system value.	* Achievement * Derived theories * Grounded in science * Systems thinking * System value
Van Tiem, Moseley, and Dessinger (2004, p. 2)	The systematic process of linking business goals and strategies with the workforce responsible for achieving goals. Moreover, performance technology practitioners study and design processes that bring about increased performance in the workplace using a common	* Achieving goals * Analyzes * Common methodology * Design processes * Study * Success

Table continues

	methodology to understand, inspire and improve. And finally, performance technology systematically analyzes performance problems and their underlying causes and describes exemplary performance.	indicators * Systematic process

Sample of Definitions of Human Performance Technology from the Past Thirty Years.

Author(s)	Definition	Key Terms
ISPI (2005b)	A systematic approach to improving productivity and competence uses a set of methods and procedures – and a strategy for solving problems – for realizing opportunities related to the performance of people. More specific, it is a process of selection, analysis, design, development, implementation, and evaluation of programs to most cost-effectively influence human behavior and accomplishment. It is a systematic combination of three fundamental processes: performance analysis, cause analysis, and intervention selection, and can be applied to individuals, small groups, and large organizations.	* Accomplishment * Competence * Cost effective * Process * Realizing opportunities * Solving problems * Systematic

Figure 1.
Definition of Human Performance Technology in the last 30years

HPT has been deployed extensively by businesses to improve work place performance but has more recently become popular with educational institutions (Prestera & Moller, 2001). Performance improvement is important to all of us, because as individuals and organizations become effective and more efficient in their work, society prospers (Bingham, 2012).

Background and Models of HPT

Frederick Taylor (1856 - 1915) is widely accepted as the "Father of Scientific Management." Taylor's major contribution was his innovations in industrial engineering, where he focused on improving worker productivity. His work in engineering culminated in his famous publication: *The Principles of Scientific Management.* The impact of Taylor's innovations spanned business, industry, psychology, and education. Taylor was not officially recognized as a founding father of HPT, however, most HPT practitioners attested to the fact that most of the guiding principles of HPT are contained in Taylor's book (Blake & Moseley, 2010).

Taylor (1911) listed the key features of scientific management to include the following: time study, functional or divided foremanship, the standardization of all tools and implements used in trades, the standardization of the acts and movements of workmen in each class of work, a unique planning function, management by the exception method, the use of slide-rules and other similar time-saving methods, instruction cards for workers, careful task allocation, bonuses for successful performance, the use of a "differential rate," a routing system, and mnemonic systems for classifying products and modern cost systems.

According to Taylor (1911), the underlying philosophy and principles of Scientific Management are:

1. Development of an authentic science for each element of a job,

2. Scientific selection and training of the worker,

3. Cooperation with the worker to ensure the job was done in accordance with the principles of scientific management, and

4. Equal sharing of work and responsibility between the workers and management.

Taylor advocated that through scientific study and analysis, one could determine the best way to perform each job to achieve the utmost efficiency. Taylor was credited with the saying that "a man equipped merely with a stop-watch and a properly ruled notebook" (p. 48) was all that was needed to determine the best way to accomplish a task. Taylor proposed a first step of finding 10 or 15 men who were skilled at the particular work to be analyzed. The next step in scientific study was to analyze the exact series of operations used while doing the work under investigation, as well as the tools used. Then a stopwatch was used to measure the time required for each of the elementary steps in order to select the quickest way of doing each step. The final analysis was to eliminate all false, slow, and surplus movements, gather the quickest and best movements, and combine them into a task.

Taylor suggested separating planning from execution as planning required higher mental aptitude that he believed was deficient in the laymen that worked on the factory floor. Therefore, he advocated the creation of planning departments, staffed with engineers, and charged with the tasks to develop scientific methods for doing work; establish goals for worker productivity; establish systems of rewards for workers when goals were attained and train the workers on how to use the methods to meet production goals.

Taylor's book on scientific management has many parallels to the principles of HPT identified by the International Society for Performance Improvement (ISPI, 2009). Though Taylors's book was publish more than fifty years prior to the founding of the HPT field, oddly enough, Taylor was not inducted into the "HPT Founding Father's Hall of Fame." According to Blake & Moseley (2010), Taylor was the first scholar to link performance to rewards by establishing the rate and the amount of the rewards equivalent to levels of performance. Taylor's work was believed to have influenced the work of Gilbert (1978) whose leisurely theorems in his book *Human Competence: Engineering Worthy Performance* like Taylor's *Principles of Scientific Management* measured competence, as well as described behavior management. According to Chyung (2005) both authors (Taylor & Gilbert) were particular about outcomes; supported the use of "an exemplary performance" as the yardstick

for upgrading typical performance; both authors were intent on producing competent performance in the workforce and both laid the responsibility of workers' poor performance on management.

Gilbert's model advocated by this study provided a means of conducting an analysis of what was going on in the organization and its work force (human behavior and performance) to reveal the stimuli, responses, and consequences that accounted for the current performance of the organization.

HPT Models

International Society for Performance Improvement (ISPI) described HPT as a systematic approach to improving productivity and competence. HPT has strategies for solving problems, and for realizing opportunities related to individual performance. HPT is a process of selection, analysis, design, development, implementation, and evaluation of programs to cost-effectively influence human behavior and accomplishment. HPT applied performance analysis, cause analysis, and intervention selection, to individuals, small groups, and large organizations (http://www.ispi.org/content.aspx? id=54).

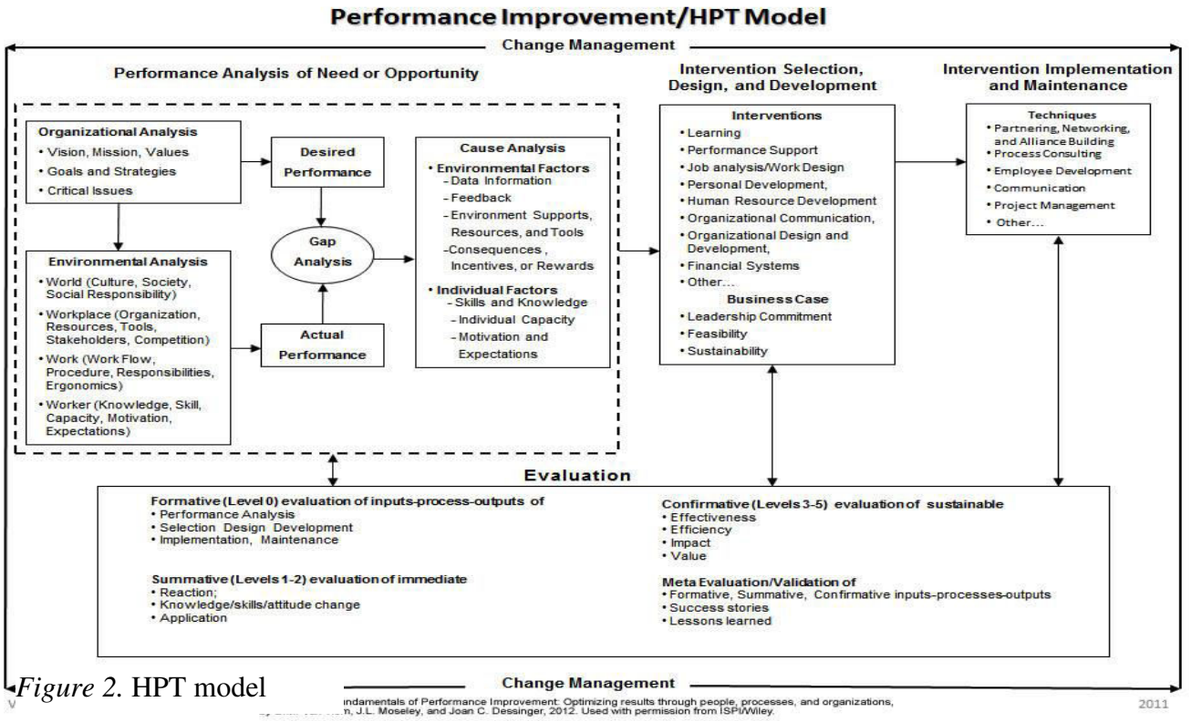

Figure 2. HPT model

The HPT process according to ISPI began with an assessment of the current and the desired levels of individual and organizational performance in order to determine the performance gap. A cause analysis was carried out to determine what impact the work environment (information, resources, and incentives) and the people (motives, individual capacity, and skills) had on performance**.**

After the identification of the performance gap and the causes, needed interventions were designed and developed. Interventions could range from measurement, feedback systems, new tools and equipment, compensation and reward systems, selection and placement of employees, to training and development. After implementation, the change process was continuously monitored.

Evaluation was the last phase of the HPT process, starting with the formative evaluation of each phase to determine the response of workers, their capacity and willingness to perform the recommended behaviors. The final evaluation focused on improvement of business outcomes and return on investment for the intervention.

Pershing, Lee, Ji-Fun, & Cheng, (2008) in their study asked HPT panelists to indicate the most influential fields and disciplines that contributed to the development of HPT. Panelists argued that due to the interdisciplinary nature of the HPT field, that among the diverse applied and academic disciplines, that the most influential contributors to the field included systems theory, information technology, and cognitive science. Other disciplines that were cited in this study included psychology, economics, physics, biology, and philosophy. The fields mentioned by the panelists agreed with Gayeski (1995) that comprehensively described the relationship between HPT and other fields.

Van Tiem (2004) identified several behavioral experts who contributed to the HPT model and practice. For each of these authors, I have presented a summary of their proposed model, critically assessed the strength of evidence either supporting or critiquing the model, and then explained how it fitted into the framework of my study.

Thomas Gilbert's Model

Gilbert's BEM (1978) is a conceptual framework used in performance technology to evaluate how environmental support and a performer's repertory of behavior contributed to organizational performance. Gilbert asserted that "worthy performance" was a behavior that was valued for its accomplishment and determined by the ratio of value to cost. He suggested that the manager responsible for performance used his engineering model to analyze alternative ways to achieve accomplishments in an efficient manner by looking at environmental methods, performers, and management actions. Gilbert's model, grouped all factors of performance that were not related to the performer or the manager's duties into the environmental category (1978). The work process, work procedures, rules, working conditions such as space, ergonomics, appropriate lighting, temperature, and acceptable noise threshold were all considered part of the environment. People programs included the workers' skills, knowledge, and attitude to work. Management referred to the actions that a manager took such as giving feedback, information, and incentives to the workers.

Gilbert is credited with the saying, "Put a good performer in a bad system, and the system will win every time" (Gilbert, 1978; Rummler 2004, p. xiii). Gilbert's framework is highly regarded in the HPT field and is widely used for cause analysis. Gilbert's framework was invaluable not only on the six influences of environmental and human repertory of behavior that positively impacted performance but also in determining the cause analysis while building the framework for my study. Finally, Gilbert's Performance Matrix provided insight into strategic, policy, logistical, tactical, cultural and philosophical aspects of my study (Van Tiem, 2004).

Geary Rummler: Components of Performance

Rummler (Van Tiem, 2004) provided a model that expanded performance analysis beyond the worker to encompass the work processes and the entire organization. Rummler is credited with identifying the five components of a performance system as follows:

1. Job situation (the occasion of the performance)

2. Performer (the worker)

3. Response (the action or decision that occurs)

4. Consequence (reward, punishment, no consequence)

5. Feedback (adequate or inadequate response)

The collaboration between Rummler and Brache (1995) provided a framework used to assess the performance functions of all the component units that made up an organization to ensure that goals were aligned to the organization's mission. Though, originally designed for the formal business sector, this analytical framework was successfully applied in DE settings.

A nine-cell matrix adapted from the Rummler & Brache (1995) framework provided a reliable analysis of the significant variables applicable to DE institutions. Moller and Benscoter (2000) confirmed that an approach akin to organizational alignment analysis was successful in examining the evaluation systems in instructional design. This model was recommended in this study to determine what is and what should be present to support the goals, structure, and management of DE programs.

Table 2.

Performance Variables in Postsecondary DE Institutions

	Goals	Structure	Management
Organization (DE Institution)	Cell1 Organization Goal	Cell4 Organization Structure/Design	Cell7 Organization Management
Process (Online Learning/Instructional Design	Cell2 Process Goals	Cell5 Process Structure/Design	Cell8 Process Management
Job/Performer (Faculty)	Cell3 Job Goals	Cell6 Job Structure/Design	Cell9 Job Management

Adapted from Rummler & Brache (1995)

Robert Mager: Objectives

Robert Mager (1992) contributed the concept of objectives to HPT theory as a framework for establishing expectations for a desired outcome. Objectives are clear unambiguous statements that described a performance, the expected condition for the performance to occur and the criterion or the acceptable performance standard. Mager (1992) provided a checklist on why workers did not perform to the required standard:

1. They did not know or understood how to perform the task
2. They did not comprehend the desired expectations
3. They did not possess the required authority
4. They did not get the information on time regarding how well they performed (i.e. lack of feedback)
5. Their sources of information were designed poorly, were not accessible, or simply did not exist
6. They did not have job aids to cue correct performance
7. Their workstations provided obstacles to desired performance
8. The organizational structure made performance difficult
9. They were punished or ignored for doing things right
10. They were rewarded for doing things wrong, and
11. Nobody ever noticed whether they performed correctly or not.

This framework was helpful to HPT practitioners in clarifying performance expectations. The same framework was very useful in describing expectations for the work and the worker in my study.

Rossett Model

Rossett (1992) proposed a model of "causes of performance problems" (p. 22). Rossett identified the following items as types of causes: Dearth of knowledge or skill, wrong incentives, wrong environment, and the absence of motivation. Rossett's model defined skills or knowledge and motivation as factors inherent in the performer, while incentives and

environment are outside influences to the performer. Rossett refined Gilbert‟s (1978) model by breaking the category of management into incentives and motivation.

Joe Harless: Front-End Analysis

Joe Harless contributed to HPT theory by determining the problem that needed to be solved by describing the performance indicator that needed to be improved. Behavioral and non-behavioral causes of poor performance were subsequently identified and probable solutions prioritized in rank order. Front-end analysis (FEA) as this model is called (Van Tiem, 2004) challenged PT practitioners to identify multiple solutions to stem the performance problem rather than “one-shot solutions”, (p. 9). This model was criticized for its use in training even when lack of knowledge or skill was not the cause of the problem that needed a solution. FEA as a training model would be used in my study only where there are behavioral performance gaps caused by lack of knowledge or skills.

Dale Brethower: Performance-Based Instruction

Brethower's performance-based instruction is applicable to the intervention aspect of the HPT model. In his model, Brethower suggested that HPT practitioners concerned themselves with the job as they designed instructions that linked training directly to business outcomes. Performance-based instruction emphasized hands-on with authentic materials and procedures that helped learners simulate excellent performance. Brethower suggested three steps to achieve excellent performance:

1. Guided observation – learners experience demonstrations
2. Guided practice – learners practice specific processes to achieve specific results
3. Demonstration of mastery – learners demonstrated competency in performance by generating the desired products or services.

Brethower's model was handy in the selection of interventions in areas such as coaching, team building, on-the-job training and other forms of performance support activities that allowed learners to achieve mastery.

Principles of HPT

HPT practice is concerned with a systemic view of organizations. Systems are such that any flaw on a subsystem destabilized the functioning of the other subsystems and hence the entire system. Therefore, a holistic analysis was always required to ensure that the entire system was in equilibrium. The concern for systemic issues was written into the HPT Certification Standards of the International Society for Performance Technology (2004). The ten standards presented below are based on ISPI's four principles, following a systematic process, and summarized as follows:

1. Focus on results and help clients focus on results.
2. Look at situations systemically, taking into consideration the larger context, including competing pressures, resource constraints, and anticipated change.
3. Add value in how you do the work and through the work itself.

4. Utilize partnerships or collaborate with clients and other experts as required.
5. Be systematic in all aspects of the process, including the assessment of the need or opportunity.
6. Be systematic in all aspects of the process, including the analysis of the work and workplace to identify the cause or factors that limited performance.
7. Be systematic in all aspects of the process, including the design of the solution or specification of the requirements of the solution.
8. Be systematic in all aspects of the process, including the development of all or some of the solution and its elements.
9. Be systematic in all aspects of the process, including the implementation of the solution.
10. Be systematic in all aspects of the process, including the evaluation of the process and the results.

The first four standards captured ISPI's four principles: focus on results, work systemically, add value, and collaborate with others. They described the essence of work in HPT. The four standards, considered together, indicated the possibility of a performance-improvement project that was considered a success in one area of an organization that made performance worse in another area or that made performance worse for the whole organization. Therefore, the four principles must work in tandem; it is necessary to meet all four principles to ensure that each one of them is necessary and worth the effort.

Administrators of postsecondary institutions who desired to instill results driven attitude in their DE faculty and administration would best succeed by under-studying the proven strategies from the field of HPT. HPT is a systematic process of stages designed to impact individual and organization behavior that produced outcome that is cost-effective. It required a logical combination of three fundamental stages: performance analysis, cause analysis, and intervention selection that are scalable to individuals, and organizations (Prestera & Moller, 2001).

HPT draws solutions to problems identified for intervention from a variety of other fields such as management sciences, behavioral psychology, organizational development, instructional systems design, quantitative analysis, and human

resources management. In general, HPT advocated a rigorous analysis of present and desired levels of performance, analyzed the causes for the performance gaps, offered a range of interventions required to improve performance as well as monitor the change management process, and outcome evaluation (Guerra-Lopez, 2006; Moller, 2001; Brethower, 2000).

Several schools, profit and non-profit organizations have used HPT as models for their performance improvement drives. HPT was used to identify potential barriers to effective design and development of 20 online high school courses for Arizona State Technology-Assisted Project-Based Instruction (TAPBI) (Arizona State, 1999). University professors, Gerson & Gerson (2008) used the HPT model to elucidate organizational design and organizational development (OD) and organizational behavior (OB) topics for their students who found the HPT approach easier to understand. In another application of HPT model for school improvement, Page (2011) used the first four Standards of Performance Technology—results focus, systemic focus, value creation, and partnership to systemically transform City Schools of Decatur in Georgia to meet 21st century standards. HPT was used by Fang (2007) to develop an expanded online faculty development model that used systematic performance analysis schema to implement alternative faculty development model that incorporated performance support, knowledge sharing, communities of practice, and formative evaluation.

Among several other organizations, performance improvement or HPT model had been successfully used to guide such organizations through performance improvement efforts: Taylor (2007) established qualitative evidence of Gilbert's (1978) six dimensions in Health Care that were effective at delivering competent patient care. Cox (2006) demonstrated support for BEM dimensions among middle-management MBA candidates as well as among 1,500 professionals across a spectrum of industries as value-added strategy for improving performance. The Perceptual Model, a survey instrument that Ripley (2003) developed, and designed to identify performance factors in an assembly line work environment, provided validation for Gilbert's model.

BEM, a diagnostic model of HPT provided structure to HPT practice as it facilitated the identification of vital behaviors in the larger organization that enabled the achievement of optimal performance improvement. Brethower (1999)

posited that since Gilbert's BEM was founded in behavioral psychology that it was essential that a learning culture drove its continued improvement.

The BEM

The BEM credited to Gilbert (1978) and published in his book, "*Human Competence: Engineering Worthy Performance,*" articulated a systematic and systemic means of identifying barriers to both individual and organizational performance. Through differentiating between a person's repertory of behavior (what the individual brought to the work place) and the environmental supports (work environment factors that helped or hindered performance) provided by the organization, barriers could be discovered. Performance deficiency, the author asserted, either emanated from deficiency in behavior repertory (P), or in the supporting environment (E), or both. However, the ultimate cause according to the author was traceable to the deficiency in management (M) (Gilbert, 1978).

Three Leisurely Theorems

Gilbert's explanation of the three leisurely theorems was described in his book. His first leisurely theorem on producing worthy performance, focused on accomplishment rather than behavior. In his first leisurely theorem, Gilbert clearly differentiated between a behavior and an accomplishment that was an outcome of the behavior. He explained that accomplishment and behavior were two aspects of human performance. Accomplishment was achieved at a cost that must first be accounted for before behavior could be accurately assessed (Krapfl, 1982).

Gilbert's second leisurely theorem, known as the measurement theorem, conceptualized the gap between the desired level of performance (the exemplary performance) and the actual level of performance (the typical performance) as the potential for improving performance (PIP). PIP measured the potential that a typical performer had for improvement. To help typical performers improve their performance level to that of an exemplary performer, a diagnostic analysis was conducted to determine the areas that caused the performance deficiencies while the appropriate interventions were implement. Gilbert

specified six areas where causes of the performance deficiencies could be found: data, instruments, incentives, knowledge, capacity, and motives. The first three categories constituted the environmental supports, and the last three categories are the performer's personal factors (see table below).

Table 3.
Behavior Engineering Model

	Information	Instrumentation	Motivation
Environmental supports	1. Data	2. Instruments	3. Incentives
Person's repertory of behavior	4. Knowledge	5. Capacity	6. Motives

For performance to become worthy to both the organization and the performers, Gilbert emphasized interventions that helped reduce or altogether eliminated the causes of a performance barrier at the least cost as most preferable. Gilbert was of the opinion that a systematic approach to finding greater success was in following the sequence from data to instruments and incentives to knowledge, capacity, and motives. Gilbert affirmed that human incompetence was mostly as a result of environmental supports and posited that since personal factors, especially human motives were difficult to observe and explain that it provided a costlier route to change and must be avoided (Chyung, 2005).

Table 4.
Updated BEM

	Information	Resources	Incentives
Environment	1. Roles and performance expectations are clearly defined; employees are given relevant and frequent feedback about the adequacy of performance. 2. Clear and relevant guides are used to describe the work process. 3. The performance management system guides employee performance and development.	1. Materials, tools and time needed to do the job are present. 2. Processes and procedures are clearly defined and enhance individual performance if followed. 3. Overall physical and psychological work environment contributes to improved performance; work conditions are safe, clean, organized, and conducive to performance.	1. Financial and nonfinancial incentives are present; measurement and reward systems reinforce positive performance. 2. Jobs are enriched to allow for fulfillment of employee needs. 3. Overall work environment is positive, where employees believe they have an opportunity to succeed; career development opportunities are present.

Table continues

	Knowledge / Skills	Capacity	Motives
Individual	1. Employees have the necessary knowledge, experience and skills to do the desired behaviors 2. Employees with the necessary knowledge, experience and skills are properly placed to use and share what they know. 3. Employees are cross-trained to understand each other's roles.	1. Employees have the capacity to learn and do what is needed to perform successfully. 2. Employees are recruited and selected to match the realities of the work situation. 3. Employees are free of emotional limitations that would interfere with their performance.	1. Motives of employees are aligned with the work and the work environment. 2. Employees desire to perform the required jobs. 3. Employees are recruited and selected to match the realities of the work situation.

Adapted from Roger D. Chevalier (2002).

Chevalier (2002) found a way to make Gilbert's model more comprehensive and scalable by re-ordering both the environmental and individual factors in a rank order of identification and treatment as shown in the figure below:

Chevalier HPT Model

Environment: 1. Information 2. Resources 3. Incentives

Individual: 6. Knowledge 5. Capacity 4. Motives

Figure 3. Chevalier Model

Chevalier (2002) asserted that cause analysis did not point users to ready made solutions for solving performance problems, but provided a framework for identifying the prevailing causes. In the updated model, the cause analysis began with the environmental factors because they represented the most barriers to exemplary performance, as they were the keys to empower workers to do what was required of them. Looking first to environmental causes agreed with the words credited to Rummler and Brache that, "If you pit a good performer against a bad system, the system will win almost every time." (Performance Improvement, 1995, p. 13)

The environmental support factors are divided into information, resources, and incentives. Chevalier (2002) described information to include communicating clear expectations, providing the necessary guides to do the work, and giving timely, behaviorally specific feedback. Resources included the provision of the proper materials, tools, time and processes needed to accomplish the work. Incentives ensured the provision of both financial and nonfinancial inducements to encourage performance.

The individual's repertory of behavior was more difficult to assess and remedy and included the individual's motives, capacity, knowledge and skills. Individual motives should conform to the work environment for employees to excel in the work place. Worker capacity sought to determine if the worker was teachable and able to learn what was required in order to be effective on the job. The knowledge factor sought to determine if the individual had the needed knowledge and skills to accomplish their assigned tasks.

The upgraded BEM provided a structure that was used to assess the six factors: information, resources, incentives, motives, capacity, and knowledge and skills that impacted individual and group performance in the work place. Chevalier

(2002) strongly suggested that the six factors be reviewed in the order described in the figure above. According to Chevalier, the environmental factors were easier to improve and had a greater impact on individual and group performance.

The cause analysis worksheet was used to establish the reason why there was a performance gap. The first step in the process involved, identifying the individual or the organization's current and future performance levels. The difference between the two levels constituted the performance gap. The second step was to identify a goal considered to be attainable in the short term that moved the organization in the desired direction. Such goals would be defined in a manner that specified measures of quality, quantity, time, and cost. Steps three and four involved assessing the impact of the environmental factors and working through the individual factors in the order recommended (see Table 3).

Environmental factors such as information, resources, and incentives were usually more cost-effective to fix than individual factors. Motives, capacity, and knowledge were more costly to address and required greater effort. Even when individual factors were successfully changed performance would most likely not improve if there were environmental factors that remained unresolved (Chevalier, 2002, p. 6).

Suitability of the HPT Model for the study of postsecondary DE in Nigeria

Several studies have looked at re-aligning DE within the HPT lens to determine the precise gaps and proffer evidence-based solutions: Cooper (2007) sought to find the factors that determined why a faculty member did or did not participate in DE; Maigo and Mei-yan (2010) applied the cognitive motivator and HPT frameworks to investigate the current situations and problems of primary school teachers' technology-instruction integration; Nijhuis & Collis (2005) investigated how teachers could stay in control under the increased expectations of more effectiveness and efficiency made possible by using LMS. Moller & Prestera (2001) outlined the structure for addressing online design, policy, best practices, and implementation from the human performance framework and the author's experience with instructional systems design. Barbera & Linder-Van Berschot (2011) discussed factors of a comprehensive model for online education that encompassed personal characteristics of learners, instructors, instructional and institutional variables, as well as learning outcomes. Davis (2010) investigated

perceptions of online students and faculty regarding quality benchmarks for: courses, institutional support, course development, the teaching and learning process, course structure, student, faculty support, evaluation and assessment. Bell (2008) developed knowledge in understanding of the multigenerational workforce as a strategy to achieve and maintain positive individual and organizational levels of performance within the 21st. century workplace. Business and military have used HPT models to increase productivity. Foshay (1999) found that the use of the HPT model was not restricted to the private sector or government but was beneficial to the public school systems. The current study benefitted from Gilbert's (1978) BEM as it investigated postsecondary DE in Nigeria from a performance standpoint of the environmental supports, the faculty and the administrators repertory of behavior.

The Concerns-Based Adoption Model (CBAM)

The Research and Development Center researched strategies that addressed teacher's attitudes and how teachers perceived innovations and reacted while implementing educational programs (Hall et al., 1979).

The CBAM) is a framework used to determine individual teacher's emerging concerns as they participated in educational innovations and change development programs and practices in their schools (Hall et al., 1973). The CBAM is a practical model for measuring, describing, and explaining the change processes teachers went through as they implemented new technologies or instructional practices (Hall & Hord, 2011). Some change principles supported by CBAM that was applicable to my research included the following:

1. Success in innovation implementation required a process that took place over time and was not to be seen as an event,

2. The change process was an independent experience for each teacher,

3. Change was an individual, developmental process that occurred over time, and

4. Using the appropriate strategies mitigated the difficulties encountered in the change process (Hall & Hord, 2011).

Concerns are affective domain responses by faculty to an innovation that encouraged or hindered the adoption of the innovation (Hall & Hord, 2011). CBAM connected the change process; the innovation and the individuals involved in the process (Hall & Hord, 2011). CBAM have been used widely to study both K-12, and higher education environments (Donovan & Green, 2010; Saunders, 2012). Studied innovations have varied greatly between innovative products and processes. The CBAM used the concerns of a population including their demographic and technographic characteristics and garnered understanding and the support needed for the adoption of the innovation (Straub, 2009). Applying CBAM to faculty and administrators of postsecondary DE institutions provided insights on their potential reaction to the challenges of change, how to facilitate adoption as well as sustained the change process (Hall & Hord, 2011). Using the stages of concern questionnaire (SoCQ), a 35-item, eight-point Likert-type scale scored at the ordinal level, respondents were asked to select

each item on a 0 to 7 Likert scale that indicated their concerns, zero (0) represented no relevant concerns or readiness for technology adoption, four represented a somewhat relevant concerns or readiness for technology adoption, while a seven represented a very relevant concern or readiness to adopt technology. The total of the responses on each of the five items on the stages of concern subscales represented the intensity of concern at each stage and thus provided an index of readiness to adopt DE (George et al., 2008).

Summary and Transition

The ability to ascertain the solution to the poor performance of Nigeria's DE programs, and any attempt to engineer improved performance ought to begin with the realization that postsecondary DE institutions are fundamentally human performance systems, and therefore, must deal with the challenges faced by its work force and the suitability of the work environment. The BEM (Gilbert, 1978) was applied to identify the performance gaps, analyzed the causes of the gaps and the SoCQ was used to determine faculty and administrator's concerns in the adoption of online learning. Data from the study was used to make the appropriate recommendations for accurate and meaningful interventions. In Chapter 3 that follows, I discuss the methodology used in the study, which includes the research questions, the hypotheses, data collection and analyses, threats to validity among others.

Chapter 3: Methodology

Introduction

This section described the methodology that I used to study the relationship between environmental and repertory of behavior support factors perceived by faculty and administrators' as barriers to DE adoption in four postsecondary DE institutions in Nigeria. The SoCQ was self-scored by faculty and administrators to determine their dominant stages of concern to online adoption. Lastly, the strategy used to determine how well the PROBE instrument predicted the popular SoCQ for innovation adoption was explored.

This predictive validity study design had two parts. First, it sought to use BEM (Gilbert, 1978) to determine faculty and administrators' perceived barriers to effective adoption of online DE in selected postsecondary DE institutions in Nigeria; concurrently, the SoCQ was used to determine faculty and administrators' dominant stages of concern about online adoption.

The second part of the study used the SoCQ to validate the PROBE instrument by determining how well the BEM predicted SoCQ. The PROBE survey (hard copy) was administered to both faculty and administrators of four postsecondary institutions in the southwest of Nigeria. It was based on Gilbert's (1978) BEM, as modified by Hersey and Chevalier (2006) and described below under the "Instruments" subsection. The survey was used to determine the perceived barriers that affected faculty and administrator's willingness to adopt DE in four postsecondary DE institutions in southwest Nigeria.

A second survey used the more established SoCQ (Hall & Hord, 2011) and determined the most dominant stages of concern as perceived by faculty and administrators as they adopted online learning. Lastly, the results from both surveys (BEM and SoCQ) were correlated and used to determine how well the BEM predicted the SoCQ.

Relationships among the study variables were evaluated and provided postsecondary leaders in education with useful information to bring DE institutions up to benchmark performance level. Such information would help established institutions realign their practices where performance gaps were identified, as well as to provide a roadmap for fresh DE startups

Research Questions

RQ1. What likely BEM factors for DE adoption as perceived by faculty are most dominant in postsecondary DE institutions in Nigeria?

RQ2. What likely BEM factors for DE adoption as perceived by administrators are most dominant in postsecondary DE institutions in Nigeria?

RQ3. What are the relationships between faculty and administrator's demographic and techno graphic characteristics and their most dominant stage of concern in adopting online learning?

RQ4. How well did the PROBE instrument predict faculty and administrator's stages of concern for DE adoption as scored by the SoCQ?

Hypotheses

Since *RQ 1* and *RQ 2* are descriptive, hypotheses are formulated only for RQ 3 and RQ 4:

$H_0 3$ There was no relationship between faculty and administrator's demographic and techno graphic characteristics and their most dominant stage of concern about adopting online learning.

$H_A 3$ There was a relationship between faculty and administrator's demographic and techno graphic characteristics and their most dominant stage of concern about adopting online learning

$H_0 4$ The PROBE instrument did not predict faculty and administrator's stages of concern for DE adoption

$H_A 4$ The PROBE instrument did predict faculty and administrator's stages of concern for DE adoption

To answer Research Questions 1-2, descriptive statistics was used to analyze data collected with the BEM instrument. The mean, standard deviation, frequencies, and percentages were used to measure faculty and administrator's perception of the environmental and repertory of behavior support factors that acted as barriers to online adoption in postsecondary DE.

The study used the Hersey-Chevalier modified (Gilbert, 1978) PROBE survey (Appendix A) instrument to examine the relationship between the BEM six component variables. For each of the six factors, participants were asked to rate them using a four-point ordinal scale. Each response was assigned a point value. This scale allowed the researcher to average the scores for each respondent. It also allowed for statements that represented different aspects of the same attitude (Brace, 2004) regarding faculty and administrator's perception of barriers to technology adoption. Percentile scores were used to rank the six BEM factors self-scored by faculty and administrators to discern the dominant factors that impacted on respondents to adopt online learning.

To answer my third research question, the 35-item, seven-point Likert-type scale stages of concern questionnaire (SoCQ), was scored at the ordinal level, respondents were requested to select each item from zero to seven (0 - 7), indicating their concerns regarding DE adoption on the following scales, zero (0) represented no significant concerns or readiness for technology adoption, four represented a slight readiness for technology adoption, and seven represented a very relevant

concern or readiness to adopt technology. Response sums, on each of the five items stages of concern subscales represented the intensity of concern at that stage. Percentiles were used to plot the concern profiles for both individual and group data to identify the peak, or most dominant stage of concern and the relative intensity of other concerns (George et al., 2008; Hall et al., 1979; Hall & Hord, 2011).

RQ4 was answered by the use of stepwise multiple regression analysis to determine the predictive validity of the BEM instrument on the more established SoCQ scale. Prior to regression analysis, exploratory and confirmatory factor analyses were performed on both the BEM and SoCQ to test the factorial structures of both instruments. General model of fit for each model to the data was determined based on structural equation modeling (SEM) that utilized both absolute and relative fit indices.

In this study, my goal was to identify, describe, and predict the barriers to online adoption in postsecondary DE institutions in Nigeria as perceived by faculty and administrators. I used faculty and administrators self-report on the BEM survey as well as their scores on the stages of concern instrument. Using faculty and administrator's self-reported survey was most amenable to identifying the barriers to online adoption in postsecondary institutions (Cohen, Manion, & Morrison; 2003). This procedure was consistent with (King, 2013), who used an adapted BEM survey in a public school to identify barriers to technology integration.

Inferential statistics, including stepwise multiple regressions, modeled the potential relationship between the variables in the two measures (BEM and SoCQ) and therefore was suitable for the current study that sought to predict the validity of the BEM instrument compared to the more established SoCQ scale. Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were adopted to examine the internal structures of the Hersey-Chevalier (2006) modified PROBE survey (Appendix A) to provide a preliminary validity evidence of the instrument. CFA was used to test whether data collected using the PROBE scale fitted the hypothesized internal structure of the PROBE six factors. Moving or deleting items in the instrument prior to scoring each respondent achieved the consolidation of the items in each of the six cells (Mertler & Vannatta, 2005).

Study Setting and Population

In sub-Saharan Africa, the demand for higher education far outstripped supply. In Nigeria for example, over 800,000 candidates qualified for entrance into the university system in 2011, however, less than 500,000 were placed. Three hundred thousand (300,000) high school graduates, not counting working and adult learners, were unable to gain access to higher education in Nigeria in 2011. About half a dozen DE programs were created to provide higher education for candidates who were unable to attend the brick and mortar universities. The story was no different in Uganda and across most of the African continent (Mbugua, 2012; Ofoha & Awe, 2011). If, and when these candidates were fortunate to secure admissions into one of the DE institutions (about a dozen), they had to grapple with the challenges of their DE courses delivered to them through the print medium; technology considered to be in the postal correspondence DE phase (Mckee, 2010, Anderson, 2012). The federal institutions mandated by the government to provide DE across Nigeria included the following: National Open University of Nigeria, National Teachers' Institute, The University of Lagos Distance Learning, The University of Ibadan Distance Learning Center, The Obafemi Awolowo University Center for Distance Learning, The University of Benin Center for Distance Learning and the University of Ilorin Center for Open and Distance Learning among others. These postsecondary DE institutes have study centers across Nigeria and represented the population of this study.

Sampling Strategy

To carry out the survey for this study in four public universities in the southwest of Nigeria, I obtained IRB approval (10-16-15-0102184) from Walden, permission from the ethical board of Oyo-state, and permission from each of the four university administrations. (Appendix B). The four universities selected for the study are diverse in their DE programs. The universities comprised two single mode ODL, and two distance-learning programs. Both the professional and the socio-economic status of the faculty and the administrators in these universities are diverse and could easily be representative of the general university population in Nigeria and Africa.

To cover the full range of perceptions on DE, the sample population of this study included both faculty and administrators in the four selected universities. Faculty could be full-time, visiting lecturers, assistant, associate or full professors who have current or future career ambitions in DE teaching. The administrators comprised individuals who have managed or are in leadership positions in DE at their institutions. Department chairs, directors, deans, and distance learning coordinators are included in the administrative group. Permission to conduct this research was requested and granted by the appropriate bodies.

Each eligible potential participant received information that detailed the objective and the purpose of the study and was requested to join in the study (Appendix C). Hardcopy surveys were sent to the target population by the researcher for completion. The hardcopy invitation contained an introduction, the purpose of the survey, and a four-week deadline for completion of the survey. Intermittent reminders and ‘thank you’ letters were sent a number of times through the coordinators for the duration of the survey period to encourage participation (Dillman, Reips, & Matzat; 2010).

Within a quantitative survey design, determining sample size and dealing with nonresponse bias was essential (Holton & Burnett, 1997). I generated my sample size as stated below:

To calculate the sample size for this study, I used Cochran's (1977) and Krejcie and Morgan's (1970) sample size formula for both continuous and categorical data as they provided identical sample sizes in most cases where the researcher adjusted the t value used based on population size.

Cochran's (1977) formula used two key factors: (a) The error the researcher was willing to accept in the study, known as the margin of error, or, and, (b) The alpha level, or the probability that differences revealed by statistical analyses really did not exist; also known Type II error. Type II error occurred when statistical procedures resulted in a judgment of no significant differences when these differences did indeed existed.

According to Cochran (1977), a researcher had to estimate the variance of scaled and categorical variables. To estimate the variance of a scaled variable, the researcher needed to determine the inclusive range of the scale, and then divided by the number of standard deviations that included all possible values in the range, and then squared this number. For my study that proposed a seven-point scale with six standard deviations (three to each side of the mean) and captured 98% of all responses, the calculations was as follows:

$$S=\frac{7(no\ of\ points\ on\ the\ scale)}{6(no\ of\ standard\ deviations)}$$

When estimating the variance of a dichotomous (proportional) variable such as gender, Krejcie and Morgan (1970) recommended that researchers use .50 as an estimate of the population proportion to maximize variance, and produce the maximum sample size. This proportion was used to estimate variance in the population. For example, squaring .50 will result in a population variance estimate of .25 for a dichotomous variable.

Bartlett, Kotrlik, and Higginsd (2001) recommend that prior to embarking on a sample size calculation that assumed continuous data, that the researcher determined if a categorical variable played a major role in the data analysis and if so, that the categorical sample formula be used for such a calculation. Because I observed the separate effect of faculty or administration on the independent variables, my calculation determination followed the categorical data calculation.

I assumed an a priori alpha level at .05, a proportional (faculty vs. administrator) variable at an acceptable error at 5%, and an estimated standard deviation of the scale as .4. Cochran's sample size formula for categorical data:

no = $\frac{t^2 * pq}{d^2}$

$no = \frac{(1.94)^2 * (.4)(.4)}{(.05)^2}$ Where t = value for selected alpha level of .025 in each tail = 1.96. (An alpha level of .05 indicated the level of risk the researcher was willing to accept so that the true margin of error would exceed the acceptable margin of error.)

Where (p)(q) = estimate of variance = .2. (Maximum possible proportion (.4) * 1- maximum possible proportion (.4) produces maximum possible sample size).

Where d = acceptable margin of error for proportion being estimated = .05 (error researcher was willing to except).

Required sample size = 245. 8625

If I assumed a 30% response rate for a study of this nature, the total number of participants to be surveyed was calculated as follows: 245*.95 +245/3 = 159. To achieve Walden's one-third-survey response rate for a sample of 159 would require that I invite a total of 530 participants. Faculty and administrators willing to participate in this study would be surveyed.

Participation in this study was voluntary. No study participant experienced any kind of coercion. All 530 in the population received a hardcopy letter (Appendix: F) explaining the study, participation criteria, assurance of privacy and the protection of any information provided. Participants were given 30 days to complete the survey. A thank you and a reminder card (Appendix B) were sent to the participants every two weeks until the time allotted was accomplished. I sent reminders to underscore the benefits for participating in the study and that the survey only took less than 30 minutes to complete.

Instrumentation

PROBE: The Hersey-Chevalier (2006) modified PROBE survey (Appendix A) instrument was administered (hardcopy) to the faculty and administrators of the four-selected postsecondary DE institutions. The survey assessed what impact the work environment (information, resources, and incentives) and performers' repertory of behavior (motives, individual capacity, and skills) had on both faculty and administrator's perceptions regarding barriers to DE adoption in four postsecondary DE institutions in Nigeria.

The PROBE instrument (see Appendix: A) was a standard validated tool used in the HPT field. The Perceptual Model, a survey instrument that Ripley (2003) developed, and designed to identify performance factors in an assembly line work environment, provided validation for Gilbert's model. Taylor (2007) found qualitative evidence of Gilbert's (1978) six dimensions in healthcare organizations that are adept at delivering culturally competent patient care. Cox (2006) also demonstrated support for BEM dimensions among middle-management MBA candidates as a value-added strategy for improving performance. Frank, Cox, and Fodness (cited in Cox, 2006) applied Gilbert's model within the context of the supermarket industry to identify drivers that contributed to employee retention.

I used the PROBE instrument to collect data on root causes of performance deficits on environmental and workers' repertory of behavior as perceived by faculty and administrators that acted as barriers to DE adoption in the four selected postsecondary DE institutions. Chevalier's probe model was adapted for this study and for each of the six factors, participants were asked to rate them on a four-point scale. Each response was assigned a point value. For question 1, strongly disagree = 1, Disagree = 2, Agree = 3 and Strongly = 4. The scale allowed the researcher to average the scores for each respondent as well as statements that represented different aspects of the same attitude (Brace, 2004). Descriptive statistics was used to analyze the data. The mean, standard deviation, frequencies, and percentages or percentiles were used to measure faculty and administrator's perceptions regarding barriers to DE adoption. After data analyses the findings were summarized and used to recommend possible interventions that would effectively address issues revealed in the data.

The survey questionnaire was a validated instrument. For the first and second research questions, descriptive statistics were used to analyze the data. The mean, standard deviation, frequencies, and percentages or percentiles were used to assess faculty and administrators perceptions regarding barriers to DE adoption. Results from this study determined if there was a relationship between environmental and repertory of behavior support and barriers to DE adoption in post secondary schools in Nigeria. Results also shed light on the independent variables perceived by faculty and administrators to have the most impact on DE adoption.

Stages of Concern Questionnaire (SoCQ): My third research question applied the 35-item SoCQ on the demographic and techno graphic characteristics of faculty and administrators to determine their dominant concerns in adopting online learning.

Data for the fourth research question, "How well did the PROBE instrument predict faculty and administrator's stages of concern for DE adoption as scored by the SoCQ?" applied multiple regression analysis on the BEM factors to evaluate their relationship to the stages of concerns variables.

The CBAM (Hall et al., 1973; Hall & Hord, 2001) underpinned the (SoCQ) widely used to evaluate the adoption of innovations (Roach, Kratochwill, & Frank, 2009; Charalambos & Phillippou, 2010; Warner & Myers, 2013). The SoCQ was tested for validity and reliability and deemed acceptable for accurately measuring individuals' stages of concern about an innovation (George et al., 2008; Hall et al., 1979; Overbaugh & Lou, 2009). The SoCQ used five statements that demonstrated the main concerns at a specific stage of concern in regard to the concerns theory (George, et al., 2008; Hall et al., 1979).

The sum of the responses to the five items on each stage constituted the raw score for each scale (George et al., 2008; Hall et al., 1979). Each stage score ranged from 0 to 35 (George et al., 2008; Hall et al., 1979). The higher the score for a stage of concern, the more dominant the concerns at that stage was considered and the lower the score for a given stage, the less dominant the concerns were at that stage. However, the concern scores are not absolute, but relative to the scores on the other stages (Hall et al., 1979).

Pilot Test

I looked for questions that did not correlate, or otherwise seemed to misbehave in ways that suggested misunderstanding of the wording in the completed consolidated (SoCQ and BEM PROBE Appendix A) hardcopy questionnaire. I also interviewed study subjects to get clarity on any problems with the questions. The goal was to use the BEM (BEM) to identify or discover the barriers to performance in four selected postsecondary DE institutions.

Validation

Possible validation questions used to assess each item on an adapted instrument according to (Dillman, 1978) are as follows:

1. Are the directions concise? If no, please explain.
2. Are the directions clear? If no, please explain.
3. Are the directions complete? If no, please explain.
4. Did the survey contain language that could be understood by the participants? Was the reading level appropriate?
5. Did the survey address specific and appropriate issues?
6. Are any statements obtrusive or offensive?
7. Are there any statements that you would exclude from the survey?
8. Are there other statements that you would add to the survey?
9. Would the participants understand the response choices?
10. How long, in minutes, did it take you to complete the survey?
11. Did you have other comments?

The survey would not take too long to complete, as it would lead to missing data. If the pilot were too long, it would be revised to an appropriate length or included as a limitation of the study after accounting for the missing data.

To be considered reliable the instrument was required to produce a consistent result at different applications (Leedy & Ormrod, 2005; Sproull, 2002). Cronbach's alpha reliability test was calculated for each of the two revised and piloted questionnaires and scores exceeded the $\propto$ value of 0.070 indicative of the minimum acceptable reliability for a survey instrument.

It was stressed that due to the high probability of participants exiting the questionnaire before finishing, or incorrectly entering answers, or skipping questions (on paper survey), it was most important that the questionnaire was properly checked.

Role of the Researcher

As a researcher, it was important that I reported all data devoid of personal bias, perceptions, and beliefs (Tufford & Newman, 2012). My role was to identify, remove, or minimize all bias that would affect data collection and analysis (Marshall & Rossman, 2011). Though familiar with the educational culture in the setting of my study, however, I did not have a direct or remote working relationship with the participants. The directors of these postsecondary DE institutions granted me permission to conduct the research in response to my letter requesting permission to conduct the study (see Appendix B). Any access to the study participants' was through the facilitations of the four postsecondary institutions was through pre-arranged personal visit to the participants.

Threats to Validity

Erroneous perception of the purpose of the study and belief that the study would adversely affect participants would become a threat to internal validity. However, clearly stated purpose of the study and emphasis that participation was voluntary and that participant information was handled with the utmost confidentiality eliminated the threat to validity. Participants that dropped out from the study created validity problems that were balanced out through recruiting additional participants to make-up the numbers. Nonresponse was another factor that constituted a threat to validity, as those who did not respond would offer different perspectives from those who responded to the survey questions (Dillman, 2010). Teachers might work in groups to fill out the survey, creating selection interaction as a probable threat to the validity of the study.

I tested nonresponse bias (Bailey, 1978) by comparing early and late respondents to determine if the respondents were representative of my sample. To ensure accurate surveys, the fidelity of the responses provided by the participants was assured by careful instrumentation and survey administration. My survey adopted the procedures suggested by Dillman (2010). The two survey instruments used in this study were previously validated and suitable for this study.

Data Analysis

In preparation for the data analysis, the survey questions were arranged and coded according to the questionnaire design. Each question was coded to identify the factor items of interest to the study. The hardcopy questionnaire was distributed and collected by the researcher. The researcher ensured proper data coding, proofing and data entry.

Descriptive statistics was employed to analyze the data. The mean, standard deviation, frequencies, and percentages were used to examine, describe and predict the relationship between faculty and administrator's perceptions of barriers to DE adoption. Additionally, descriptive statistics were used to spot missing data and coding errors, while outliers were discarded. In the event of coding errors, outliers, and missing data, the entire record where there were missing data was deleted. I did not make provision for open responses in this survey; rather, I provided categories for respondents to check and analyzed quantitatively.

Summary and Transition

This chapter described my plan for the research methodology, the sample selection, and the description of the survey instruments. I outlined the processes that confirmed the validity and reliability of the instrument. I also described how I operationalized the research questions, as well as the procedures that I used for data collection and analysis. The survey instrument comprised the adapted Gilbert's (1978) BEM constructs updated by Chevalier that used a six category PROBE and the SoCQ.

I outlined my plan to use descriptive statistics to analyze the data. The mean, standard deviation, frequencies, and percentages were used to examine the relationship between faculty and administrator's perception of the barriers to DE

adoption. Step-wise multiple regression analysis was used to predict the validity of BEM against the SoCQ as a viable adoption scale. Faculty concerns in adopting online learning was assessed based on their demographics and techno graphics characteristics. Results from this study determined if there was a relationship between environmental and repertory of behavior barriers to DE adoption in post secondary schools in Nigeria. Results also shed light on the independent variables perceived by faculty and administrators that had the most impact on DE adoption.

Chapter 4: Results

Introduction

The purpose of this study was to use HPT framework (Van Tiem, 2004) to delineate the environmental and the performer repertory of behavior support functions that significantly impacted the adoption of DE among faculty and administrators in four public universities in Nigeria. The study also sought to determine how well the BEM PROBE instrument predicted faculty and administrator's stages of concern for DE adoption as scored by the SoCQ).

Research Questions

The research questions stated below, assumed faculty and administrators' perceptions of barriers indicated the actual barriers:

RQ1. What likely BEM factors for DE adoption as perceived by faculty are most dominant in postsecondary DE institutions in Nigeria?

RQ2. What likely BEM factors for DE adoption as perceived by administrators are most dominant in postsecondary DE institutions in Nigeria?

RQ3. What are the relationships between faculty and administrator's demographic and techno graphic characteristics and their most dominant stage of concern in adopting online learning?

RQ4. How well did the PROBE instrument predict faculty and administrator's stages of concern for DE adoption as scored by the SoCQ?

Hypotheses

Since *RQ1* and *RQ2* are descriptive, hypotheses are formulated only for *RQ3* and *RQ4*:

$H_0 3$ There was no relationship between faculty and administrator's demographic and techno graphic characteristics and their most dominant stage of concern about adopting online learning

$H_A 3$ There was a relationship between faculty and administrator's demographic and techno graphic characteristics and their most dominant stage of concern about adopting online learning

$H_0 4$ The PROBE instrument did not predict faculty and administrator's stages of concern for DE adoption

$H_A 4$ The PROBE instrument predicted faculty and administrator's stages of concern for DE adoption.

Sampling Strategy

Permission from the relevant institutions (Appendix: K to P) was obtained to carry out the survey for the study in four public universities in the southwest of Nigeria. The four universities selected for the study were diverse in their DE programs. The universities comprised two single mode ODL, and two distance-learning programs. These institutions representative of the population were surveyed only after permission was received from both Walden and the Ethical Review Board of Oyo State, where I reside. The survey was conducted over a 6-week period. Both the professional and the socio-economic status of the faculty and the administrators in these universities are diverse and could easily be representative of the general university population in Nigeria and West Africa.

A total of 146 staff members comprised of both academic and administrative staff from four different public universities in Nigeria were randomly selected and requested to voluntarily respond to the questionnaires. Ninety-six respondents completed the entire questionnaire with no missing data, which represented a 66% response rate. Fifty respondents completed part or some of the questionnaires. These were defined as missing or incomplete data and were excluded from the analyses. Respondents provided additional demographic information such as their institution, gender, age, and level of education, length of employment or tenure. They also provided technographic information that included, range of experience

with technology, range of experience with online use, duration of online professional development attended, type of online professional development attended and level of online use.

Data Preparation

The data from the retrieved questionnaires were entered into excel and imported into SPSS, numerical values were assigned to the categorical responses. The Likert type questions were assigned numeric values on the scale of 1 to 4 (strongly agree to strongly disagree). The resulting file was then checked for accuracy and completeness. Incomplete questionnaires resulting in missing values were excluded from the analysis. Repeated entries were also excluded from the analysis. As all questions in the survey were closed-ended categorical questions, there were no outliers in the resulting file.

Results

Tables 1 to 10 and Figures 4 to 9, below, showed the responses to each of the demographic and technographic questions.

The fourfold plot is a relation of the Pie Chart (Friendly, 1995), was designed to enhance visual comparison of the pattern of association between two dichotomous variables across two or more populations. A quarter circle, with a radius that was proportional to $\sqrt{n_{ij}}$ so that the area of the circular wedge was proportional to the cell count, showed the frequency nij in each cell of a fourfold table.

For a single 2×2 table, the fourfold display presented the frequencies by area, but scaled in a way that depicted the sample odds ratio, odds ratio = $(n_{11}/n_{12})/(n_{21}/n_{22})$. An association between the variables (i.e. odd ratio $\neq 1$) was shown by the tendency of diagonally opposite cells in one direction to differ in size from those in the opposite direction. The display used color or shading to show this direction. Confidence rings for the observed odds ratio allowed a visual test of the hypothesis H_0: odds ratio = 1. They have the property that the rings for adjacent quadrants overlapped if and only if the observed counts were consistent with the null hypothesis (i.e. the odds ratio between the adjacent cells is 1). In the case of a 2×2×k table the last dimension typically corresponded to “strata” or populations, and it was typically of interest if the observed associations between the first two variables are homogeneous across strata.

Frequency Distribution Between Category, Gender, and Level of Online Use

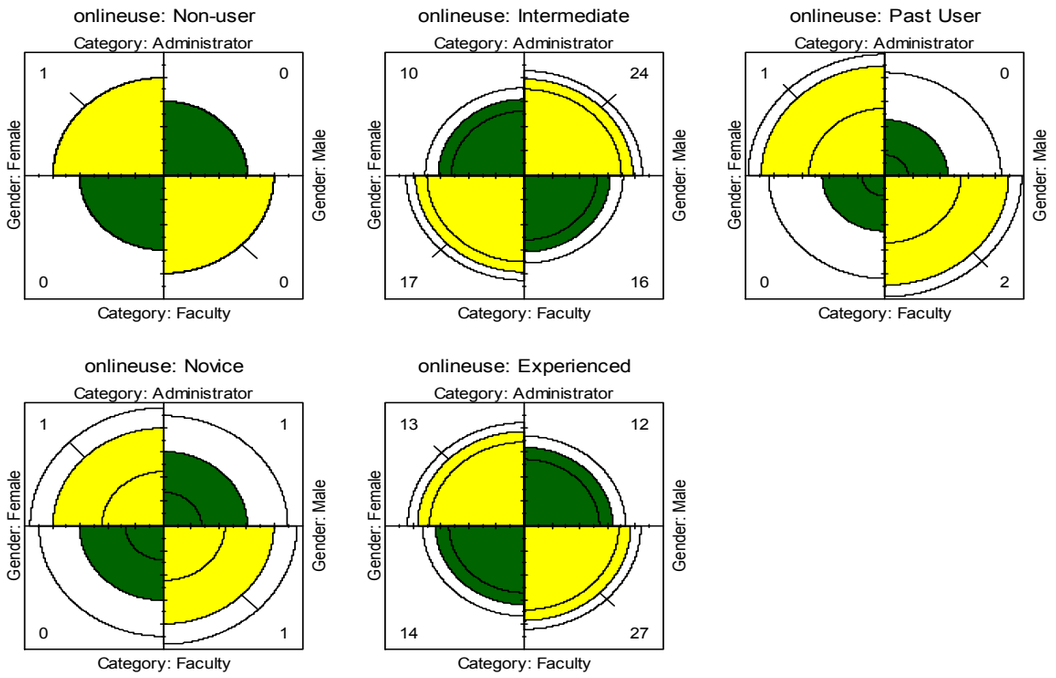

Figure 4. A fourfold plot showing the frequency distribution between category, gender, and level of online use.

In Figure 4, the top right box color represented the number of female administrators and the top left box represented the number of male administrators in each category for level of online use. Also, the bottom right box represented the number of female faculty while the bottom left box slice represented the number of male faculty in each category for level of online use.

I observed from the plot that most of the respondents were either intermediate or experienced online users, and that the highest number of intermediate users were male administrators while the highest number of experienced users were male faculty members.

The green and yellow colors indicated the direction of association between gender and category. It was observed that

the direction of association between gender and category for intermediate users was different from all the other online user groups defined. The plot also showed that for intermediate and experienced users the odds of either a male or female being an administrator or faculty was about the same while for novice and past-users the odds were also similar.

Table 5.

Category Response Frequency Distribution

Staff	Frequency	Percent
Administrator	66	45.21
Faculty	80	54.79

Table 5 recorded the frequency distribution of the Staff category, either administrators or faculty members that responded to the survey. Administrators were 45.21% of the respondents and faculty made up 54.79%. Responses per Gender indicated that 41.96% of the respondents were female and 58.04% male. Furthermore, 65.75% of the respondents fell within the 30-49-age bracket, 19.17% were 50 and over, while 15.07% of the respondents were under 30 years (see Table 4.16).

Table 6.

Gender

Gender	Frequency	Percent
Female	60	41.96
Male	83	58.04

Table 6 records the frequency distribution of the gender of respondents. I observed that there were slightly more male respondents (58.04%) than female respondents (41.96%).

Table 7.

Age Group

Age Group	Frequency	Percent
18 to 29	22	15.07
30 to 39	67	45.89
40 to 49	29	19.86
50 to 59	23	15.75
60 or over	5	3.42

The frequency distribution of the age group of respondents as reported in Table 7, I observed that the bulk of the respondents are within the 30-39-age bracket (45.89%) and just about 3% are above 60years.

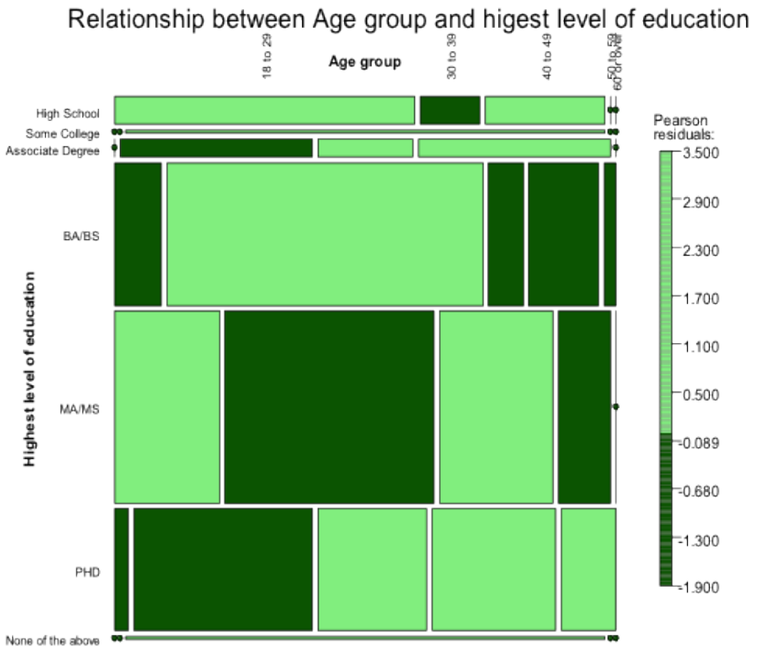

Figure 5.
Mosaic plot: Showing relationship between Age group and highest level of education

The colors represented the level of the residual for that cell or combination of levels. More specifically, darker shades of green meant there are more observations in that cell than would be expected under the null model (independence). Lighter green shade meant there are fewer observations than would have been expected. This could be interpreted as showing, which cells are contributing to the significance of the chi-squared test result.

From Figure 5, it was observed that all respondents above 50years have some form of university degree. The mosaic plot in Figure 5 was a graphical representation of the Contingency Table of highest level of education and age group. The mosaic plot was divided into rectangles, so that the vertical length of each rectangle was proportional to the proportions of highest level of education variable in each level of the age group variable. The proportions on the x-axis represented the number of observations for each level of age group. The proportions on the y-axis at right represented the overall proportions of high level of education for the combined levels (i.e. age groups).

The colors represented the level of the residual for that cell or combination of levels. More specifically, darker shades of green meant there are more observations in that cell than would be expected under the null model (independence). Lighter green shade meant there are fewer observations than would have been expected. This could be interpreted as showing, which cells are contributing to the significance of the chi-squared test result.

Table 8

Highest Level of Education by Category: For administrators, faculty and all respondents.

Highest level of education.	Administrator	Faculty	Frequency (Total)	Percent
High School	1	7	8	5.48
Some College	0	1	1	0.68
Associate Degree	4	1	5	3.42
BA/BS	30	11	41	28.08
MA/MS	29	26	55	37.67
PHD	2	33	35	23.97
None of the above	0	1	1	0.68

Table 4, reported the overall highest level of education for respondents and their level of education by staff category. Only 23.97% of the respondents at the time of the survey attained the highest level of education identified (PhD), 2 of the administrative staff had PhDs while 33 of the faculty (Academic staff) have PhDs. Majority of the respondents had either a first degree or a form of master's degree. Only about 6% of the respondents had less than some form of a bachelor's degree.

Table 9.

Duration of Work at Your University

Duration of work at your university	Administrator	Faculty	Frequency (Total)	Percent
Less than 6 months	3	5	8	5.56
6 to 12 months	10	7	17	11.81
1 to 3 years	13	25	38	26.39
3 to 6 years	14	19	33	22.92
6 to 10 years	8	6	14	9.72
10 to 20 years	4	13	17	11.81
More than 20 years	3	5	17	11.81

It was also observed that more than half of the respondents have worked in the university for less than 10years (see Table 9.), however most of the respondents have worked in the universities between 1-3years.

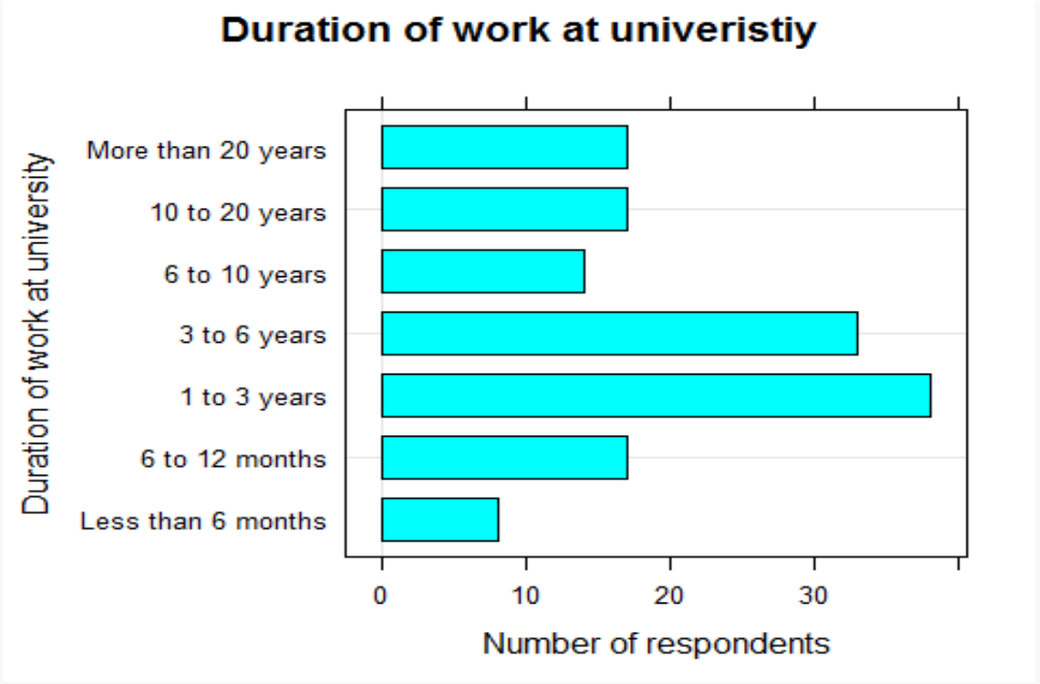

Figure 6.
Duration of work at univeristiy

The respondents were asked to indicate their range of experience with technology in education, range of experience with online use, duration of online professional development attended, type of online professional development attended and level of online use. The frequency distributions of their responses are presented in Tables 10 to Table 14 and Figures 7 to 9

It is important to note here that without hard data, it was impossible to judge the representativeness of my sample and therefore presented the potential for sampling bias in the survey response.

Table 10.

Range of Experience with Technology in Education

Range of experience with technology in education	Administrator	Faculty	Frequency (Total)	Percent
Less than 6 month	2	0	2	1.39
6 to 12 months	5	4	9	6.25
1 to 3 years	18	22	40	27.78
3 to 6 years	19	23	42	29.17
6 to 10 years	12	11	23	15.97
10 to 20 years	6	13	19	13.19
More than 20 years	3	6	9	6.25

I observed that more than half of the respondents, mostly faculty had less than 10years experience working with technology in education (See Table10) while only about 6% of the faculty respondents had more than 20 years' experience working with technology in education. More than a decade's deficit in experience working with technology in education among faculty possibly indicated the gulf between the majority of faculty (93.75%) in educational technology time warp and the 6% struggling to cope with the dizzying pace of change in technology in education.

Table 11
Range of Experience with Online

Range of experience with online use	Administrator	Faculty	Frequency (Total)	Percent
Less than 6 months	2	0	2	1.40
6 to 12 months	4	10	14	9.79
1 to 3 years	13	14	27	18.88
3 to 6 years	25	25	50	34.97
6 to 10 years	11	17	28	19.58
10 to 20 years	8	12	20	13.99
More than 20 years	0	2	2	1.40

Furthermore, although more than 90% of the respondents were exposed to more than one year of online usage, only about 15% of the respondents had more than 10years experience with online usage. Most of the respondents attended some form of lecture-based, hands-on or a combination of lecture and hands-on online professional development (see Table 12). While more of the faculty had a combination of both lecture based and hands on professional development, the administrative staff had more hands on than lecture based online professional development. A Chi-square test for independence was then conducted to ascertain if experience with technology in education was dependent on experience online. Figure 7, below outlined the tested relationship. The hypothesis:

H_0: experience with technology in education was independent of experience online was tested against the alternative

H_A: experience with technology in education was dependent on experience online

The test was carried out at 5% level of significance. From Figure 7, I observed a strong association between range of experience with online usage and range of experience with technology in education. A test for association between the two variables produced a contingency coefficient of 79.20 indicative of a strong association; this test was significant at 5% level of significance. In addition, a chi-square test for independence recorded a test statistic value of 239.30 with a corresponding p-value <0.0001 indicated that at 5% level of significance, that the two variables are not independent of each other. Hence, range of experience online is not independent of range of experience with technology.

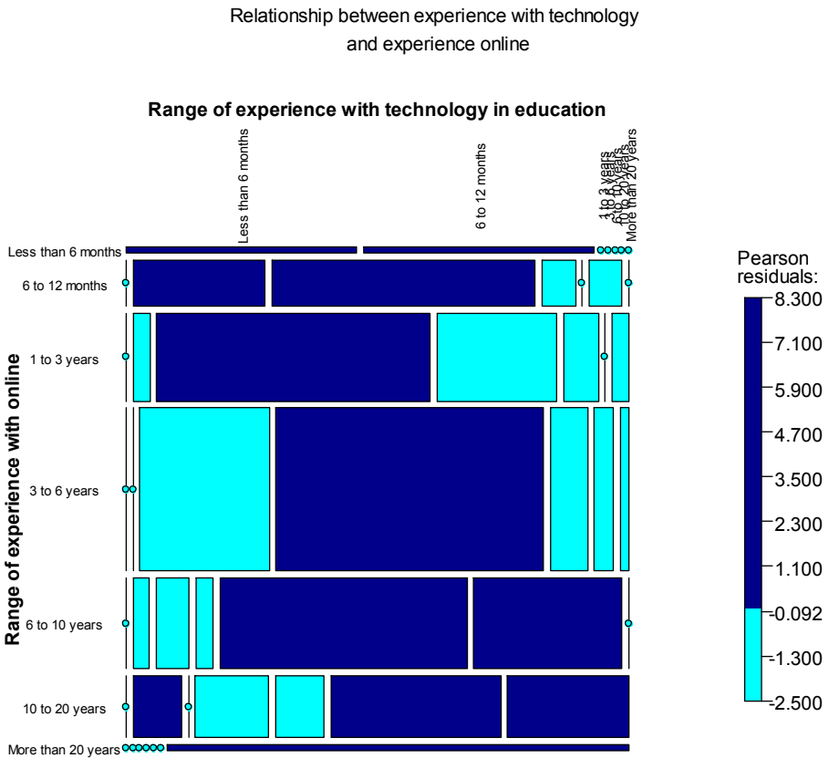

Figure 7: Mosaic Plot Showing the Relationship Between Experience with Technology in Education and Experience Online

The mosaic plot in Figure 7 was a graphical representation of the Contingency Table of range of experience with online and range of experience with technology in education. The mosaic plot was divided into rectangles, so that the vertical length

of each rectangle is proportional to the proportions of range of experience with online variable in each level of the range of experience with technology in education variable.

The proportions on the x-axis represented the number of observations for each level of range of experience with technology in education. The proportions on the y-axis at right represented the overall proportions of range of experience with online for the combined levels (i.e. range of experience with technology in education).

The colors represented the level of the residual for that cell and combination of levels. More specifically, darker shades of blue meant there were more observations in that cell than would be expected under the null model (independence). Lighter blue shade meant there were fewer observations than expected. This could be interpreted as showing, which cells contributed to the significance of the chi-squared test result.

Table 12

Duration of Online Professional Development Attended

Duration of online professional development attended	Administrator	Faculty	Frequency (Total)	Percent
Less than 6 months	13	10	23	16.20
6 to 12 months	14	19	33	23.24
1 to 3 years	13	20	33	23.24
3 to 6 years	13	16	29	20.42
6 to 10 years	9	8	17	11.97
10 to 20 years	0	4	4	2.82
More than 20 years	2	1	3	2.11

Table 12 reported the frequency distribution of the duration of professional online trainings attended. About 40% of the respondents have a year or less professional online training while approximately 54% have between 1 and 10years of professional online training. Only about 2% of the respondents have more than 20years of professional online training. Again, online professional development did not seem to keep pace with the rapid change in technology in education.

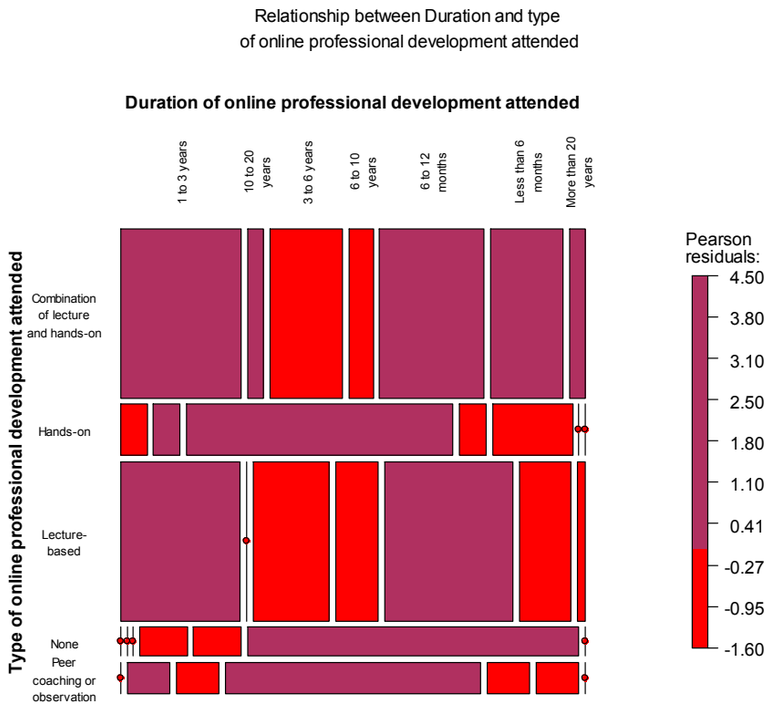

Figure 8: Mosaic Plot Showing Relationship Between Duration and Type of Professional Development Attended

The mosaic plot in Figure 8 was a graphical representation of the Contingency Table of type of online professional development attended and duration of online professional development attended. The mosaic plot was divided into rectangles, so that the vertical length of each rectangle was proportional to the proportions of Table of type of online professional development variable in each level of the duration of online professional development attended variable.

The proportions on the x-axis represented the number of observations for each level of duration of online professional development attended. The proportions on the y-axis at right represented the overall proportions of Table of type of online professional development for the combined levels (i.e. duration of online professional development attended).

The colors represented the level of the residual for that cell and combination of levels. More specifically, darker maroon shades meant there were more observations in that cell than expected under the null model (independence). Lighter orange shade meant there were fewer observations than expected. This could be interpreted as showing, which cells contributed to the significance of the chi-squared test result.

Figure 8, showed no identifiable interdependence between duration and type of professional development attended.

Table 13

Type of Online Professional Development Attended

Type of online professional development attended	Administrator	Faculty	Frequency (Total)	Percent
None	8	1	9	6.52
Lecture-based	23	27	50	36.23
Hands-on	10	6	16	11.59
Combination of lecture and hands-on	18	35	53	38.41
Peer coaching or observation	3	7	10	7.25

The respondents were asked to indicate their level of online use. Most of the respondents were either experienced or intermediate users while 1 and 2 administrators indicated complete non-usage and novice levels respectively. It was difficult to determine the context of online use for these respondents since the literature suggested the absence of online use in most of the institutions' active learning environments.

Table 14.

Level of Online Use

Level of online use	Administrator	Faculty	Frequency (Total)	Percent
Non-user	1	0	1	0.70
Novice	2	1	3	2.10
Intermediate	35	33	68	47.55
Experienced	25	43	68	47.55
Past User	1	2		2.10

Table 14 reported that over 95% of the respondents are either intermediate or experienced online users.

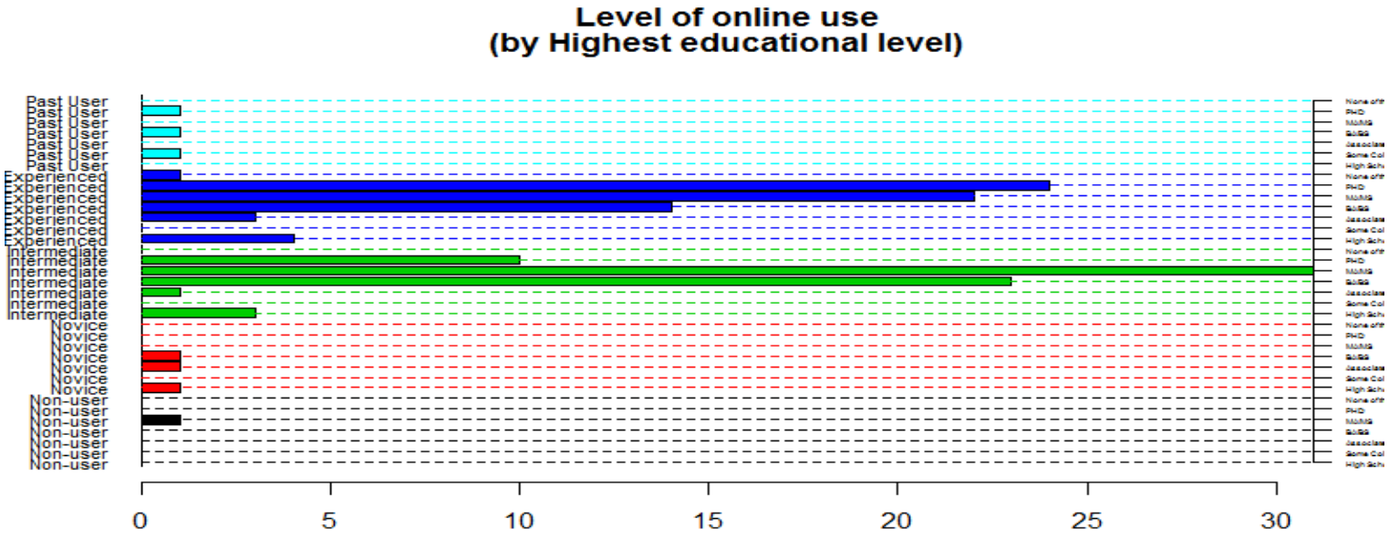

Figure 9: Level of online use

From Figure 9, I observed that the highest numbers of intermediate online users are respondents with master's degrees while the highest numbers of experienced online users are the respondents with PhDs. Displayed in the 12 figures below, are responses to the 6 factors BEM constructs: *Information*, *Resources*, *Incentives*, *Motive*, *Capacity*, and *Knowledge and Skills*.

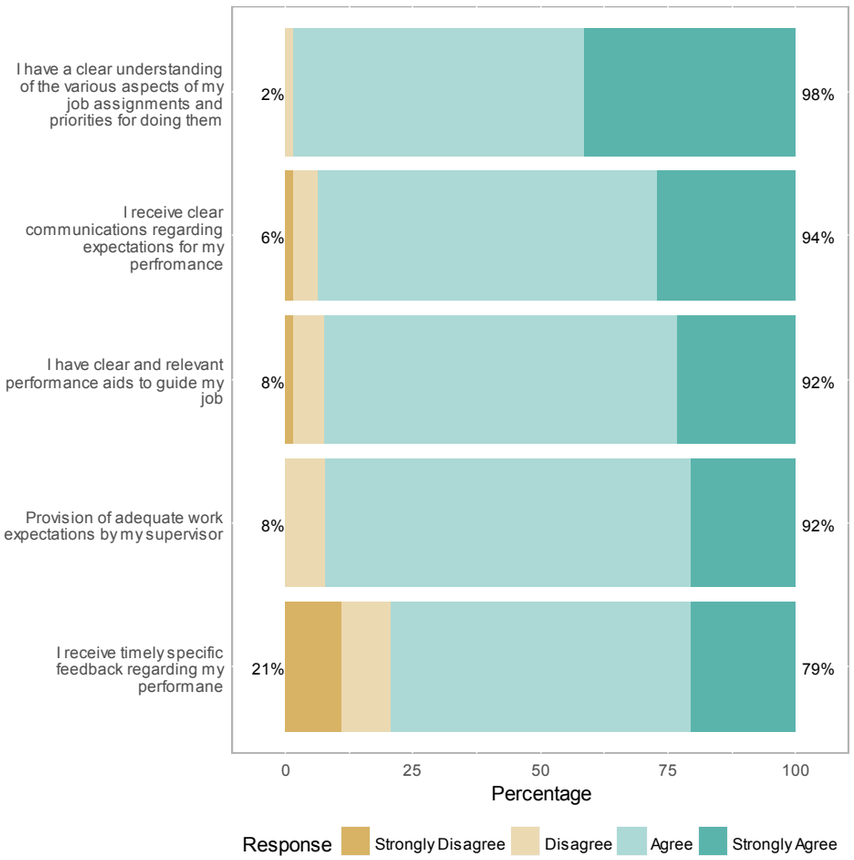

Figure 10
BEM Factors: Information – Administrators

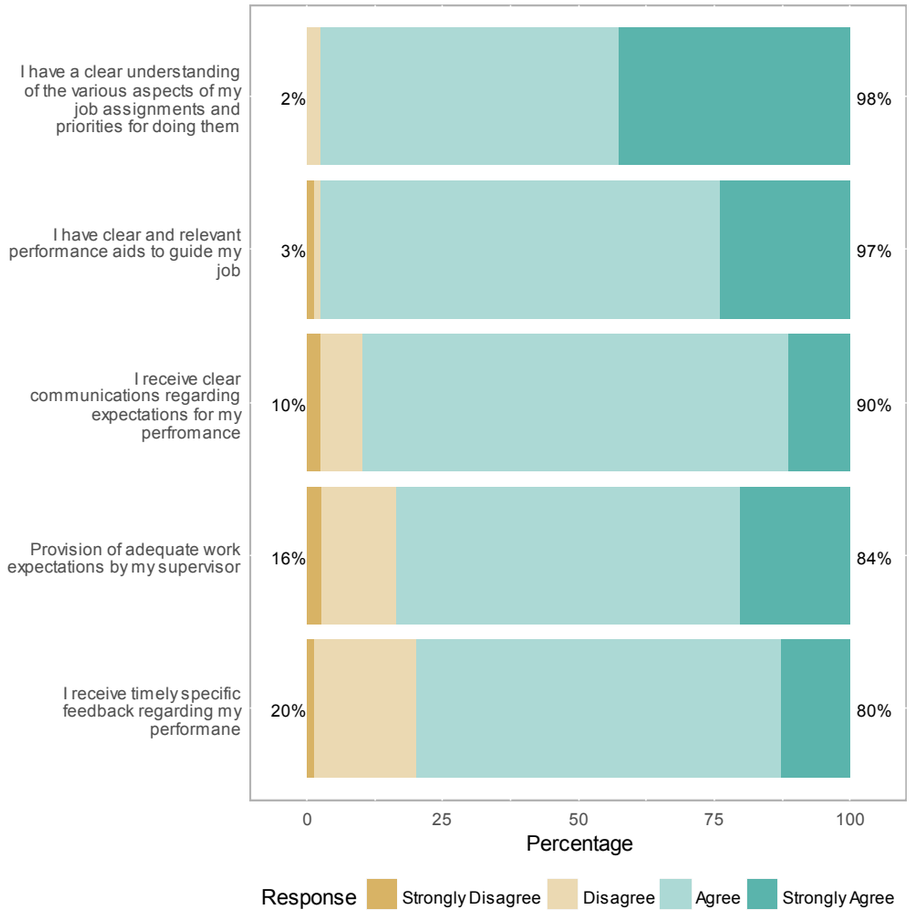

Figure 11
BEM Factors: Information - Faculty

Although most of the respondents indicated that they have adequate information regarding their job, about 25% felt they did not receive adequate feedback about their performance and about 10% said they did not get adequate work expectations from their supervisors.

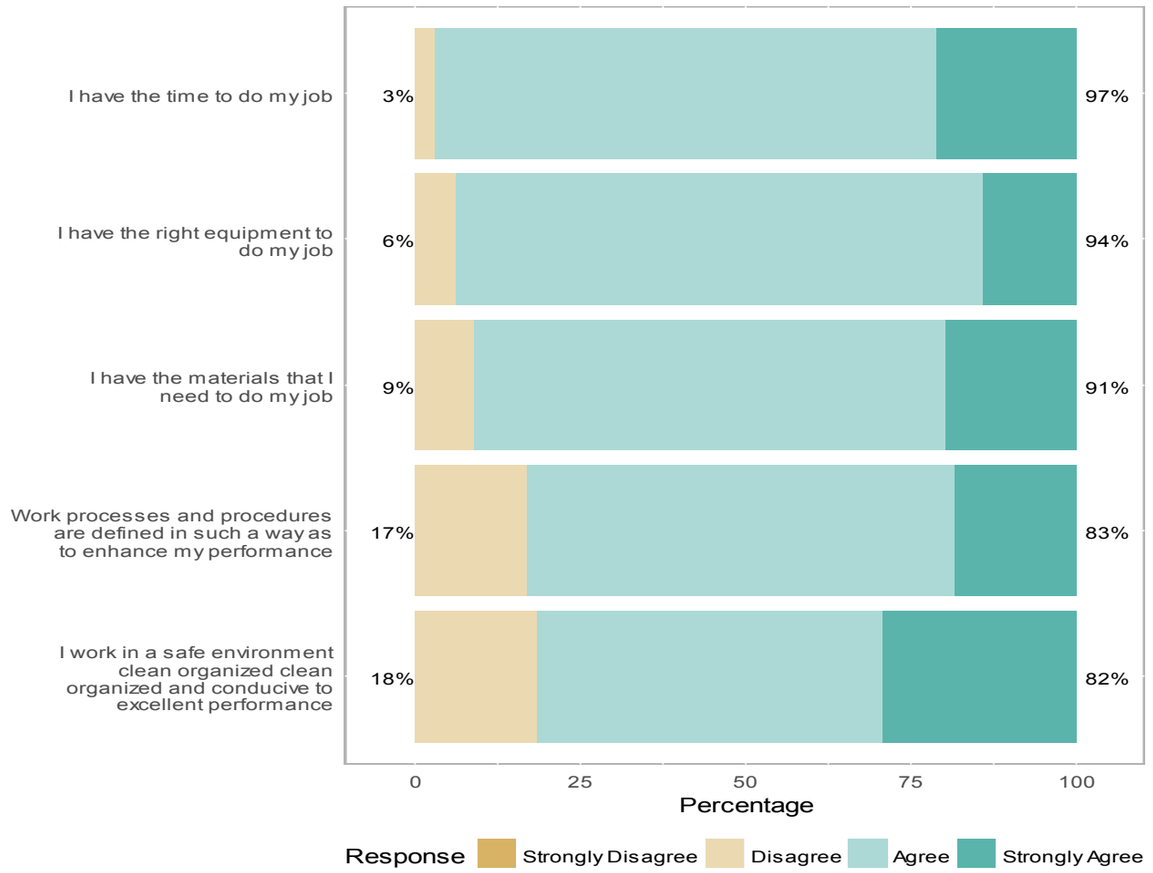

Figure 12.
BEM Factors: Resources - Administration

Up to 20% of the administrators and over 25% of faculty members did not feel that they worked in a clean and safe environment, they did not feel that their environment was conducive enough to motivate excellence in their performance. About 17% did not feel that the work processes were defined in a way that enhanced their performance.

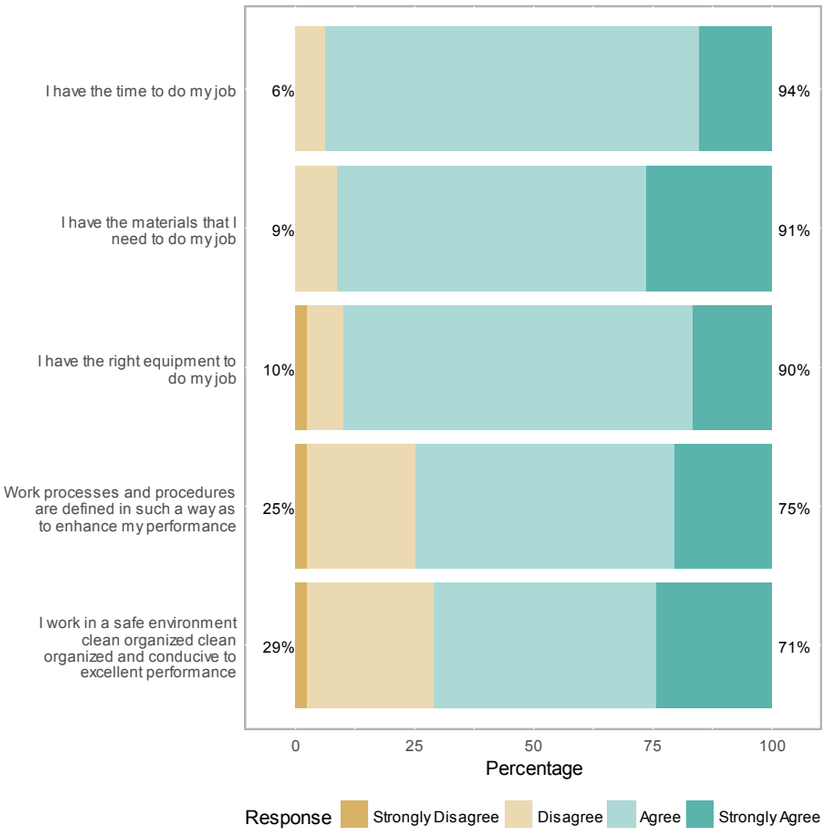

Figure 13.
BEM Factors: Resources - Faculty

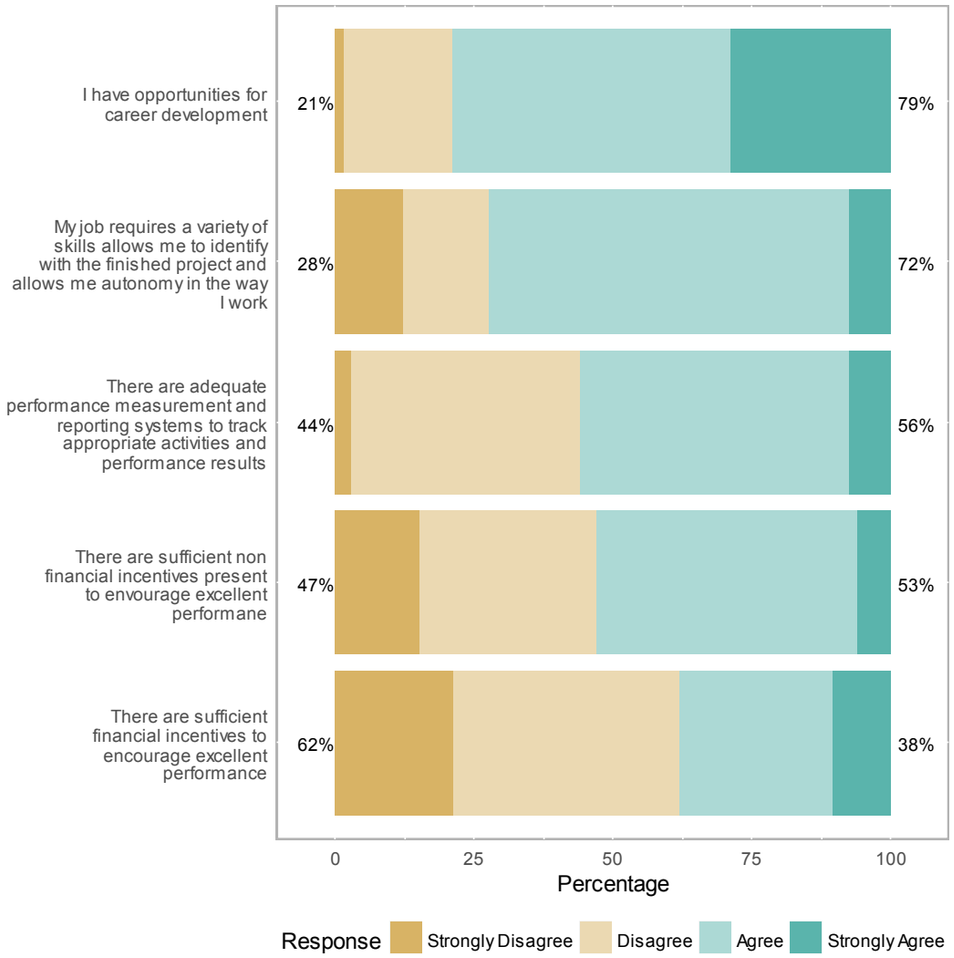

Figure 14
BEM Factors: Incentives - Administration

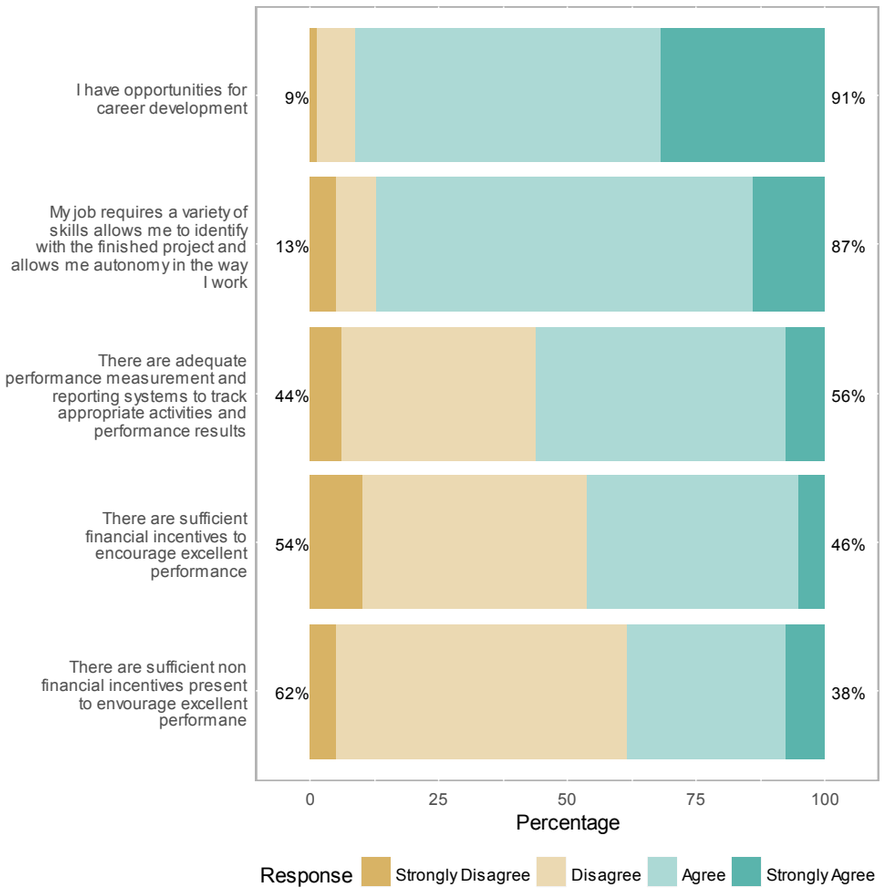

Figure 15.
BEM Factors: Incentives - Faculty

More than half of the respondents (both faculty and administrators) were convinced that there were inadequate performance measurement and reporting systems to track appropriate activities and performance results. They also felt that there were insufficient financial and nonfinancial incentives to encourage excellent performance.

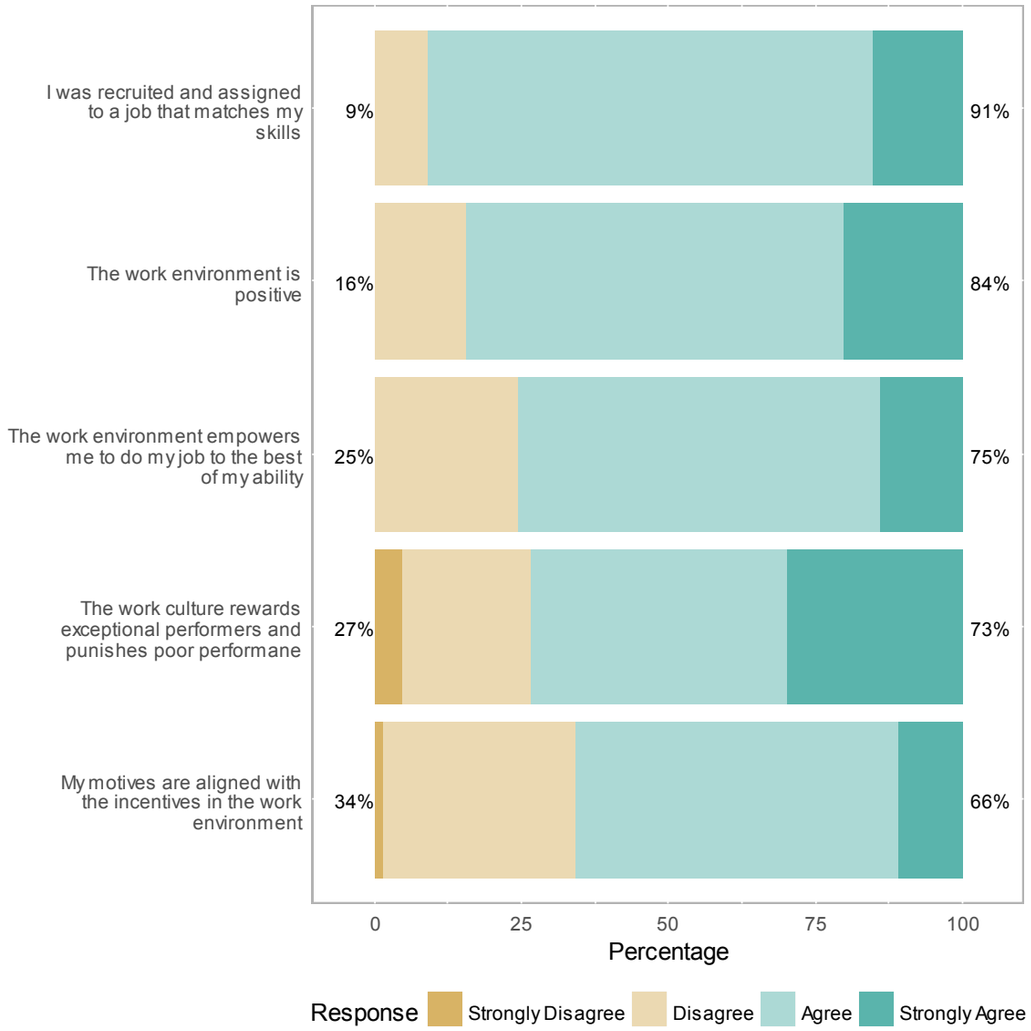

Figure 16.
BEM Factors: Motive-Administrator

It was observed from Figures 16 and 18 that more than 30% of the administrative staff (see Figure 16) and up to half of the faculty (see Figure 18) felt that their motives were not aligned with the incentives in the work environment. Furthermore, about 25% of the administrators and over 40% of the faculty felt that the work culture did not reward exceptional performers and that poor performers were not adequately punished.

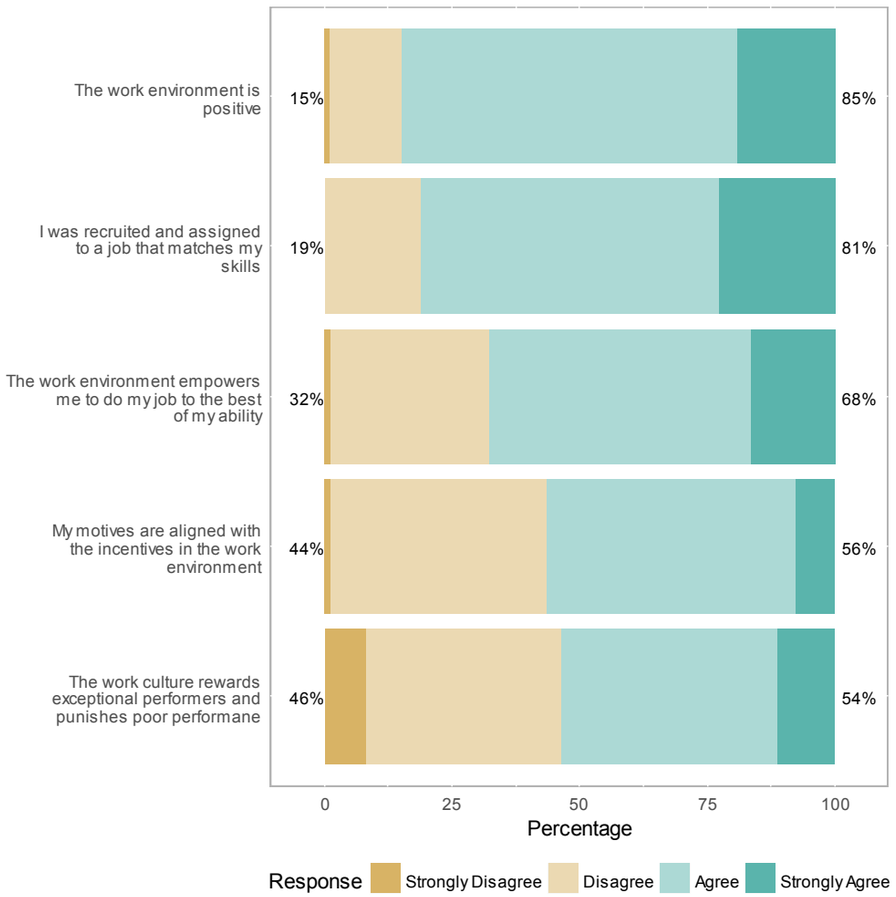

Figure 17
BEM Factors: Motive - Faculty

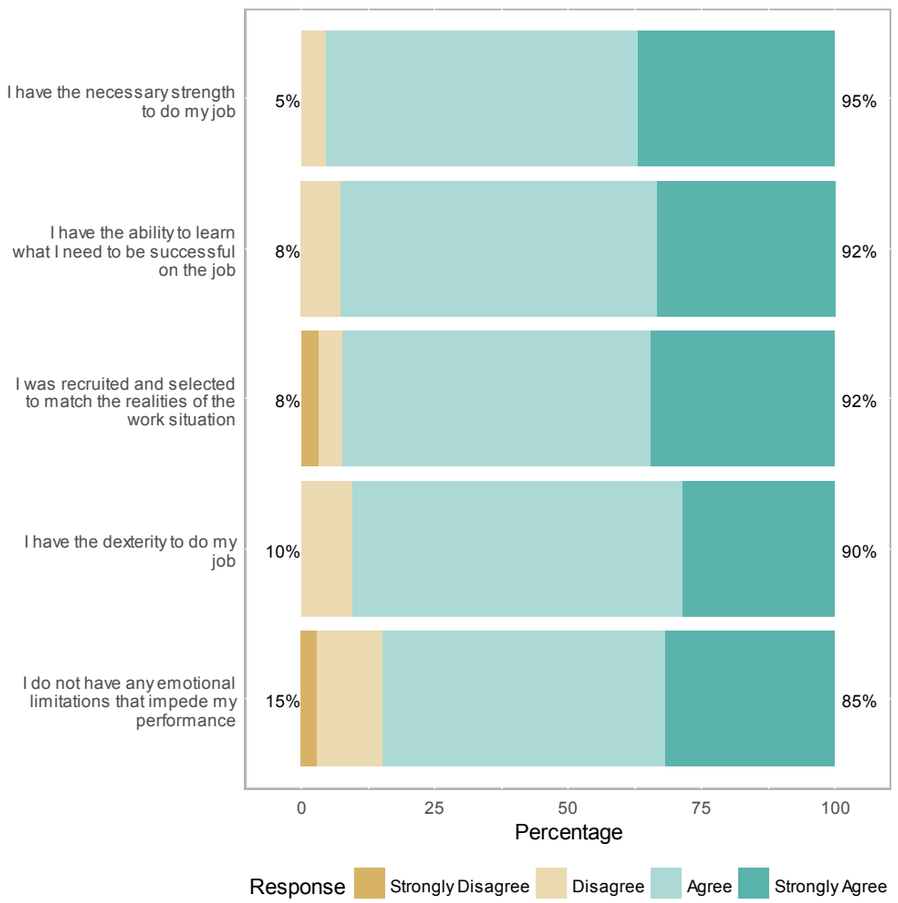

Figure 18
BEM Factors: Capacity - Administration

It was observed from Figures 18 and 20 that over 85% of the respondents (both faculty and administrators) were convinced that they did not have any emotional limitations that impeded their performance, in fact, over 95% of the respondents were quite confident in their ability to deliver on their jobs.

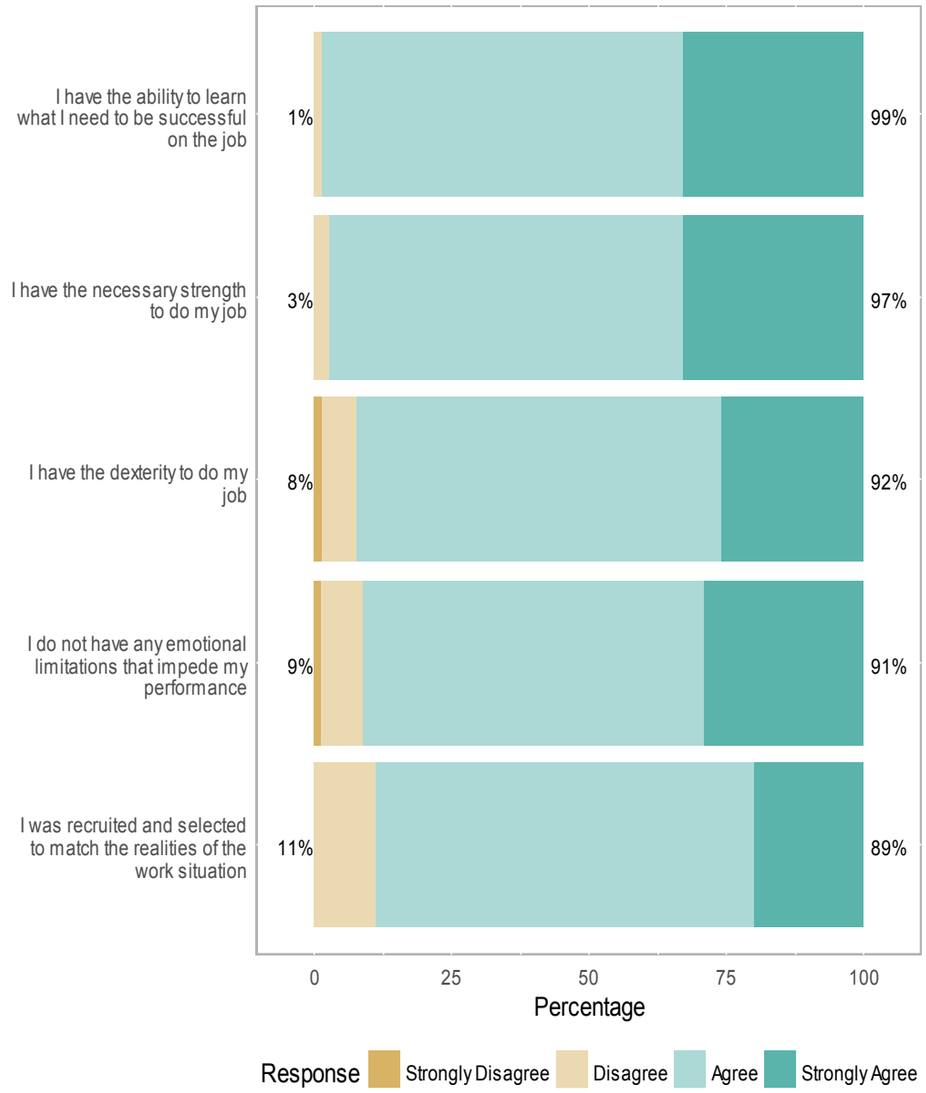

Figure 19
BEM Factors: Capacity - Faculty

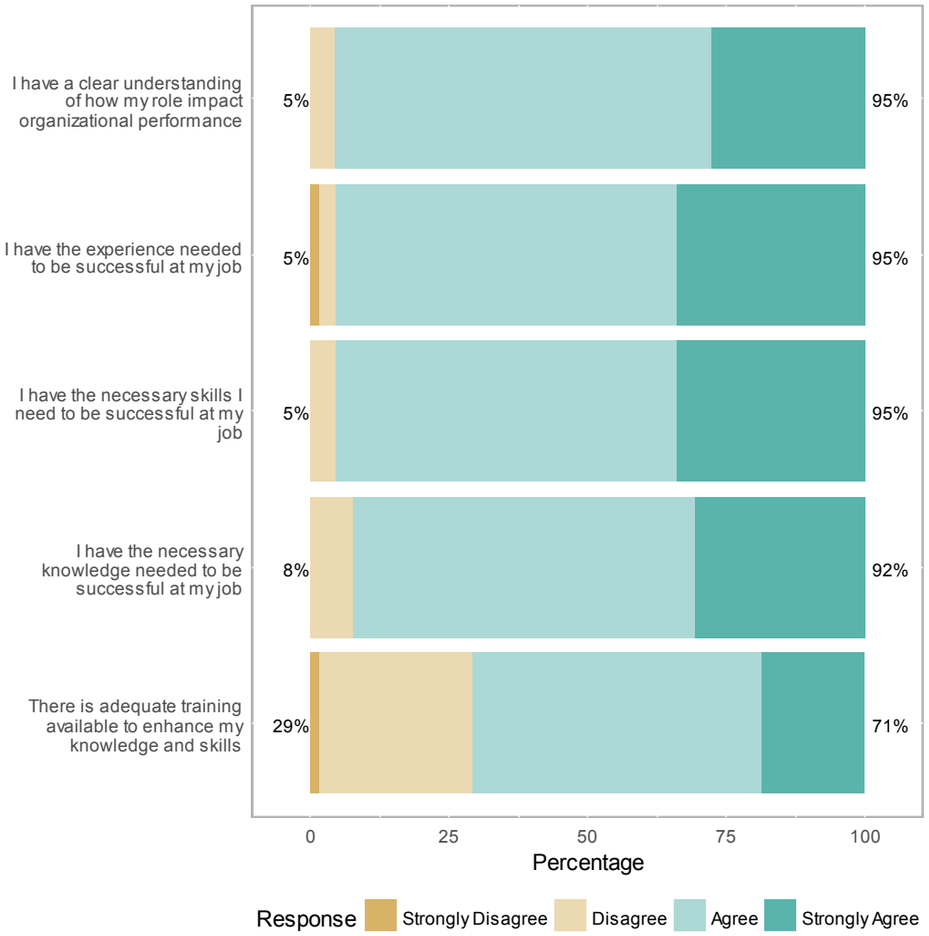

Figure 20
BEM Factors: Knowledge and Skills - Administrators

Although most of the respondents agreed based on Figures 20 and 21 that they had the necessary knowledge and skills needed to be successful at their jobs, a large percentage affirmed to non-availability of adequate training to enhance their knowledge and skills.

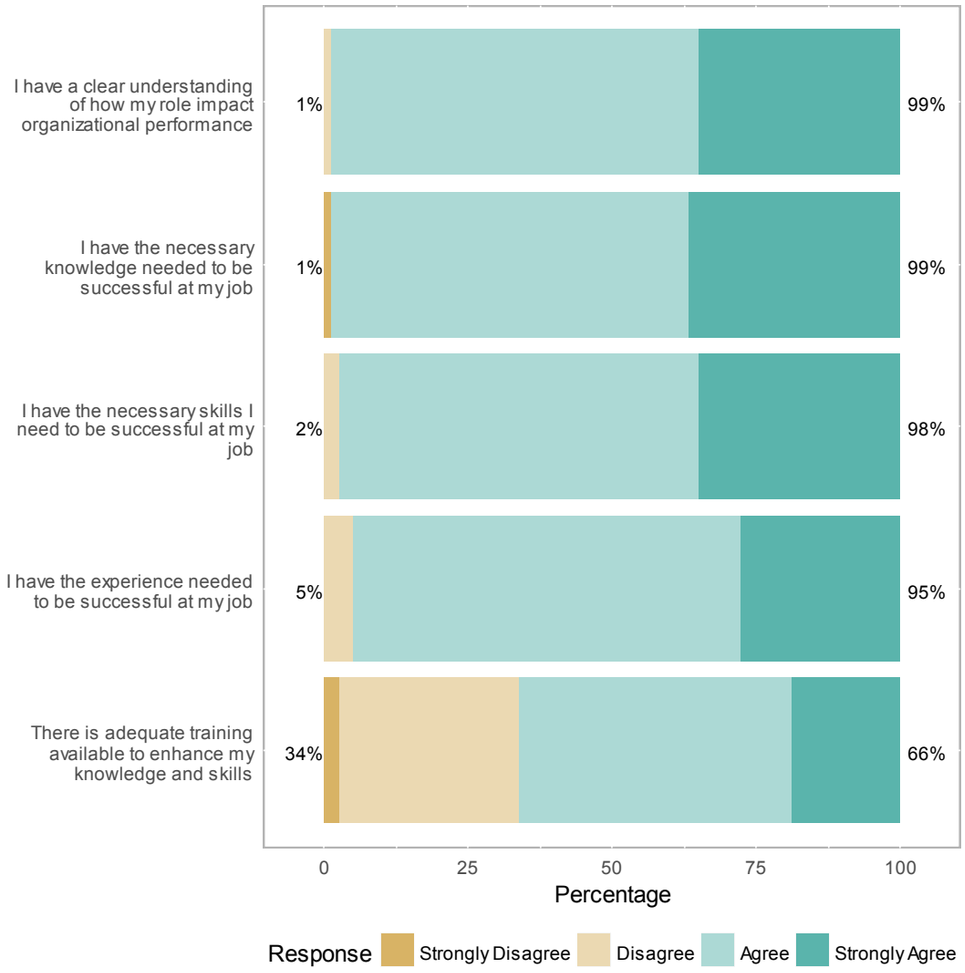

Figure 21.
BEM Factors: Knowledge and Skills - Faculty

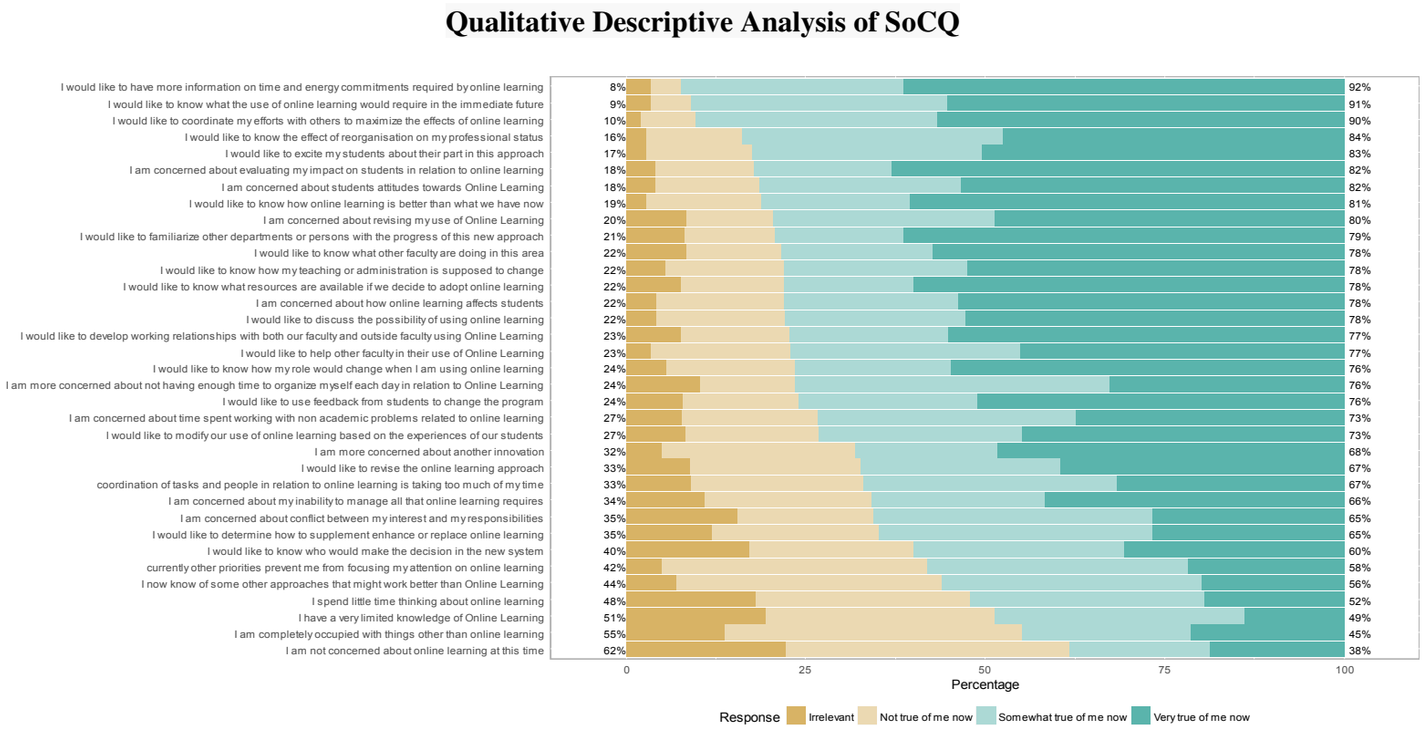

Figure 22.
Qualitative Analysis of SoCQ

Quantitative Descriptive Analysis of BEM Factors

Tables 15 to 17 report the mean, standard deviation (SD) as well as reliability measures including the Cronabach's alpha and Guttman's lambda (G6) for each of the variables in the constructs.

Alpha is one of several estimates of the internal consistency reliability of a test.

Alpha is the most frequently reported measure of internal consistency reliability. Alpha is the mean of all possible spit half reliabilities (corrected for test length).

Guttman's Lambda 6 (G6) considers the amount of variance in each item that can be accounted for the linear regression of all of the other items (the squared multiple correlation or smc). Alpha and G6 are both positive functions of the number of items in a test as well as the average inter-correlation of the items in the test. When calculated from the item variances and total test

variance, as is done here, raw alpha is sensitive to differences in the item variances. Standardized alpha is based upon the correlations rather than the covariances.

Table 15

Overall Descriptive Statistics and Reliability for all BEM Constructs

Question	Mean	SD	Alpha	G6
qinf1-I receive clear communications regarding expectations for my performance	3.07	0.58	0.76	0.72
qinf2-I have a clear understanding of the various aspects of my job assignments and priorities for doing them	3.40	0.54	0.74	0.69
qinf3-I have clear and relevant performance aids to guide my job	3.18	0.53	0.74	0.70
qinf4-I receive timely specific feedback regarding my performance	2.93	0.73	0.77	0.72
Qinf5-Provision of adequate work expectations by my supervisor	3.07	0.60	0.75	0.70

qres1-I have the materials that I need to do my job	3.16	0.56	0.70	0.65
qres2-I have the right equipment to do my job	3.05	0.53	0.61	0.57
qres3-I have the time to do my job	3.13	0.46	0.67	0.65
qres4-Work processes and procedures are defined in such a way as to enhance my performance	2.96	0.67	0.68	0.63
qres5-I work in a safe environment clean organized clean organized and conducive to excellent performance	3.03	0.74	0.65	0.61
qins1-There are sufficient financial incentives to encourage excellent performance	2.36	0.84	0.49	0.47
qins2-There are sufficient non-financial incentives present to encourage excellent performance	2.42	0.77	0.55	0.53
qins3-There are adequate performance measurement	2.59	0.71	0.54	0.55

and reporting systems to track appropriate activities and performance results				
qins4-My job requires a variety of skills allows me to identify with the finished project and allows me autonomy in the way I work	2.83	0.74	0.63	0.61
qins5-I have opportunities for career development	3.16	0.69	0.72	0.67
qmot1-My motives are aligned with the incentives in the work environment	2.66	0.67	0.68	0.65
qmot2-The work environment empowers me to do my job to the best of my ability	2.82	0.62	0.63	0.58
qmot3-I was recruited and assigned to a job that matches my skills	3.10	0.54	0.69	0.66
qmot4-The work environment is positive	2.98	0.58	0.67	0.62

qmot5-The work culture rewards exceptional performers and punishes poor performance	2.76	0.84	0.77	0.72
qcap1-I have the necessary strength to do my job	3.33	0.52	0.77	0.76
qcap2-I have the dexterity to do my job	3.19	0.58	0.71	0.74
qcap3-I have the ability to learn what I need to be successful on the job	3.28	0.53	0.67	0.71
qcap4-I do not have any emotional limitations that impede my performance	3.18	0.68	0.70	0.72
qcap5-I was recruited and selected to match the realities of the work situation	3.14	0.62	0.80	0.78
qks1-I have the necessary knowledge needed to be successful at my job	3.30	0.57	0.74	0.71
qks2-I have the necessary skills I need to be successful	3.32	0.54	0.73	0.71

at my job				
qks3-I have the experience needed to be successful at my job	3.25	0.56	0.72	0.70
qks4-There is adequate training available to enhance my knowledge and skills	2.84	0.73	0.80	0.77
qks5-I have a clear understanding of how my role impact organizational performance	3.28	0.51	0.78	0.76

Based on Table 15, except for qins1-“There are sufficient financial incentives to encourage excellent performance”, qins2-“There are sufficient nonfinancial incentives present to encourage excellent performance” and qins3-“There are adequate performance measurement and reporting systems to track appropriate activities and performance results”, all the items had reasonably acceptable alpha and G6 coefficient > 0.60, hence it was safe to say that 90% of the items did indeed tap into an underlying BEM construct among respondents.

In addition, overall highest mean score for both faculty and administrators was attained in capacity (“I have the necessary strength to do my job” and “I have the ability to learn what I need to be successful on the job”) indicating that most of the respondents are quite confident in their capacity to deliver on their jobs. The lowest mean score was in incentives (“There are sufficient financial incentives to encourage excellent performance”) indicating that most of the respondents do not feel there are enough incentives to encourage excellent delivery on their jobs (see Table 15 to Table 17).

Table 16.
Descriptive Statistics and Reliability for BEM Constructs by Category – Administrators

Question	Mean	SD	Alpha	G6
qinf1-I receive clear communications regarding expectations for my performance	3.21	0.61	0.74	0.73
qinf2-I have a clear understanding of the various aspects of my job assignments and priorities for doing them	3.43	0.53	0.74	0.71
qinf3-I have clear and relevant performance aids to guide my job	3.16	0.56	0.72	0.72
qinf4-I receive timely specific feedback regarding my performance	2.93	0.88	0.80	0.79
Qinf5-Provision of adequate work expectations by my supervisor	3.17	0.50	0.78	0.75
qres1-I have the materials that I need to do my job	3.13	0.53	0.73	0.71
qres2-I have the right equipment to do my job	3.08	0.45	0.63	0.57
qres3-I have the time to do my job	3.18	0.46	0.70	0.68
qres4-Work processes and procedures are defined in such a way as to enhance my performance	3.03	0.60	0.79	0.77
qres5-I work in a safe environment clean organized clean organized and conducive to excellent performance	3.15	0.67	0.71	0.69
qins1-There are sufficient financial incentives to encourage excellent performance	2.28	0.93	0.56	0.56
qins2-There are sufficient nonfinancial incentives present to encourage excellent performance	2.43	0.83	0.49	0.53
qins3-There are adequate performance measurement and reporting systems to track appropriate activities and performance results	2.60	0.68	0.66	0.70
qins4-My job requires a variety of skills allows me to identify with the finished project and allows me autonomy in the way I work	2.68	0.79	0.48	0.54

Table continues

Question	Mean	SD	Alpha	G6
qins5-I have opportunities for career development	1.92	0.74	0.76	0.74
qmot1-My motives are aligned with the incentives in the work environment	2.76	0.67	0.64	0.67
qmot2-The work environment empowers me to do my job to the best of my ability	2.90	0.62	0.61	0.63
qmot3-I was recruited and assigned to a job that matches my skills	3.08	0.49	0.61	0.61
qmot4-The work environment is positive	3.05	0.61	0.64	0.63
qmot5-The work culture rewards exceptional performers and punishes poor performance	2.97	0.85	0.81	0.79
qcap1-I have the necessary strength to do my job	3.35	0.52	0.73	0.79
qcap2-I have the dexterity to do my job	3.23	0.56	0.70	0.80
qcap3-I have the ability to learn what I need to be successful on the job	3.27	0.58	0.63	0.77
qcap4-I do not have any emotional limitations that impede my performance	3.18	0.75	0.72	0.75
qcap5-I was recruited and selected to match the realities of the work situation	3.22	0.69	0.77	0.79
qks1-I have the necessary knowledge needed to be successful at my job	3.24	0.59	0.67	0.65
qks2-I have the necessary skills I need to be successful at my job	3.31	0.56	0.71	0.71
qks3-I have the experience needed to be successful at my job	3.27	0.61	0.70	0.68
qks4-There is adequate training available to enhance my knowledge and skills	2.87	0.71	0.77	0.76
qks5-I have a clear understanding of how my role impact organizational performance	3.23	0.53	0.78	0.76

Table continues

Based on table 16, apart from qins1-"There are sufficient financial incentives to encourage excellent performance", qins2-"There are sufficient nonfinancial incentives present to encourage excellent performance" and qins4-"My job requires a variety of skills allows me to identify with the finished project and allows me autonomy in the way I work", all the items had reasonably acceptable alpha and G6 coefficient > 0.60, hence it was safe to say that 90% of the items did indeed tap into an underlying BEM construct among respondents.

Table 17
Descriptive Statistics and Reliability for BEM Constructs by Category - Faculty

Question	Mean	SD	Alpha	G6
qinf1-I receive clear communications regarding expectations for my performance	2.97	0.54	0.78	0.76
qinf2-I have a clear understanding of the various aspects of my job assignments and priorities for doing them	3.38	0.54	0.76	0.73
qinf3-I have clear and relevant performance aids to guide my job	3.20	0.52	0.77	0.73
qinf4-I receive timely specific feedback regarding my performance	2.92	0.61	0.75	0.71
qinf5-Provision of adequate work expectations by my supervisor	2.99	0.66	0.74	0.70
qres1-I have the materials that I need to do my job	3.18	0.58	0.67	0.65
qres2-I have the right equipment to do my job	3.03	0.58	0.59	0.59
qres3-I have the time to do my job	3.09	0.46	0.66	0.66
qres4-Work processes and procedures are defined in such a way as to enhance my performance	2.90	0.72	0.58	0.54
qres5-I work in a safe environment clean organized clean organized and conducive to excellent performance	2.94	0.78	0.61	0.57
qins1-There are sufficient financial incentives to encourage excellent performance	2.43	0.76	0.54	0.55
qins2-There are sufficient nonfinancial incentives present to encourage excellent performance	2.41	0.72	0.63	0.62
qins3-There are adequate performance measurement and reporting systems to track appropriate activities and performance results	2.59	0.74	0.44	0.41
qins4-My job requires a variety of skills allows me to identify with the finished project and allows me autonomy in the way I work	2.96	0.67	0.70	0.69
qins5-I have opportunities for career development	3.23	0.65	0.66	0.65
qmot1-My motives are aligned with the incentives in the work	2.58	0.67	0.71	0.68

Table continues

Question	Mean	SD	Alpha	G6
environment				
qmot2-The work environment empowers me to do my job to the best of my ability	2.74	0.61	0.65	0.59
qmot3-I was recruited and assigned to a job that matches my skills	3.12	0.58	0.74	0.70
qmot4-The work environment is positive	2.93	0.55	0.69	0.63
qmot5-The work culture rewards exceptional performers and punishes poor performance	2.58	0.79	0.73	0.70
qcap1-I have the necessary strength to do my job	3.32	0.52	0.80	0.78
qcap2-I have the dexterity to do my job	3.16	0.59	0.72	0.74
qcap3-I have the ability to learn what I need to be successful on the job	3.29	0.49	0.69	0.70
qcap4-I do not have any emotional limitations that impede my performance	3.17	0.62	0.70	0.70
qcap5-I was recruited and selected to match the realities of the work situation	3.08	0.56	0.83	0.81
qks1-I have the necessary knowledge needed to be successful at my job	3.34	0.55	0.79	0.77
qks2-I have the necessary skills I need to be successful at my job	3.33	0.52	0.76	0.73
qks3-I have the experience needed to be successful at my job	3.23	0.53	0.75	0.73
qks4-There is adequate training available to enhance my knowledge and skills	2.81	0.75	0.83	0.80
qks5-I have a clear understanding of how my role impact organizational performance	3.33	0.50	0.79	0.78

From table 17, it was observed that apart from qres2-"I have the right equipment to do my job", qres4-"Work processes and procedures are defined in such a way as to enhance my performance", qres5-"I work in a safe environment clean organized and conducive to excellent performance", qins1-"There are sufficient financial incentives to encourage excellent performance", qins3-"There are adequate performance measurement and reporting systems to track appropriate activities and performance results", qmot2-"The work environment empowers me to do my job to the best of my ability," all the items had reasonably acceptable alpha and G6 coefficient > 0.60, hence it was safe to say that 80% of the items did indeed tap into an underlying BEM construct among respondents.

This descriptive analysis section reported the exploratory analysis conducted on the questionnaires. It was observed that about 58% (see Table 6) of the respondents were males and that a large proportion (about 66%-see Table 7) of the respondents fell within the 30-49-age bracket, this age bracket constituted the bulk of the Nigerian active workforce across most industries in the country. Furthermore, only 23.97% (see Table 8) of the respondents had obtained their PhDs as at the time of the survey, of which 1.37% work as administrators and 22.60% are faculty members (see Table 8). A strong association between range of experience with online usage and range of experience with technology in education was also observed (see Figure 11) indicating that those who have more experience with online usage tend to also have more experience with technology in education. About 83% (see Table 12) of the respondents had been exposed to less than 6 years online professional development, a frequency that corroborates rudimentary use of online delivery in the surveyed institutions. About 86% of respondents (see Table 13) had attended a lecture based, hands on or a combination of both lecture based and hands on online professional development. An analysis of the level of online use revealed only 1(see Table 14) respondent as a non-user and 3 respondents (1 administrator and 2 faculty) as past users. Furthermore, it was observed that the highest numbers of intermediate online users are respondents with master's degrees while the highest numbers of experienced online users are the respondents with PhDs (See Figure 9).

Qualitative analysis of the BEM factors indicated that most of the respondents perceived that they had adequate information regarding their job, however, a good number of the respondents felt that they did not work in a clean and safe environment (see Figures 10 to 13). In addition, about half of the respondents were convinced that there were inadequate performance measures and reporting systems to track appropriate activities and performance results and that the work culture did not reward exceptional performers (see Figures 14 to 18). It was also observed that over 95% of the respondents were quite confident in their ability to deliver on their jobs. This observation is difficult to understand in the absence of exemplary or performance benchmarks and expected performance outcomes in the surveyed institutions. Respondents' conviction that they had the necessary knowledge and skills needed to be successful at their jobs, despite not having adequate training opportunities and facilities (see Figure 19 to 22) was unexplained.

A quantitative analysis of the BEM factors revealed that capacity had the highest mean score and incentives had the lowest mean score. Indicating that although most of the respondents perceived that they had the capacity to deliver on their jobs, they did not feel there was enough incentives to encourage excellent delivery on their jobs (see Table 15 to Table 17).

Exploratory Factor Analysis of BEM

These item level responses to the BEM constructs were scrutinized for underlying patterns via factor analytic procedures. Exploratory factor analysis (EFA) was commonly used to find structures or patterns of correlations within the data. It was also used to reduce a data set of interrelated variables to a smaller set of factors (Field, 2000). Initially, the factorability of all 30 BEM items was examined. Several well-recognized criteria for the factorability of a correlation were used (Gorsuch, 1997) (Field, 2000). Firstly, 17 of the 30 items correlated at least 0.3 with at least one other item, suggesting reasonable factorability. Secondly, the Kaiser-Meyer-Olkin (KMO) (Gorsuch, 1997), (Field, 2000), measure of sampling adequacy was 0.81, above the recommended value of 0.6, and Bartlett's test of sphericity (Gorsuch, 1997) (Field, 2000) was significant (chi-square=2215.038, $p=0.00 < 0.05$). Finally, the communalities were all above 0.3 (see Table 15), further confirming that each

item shared some common variance with other items. Given these overall indicators, factor analysis was conducted with all 30 items.

The initial Eigenvalues showed that the first factor explained 30.70% of the variance, the second factor 10.13% of the variance, and a third factor 7.39% of the variance. The fourth factor 5.88% and fifth (5.45) with Eigen values of a little less than 2.0. 5-factor solutions using both Promax rotations of the factor loading matrix were examined. (Note: I used Promax rotation since I could not assume that the factors were uncorrelated). Primary factor loadings of absolute values of less than 0.4 were suppressed from the output.

Only 2 items "I have the time to do my job" and "There are adequate performance measurement and reporting systems to track appropriate activities" did not have a loading of at least 0.4. on at least one factor while 20 of the items had primary loadings over 0.5, and 8 items had loadings between 0.4 and 0.5, 25 items had cross-loadings above 0.3. The factor-loading matrix is presented in Table 18.

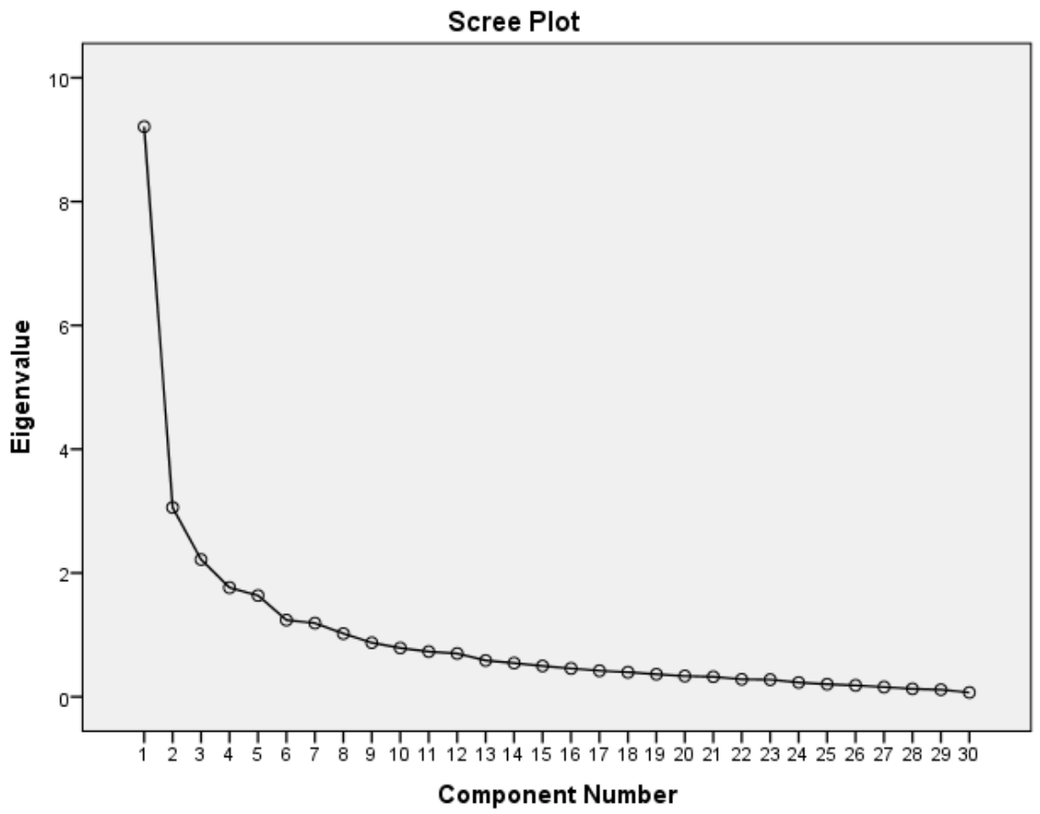

Figure 23
Scree Plot Based on 5 Factor Loading

Table 18

Factor Loadings and Communalities Based on Principle Components Analysis with Promax Rotation for 30 Items from the BEM Factors.

Question	Information	Resources	Incentives	Motives	Capacity	Knowledge and skills	Commun-alities
qinf1-I receive clear communications regarding expectations for my performance				0.43			0.40
qinf2-I have a clear understanding of the various aspects of my job assignments and priorities for doing them	0.51						0.49
qinf3-I have clear and relevant performance aids to guide my job	0.5						0.52
qinf4-I receive timely specific feedback regarding my performance		0.53		0.49			0.70
qinf5-Provision of adequate work expectations by my supervisor				0.77			0.69
qres1-I have the materials that I need to do my job				0.49			0.32
qres2-I have the right equipment to do my job				0.58			0.60
qres3-I have the time to do my job							0.28
qres4-Work processes and procedures are defined in such a way as to enhance my performance			0.45				0.49
qres5-I work in a safe environment clean organized clean organized and conducive to excellent performance			0.53				0.42
qins1-There are		0.61					0.54

Table continues

Question	Information	Resources	Incentives	Motives	Capacity	Knowledge and skills	Commun-alities
sufficient financial incentives to encourage excellent performance							
qins2-There are sufficient nonfinancial incentives present to encourage excellent performance		0.82					0.65
qins3-There are adequate performance measurement and reporting systems to track appropriate activities and performance results			0.37				0.36
qins4-My job requires a variety of skills allows me to identify with the finished project and allows me autonomy in the way I work		0.41				-0.46	0.52
qins5-I have opportunities for career development			0.41				0.42
qmot1-My motives are aligned with the incentives in the work environment			0.47				0.40
qmot2-The work environment empowers me to do my job to the best of my ability			0.74				0.65
qmot3-I was recruited and assigned to a job that matches my skills					0.52		0.37
qmot4-The work environment is positive			0.56				0.59
qmot5-The work culture rewards exceptional performers and punishes poor performance						0.52	0.48

Table continues

Question	Information	Resources	Incentives	Motives	Capacity	Knowledge and skills	Commun-alities
qcap1-I have the necessary strength to do my job	0.59						0.59
qcap2-I have the dexterity to do my job	0.55						0.65
qcap3-I have the ability to learn what I need to be successful on the job	0.57				0.52		0.74
qcap4-I do not have any emotional limitations that impede my performance					0.66		0.66
qcap5-I was recruited and selected to match the realities of the work situation					0.75		0.59
qks1-I have the necessary knowledge needed to be successful at my job	0.79						0.71
qks2-I have the necessary skills I need to be successful at my job	0.66						0.51
qks3-I have the experience needed to be successful at my job	0.69						0.58
qks4-There is adequate training available to enhance my knowledge and skills			0.46				0.49
qks5-I have a clear understanding of how my role impact organizational performance	0.49						0.33

Internal consistency for each of the scales was examined using Cronbach's alpha. Results are presented in Table 22. It was observed that incentives had the smallest alpha (0.65). In addition, composite scores were created for each of the 6 factors,

based on the mean of the items, which had their primary loadings on each factor. The mean and SD of the composite scores are recorded in Table 21. Furthermore, since all BEM factors have at least one item loading, it is consistent to agree with (Gilbert, 1978) that all factors are important and must be present for enhanced performance to occur.

Examination of the histograms suggested that the distributions looked approximately normal (see Figure 24, below). Table 21 reported the correlations between each of the composite scores. Since an approximately normal distribution was evident for the composite score data in the current study, thus the data were well suited for parametric statistical analyses.

Table 19.

Factor Correlation Matrix Based on 6 BEM Factors

Factor Correlation Matrix

Factor	1	2	3	4	5
1	1.000	.473	.241	.500	.156
2	.473	1.000	-.028	.320	-.019
3	.241	-.028	1.000	.236	.229
4	.500	.320	.236	1.000	.176
5	.156	-.019	.229	.176	1.000

Table 20
Descriptive Statistics for the 6 BEM Factors

Construct	mean	sd	skew	kurtosis	Alpha	G6(smc)
Information	3.12	0.43	-0.26	0.94	0.79	0.77
Resources	2.2	0.33	0.41	0.65	0.71	0.7
Incentives	2.33	0.48	0.01	-0.09	0.65	0.65
Motives	2.23	0.36	-0.18	0.03	0.74	0.71
Capacity	2.9	0.28	0.09	-0.06	0.77	0.8
Knowledge and skills	3.2	0.43	0.44	-0.48	0.8	0.79

Table 21
Mean and SD of Composite Scores

Statistic	Information	Resources	Incentives	Motives	Capacity	Knowledge and skills
mean	-0.06	-0.01	-0.03	0.05	0.08	0.05
sd	0.94	0.96	0.83	0.97	0.92	0.83

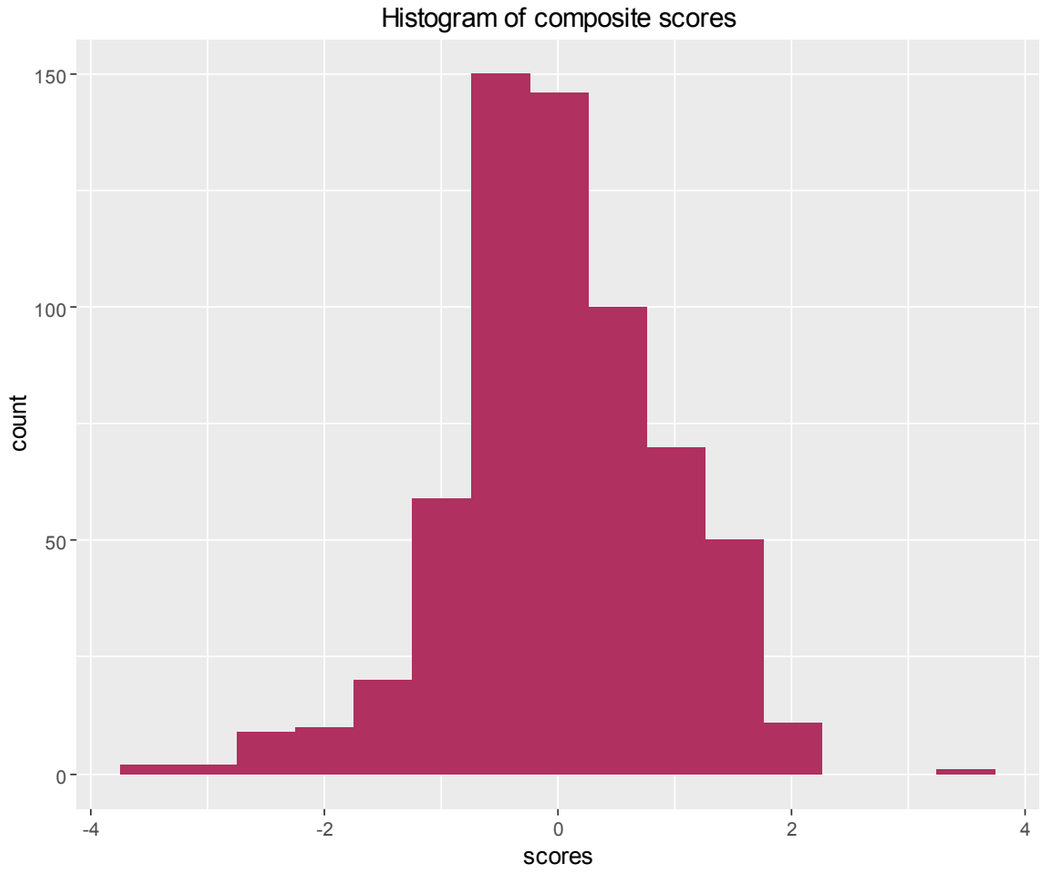

Figure 24.
Histogram of Composite Scores

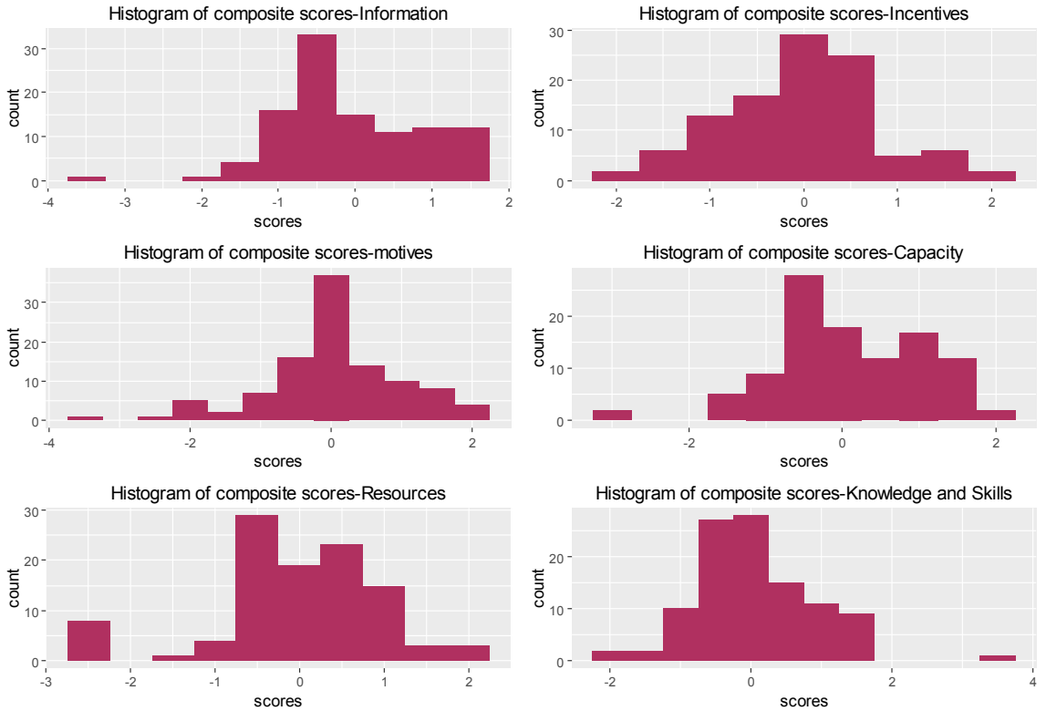

Figure 25
Histogram of Composite Scores for Each BEM Factor

Exploratory factor analysis with a Promax rotation of all 30 Likert scale questions on each BEM factor was conducted on data gathered from the respondents. The results of the confirmatory analysis are consistent with (Gilbert, 1978) that all factors are important and must be present for enhanced performance to occur.

Structural Equation Modeling

This study attempted to explain how the BEM could be used to understand staff concerns that impacted the DE adoption in universities (*RQ 4*). Structural equation modeling (SEM) was used to show the relationships between the latent constructs that comprised the six constructs within the BEM and designated variables. This was done to investigate what likely BEM factors as perceived by faculty and administrators to influence DE adoption in postsecondary DE institutions in Nigeria?

According to Vogt (2007), SEM uses a proposed model to test collected data to determine how well the sample data fits to the model. The SEM technique used a confirmatory approach to evaluate the data (Byrne, 2012). Confirmatory factor

analysis was used to verify the number of factors and the factor loadings. Variables used with SEM are: dependent variables (endogenous), independent variables (exogenous), indicators of dependent variables, indicators of independent variables, error in observed dependent variables, error in observed independent variables, and variance in dependent variables not explained with the independent variables (Kline, 2005). SEM experts agree on six steps necessary in model testing. These consist of data collection, model specification, identification, estimation, evaluation, and modification (Weston & Gore, 2006).

SEM used several tests to determine the fit of the model to the data. Chi-square was commonly used to measure the overall model fit. The chi-square test should be non-significant to indicate that a model fits the data well. Weston & Gore (2006) cautioned that the chi-square could be somewhat confusing due to the interpretation of non-significant being significant (the model fits the data well) and significant being non-significant (the model does not fit the data well). The chi-square test is a test of exact fit, yet exact fit is difficult to attain, so researchers must approximate exact fit with close fit to the data. Large sample sizes tend to skew the chi-square test by increasing power, which resulted in significance with small effects (Weston & Gore, 2006). To indicate goodness-of-fit, the probability level, or p-values, must be greater than 0.05 when the chi-square value is close to zero. Even though the chi-square test had limitations, it was still reported and used to determine the difference between models and their fit to the data (Weston & Gore, 2006). Additional fit indexes are recommended to provide useful information about the adequacy of fit for the overall model (Vogt, 2007).

Another test of model fit that was used to determine overall goodness-of-fit to the model was the Comparative Fit Index (CFI) (Bentler, 1990). CFI values ranged from 0 to 1.0. CFI values closer to 1.0 indicated a better fit. Values greater than 0.90 indicated a better fit to the researcher's model (Kline, 2005). The CFI was referred to as a comparison or incremental fit index because this "index compared the improvement of the fit of the researcher's model over a more restricted model, called an independence or null model which specified no relationships among variables" (Weston & Gore, 2006). A limitation of this goodness-of-fit index was that the "assumption of zero covariance is scientifically implausible in many (probably most) applications of SEM" (Kline, 2005).

The Tucker-Lewis Index (TLI) (Tucker & Lewis, 1973) is another comparative fit or incremental index. The TLI is non-normed, meaning that its values could fall outside the range of 0 to 1.0. However, TLI could be interpreted much like the CFI in that values closer to 1.0 reflect a good model fit, specifically, values equal to or greater than 0.95.

The Root Mean Square Error of Approximation (RMSEA) (Steiger & Lind, 1980) is a parsimony-corrected index that corrected for the effect of model complexity by indicating discrepancy in fit for each degree of freedom in the model. In other words, RMSEA is a "badness of fit" index because a zero value indicated the best model fit and higher values indicated poor model fit (Kline, 2005). (Weston & Gore, 2006) stated that RMSEA values between 0.05 and 0.10 indicated acceptable fit, however, sample size, model complexity, and degree of misspecification affect appropriate cutoff values.

The average residual for the correlation matrix is the Standard Root Mean Square Residual (SRMSR). The recommended value for this goodness of fit indicator should be less than or equal to 0.07 (Weston & Gore, 2006). A structural equation model (SEM) was constructed for using the BEM constructs. Questions with Cronbach's alpha 0.70 or greater were retained in the analysis while questions with less than 0.70 Cronbach alpha were dropped from the analysis (see Table 22).

Table 22.
Retained Subscales Based on Cronbach Alpha and G6 ≥0.70

Question	Mean	SD	Alpha	G6
qinf1-I receive clear communications regarding expectations for my performance	3.07	0.58	0.76	0.72
qinf3-I have clear and relevant performance aids to guide my job	3.18	0.53	0.74	0.70
qinf4-I receive timely specific feedback regarding my performance	2.93	0.73	0.77	0.72
Qinf5-Provision of adequate work expectations by my supervisor	3.07	0.60	0.75	0.70
qmot5-The work culture rewards exceptional performers and punishes poor performance	2.76	0.84	0.77	0.72
qcap1-I have the necessary strength to do my job	3.33	0.52	0.77	0.76
qcap2-I have the dexterity to do my job	3.19	0.58	0.71	0.74
qcap4-I do not have any emotional limitations that impede my performance	3.18	0.68	0.70	0.72
qcap5-I was recruited and selected to match the realities of the work situation	3.14	0.62	0.80	0.78
qks1-I have the necessary knowledge needed to be successful at my job	3.30	0.57	0.74	0.71
qks2-I have the necessary skills I need to be successful at my job	3.32	0.54	0.73	0.71
qks3-I have the experience needed to be successful at my job	3.25	0.56	0.72	0.70
qks4-There is adequate training available to enhance my knowledge and skills	2.84	0.73	0.80	0.77
qks5-I have a clear understanding of how my role impact organizational performance	3.28	0.51	0.78	0.76

Table 23.
Result of the Standardized Test for the BEM Construct Model

Chi-square	p-value	Df	CFI	TLI	RMSEA	SRMR
319.884	0.000	1576.257	0.72	0.64	(0.12,0.15)	0.10

The results in Table 23 are interpreted as follows:

Chi-square was used to measure the statistical significance of the fit. A big Chi-square was indicative of a poor fit. Statistically insignificant Chi-squared was indicative of a good fit. In Table 23 above, the p-value (0.000<0.05) indicated statistical significance; an indication that the model fit was not good enough.

RMSEA: The fit was considered close if the lower bound of the 95% CI was below 0.05 and labeled a poor fit if the upper bound was above 0.10. Again, the model indicated a relatively low fit as the RMSEA exceeded both the lower and upper bounds for a good fit. Comparative Fit Index (CFI) and Tucker–Lewis Index (TLI): These two indices are such that a value close to 1 indicated a good fit. TLI is also known as the non-normed fit index. Here the CFI and TLI are 0.72 and 0.64 respectively, indicating that the model though not a perfect fit, was not too far from a good fit.

Standardized Root Mean Squared (SRMR): A perfect fit corresponded to a SRMR of 0. A good fit would be a small value, considered by some to be limited to 0.08. Here the SRMR was again not too far from a good fit.

In summary, although the chi-square measure and the RMSEA did not give indications of a good fit, CFI, TLI and SRMR pointed at the model not too far from a good fit. Gilbert (1978) pointed out the need to consider the “diffusion effect” when considering analysis such as was involved in this research. The diffusion of effect motivated by the fact that whenever a change occurred in some condition of behavior, the change would often have a significant effect on some other aspect of

behavior so that there was no way to alter one condition of behavior without having at least some effect on another aspect, often, a considerable effect.

The diffusion effect was explored here by testing the interrelationship between the BEM construct, the results of which are reported in Table 24.

The following sub-hypothesis were tested:

1. H_1: Information will have a positive effect on resources as it relates to DE adoption in post-secondary institutions.
2. H_2: Information will have a positive effect on incentives as it relates to DE adoption in post-secondary institutions.
3. H_3: Information will have a positive effect on motives as it relates to DE adoption in post-secondary institutions.
4. H_4: Information will have a positive effect on capacity as it relates to DE adoption in post-secondary institutions.
5. H_5: Information will have a positive effect on knowledge and skills as it relates to DE adoption in post-secondary institutions.
6. H_6: Resources will have a positive effect on incentives as it relates to DE adoption in post-secondary institutions.
7. H_7: Resources will have a positive effect on motives as it relates to DE adoption in post-secondary institutions.
8. H_8: Resources will have a positive effect on capacity as it relates to DE adoption in post-secondary institutions.
9. H_9: Resources will have a positive effect on knowledge and skills as it relates to DE adoption in post-secondary institutions.
10. H_{10}: Incentives will have a positive effect on motives as it relates to DE adoption in post-secondary institutions.
11. H_{11}: Incentives will have a positive effect on capacity as it relates to DE adoption in post-secondary institutions.
12. H_{12}: Incentives will have a positive effect on knowledge and skills as it relates to DE adoption in post-secondary institutions.
13. H_{13}: Motives will have a positive effect on capacity as it relates to DE adoption in post-secondary institutions.

14. H_{14}: Motives will have a positive effect on knowledge and skills as it relates to DE adoption in post-secondary institutions.
15. H_{15}: Capacity will have a positive effect on knowledge and skills as it relates to DE adoption in post-secondary institutions.

The results of the hypothesis tests are presented in Table 24, below.

Table 24.
Hypothesis Testing of the Interrelationship Between BEM Constructs

Attributes	Estimate	S.E.	C.R.	P	Hypothesis Status
Information-resources	0.09	0.03	3.54	0.00	Supported-1
Information-incentives	0.16	0.04	3.67	0.00	Supported-2
Information-motives	0.10	0.03	3.37	0.00	Supported-3
Information-capacity	0.12	0.03	4.39	0.00	Supported-4
Information-knowledge and skills	0.13	0.03	4.33	0.00	Supported-5
Resources-incentives	0.10	0.03	3.11	0.00	Supported-6
Resources-motives	0.09	0.03	3.42	0.00	Supported-7
Resources-capacity	0.06	0.02	3.21	0.00	Supported-8
Resources-knowledge and skills	0.06	0.02	3.02	0.00	Supported-9
Incentive-motives	0.14	0.04	3.27	0.00	Supported-10
Incentive-capacity	0.07	0.03	2.22	0.03	Supported-11
Incentive-knowledge and skills	0.11	0.04	2.89	0.00	Supported-12
Motives-capacity	0.11	0.03	3.98	0.00	Supported-13
Motives-knowledge and skills	0.11	0.03	3.60	0.00	Supported-14
Capacity-knowledge and skills	0.13	0.03	4.68	0.00	Supported-15

From Table 24 we saw that each of the constructs have positive effects on each other. Recognizing that the diffusion effect could lead to less costly interventions aimed at improving incentives, providing better feedback, or redesigning tools and materials may indirectly improve individuals' attitudes about work (motives) or help them to learn more of what they needed without formal instructional interventions. Here, since all BEM constructs had positive effects on each other, it would be possible for decision makers to adopt a less costly intervention for DE adoption and still improve individuals' behavioral attitudes in other costlier constructs.

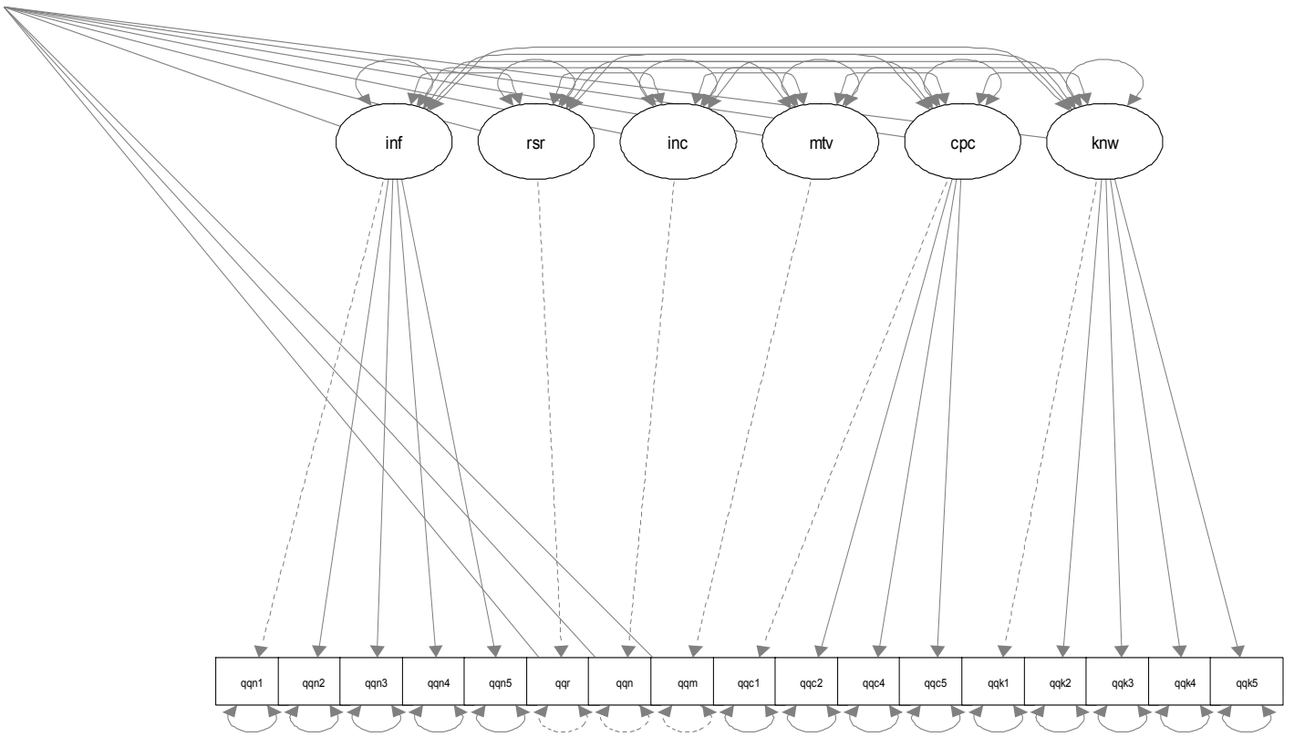

Figure 26: Final SEM model

The structural equation model (SEM) was visualized using the path diagram in Figure 26. The arrows in the flow-chart indicated direct and indirect causal links between the exogenous and endogenous variables, as well as between the latent and the observed variables. The rectangles represented the observed variables, ellipses symbolized latent variables, curves with arrowheads on both sides denoted correlations and most important: Straight lines with arrow-heads on one end as paths, that linked a predicting and a predicted variable. e.g. in Figure 26, Information is a latent variable which is observed via the 5 questions in the construct.

Quantitative Descriptive Analysis of SOCQ items

In this section, I reported the quantitative analysis of the SOCQ items. Tables 25 to 27 reported the mean, standard deviation (SD) as well as reliability measures including the Cronabach's alpha and Guttman's lambda (G6) for each of the SOCQ items for all the respondents (see Table 25), faculty (see Table 26) and administrators (see Table 27).

Table 25.
Overall Descriptive Statistics and Reliability for all SoCQ

Question	Mean	SD	Alpha	G6
Q31-I am concerned about students' attitudes towards Online Learning	4.08	2.05	0.96	0.98
Q32-I now know of some other approaches that might work better than Online Learning	2.61	1.86	0.96	0.98
Q33-I am more concerned about another innovation	3.65	2.32	0.96	0.98
Q34-I am more concerned about not having enough time to organize myself each day in relation to Online Learning	3.34	2.07	0.96	0.98
Q35-I would like to help other faculty in their use of Online Learning	3.81	2.11	0.96	0.98
Q36-I have a very limited knowledge of Online Learning	2.17	1.95	0.96	0.98
Q37-I would like to know the effect of reorganization on my professional status	4.04	1.94	0.96	0.98
Q38-I am concerned about conflict between my interest and my responsibilities	2.92	2.11	0.96	0.98
Q39-I am concerned about revising my use of Online Learning	3.78	2.04	0.96	0.98
Q40-I would like to develop working relationships with both our faculty and outside faculty using Online Learning	4.05	2.20	0.96	0.98
Q41-I am concerned about how online learning affects students	4.12	2.22	0.96	0.98
Q42-I am not concerned about online learning at this time	2.10	2.12	0.96	0.98
Q43-I would like to know who would make the decision in the new system	2.90	2.27	0.96	0.98
Q44-I would like to discuss the possibility of using online learning	4.00	2.06	0.96	0.98
Q45-I would like to know what resources are available if we	4.30	2.30	0.96	0.98

Table continues

Question	Mean	SD	Alpha	G6
decide to adopt online learning				
Q46-I am concerned about my inability to manage all that online learning requires	3.45	2.36	0.96	0.98
Q47-I would like to know how my teaching or administration is supposed to change	4.05	2.20	0.96	0.98
Q48-I would like to familiarize other departments or persons with the progress of this new approach	4.34	2.27	0.96	0.98
Q49-I am concerned about evaluating my impact on students in relation to online learning	4.58	2.21	0.96	0.98
Q50-I would like to revise the online learning approach	3.33	2.20	0.96	0.98
Q51-I am completely occupied with things other than online learning	2.21	1.95	0.96	0.98
Q52-I would like to modify our use of online learning based on the experiences of our students	3.61	2.13	0.96	0.98
Q53-I spend little time thinking about online learning	2.28	1.93	0.96	0.98
Q54-I would like to excite my students about their part in this approach	4.08	1.98	0.96	0.98
Q55-I am concerned about time spent working with non-academic problems related to online learning	3.49	2.13	0.96	0.98
Q56-I would like to know what the use of online learning would require in the immediate future	4.60	1.91	0.96	0.98
Q57-I would like to coordinate my efforts with others to maximize the effects of online learning	4.69	1.93	0.96	0.98
Q58-I would like to have more information on time and energy commitments required by online learning	4.64	1.74	0.96	0.98

Table continues

Question	Mean	SD	Alpha	G6
Q59-I would like to know what other faculty are doing in this area	4.21	2.24	0.96	0.98
Q60-Currently other priorities prevent me from focusing my attention on online learning	2.73	1.95	0.96	0.98
Q61-I would like to determine how to supplement enhance or replace online learning	2.87	2.08	0.96	0.98
Q62-I would like to use feedback from students to change the program	3.83	2.27	0.96	0.98
Q63-I would like to know how my role would change when I am using online learning	4.07	2.21	0.96	0.98

Table 26
Descriptive Statistics and Reliability for SoCQ by Category - Faculty

Question	Mean	SD	Alpha	G6
Q31-I am concerned about students' attitudes towards Online Learning	4.16	2.06	0.95	0.99
Q32-I now know of some other approaches that might work better than Online Learning	2.61	1.92	0.95	0.99
Q33-I am more concerned about another innovation	3.47	2.19	0.96	0.99
Q34-I am more concerned about not having enough time to organize myself each day in relation to Online Learning	3.63	2.04	0.96	0.99
Q35-I would like to help other faculty in their use of Online Learning	3.96	2.03	0.95	0.99
Q36-I have a very limited knowledge of Online Learning	1.77	1.84	0.96	0.99
Q37-I would like to know the effect of reorganization on my professional status	4.46	1.72	0.96	0.99
Q38-I am concerned about conflict between my interest and my responsibilities	2.68	2.22	0.96	0.99
Q39-I am concerned about revising my use of Online Learning	3.76	2.01	0.95	0.99
Q40-I would like to develop working relationships with both our faculty and outside faculty using Online Learning	4.15	2.20	0.95	0.99
Q41-I am concerned about how online learning affects students	4.26	2.21	0.95	0.99
Q42-I am not concerned about online learning at this time	1.90	2.15	0.96	0.99
Q43-I would like to know who would make the decision in the new system	2.74	2.30	0.96	0.99
Q44-I would like to discuss the possibility of using online learning	3.97	2.08	0.95	0.99
Q45-I would like to know what resources are available if we decide to adopt online learning	4.26	2.33	0.95	0.99

Table continues

Question	Mean	SD	Alpha	G6
Q46-I am concerned about my inability to manage all that online learning requires	3.44	2.41	0.95	0.99
Q47-I would like to know how my teaching or administration is supposed to change	4.29	2.06	0.95	0.99
Q48-I would like to familiarize other departments or persons with the progress of this new approach	4.49	2.23	0.95	0.99
Q49-I am concerned about evaluating my impact on students in relation to online learning	5.11	2.00	0.95	0.99
Q50-I would like to revise the online learning approach	3.77	2.15	0.96	0.99
Q51-I am completely occupied with things other than online learning	2.15	1.99	0.96	0.99
Q52-I would like to modify our use of online learning based on the experiences of our students	3.70	2.14	0.95	0.99
Q53-I spend little time thinking about online learning	1.95	1.83	0.96	0.99
Q54-I would like to excite my students about their part in this approach	4.40	1.79	0.95	0.99
Q55-I am concerned about time spent working with non-academic problems related to online learning	3.37	2.22	0.96	0.99
Q56-I would like to know what the use of online learning would require in the immediate future	4.68	2.00	0.95	0.99
Q57-I would like to coordinate my efforts with others to maximize the effects of online learning	4.81	2.04	0.95	0.99
Q58-I would like to have more information on time and energy commitments required by online learning	4.78	1.76	0.96	0.99
Q59-I would like to know what other faculty are doing in this area	4.41	2.27	0.95	0.99

Table continues

Question	Mean	SD	Alpha	G6
Q60-Currently other priorities prevent me from focusing my attention on online learning	2.56	1.97	0.96	0.99
Q61-I would like to determine how to supplement enhance or replace online learning	2.69	2.08	0.96	0.99
Q62-I would like to use feedback from students to change the program	3.94	2.30	0.95	0.99
Q63-I would like to know how my role would change when I am using online learning	4.24	2.27	0.95	0.99
Q64-coordination of tasks and people in relation to online learning is taking too much of my time	3.32	2.16	0.96	0.99
Q65-I would like to know how online learning is better than what we have now	4.46	2.10	0.95	0.99

Table 27: Descriptive Statistics and Reliability for SoCQ by Category - Administrator

Question	Mean	SD	Alpha	G6
Q31-I am concerned about students' attitudes towards Online Learning	3.98	2.05	0.96	0.99
Q32-I now know of some other approaches that might work better than Online Learning	2.61	1.80	0.96	0.99
Q33-I am more concerned about another innovation	3.87	2.48	0.97	0.99
Q34-I am more concerned about not having enough time to organize myself each day in relation to Online Learning	3.00	2.08	0.96	0.99
Q35-I would like to help other faculty in their use of Online Learning	3.63	2.19	0.96	0.99
Q36-I have a very limited knowledge of Online Learning	2.64	2.00	0.96	0.99
Q37-I would like to know the effect of reorganization on my professional status	3.53	2.08	0.96	0.99
Q38-I am concerned about conflict between my interest and my responsibilities	3.20	1.96	0.96	0.99
Q39-I am concerned about revising my use of Online Learning	3.81	2.10	0.96	0.99
Q40-I would like to develop working relationships with both our faculty and outside faculty using Online Learning	3.92	2.22	0.96	0.99
Q41-I am concerned about how online learning affects students	3.95	2.23	0.96	0.99
Q42-I am not concerned about online learning at this time	2.35	2.06	0.96	0.99
Q43-I would like to know who would make the decision in the new system	3.10	2.24	0.96	0.99
Q44-I would like to discuss the possibility of using online	4.03	2.05	0.96	0.99

Table continues

Question	Mean	SD	Alpha	G6
learning				
Q45-I would like to know what resources are available if we decide to adopt online learning	4.35	2.27	0.96	0.99
Q46-I am concerned about my inability to manage all that online learning requires	3.45	2.32	0.96	0.99
Q47-I would like to know how my teaching or administration is supposed to change	3.76	2.33	0.96	0.99
Q48-I would like to familiarize other departments or persons with the progress of this new approach	4.15	2.32	0.96	0.99
Q49-I am concerned about evaluating my impact on students in relation to online learning	3.92	2.29	0.96	0.99
Q50-I would like to revise the online learning approach	2.78	2.15	0.96	0.99
Q51-I am completely occupied with things other than online learning	2.27	1.92	0.96	0.99
Q52-I would like to modify our use of online learning based on the experiences of our students	3.50	2.12	0.96	0.99
Q53-I spend little time thinking about online learning	2.68	1.99	0.96	0.99
Q54-I would like to excite my students about their part in this approach	3.69	2.13	0.96	0.99
Q55-I am concerned about time spent working with non-academic problems related to online learning	3.64	2.03	0.96	0.99
Q56-I would like to know what the use of online learning would require in the immediate future	4.50	1.81	0.96	0.99
Q57-I would like to coordinate my efforts with others to maximize the effects of online learning	4.54	1.80	0.96	0.99

Table continues

Question	Mean	SD	Alpha	G6
Q58-I would like to have more information on time and energy commitments required by online learning	4.47	1.72	0.96	0.99
Q59-I would like to know what other faculty are doing in this area	3.97	2.20	0.96	0.99
Q60-Currently other priorities prevent me from focusing my attention on online learning	2.92	1.91	0.96	0.99
Q61-I would like to determine how to supplement enhance or replace online learning	3.08	2.08	0.96	0.99
Q62-I would like to use feedback from students to change the program	3.70	2.24	0.96	0.99
Q63-I would like to know how my role would change when I am using online learning	3.86	2.14	0.96	0.99
Q64-coordination of tasks and people in relation to online learning is taking too much of my time	2.73	2.04	0.96	0.99
Q65-I would like to know how online learning is better than what we have now	4.35	2.27	0.96	0.99

It was observed that all the items had very good alpha and G6 coefficient (> 0.90), hence it was safe to say that all the items did indeed fit into an underlying construct of the SOCQ among respondents.

Exploratory Factor Analysis of SoCQ

Exploratory factor analysis (EFA) is commonly used to find structures or patterns of correlations within data sets. It is also used to reduce a data set of interrelated variables to a smaller set of factors (Field, 2000). Complete responses for all 35 SoCQ items were included in the exploratory factor analysis. The factor analysis methods described by (Field, 2000) were conducted to examine the data. The data was cleaned up in excel and analyzed using R-language and SPSS. I scanned the correlation matrixes to determine if correlations existed that were 0.9 or greater and 0.1 or less (Field, 2000). Correlations that are 0.9 or greater may measure the same variable. Correlations that are 0.1 or less may allow one or more of the variables to load only onto one principal component, which would make it its own principal component. There were no variables discovered to have correlations of 0.9 or greater. However, there were some pairs with correlation values less than 0.14. (See, Table 28) The boxes containing pairs with correlation values less than 0.14 are shaded red in Table 28.

Table 28
Correlation Between SoCQ Exploratory Factor Analysis

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34
Q1	0.45	0.12	0.21	0.6	0.06	0.35	0.32	0.36	0.65	0.7	0.26	0.45	0.62	0.66	0.43	0.5	0.55	0.55	0.35	0.17	0.58	0.19	0.63	0.37	0.61	0.63	0.45	0.62	0.32	0.24	0.61	0.52	0.14	0.58
Q2		0.4	0.28	0.48	0.31	0.32	0.3	0.35	0.45	0.36	0.43	0.52	0.44	0.48	0.56	0.44	0.47	0.5	0.29	0.38	0.44	0.35	0.5	0.31	0.36	0.38	0.34	0.43	0.27	0.35	0.41	0.47	0.28	0.42
Q3			0.15	0.28	0.31	0.2	0.22	0.41	0.18	0.11	0.18	0.21	0.24	0.2	0.33	0.16	0.16	0.18	0.14	0.2	0.19	0.15	0.12	0.13	0.35	0.27	0.2	0.23	0.12	0.18	0.18	0.18	0.12	0.28
Q4				0.16	0.09	0.27	0.03	0.19	0.21	0.17	0.11	0.06	0.3	0.26	0.4	0.33	0.15	0.27	0.29	0.15	0.23	0.16	0.39	0.3	0.3	0.29	0.34	0.17	0.16	0.21	0.11	0.18	0.29	0.33
Q5					-0.04	0.53	0.32	0.5	0.72	0.63	0.18	0.44	0.67	0.62	0.48	0.49	0.62	0.59	0.49	0.32	0.6	0.21	0.64	0.39	0.48	0.52	0.36	0.66	0.28	0.27	0.6	0.54	0.36	0.48
Q6						0.05	0.42	0.23	0.21	0.06	0.52	0.29	0.13	0.14	0.27	0.1	0.04	0.02	0.01	0.36	0.17	0.41	0.05	0.1	0.11	0.1	0.11	0.08	0.41	0.36	0.13	0.21	0.25	0.22
Q7							0.35	0.21	0.43	0.41	0.15	0.38	0.44	0.55	0.47	0.5	0.57	0.59	0.5	0.28	0.38	0.14	0.55	0.41	0.42	0.43	0.23	0.48	0.24	0.35	0.47	0.57	0.45	0.52
Q8								0.2	0.43	0.38	0.4	0.51	0.39	0.35	0.25	0.25	0.41	0.36	0.17	0.36	0.35	0.43	0.26	0.24	0.24	0.22	0.14	0.38	0.41	0.45	0.44	0.31	0.23	0.35
Q9									0.54	0.4	0.3	0.26	0.45	0.47	0.4	0.4	0.26	0.34	0.25	0.36	0.38	0.2	0.43	0.3	0.44	0.39	0.23	0.33	0.27	0.15	0.36	0.43	0.31	0.29
Q10										0.74	0.28	0.43	0.74	0.72	0.47	0.55	0.63	0.64	0.43	0.36	0.62	0.26	0.7	0.45	0.53	0.59	0.39	0.68	0.42	0.28	0.63	0.62	0.32	0.62
Q11											0.19	0.4	0.67	0.71	0.44	0.56	0.62	0.61	0.42	0.33	0.54	0.22	0.66	0.41	0.53	0.58	0.38	0.62	0.41	0.3	0.59	0.55	0.22	0.62
Q12												0.52	0.22	0.3	0.43	0.31	0.27	0.21	0.11	0.47	0.25	0.59	0.13	0.21	0.12	0.08	0.16	0.27	0.41	0.43	0.25	0.34	0.25	0.26
Q13													0.54	0.49	0.5	0.5	0.49	0.44	0.3	0.38	0.42	0.37	0.41	0.36	0.32	0.27	0.3	0.47	0.36	0.51	0.58	0.46	0.18	0.43
Q14														0.77	0.55	0.64	0.62	0.64	0.42	0.27	0.63	0.15	0.67	0.48	0.64	0.59	0.48	0.64	0.35	0.29	0.65	0.58	0.26	0.6
Q15															0.56	0.68	0.68	0.65	0.43	0.33	0.61	0.23	0.7	0.51	0.67	0.61	0.45	0.64	0.38	0.32	0.63	0.68	0.37	0.7
Q16																0.7	0.58	0.6	0.5	0.35	0.57	0.35	0.57	0.53	0.47	0.48	0.33	0.6	0.34	0.36	0.52	0.6	0.46	0.57
Q17																	0.69	0.68	0.44	0.34	0.55	0.21	0.68	0.54	0.57	0.54	0.47	0.61	0.33	0.27	0.6	0.65	0.4	0.63
Q18																		0.75	0.59	0.22	0.54	0.2	0.67	0.54	0.58	0.61	0.4	0.78	0.27	0.28	0.67	0.64	0.43	0.62
Q19																			0.65	0.36	0.61	0.2	0.75	0.41	0.55	0.56	0.31	0.75	0.26	0.29	0.63	0.66	0.46	0.68
Q20																				0.31	0.53	0.17	0.6	0.26	0.4	0.44	0.18	0.56	0.2	0.23	0.52	0.5	0.6	0.42
Q21																					0.38	0.64	0.29	0.19	0.06	0.04	0.05	0.3	0.52	0.46	0.35	0.39	0.39	0.31
Q22																						0.16	0.69	0.35	0.53	0.47	0.46	0.69	0.35	0.31	0.57	0.56	0.36	0.47
Q23																							0.17	0.25	0	0.04	0.05	0.25	0.57	0.51	0.21	0.25	0.26	0.27
Q24																								0.43	0.66	0.7	0.55	0.68	0.26	0.35	0.7	0.67	0.38	0.59
Q25																									0.41	0.44	0.3	0.5	0.37	0.2	0.33	0.48	0.43	0.48
Q26																										0.79	0.7	0.59	0.24	0.17	0.62	0.54	0.23	0.56
Q27																											0.61	0.61	0.24	0.2	0.58	0.57	0.23	0.61
Q28																												0.48	0.29	0.34	0.47	0.38	0.01	0.39
Q29																													0.31	0.27	0.66	0.68	0.37	0.69
Q30																														0.55	0.35	0.32	0.28	0.38
Q31																															0.45	0.32	0.2	0.42

To address concerns regarding the low correlation, the Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity to determine if all variables were suitable for inclusion were conducted. The Bartlett's test compares the observed correlation matrix to the identity matrix. In other words, it checks if there is a certain redundancy between the variables that could be summarized with a few number of factors. If the variables are perfectly correlated, only one factor is sufficient. If they are orthogonal, we need as many factors as variables. The Bartlett's test checks if the observed correlation matrix diverges

significantly from the identity matrix (theoretical matrix under H_0: the variables are orthogonal). The Principal Component Analysis (PCA) could be used to perform a compression of the available information only if we rejected the null hypothesis. To measure the overall relation between the variables, I computed the determinant of the correlation matrix |R|. Under H, |R| = 1; if the variables are highly correlated, we have |R| approximately 0. The Bartlett's test statistic indicated to what extent we deviated from the reference situation |R| = 1. If we rejected the null hypothesis, then we could perform deficiently a PCA on our dataset. KMO measures the sampling adequacy of the data and should exceed 0.5 to conduct a factor analysis. The purpose of the KMO measure of sampling adequacy was to compare the magnitudes of the observed correlation coefficients to the magnitudes of the partial correlation coefficients. To confirm the appropriateness of conducting a factor analysis, large values for the KMO must be found (Gorsuch, 1997).

Bartlett's Test of Sphericity also indicated the strength of relationship among variables. The null hypothesis was tested with Bartlett's Test of Sphericity to determine whether a variance-covariance matrix was similar to an identity matrix (Field, 2000).

Both the Kaiser-Meyer-Olkin (KMO) test and Bartlett's Test of Sphericity were run on the data to determine if factor analysis was appropriate. The tests were conducted at 95% level of significance. The results for the KMO and Bartlett's Test of Sphericity are displayed in Table 29. For this study, the KMO value (0.88) indicated an adequate sample size to conduct factor analysis. The observed Chi Square and degrees of freedom for the Bartlett's Test of Sphericity were significant ($P = 0.00<0.01$), indicating that there are some relationships among the variables within the analysis, and that it was appropriate to proceed with a factor analysis.

Table 29.
KMO and Bartlett's Test of Sphericity

Measure	Value
KMO	0.881
	Bartlett's Test
Chi-Square	4104.96
Degrees of Freedom	595
P-value	0
Decision	P < 0.05 hence reject null hypothesis

The variances of the principal factors are expressed in the eigenvalues and are shown in Table 30: As part of the Extraction Sum of Squared Loadings, the column titled "Total" contains the eigenvalues of the first factor, which is the highest eigenvalue (15.79) and accounts for the most variance (45.12%). The additional six factors listed accounted for incrementally decreasing variance per factor. The values in the % Variance column represent the percent of variance specified by each principal factor.

Table 30

Total Explained Variance

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	15.79	45.12	45.12	15.50	44.30	44.30	14.41
2	3.26	9.33	54.44	2.92	8.35	52.65	5.98
3	1.89	5.39	59.84	1.56	4.45	57.09	6.86
4	1.63	4.66	64.50	1.25	3.58	60.67	5.63
5	1.37	3.90	68.40	1.00	2.85	63.52	3.37
6	1.16	3.31	71.72	.85	2.42	65.94	3.27
7	1.01	2.89	74.61	.71	2.02	67.96	5.28

The Extraction Sum of Squared Loadings columns provided the variance, the percent of variance, and the cumulative effect of variance for each principal factor with an eigenvalue greater than 1. Within the extraction column, the values indicated the proportion of each variable's variance that was explained by the retained factors. The extraction method selected was principal axis factoring.

The Promax rotation method was employed for factor rotation analysis; again, I used Promax rotation here as I did not assume that the factors are uncorrelated. Absolute values of less than 0.4 were suppressed from the output. The pattern matrix displayed the factor loadings; it contains information about the unique contributions of the variables to the factors. The 35 variables are represented in the seven-factor pattern matrix in Table 31 below.

Table 31
Seven-Factor Pattern Matrix

	Factors						
Item	1	2	3	4	5	6	7
Q16	0.42						
Q17	0.45						
Q18	0.40						
Q25	0.64						
Q35	0.45						
Q6		0.50		0.42			
Q12		0.53					
Q21		0.63					
Q23		0.74					
Q30		0.66					
Q31		0.73					
Q26			0.65				
Q27			0.54				
Q28			0.86				
Q19				0.53			
Q20				0.81			
Q24				0.24			
Q34				0.59			
Q3					0.60		
Q9					0.64		
Q1						0.54	
Q5						0.53	

Table continues

Factors

Item	1	2	3	4	5	6	7
Q10						0.72	
Q11						0.73	
Q14						0.49	
Q15						0.47	
Q13							0.50
Q2							
Q4							
Q7							
Q8							
Q22							
Q29							
Q32							
Q33							

The pattern matrix revealed that 5 items loaded on Factor 1, 6 items loaded on Factor 2, 3 items loaded on Factor 3, 5 items loaded on Factor 4, 2 items loaded on Factor 5, 6 items loaded on Factor 6, and 1 item loaded on Factor 7. Cross loadings of items occurred on Factor 2 and 4 (Q6) “I have a very limited knowledge of Online Learning” The following 8 items, “I now know of some other approaches that might work better than Online Learning”(Q2), "I am more concerned about not having enough time to organize myself each day in relation to Online Learning" (Q4), "I would like to know the effect of reorganization on my professional status"(Q7),"I am concerned about conflict between my interest and my responsibilities" (Q8), "I would like to modify our use of online learning based on the experiences of our students"(Q22), "I would like to know what other faculty are doing in this area"(Q29), "I would like to use feedback from students to change the program" (Q32), "I

would like to know how my role would change when I am using online learning"(Q33), did not load on any of the seven factors. Factor 7 showed that only one item loaded per factor.

Table 32
Matrix summarizing factor loadings by item

Factor	Item no.	Questions
1	16,17,18, 25,35	Q46-I am concerned about my inability to manage all that online learning requires Q47-I would like to know how my teaching or administration is supposed to change Q48-I would like to familiarize other departments or persons with the progress of this new approach Q55-I am concerned about time spent working with non-academic problems related to online learning Q65-I would like to know how online learning is better than what we have now
2	6,12,21,23, 30,31	Q36-I have a very limited knowledge of Online Learning Q42-I am not concerned about online learning at this time Q51-I am completely occupied with things other than online learning Q53-I spend little time thinking about online learning Q60-Currently other priorities prevent me from focusing my attention on online learning Q61-I would like to determine how to supplement enhance or replace online learning
3	26,27,28	Q46-I am concerned about my inability to manage all that online learning requires Q47-I would like to know how my teaching or administration is supposed to change Q48-I would like to familiarize other departments or persons with the progress of this new approach
4	6,19,20,24, 34	Q49-I am concerned about evaluating my impact on students in relation to online learning Q50-I would like to revise the online learning approach Q54-I would like to excite my students about their part in this approach Q64-coordination of tasks and people in relation to online learning is taking too much of my time
5	3,9	Q33-I am more concerned about another innovation Q39-I am concerned about revising my use of Online Learning
6	1,5,10,11 ,14,15	Q31-I am concerned about students' attitudes towards Online Learning Q35-I would like to help other faculty in their use of Online Learning Q40-I would like to develop working relationships with both our faculty and outside faculty using Online Learning Q41-I am concerned about how online learning affects students Q44-I would like to discuss the possibility of using online learning Q45-I would like to know what resources are available if we decide to adopt online learning
7	13	Q43-I would like to know who would make the decision in the new system
No factor loading	2,4,7,8,22, 29,32, 33	Q32-I now know of some other approaches that might work better than Online Learning, Q34-I am more concerned about not having enough time to organize myself each day in relation to Online Learning,

Table continues

Q37-I would like to know the effect of reorganization on my professional status
Q38-I am concerned about conflict between my interest and my responsibilities
Q52-I would like to modify our use of online learning based on the experiences of our students
Q59-I would like to know what other faculty are doing in this area
Q62-I would like to use feedback from students to change the program
Q63-I would like to know how my role would change when I am using online learning

Following Gorsuch's (1997) criteria, we eliminated factor 7 so that additional exploratory factor analysis was necessary to ascertain appropriate variable or item loadings on each factor after the model had been reduced from seven factors to 6 factors.

Table 33.
Six-factor pattern matrix

Item	1	2	3	4	5	6
Q1	0.84					
Q5	0.81					
Q10	0.92					
Q11	0.96					
Q14	0.77					
Q15	0.71					
Q18	0.60					0.41
Q19	0.58		0.44			
Q22	0.58					

Table continues

Q24	0.68			
Q26	0.54		0.51	
Q27	0.59		0.45	
Q29	0.67			
Q32	0.68			
Q33	0.48			
Q35	0.44			
Q6		0.56		
Q8		0.44		
Q12		0.59		
Q21		0.65		
Q23		0.83		
Q30		0.78		
Q31		0.69		
Q7			0.44	
Q16			0.45	

Table continues

Q9			0.81	0.62
Q13				0.53
Q17				
Q25				
Q2				
Q20	0.67			
Q34	0.86			
Q4		0.49		
Q28		0.73		
Q3			0.71	

The report of the revised variable or item loadings on each factor after the model had been reduced from seven factors to 6 factors is presented in Table 33. I observed that Factors 5,6 and 7 have only 2 item loadings each. Furthermore, with the 6-factor model, more of the items are loaded on the factors. However, 3 items: "I now know of some other approaches that might work better than Online Learning" (Q2), "I would like to know how my teaching or administration is supposed to change" (Q17) and "I am concerned about time spent working with non-academic problems related to online learning" (Q25) did not load on any of the factors. These all made sense because continuing faculty and administrators' concerns did not just go away on their own accord (Hall & Hord, 2011). Except faculty and administrators overcame or resolved their lower level concerns, they are not likely to support the target innovation (Hall & Hord, 2011).

Structural Equation Modeling for SoCQ

This study attempted to explain how the SoCQ could be used to understand staff concerns impacting the DE adoption in universities. Structural equation modeling was used to show the relationships between the latent constructs that comprised the seven stages within the SoCQ and designated variables.

Table 34, shows the results of the structural equation modeling (Weston & Gore, 2006) for the SOCQ constructs.

Table 34.
Result of the Standardized Test for the 7-Construct Model

Chi-sq	df	CFI	TLI	RMSEA	SRMR
1576.26	1576.257	0.69	0.66	0.13	0.10

Note: df = degrees of freedom. CFI = Comparative Fit Index. TLI = Tucker Lewis Index. RMSEA = Root Mean Square of Approximation. SRMR = Standardized Root Mean Square Residual. Level of significance =0.05

In Table 34, CFI and TLI are 0.69 and 0.66 respectively, an indication that the model though not a perfect fit, was not too far from a good fit.

The SRMR was 0.10 indicative that the model was not a good fit.

In summary, it was observed that the seven-construct model did not give a good fit for the model with a RMSEA and SRMR of 0.13 and 0.10, respectively. The poor fit might be because of some correlation between the 7 constructs considered, which though not up to 0.9 could still be considered as relatively high.

Questions that Comprise each Stage of Concern

Table 35.
Stages of Concern Questions that Comprise Each Stage of Concern

Stage	Item	Statement
0(Awareness)	3	I am more concerned about another innovation
	12	I am not concerned about online learning at this time
	21	I am completely occupied with things other than online learning
	23	I spend little time thinking about online learning
	30	Currently other priorities prevent me from focusing my attention on online learning
1(Informational)	6	I have a very limited knowledge of Online Learning
	14	I would like to discuss the possibility of using online learning
	15	I would like to know what resources are available if we decide to adopt online learning
	26	I would like to know what the use of online learning would require in the immediate future
	35	I would like to know how online learning is better than what we have now
2(Personal)	7	I would like to know the effect of reorganization on my professional status
	13	I would like to know who would make the decision in the new system
	17	I would like to know how my teaching or administration is supposed to change
	28	I would like to have more information on time and energy commitments required by online learning
	33	I would like to know how my role would change when I am using online learning
3(Management)	4	I am more concerned about not having enough time to organize myself each day in relation to Online Learning

Table continues

Stage	Item	Statement
	8	I am concerned about conflict between my interest and my responsibilities
	16	I am concerned about my inability to manage all that online learning requires
	25	I am concerned about time spent working with non-academic problems related to online learning
	34	Coordination of tasks and people in relation to online learning is taking too much of my time
4(Consequence)	1	I am concerned about students' attitudes towards Online Learning
	11	I am concerned about how online learning affects students
	4419	I am concerned about evaluating my impact on students in relation to online learning
	24	I would like to excite my students about their part in this approach
	32	I would like to use feedback from students to change the program
5(Collaboration)	5	I would like to help other faculty in their use of Online Learning
	10	I would like to develop working relationships with both our faculty and outside faculty using Online Learning
	18	I would like to familiarize other departments or persons with the progress of this new approach
	27	I would like to coordinate my efforts with others to maximize the effects of online learning
	29	I would like to know what other faculty are doing in this area
6(Refocusing)	2	I now know of some other approaches that might work better than Online Learning
	9	I am concerned about revising my use of Online Learning
	20	I would like to revise the online learning approach

Table continues

Stage	Item	Statement
	22	I would like to modify our use of online learning based on the experiences of our students
	31	I would like to determine how to supplement enhance or replace online learning

Correlations Between Scale Scores from the Stages of Concern Questionnaire

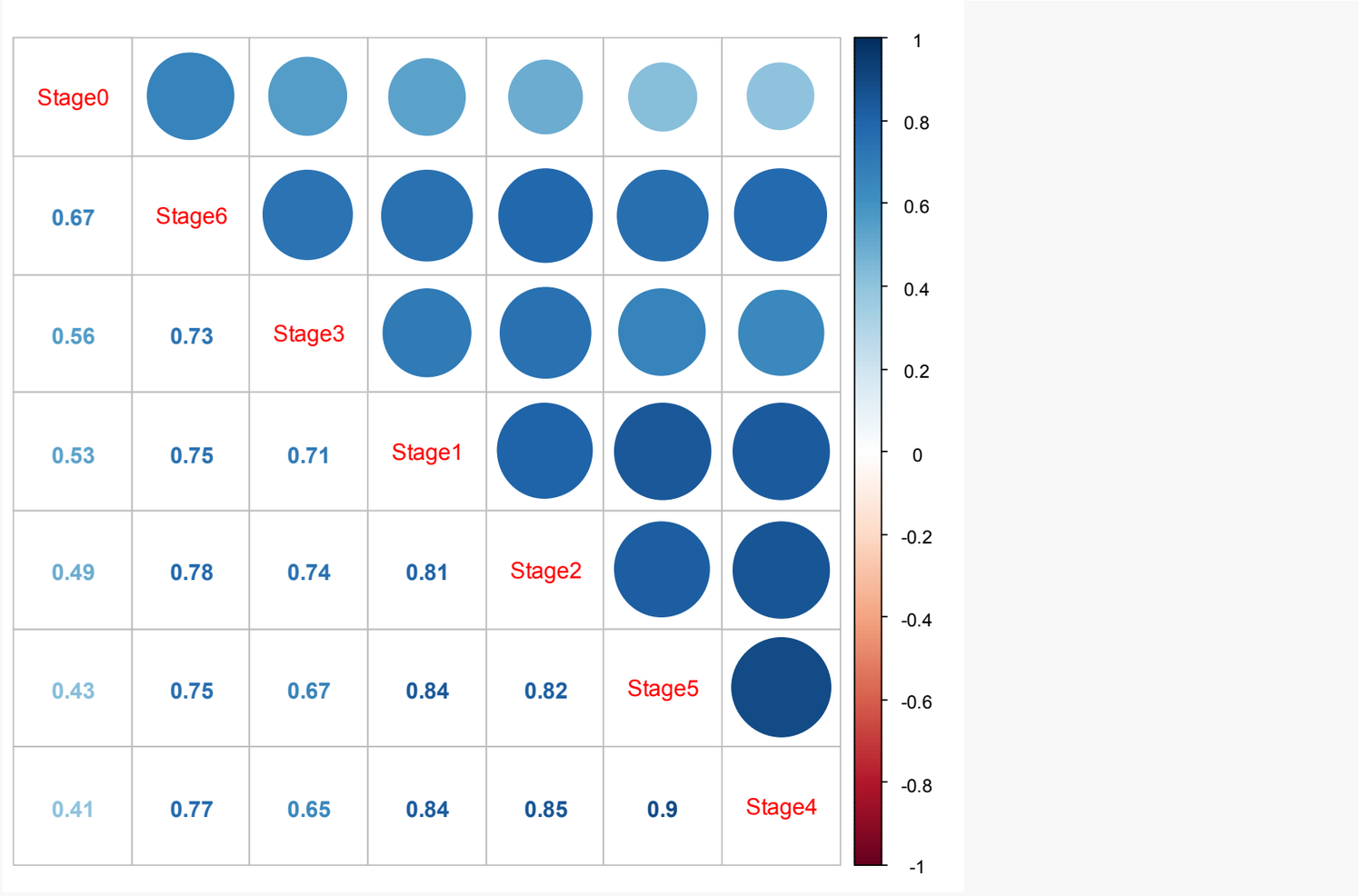

Figure 27: Correlations Between Scale Scores from the Stages of Concern Questionnaire

Figure 27, is a Correlogram showing interrelationship between scale scores from the SoCQ. The Bar on the side shows the correlation matrix key, the blue extreme is indicative of strong positive correlation while the red extreme is indicative of strong negative correlation. Bigger, darker colored blue circles indicated higher positive correlation coefficients while smaller lighter colored blue circles indicated lower positive correlation coefficients. I observed that stage 2 (personal) was highly correlated with all the other stages apart from Collaboration, indicating that individuals who were concerned about the effect of

DE adoption in their institutions were not likely to be unconcerned about the concept. In addition, stage 4 (Consequence) and stage 5 (Collaboration) are also highly correlated indicating that staff who were concerned about the effect of DE adoption on their students were also interested in collaborating to enhance DE adoption in their institutions.

Table 36.
Overall Mean SD and Percentile of Each Stage Based on Responses

Stages	Mean (Overall)	SD (Overall)	Percentile (Overall)
Awareness (Stage0)	12.83	7.38	61.19
Informational (Stage1)	18.77	8.05	68.78
Personal (Stage2)	18.68	7.64	66.32
Management (Stage3)	15.80	7.16	57.34
Consequence (Stage4)	19.62	9.23	38.47
Collaboration (Stage5)	19.89	9.00	50.82
Refocusing (Stage6)	15.48	6.96	47.39

Results for research question one were obtained from the 35 items that comprised the Stages of Concern instrument. The Stages of Concern instrument consisted of 35 questions categorized into seven Stages of Concern: (a) awareness, (b) informational, (c) personal, (d) management, (e) consequence, (f) collaboration and (g) refocusing (Hall, Newlove, George, Rutherford, & Hord, 1991). Specific questions that comprised each Stage of Concern are found in Table 35. Stages of Concern scores were calculated using R. Means and standard deviations of Stages of Concern scores were calculated for the entire sample. The percentiles were also identified and recorded along with the calculated means and standard deviations in adoption in their institutions.

In Table 36 (above), the highest and second highest mean scores were for collaboration and consequence (stages 5 and 4) constructs and have means of 19.89 and 19.62 respectively and a standard deviation of 9.00 and 9.23 respectively.

Table 37.
Frequency of Respondents with Highest Stages of Concern

Stage	Frequency	Percent
Awareness (Stage 0)	15	11.72
Informational (Stage1)	20	15.63
Personal (Stage 2)	21	16.41
Management (Stage`3)	10	7.81
Consequence (Stage4)	28	21.88
Collaboration (Stage5)	31	24.22
Refocusing (Stage6)	3	2.344

Collaboration (stage 5) and consequence (stage 4) was categorized as the highest and second highest Stage of Concern for the largest percentage of respondents (31% and 28%respectively).

Figure 28; recorded the relative intensity of the stages for faculty, administrators and their combined scores. Stage 3 (Management) and stage 2 (Personal) have over 60% intensity for faculty members, while for the Administrators, their highest intensity was at Stage 0 (Awareness), Stage 1 (Informational) and stage 2 (Personal). An indication that while faculty are majorly concerned about management and personal interests, they seemed to be sufficiently informed about DE while administrators needed to be better informed about the DE concept and at the same time wary about how DE adoption would

impact them personally. Furthermore, administrators' high Stage 0 score indicated that DE adoption was not of high priority or concern for the administrators.

Stages of Concern of Faculty, Administrators and Combined Staff

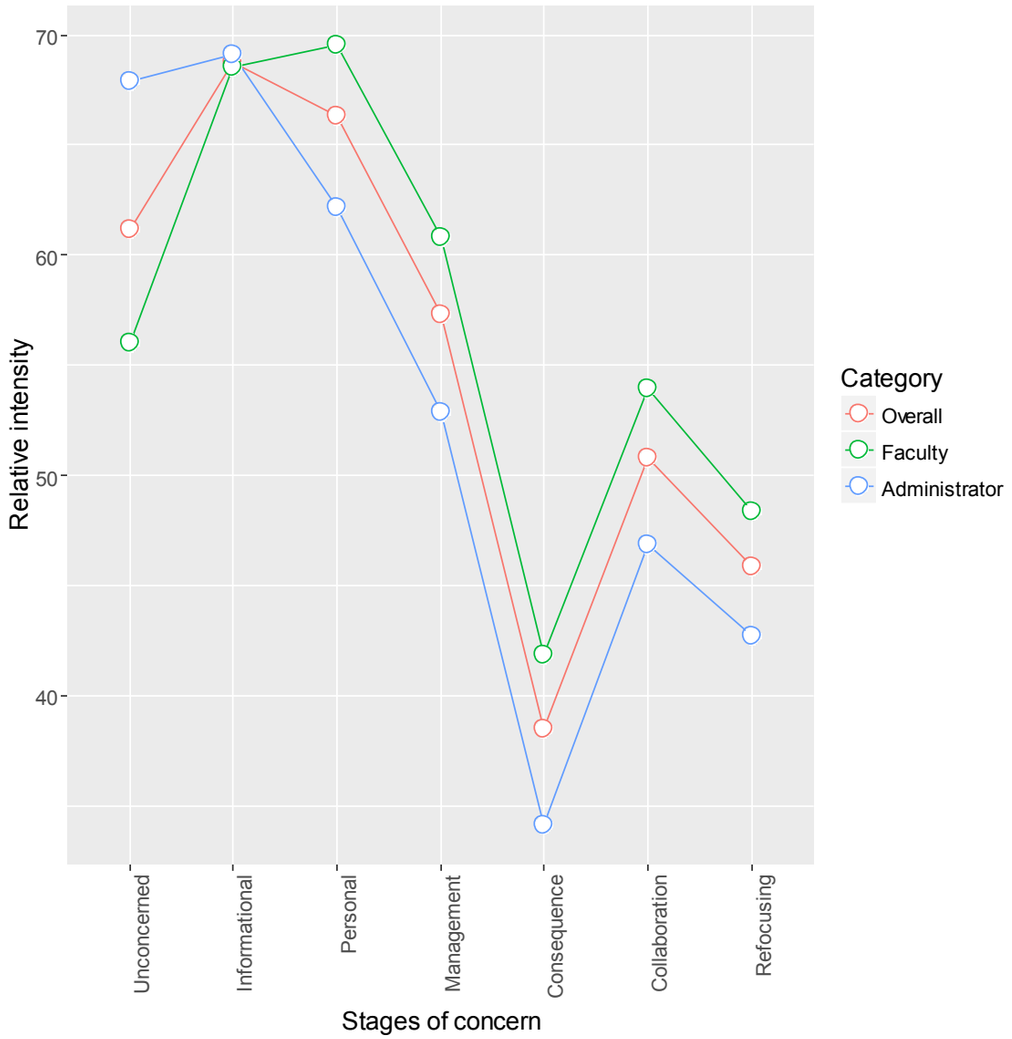

Figure 28.
Stages of Concern of Faculty, Administrators and Combined Staff

From Figure 28, the lowest stage of concern for both faculty and administrators was stage 5 (collaboration) an indication that both faculty and administrators of the universities are open to collaboration with other faculty and administrators in facilitating DE adoption in their various universities.

The dominant stages of concern of each demographic and technographic characteristic was documented, Chi square test for independence was then used to test for the relationship between faculty and administrator's demographic and techno graphic characteristics and their most dominant stages of concern about adopting online learning. The results are documented in Tables 38 to 39. All tests are carried out at 95% level of significance.

Table 38.
Dominant Stages of Concern by Demographic Characteristics

		Faculty			Administrator		
Demographic characteristic	Factors	Dominant Stage	Score	P-value	Dominant Stage	Score	P-value
Gender	Male	4	17.33	0.08	2	20.00	0.03
	Female	2	23.53		1	18.38	
Age group	18 to 29	5	18.40	0.35	1	13.50	0.17
	30 to 39	4	17.56		4	22.25	
	40 to 49	4	23.20		5	24.00	
	50 to 59	4	26.30		1	17.00	
	60 or over	2	26.75		6	31.00	
Highest Educational Level	High School	5	19.40	0	1	29.00	0.09
	Associate Degree	5	30.00		6	17.00	
	BA/BS	2	14.20		5	19.29	
	MA/MS	5	21.69		1	18.90	
	PHD	4	25.55		1	31.00	
Duration of work at your university	Less than 6 months	5	20.00	0	4	22.00	0.88
	6 to 12 months	5	16.67		5	27.60	
	1 to 3 years	4	16.71		1	14.33	
	3 to 6 years	5	25.82		4	21.75	
	6 to 10 years	4	25.60		5	21.75	
	10 to 20 years	5	24.86		2	13.67	
	More than 20 years	2	26.75		1	23.00	

Table 39.
Dominant Stages of Concern by Technographic Characteristics

		Faculty			Administrator		
Technographic characteristic	Factors	Dominant Stage	Score	P-value	Dominant Stage	Score	P-value
Range of experience with technology in education	Less than 6 months	-	-	0.02	1	16.00	0.00
	6 to 12 months	2	13.00		5	26.33	
	1 to 3 years	4	16.88		1	17.21	
	3 to 6 years	5	26.21		1	21.45	
	6 to 10 years	5	21.14		2	17.71	
	10 to 20 years	5	22.44		4	26.75	
Range of experience with online	Less than 6 months	-	-	0.00	1	16.00	0.02
	6 to 12 months	2	10.75		5	21.67	
	1 to 3 years	5	26.20		1	23.14	
	3 to 6 years	4	25.36		1	17.37	
	6 to 10 years	2	20.80		4	20.00	
	10 to 20 years	5	25.12		5	23.17	
	More than 20 years	4	34.00		-	-	
Duration of online professional development attended	Less than 6 months	5	25.80	0.00	4	25.86	0.00
	6 to 12 months	2	17.19		5	22.33	
	1 to 3 years	4	22.64		4	17.38	
	3 to 6 years	5	27.60		1	15.58	
	6 to 10 years	3	18.00		2	19.29	
	10 to 20 years	4	25.67		-	-	
	More than 20 years	-	-		1	28.00	
Type of online	Hands-on	5	24.33	0.15	1	11.88	0.00

Table continues

		Faculty			Administrator		
Technographic characteristic	Factors	Dominant Stage	Score	P-value	Dominant Stage	Score	P-value
professional development attended	Lecture-based	5	24.53		1	19.77	
	Combination of lecture and hands-on	4	19.04		4	22.00	
	Peer coaching or observation	5	21.00		5	26.00	
	None	-	-		5	23.67	
Level of online use	Experienced	4	25.46	0.80	4	22.25	0.22
	Intermediate	2	16.96		1	17.25	
	Novice	5	30.00		1	25.00	
	Past User	4	24.00		-	-	

To answer the research question: “Do faculty and administrator’s demographic and technographic characteristics influence their stages of concerns in adopting online learning?” One-way Analysis of Variance (ANOVA) tests were employed.

The One-way Analysis of Variance (ANOVA) tests were employed to determine if differences existed between Stages of Concern of respondents when grouped by their selected characteristics (demographic and technographic).

The results of the tests are presented in Table 39. The tests are carried out at 95% level of significance, so that each of the p-values compared to the significant level. The test that returned significant results are colored in red. If $P>0.05$, the test was said to not have reached significance and indicated no significant difference in stages of concern within the characteristic group. However, if $p<0.05$, a significant test is recorded that might suggest some difference within the group so that a post hoc test was then conducted to further explore the differences. Tukey’s HSD test was used for this purpose.

The results of the Tukey's HSD test for each of the significant ANOVA tests are recorded in the appendix Q (Tables 2-8). Table 40. ANOVA Test Results (tests are carried out at α=0.05), Statistically Significant Test Results Boxes are Shaded Red.

	Stage0		Stage1		Stage2		Stage3		Stage4		Stage5		Stage6	
Characteristic	F	P	F	P	F	P	F	P	F	P	F	P	F	P
Demographic characteristics														
Category	1.12	0.29	0.06	0.81	2.43	0.12	2.15	0.15	1.7	0.2	0.93	0.34	1.02	0.32
Gender	4.28	0.04	3.55	0.06	1.45	0.23	2.37	0.13	2.24	0.14	4.97	0.03	3.39	0.07
Age group	3.75	0.01	3.26	0.02	6.04	0	4.99	0	4.56	0	3.21	0.02	6.01	0
Highest Educational Level	2.68	0.04	3.09	0.02	3.2	0.02	4.96	0	4.03	0	3.31	0.01	5.72	0
Duration of work at your university	4.24	0	2.75	0.02	2.05	0.07	3.22	0.01	2.37	0.04	2.6	0.02	1.7	0.13
	Stage0		Stage1		Stage2		Stage3		Stage4		Stage5		Stage6	
Characteristic	F	P	F	P	F	P	F	P	F	P	F	P	F	P
Technographic characteristics														
Range of experience with technology in education	2.02	0.07	2.37	0.04	1.78	0.11	2.78	0.02	3.07	0.01	2.43	0.03	2.69	0.02
Range of experience with online	2.61	0.02	4.11	0	1.4	0.22	2.52	0.03	3.29	0.01	4.86	0	2.12	0.06
Duration of online professional development attended	2.41	0.03	1.54	0.18	0.69	0.66	0.71	0.64	1.85	0.1	1.56	0.17	0.8	0.57
Type of online professional development attended	1.84	0.13	1.05	0.39	1.23	0.31	2.09	0.09	1.96	0.11	2.18	0.08	1.73	0.15
Level of online use	1.83	0.15	4.13	0.01	3.91	0.01	5.18	0	7.98	0	6.34	0	6.35	0

Tukey's HSD test

The results of the Tukey's HSD tests for the significant characteristics for each stage of concern are presented in appendix: Q. The tests revealed that faculty and administrator's demographic and technographic characteristics do influence their stages of concerns in the adoption of online learning. Result details are compiled in the next section.

Demographic Characteristics

Category: The ANOVA results showed no statistically significant difference in the concerns of both faculty and administrators

Gender: The results showed a significant difference in the male and female concerns at Stage 0 (awareness) and 5 (collaboration).

Age group: The ANOVA tests reported a significant difference in all the Stages of concern.

The results of the Tukey's HSD test indicated that respondents aged 60 and over had much higher stage 0 (awareness) concerns than respondents in other age groups. At stage 1 (informational), stage 3 (management) and stage 6 (refocusing), respondents who were within ages 40-59 had higher concerns than respondents who were within ages 18-29. Also, respondents who were over 30years had higher stage2 (personal) and stage 4 (consequence) concerns than respondents who were within ages 18-29. While at stage 5 (collaboration) only respondents within ages 40-49 had higher concerns than respondents within ages 18-29.

Highest Educational Level: The ANOVA tests report a significant difference in the Stages of concern at all stages. The results of the Tukey's HSD test indicated that respondents with PhDs. had much higher stage 0 (awareness) concerns than respondents with high school certificates only. Respondents who had PhD degrees had higher stage 1(informational), stage 2 (personal) and stage 5 (collaboration) concerns than respondents with BSc/BAs. Also, respondents who had PhD degrees had higher stage 3 (management) and stage 4 (consequence) concerns than respondents with BSc/BAs and MSc. /Ma degrees. While at stage 6 (refocusing), respondents who had PhD degrees had higher stage concerns than respondents with high school, BSc/BAs and MSc. /Ma degrees.

Duration of work at your university: The ANOVA tests report a significant difference in the Stages of concern at all stages except stage 2 (personal) and 6 (refocusing).

The results of the Tukey's test indicated that respondents who had worked between 6-10years had much higher stage 0 (awareness) concerns than respondents who had worked for 3 years and less. Furthermore, respondents who had worked for more than 20 years or more had higher stage 0 (awareness) concerns than those that had worked for less than 6years. Respondents with 3-6years work experiences at the university had higher stage1 (informational) concerns than respondents who had 1-3years of work experience at the university. Respondents with more than 20years work experience at the university had higher stage1 (informational) concerns than respondents who had 1-3years work experience at the university. Furthermore, respondents who had 3 to 6 years' experience at the universities had higher stage 4 (consequence) and stage 5 (collaboration) concerns than those who had worked at the universities for 1-3years.

Technographic Characteristics

Range of experience with technology in education: The ANOVA tests reported a significant difference in the Stages of concern at all stages except Stage 0 (awareness) and 2 (personal).

Respondents with 3-6years experience in technology had higher stage 1 (informational), stage 3 (management), stage 4 (consequence), stage 5 (collaboration) and stage 6 (refocusing) concerns than respondent with 1-3years experience.

Range of experience with online: The ANOVA tests reported a significant difference in the stages of concerns at all stages except stage 2 (Personal) and 6 (refocusing). The results of the Tukey's HSD test indicated that respondents with 10-20 years' experience online had much higher stage 0 (awareness) concerns than respondents with less than a year's experience. Respondents with more than 1 years' experience with online have higher stage 1 (informational), stage 3 (management), stage 4 (consequence) and stage 5 (collaboration) concerns than respondents with less than 1-year experience with online.

Duration of online professional development attended: The ANOVA tests reported a significant difference only in stage 0 (awareness). The results of the Tukey's HSD test indicated that respondents with 10-20 years' online professional development had much higher stage 0 (awareness) concerns than respondents in other stages with less than a year's experience.

Type of online professional development attended: The ANOVA result showed no statistically significant difference in the concerns of respondents based on the type of online professional development attended.

Level of online use: The ANOVA result showed statistically significant difference in the concerns at all stages except stage 0 (awareness) of respondents at different levels of online use. The results of the Tukey's HSD test showed that experienced users have higher stage 1 (informational), stage 2 (personal), stage 3 (management), stage 4 (consequence), stage 5 (collaboration) and stage 6 (refocusing) concerns than intermediate users.

Summary of Findings

This section reported both quantitative and qualitative data for the study's four main research questions. The SoCQ and BEM instruments were used to study DE adoption in post-secondary institutions in Nigeria. A total of 96 respondents were considered across various institutions in Nigeria including both faculty and administrative staff. The sample consisted of 42% female and 58% male respondents. Descriptive statistics was conducted on the demographic and technographic variables. The technographic analysis revealed that about 90% of the respondents had been exposed to online usage for at least one year and less than 10% have been exposed for up to 10 years. Furthermore, I found that more than 95% of the respondents were either intermediate or experienced online users. In addition, a little over 70% of the respondents had between 1 and 10 years' experience with technology in education while respondents with 10years or more made up less than 20%.

Qualitative and quantitative analysis were conducted on the BEM constructs.

Likert type qualitative analysis was carried out on the constructs. Revised reliability and consistency (after excluding construct questions with Cronbach alphas less than 70%) showed all constructs had reliability of more than 70%. Exploratory factor analysis showed that only 2 of the factors did not load on any construct. However confirmatory factor analysis results revealed that the model only partially fitted the data.

In addition, test for interrelationship between the constructs reported positive effects of constructs on each other that support the diffusion effect concept of (Gilbert, 1978).

The SoCQ was also analyzed using both a Likert type qualitative analysis and quantitative analysis. Correlation between the factors was examined. Although none of the factors had correlations greater than 90%, some of the pairs had correlations less than 0.14, that necessitated the inclusion of KMO and Bartlett's tests to determine the feasibility of an exploratory factor analysis (EFA). The KMO and Bartlett's test results supported the conduction of EFA. Initial 7-factor EFA was conducted of which 1 of the factors did not load on any construct. A 6-factor construct was then conducted which slightly improved the results.

However, confirmatory factor analysis (CFA) indicated only a partial fit.

In the next section, I outlined the implications of the results on the research questions considered in this study.

Summary of Findings on Research Questions

Here a summary of the research findings and discussions on the four research questions from the study is presented. The research questions that guided this study were:

1. What likely BEM factors as perceived by faculty influence DE adoption in postsecondary DE institutions in Nigeria?
2. What likely BEM factors as perceived by administrators influence DE adoption in postsecondary DE institutions in Nigeria?
3. Do faculty and administrators demographic and techno graphic characteristics influence their stages of concerns in adopting online learning?
4. How well does the BEM (PROBE) instrument predict faculty and administrator's stages of concern for DE adoption as scored by the SoCQ?

Research Question 1*:* What likely BEM factors as perceived by faculty influence DE adoption in postsecondary DE institutions in Nigeria?

It was observed that most faculty members felt quite competent in their ability to deliver on their jobs, major BEM factors identified to influence DE adoption are incentives, motive and knowledge and skills (see Table 17).

About a quarter of the faculty, 23.5% believed that work processes and procedures are not defined in such a way as to enhance their performance. Another 29.1% did not feel that their work environment was safe clean, organized and conducive (see Figure 14, Figure 16, Figure 18, Figure 20, Figure 22).

Many faculty, 43.5%, perceived that their motives are not aligned with the incentives in the work environment, while another 32.4% did not believe that the work environment empowered them to do their jobs to the best of their abilities (see Figure 18).

A sizeable number of faculty members perceived that not only did they not have properly documented feedback processes and clearly defined work expectations (20%), they were also convinced that there were inadequate performance measurement and reporting systems to track appropriate activities and performance results (43.7%). This in turn translated to a lopsided rewards system that led to a high perception (46.5%) that the work culture did not reward exceptional performers and that poor performers were not adequately punished. The feeling of insufficient financial (57%) and nonfinancial incentives (61.5%), resulted in the faculty not being motivated nor encouraged to perform excellently on their jobs (Figure 16).

A large proportion of faculty members (33.7%) felt they did not have access to adequate training opportunities and facilities to enable them perform optimally on their jobs (Figure 22).

In summary, the most likely BEM factors that affected DE adoption as perceived by faculty were factors that related to incentives, motive and knowledge and skills.

Research Question 2: What likely BEM factors as perceived by administrators influence DE adoption in postsecondary DE institutions in Nigeria?

It was observed again that most of the administrators also felt quite competent in their ability to perform on their jobs, major BEM factors identified to influence DE adoption by administrators were also tied to incentives, motive and knowledge and skills (see Table 16).

The administrators also perceived that feedback processes and work expectations were not clearly defined (20.30%) and that there were inadequate performance measurement and reporting systems to track appropriate activities and performance results 43.9% (see Figure 15). Again, this translated to a high perception that the work culture did not reward exceptional performers and that poor performers were not adequately punished. The feeling of insufficient financial (62.1%) and nonfinancial (47%) incentives, resulted in the administrators not being motivated nor encouraged to deliver excellently on their jobs (see Figure 21).

A large proportion of administrators (31.7%) were also convinced that there were inadequate training opportunities and facilities to enable them perform optimally on their jobs (see Figure 21).

In summary, the most likely BEM factors that affected DE adoption as perceived by administrators were also factors that related to incentives, motives and knowledge and skills.

Research Question 3: Does faculty and administrators demographic and technographic characteristics influence their stages of concerns in adopting online learning?

The interdependence between each of the demographic and technographic characteristics of each category (faculty and administrators) were explored, in addition, the statistical significance of the influence of each of the characteristics were tested. A Summary of the Findings is as follows:

Demographic characteristics

Gender: It was observed that there was a relationship between gender and dominant stage of concern for both faculty ($p = 0.08$) and administrators ($p = 0.03$). In particular, the ANOVA test showed an overall significant difference in the male and female concerns at Stage 0 (awareness) and 5 (collaboration) (see Table 38).

Age Group: Although the chi-square test revealed no relationship between age group and dominant stages of concern for both faculty (p = 0.35) and administrators (p = 0.17), the Tukey's HSD test indicated that overall, respondents aged 60 and over had much higher stage 0 (awareness) concerns than respondents in other age groups. At stage 1 (Informational), stage 3 (management) and stage 6 (refocusing), respondents who were within ages 40-59 had higher concerns than respondents who were within ages 18-29 (see Table 37).

Highest Educational Level: There was a significant relationship between highest level of education and dominant stages of concern for faculty staff (p = 0.00) while there was no significant relationship between highest level of education for administrators (p = 0.09). The results of the Tukey's HSD test indicated that overall, respondents at the PhD levels had much higher stage 0 (awareness) concerns than respondents with high school certificates only. Respondents who had PhD degrees had higher stage 1 (informational), stage 2 (personal) and stage 5 (collaboration) concerns than respondents with BSc/BAs. Also, respondents who had PhD degrees had higher stage 3 (management) and stage 4 (consequence) concerns than respondents with BSc/BAs and MSc. /Ma degrees. While at stage 6 (refocusing), respondents who had PhD degrees had higher stage concerns than respondents with high school, BSc/Bas and MSc. /Ma degrees (see Table 37).

Duration of Work at Your University: There is a significant relationship between duration of work at the university and dominant stages of concern for faculty (p = 0.00) while there was no significant relationship between duration of work for administrators (p = 0.88). The results of the Tukey's test indicated that respondents who had been working between 6-10years had much higher stage 0 (awareness) concerns than respondents who had been working for 3 years and less. Furthermore, respondents who had been working for more than 20 years or more had higher stage 0 (awareness) concerns than those that had been working for less than 6years. Respondents with 3-6years work experiences at the university had higher stage1 (informational) concerns than respondents who had 1-3years-work experience at the university. Respondents with more than 20years work experience at the university had higher stage1 (informational) concerns than respondents who had 1-3years work experience at the university. Furthermore, respondents who had 3 to 6 years' experience at the universities had higher stage 4

(consequence) and stage 5 (collaboration) concerns than those who had been working at the universities for 1-3years (see Table 37).

Technographic Characteristics

Range of Experience with Technology in Education: There was a significant relationship between range of experience with technology in education and dominant stages of concern for both faculty (p = 0.02) and administrators (p = 0.00). Furthermore, significant differences were recorded at all stages except Stage 0 (awareness) and 2 (personal). Respondents with 3-6years experience in technology had higher stage 1 (informational), stage 3 (management), stage 4 (consequence), stage 5 (collaboration) and stage 6 (refocusing) concerns than respondent with 1-3years experience.

Range of Experience with Online: There was a significant relationship between range of experience with online and dominant stages of concern for both faculty (p = 0.00) and administrators (p = 0.02). The results of the Tukey's HSD test indicated that respondents who had 10-20 years' experience online had much higher stage 0 (awareness) concerns than respondents with less than a year's experience. Respondents with more than 1 years' experience with online had higher stage 1 (informational), stage 3 (management), stage 4 (consequence) and stage 5 (collaboration) concerns than respondents with less than 1-year experience with online (see Table 39).

Duration of Online Professional Development Attended: There was a significant relationship between duration of online professional development attended and dominant stages of concern for both faculty (p = 0.00) and administrators (p = 0.00). The results of the Tukey's HSD test indicated that respondents with 10-20 years' online professional development had much higher stage 0 (awareness) concerns than respondents with less than a year's professional development experience (see Table 39).

Type of Online Professional Development Attended: There was no significant relationship between type of online professional development attended and dominant stages of concern for faculty (p = 0.15) while there was a significant relationship between highest levels of education for administrators (p = 0.00). The ANOVA result showed no statistically

significant difference in the concerns of respondents based on the type of online professional development attended (see Table 39).

Level of Online Use: There was no significant relationship between level of online use and dominant stages of concern for both faculty ($p = 0.80$) and administrators ($p = 0.22$). The results of the Tukey's HSD test showed that experienced users had higher stage 1 (informational), stage 2 (personal), stage 3 (management), stage 4 (consequence), stage 5 (collaboration) and stage 6 (refocusing) concerns than intermediate users.

In summary, demographic factors, gender, highest level of education and Duration of work at the university influenced dominant stages of concern for faculty while for administrators, only gender influenced the dominant stages of concern. It was noteworthy that age did not influence dominant stages of concern in both categories (see Table 38).

Technographic characteristics, range of experience with technology in education, range of experience with online, duration of online professional development attended influenced dominant stages of concern for faculty while, range of experience with technology in education, range of experience with online, duration of online professional development attended and type of online professional development attended did not constitute concerns for administrators. It was observed that the level of online use did not influence the stages of concern in both categories.

In summary, the demographic characteristic age did not influence faculty and administrator's stages of concern on DE adoption. However, faculty's level of education as well as duration of work at the university did influence stages of concern on DE adoption while administrators' level of education did not. Furthermore, duration of work at the institution did not influence stages of concern for DE adoption. I also observed that both faculty and administrator's range of experience with technology in education; range of experience with online use and duration of online professional development attended influenced their stages of concern on DE adoption. However, the type of online professional development attended and the level of online use did not influence stages of concern on DE adoption.

Rearch Question 4: How well does the BEM (PROBE) instrument predict faculty and administrator's stages of concern for DE adoption as scored by the SoCQ?

The discussion here was based on the results of reliability, factor analysis, and structural equation modeling. Apart from "incentives", which had an alpha of 0.65; all the other BEM constructs had overall alphas well over the 70% standard. Furthermore, over 90% of the items successfully loaded unto at least one of the 6 factors considered. However, the structural equation model that was developed based on the constructs did not give a very good fit.

Summary and Transition

In summary, although the BEM or PROBE instrument was reliable in measuring the faculty and administrator's stages of concern for DE adoption, the 6-factor model tested at 95% significant level did not give a good enough fit. Hence, the BEM instrument might not be the best tool for predicting faculty and administrators' stages of concern for DE adoption.

In Chapter 5, I discuss the ramifications of my findings in my conclusions and made recommendations for practice and further research.

Chapter 5: Discussion, Conclusions, and Recommendations.

Introduction

The fusion of the Internet with instructional design, and curricula delivery methods eliminated transactional distance in online learning and produced ubiquitous learning possibilities that are unimaginable to past generations. With this new opportunity also came diverse challenges of how to both harness, harmonize technology and humans in the most effective way to achieve the desired pedagogic outcomes.

In Nigeria, the setting of this study, all the postsecondary DE) institutions, less than a dozen, use print technology to deliver DE courses – technology considered to be in the postal correspondence DE phase (Mckee, 2010, Anderson, 2012).

This study investigated the root causes of the fact that Nigeria's postsecondary DE institutions are stuck in the postal phase against the clamor of majority of the learners (68%) for online delivery (Ofulue, 2011). To understand why online adoption lagged in Nigeria's postsecondary DE institutions, it was important to examine the barriers to DE adoption, and faculty and administrators' concerns about DE adoption. The analytical framework of HPT and CBAM, were assessed for their applicability to this problem.

In this study, the aims were to analyze the root causes of the barriers to effective DE adoption by studying the appropriate organizational and environmental support, the work and the worker support variables and to identify the gaps that prevented DE from being actualized in Nigeria's postsecondary institutions. Because HPT places a premium on the performer and his or her performance environment for optimum outcome, it provided the necessary tools to examine the impact that faculty and administrators have on DE adoption.

The HPT framework was used in this study to analyze and compare the present and the desired levels of individual and organizational performance. I used cause analysis to determine what impact the work environment (information, resources, and incentives) and the people (motives, individual capacity, and skills) had on performance to offer appropriate interventions (Van Tiem, 2004).

The CBAM was a second framework used in this study. The Research and Development Center (RDCTE) created the CBAM as a tool used to determine teachers' attitudes and how they perceived and reacted while implementing educational programs (Hall, George, & Rutherford; 1979). The CBAM was used to determine faculty and administrators' emerging concerns as they participated in DE and technological development programs and practices in their universities (Hall, Wallace, & Dossett; 1973). The CBAM was used for measuring, describing, and explaining the change process that faculty and administrators went through in implementing DE (Hall & Hord, 2011).

Descriptive statistics were used to analyze data collected with the BEM instrument. The mean, standard deviation, frequencies, and percentages were used to assess faculty and administrators' perceptions of the environmental and repertory of behavior support factors that acted as barriers against online adoption in postsecondary DE.

The 35-item, seven-point Likert-type scale Stages of Concern Questionnaire (SoCQ) was scored at the ordinal level. Respondents were requested to select each item from 0 to 7 indicating their level of concerns regarding DE adoption on the following scales: zero (0) represented no significant concerns or readiness for technology adoption, four represented a slight readiness for technology adoption, and a seven represented a very relevant concern or readiness to adopt technology. Response sums, on each of the five item stages of concern subscales represented the intensity of concern at the stage (George, Hall, & Stiegelbauer; 2008). To assess my research questions and the data collected through the SoCQ, statistical analyses included descriptive statistics, correlation analyses, and stepwise multiple regressions. I performed my statistical analyses using SPSS at a probability (p) value of .05 or less for significance testing. Lastly, I attempted to validate the BEM using the more popular SoCQ.

Interpretation of the Findings

In the interpretation sections that follow, I analyzed the findings in the context of the research questions in alignment with the literature reviewed in Chapter 2.

Research Question 1

Faculty who believed that their work processes and procedures were not properly defined to enhance their performance was 23.5%. This finding corroborated, Ofoha & Awe, 2011; Okonkwo, 2012; Adeyemi, 2011 who reported that DE institutions in the setting of the study lacked the organizational structure and the relevant processes needed to accomplish their strategic initiatives. In another DE study with a wider regional coverage, Unwin et al. (2010) concluded that the "softer" dimensions of management, training, and the development of appropriate levels of expertise in e-learning design were the most important factors for the effective implementation of LMS rather than the hard infrastructural constraints that are suggested to hold back the expansion of e-learning in DE.

Moller & Prestera (2001) outlined a proven DE structure for addressing design, policy, best practices, and implementation of a DE program that used the human performance framework, a potential antidote to the current amorphous DE structure perceived by faculty.

Faculty who indicated that their work environment was not safe, clean, organized nor conducive for their work was 29.1%. This finding was confirmed by Okonkwo (2011), in the researcher's assertion that most of the university staffs complained that their offices were hot and stuffy and therefore not conducive for mental engagement.

Gilbert (1978) underscored the importance of work place environment by categorizing all factors of performance that did not relate to the performer or the manager's duties into environmental factors. These included the work process, work procedures, rules, and working conditions such as space, ergonomics, appropriate lighting, temperature, and acceptable noise threshold. These factors must work together to achieve "worthy performance (p. 18)."

About 43.5% of faculty perceived that their motives did not align with the incentives provided in the work environment; another 32.4% were of the opinion that their work environment did not motivate them to perform optimally. Okonkwo (2011) confirmed these findings when she stated that the university was under-staffed, and the available staffs were over-worked; some staffs were assigned to serve in areas where they had neither professional training nor experience.

A sizeable number of faculty (20%) indicated that their institutions had poor feedback processes and vague work expectations. Adeyemi (2011) supported this finding in his report that most of the DE institutions were handicapped by low-level development of communication facilities characteristic of Nigeria. He stated that students did not have seamless access to interact with their teachers and other educational resources. He decried the absence of guidance and counseling services; unstructured course development and presentation platforms, inadequate organizational structure for student evaluation, and motivation as hindrances to the ability of the postsecondary institutions to meaningfully interact with their critical stakeholders.

Mager (1992) advocated the use of measurable objectives to guide performance in order to achieve the expected outcome. According to Mager (1992), objectives are clear unambiguous statements that described a performance, the expected condition for the performance to occur and the criterion or the acceptable performance standard.

Approximately half of the respondents (43.7%) confirmed inadequate performance measurement and reporting systems to track appropriate activities and performance results that encouraged lopsided rewards system. There was also a high perception (46.5%) that the work culture did not reward exceptional performers and that poor performers were not adequately punished. Chyung (2005), observed that both Taylor (1911) and Gilbert (1978) were particular about outcomes, and supported the use of "an exemplary performance" as the yardstick for upgrading typical performance; both authors were intent on producing competent performance in the workforce and both laid the responsibility of workers' poor performance on management. Taylor (1911), advocated the creation of planning departments, staffed with engineers, and charged with the tasks of developing scientific methods for doing work; established goals for worker productivity; established systems of rewards for workers when goals are attained, and training of workers on how to use the methods to meet production goals.

More than half of the respondents (57%) felt that there were insufficient financial and nonfinancial incentives. This finding was confirmed by Okonkwo (2011) and others who asserted that some staffs of the university were denied their annual leave for several years due to under-staffing in the university thereby putting a great deal of pressure on the personnel's'

capabilities (Ofulue, 2011; Dorothy Ofoha, & Awe, 2011). Studies by several researchers (King, 2013 and Lochner, 2014) found lack of financial and nonfinancial incentives as perceived hindrances to optimum performance by respondents.

Majority of the faculty (61.5%) indicated that they were not motivated nor encouraged to deliver excellently on their jobs. This finding aligned with Nijhuis and Collis (2005) who investigated how teachers could be motivated to remain in control of their responsibility under the increased expectations of more effectiveness and efficiency made possible by the demands of technology.

Research Question 2

Like faculties, it was observed that most of the administrators felt competent in their ability to deliver on their jobs, major BEM factors identified to influence DE adoption by administrators were also tied to incentives, motive and knowledge and skills.

A sizeable number of administrators (20.30%) perceived that feedback processes and work expectations were not clearly defined. Another 43.9% of administrators felt there was inadequate performance measurement and reporting systems to track appropriate activities and performance results. Again, this translated to a high perception that the work culture did not reward exceptional performers and that poor performers were not adequately punished. Administrators who felt there were insufficient financial incentives were 62.1%, while 47% felt there were nonfinancial incentives, resulting in the administrators not being motivated nor encouraged to deliver excellently on their jobs.

Administrators who were convinced that there were inadequate training opportunities and facilities to enable them perform optimally on their jobs were about 31.7%. These all support the HPT truism: "Put a good performer in a bad system, and the system will win every time" (Gilbert, 1978; Rummler 2004, p. xiii).

Research Question 3: Interpretation of Stages of Concern

Here, I analyzed faculty and administrators' demographic and techno-graphic variables regarding online learning. Collaboration (Stage 5) and consequence (Stage 4) were categorized as the highest and second highest Stages of Concern for

the largest percentage of respondents (31% and 28%respectively). However, the relative intensity of the stages for faculty, and administrators; the focus of this study, indicated Stage 3 (Management) and stage 2 (Personal) for faculty and Stage 0 (Awareness), Stage 1 (Informational) and stage 2 (Personal) for administrators. Highest intensity concerns at Stage 3 (management) entailed proper planning, consistent and minimum down time in the operation of an online system, including content development and the appropriate methods for content delivery. Ofoha & Awe (2011) & Jegede, (2009) corroborated the above finding in their criticism of the absence of rigor in the workflow, policies and procedures for the design and development of course materials in some surveyed institutions. Management concern was further confirmed by the 23.5% of faculty (BEM survey) who stated that work processes and procedures were not properly defined to enhance performance. Ofoha & Awe, 2011, Okonkwo, 2012 & Adeyemi, 2011 reported that DE institutions in the setting of this study lacked the organizational structure and the relevant processes needed to accomplish strategic initiatives.

Stage 2 intense concerns were also prominent among faculty and this may have indicated lack of confidence on the part of faculty to engage the online platform and the personal consequences it might portend. An online platform required different skill sets and practices over those acquired for dated technology, and faculty might not be willing to invest in the rigors necessary for learning the new innovation (Hall and Hord, 2011).

The Stage 2 concerns were further supported by the 32.4% faculty (BEM survey) respondents that reported lack of motivation from the work environment as reason for less than optimal performance. Okonkwo (2011) agreed that the university was under-staffed, that staffs were over-worked; while other staffs were assigned to serve in areas where they had neither professional training nor experience.

The administrators' highest intensities at Stage 0 (Awareness), Stage 1 (Informational) and stage 2 (Personal) could be interpreted to imply that at the Awareness stage, administrators are hardly interested nor willing to participate in the online program. At Stage 1 or informational concern, administrators were only interested in perusing information about the online

program without the intention of getting involved; while at Stage 2 or Personal, administrators were wary about how the online platform could disrupt the status quo that they were so familiar and comfortable with.

For faculty, all demographic factors (Gender, Highest level of education, Duration of work at the university) excluding "Age" of respondents were observed to influence faculty's stages of concern. For administrators however, only Gender was observed to influence the administrators' stages of concern. Except for "Level of online use" which did not influence faculty or administrators' stages of concern, all other technographic characteristics (Range of experience with technology in education, Range of experience with online, Duration of online professional development attended) were observed to influence faculty members' stages of concern but not administrators.'

Research Question 4

The discussion here was based on the results of reliability, factor analysis and structural equation modeling. Apart from "incentives", which had an alpha of 0.65; all the other BEM constructs had overall alphas well over the 70% standard. Furthermore, over 90% of the items successfully loaded unto at least one of the 6 factors considered. Here we saw that each of the constructs had positive effects on each other. The point was that the diffusion effect could lead to less costly interventions aimed at improving incentives, providing better feedback, or redesigning tools and materials that would indirectly improve individuals' attitudes about work (motives) or help them to learn more of what they needed without engaging in more difficult and expensive interventions. Therefore, it is possible for decision makers to adopt a less costly intervention for DE adoption and still improve individuals' behavioral attitudes in other costlier constructs.

Limitations of the Study

The major limitation of this study was being 8% short of the 159 respondents required by my power calculation. Apathy among respondents was responsible for not doing a good job of completing the survey questionnaire. The poor attitude led to 44% of the returned survey not usable. Additionally, the prior plan of conducting fresh surveys to replace dropouts and questionnaires with missing data were not administratively feasible.

Data for the study was gathered from public postsecondary institutions that provided DE in the South Western states of the country; this process might be scholarly and culturally biased if the results of the study were used to make inferences that covered DE practices across the nation.

Recommendations

To counter the limitations of faculty and administrators' perception as the actual barriers to DE implementation, I highly recommend further studies that used the nine-cell matrix adapted from the Rummler and Brache (1995) framework (table 2) to analyze and validate the significant variables applicable to postsecondary DE institutions in Nigeria.

To ascertain the performance of postsecondary DE institutions across the country, I recommend that similar studies be replicated in the six geopolitical zones of the country to obtain a generalizable result.

Moller and Benscoter (2000) confirmed that an approach akin to organizational alignment analysis was successful in examining the evaluation systems in instructional design. To checkmate the dearth of course material production in Nigeria's DE system (Ofoha & Awe 2011; Jegede, 2009 & Okonkwo, 2011), Instructional Design (ID) programs must be pursued vigorously as a strategic core component of every DE system in the country.

Lastly, to forestall "inbreeding." I recommend that DE performance studies in Nigeria be benchmarked to align its processes, structures and management practices to conform to professional and international standards, such an alignment might reveal other cogent performance gaps in DE as currently practiced in Nigeria.

It is pertinent to mention that previous attempts to discern the root causes of non-performance of DE in postsecondary institutions in Nigeria and indeed, across Africa, only took a cursory look and not a holistic view of DE as a human performance system with vital inter-dependent subsystems that must all be aligned to succeed. The HPT framework ensures that goals are aligned to the organization's mission and has been successfully applied in DE settings to analyze the significant variables applicable to DE institutions. The model recommended in this study (Rummler and Brache, 1995) and used to

determine what is and what should be present to support the goals, structure, and management of DE programs has the potential to realize the vision and mission outcome proposed by the Federal Government in setting up DE in Nigeria.

Implications

Positive Social Change

In one of my many visits to send reminders and retrieve survey materials from my survey respondents, a program coordinator in one of the universities told of how students traveled from Maiduguri and other far corners of Nigeria to the SouthWest university campuses to load study materials onto their Ipads. A journey of over 700 kilometers was both perilous and expensive. The irony was that such an ominous journey with all the associated risks was not necessary in the current DE environment. A proper online platform would support the student with the opportunity and the ease to learn "anywhere." Such a platform would also fulfill the government's founding vision and mission to provide "highly accessible and enhanced quality education … through a comprehensive reach that transcends all barriers … to provide functional, cost-effective, flexible learning, which adds lifelong value to quality education for all who seek knowledge" (NOUN, 2006, p. 4).

DE is most attractive to adult practitioners who do not have the luxury of time to be physically present in a brick-and mortar-learning environment due to work and family commitments. Visits to study centers would be considerably reduced or totally eliminated for families, if proper DE platforms were properly managed and deployed in such institutions. DE institutions would then be fulfilling their mandate to provide ubiquitous, quality and cost effective education to all Nigerians who desire education. Lastly, the literacy rate in our society would grow exponentially and many more Nigerians would have the emerging knowledge and skills to join the global discourse through research and advocacy.

Theoretical, Methodological, and Empirical Implications

This study is expected to contribute to the HPT field by demonstrating that the PROBE instrument is a valid and reliable measure to both describe and predict technology adoption that is applicable in education. The PROBE instrument was previously validated through several studies; however, data from the current study showed a positive relationship between the PROBE instrument and the SoCQ. The current study also offered methodological implications to HPT research, as no other study has used regression analyses to validate the BEM factors with the stages of concerns questionnaire.

No studies in the field have previously compared two different models to account for the same set of data or examined the barriers and concerns of faculty and administrators to DE adoption in the current location using the HPT, and the CBAM. This study expanded the current related literature for both frameworks. The findings have added to the meager adoption research in postsecondary education by providing empirical data on the identified demographic and technographic variables linked to the BEM constructs and the stages of concern respectively.

Recommendations for Practice

The following were recognized as points to pay attention to if DE adoption was to be facilitated in the Nigerian postsecondary institutions:

1. More attention should be paid to ensure that job expectations and outcomes are pre-agreed upon, properly defined and outlined by both faculty and administrators and their corresponding supervisors.

2. Management must develop a working structure for evaluating and rewarding high performers in the universities.

3. A significant improvement in financial and nonfinancial incentives must be seriously considered.

4. Faculty and administrators with more experience and years of service are more concerned about awareness and the availability of information on DE adoption than people with less experience. Indicating that experienced people identify gaps

in awareness as well as non-availability of information as barriers to DE adoption in their institutions. These people should be engaged to identify and document gaps to be filled.

5. A number of administrators, though familiar with online use, were not as familiar with technology in education; therefore, a deliberate campaign to familiarize administrators with technology in education should be strongly pursued.

6. Respondents with few years of work experience had higher collaboration concerns; consequently, developing a peer-mentoring scheme that would enhance effective collaboration especially for younger academic staff is highly recommended.

Conclusion

The "No Difference Verdict" in favor of DE is good news to postsecondary institutions in Nigeria and across developing nations that are responsible for tertiary education of their citizens in "the knowledge age." However, to optimize the benefits of DE programming, Program Directors ought to begin with the realization that postsecondary DE institutions are fundamentally human performance systems, and therefore, must deal with the challenges faced by its work force and the suitability of the work environment. The bad news is that most education policies on DE in developing nations are not evidence-based and therefore do not have the appropriate framework, support structures or the expected outcomes for quality assurance. Therefore, huge amounts of scarce resources are allocated to "bad systems" and the systems worsen with each additional funding.

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Appendix: A: Combined SEDLE and Hersey – Chevelier Modified Survey Instrument

The purpose of the research study is to examine faculty/administrator's perceived impact of environmental supports (information, incentives and resources) and individual repertory factors (knowledge/skills, capacity and motives) on their willingness to adopt online learning. The findings would assist the established institutions to realign their practices where there are performance gaps, as well as provide the roadmap for fresh DE startups.

Please complete this survey and return it to the researcher. Participation is voluntary and there are no punitive consequences for not participating. A consent letter will be part of the survey research package. Survey takers do not have to sign anything to acknowledge consent to participate. Return of completed survey package would be considered consent to participate. There are no potential or anticipated risks associated with completing or not completing the survey. No personal or identifying information is required to complete the survey. Therefore the survey process ensures that participant's information will be treated with the utmost confidentiality.

The survey takes about 30 minutes to complete. Your participation is greatly appreciated.

Equi E. Nwulu

Demographic Information

I have read and understand the participant consent form and agree to voluntarily participate in the research study. Mark your response. Yes ☐ / No ☐

Please provide the following demographic information about yourself. The information you provide will not be used to identify you personally but for reflecting results across groups involved in the study.

Please complete all parts in the questionnaire by marking an X in the appropriate box.

Category Faculty ☐

Adminstrator ☐

Gender Male ☐ / Female

☐

Identify your age group

☐18 – 29 ☐30 – 39 ☐40 – 49 ☐50 – 59 ☐60 or over

What is your highest educational level?

☐High School ☐Some College ☐Associate Degree ☐BA/BS
☐MA/MS ☐PhD ☐None of the above

How long have you worked at your university?

☐Less than 6 months ☐6 to 12 months ☐1 to 3 years ☐3 to 6 years
☐6 to 10 years ☐10 to 20 years ☐More than 20 years

Range of experience with technology in education:

☐Less than 6 months ☐6 to 12 months ☐1 to 3 years ☐3 to 6 years
☐6 to 10 years ☐10 to 20 years ☐More than 20 years

Range of experience with online:

☐Less than 6 months ☐6 to 12 months ☐1 to 3 years ☐3 to 6 years
☐6 to 10 years ☐10 to 20 years ☐More than 20 years

Duration of online professional development attended:

☐Less than 6 months ☐6 to 12 months ☐1 to 3 years ☐3 to 6 years
☐6 to 10 years ☐10 to 20 years ☐More than 20 years

Type of online professional development attended:

☐None, ☐lecture-based, ☐Hands-on,
☐combination of lecture and hands-on, ☐peer coaching or observation.

What is your level of online use:

☐Non-user, ☐Novice, ☐Intermediate, ☐Experienced, ☐Past user

This survey is designed to answer, “What environmental supports and repertory of behavior BEM variables are perceived by faculty/administrators to enhance or hinder their performance?” Please rate how each of the following statements would enhance or hinder your work performance. Your level of agreement or disagreement will be measured against each item in the six variables of information, resources, incentives, motives, capacity and knowledge based on a four point likert scale.

Questionnaire

Please Note:
1. If you feel you do not have enough information to answer a question, please skip it
2. If you would like to comment further on a question, please use the space at the end.

INFORMATION	Strongly Disagree	Disagree	Agree	Strongly Agree
1. I receive clear communications regarding expectations for my performance				
2. I have a clear understanding of the various aspects of my job assignments and priorities for doing them.				
3. I have clear and relevant performance aids to guide my job.				
4. I receive timely, specific feedback regarding my performance.				
5. Provision of adequate work expectations by my supervisor				
RESOURCES				
6. I have the materials that I need to do my job.				
7. I have the right equipment to do my job.				
8. I have the time to do my job				
9. Work processes and procedures are defined in such a way as to enhance my performance				
10. I work in a safe environment, clean, organized, and conducive to excellent performance.				
INCENTIVES	Strongly Disagree	Disagree	Agree	Strongly Agree
11. There are sufficient financial incentives to encourage excellent performance.				
12. There are sufficient nonfinancial incentives present to encourage excellent performance.				
13. There are adequate performance measurement and reporting systems to track appropriate activities and performance results.				
14. My job requires a variety of skills, allows me to identify with the finished project, and allows me autonomy in the way I work.				
15. I have opportunities for career development.				

MOTIVES	Strongly Disagree	Disagree	Agree	Strongly Agree
16. My motives are aligned with the incentives in the work environment.				
17. The work environment empowers me to do my job to the best of my ability.				
18. I was recruited and assigned to a job that matches my skills.				
19. The work environment is positive.				
20. The work culture rewards exceptional performers and punishes poor performance.				
CAPACITY				
21. I have the necessary strength to do my job.				
22. I have the necessary dexterity to do my job.				
23. I have the ability to learn what I need to be successful on the job.				
24. I do not have any emotional limitations that impede my performance.				
25. I was recruited and selected to match the realities of the work situation.				
KNOWLEDGE AND SKILLS				
26. I have the necessary knowledge needed to be successful at my job				
27. I have the necessary skills I need to be successful at my job.				
28. I have the experience needed to be successful at my job.				
29. There is adequate training available to enhance my knowledge and skills.				
30. I have a clear understanding of how my role impact organizational performance.				

0 1 2 3 4 5 6 7 Irrelevant Not true of me now Somewhat true of me now Very true of me now Please circle one number for each item	
31. I am concerned about students' attitudes toward Online Learning.	0 1 2 3 4 5 6 7
32. I now know of some other approaches that might work better than Online Learning.	0 1 2 3 4 5 6 7
33. I am more concerned about another innovation.	0 1 2 3 4 5 6 7
34. I am concerned about not having enough time to organize myself each day in relation to Online Learning.	0 1 2 3 4 5 6 7
35. I would like to help other faculty in their use of Online Learning.	0 1 2 3 4 5 6 7
36. I have a very limited knowledge of Online Learning.	0 1 2 3 4 5 6 7
37. I would like to know the effect of reorganization on my professional status.	0 1 2 3 4 5 6 7
38. I am concerned about conflict between my interests and my responsibilities.	0 1 2 3 4 5 6 7
39. I am concerned about revising my use of Online Learning.	0 1 2 3 4 5 6 7
40. I would like to develop working relationships with both our faculty and outside faculty using Online Learning. 41. I am concerned about how Online Learning affects students.	0 1 2 3 4 5 6 7 0 1 2 3 4 5 6 7
42. I am not concerned about Online Learning at this time	0 1 2 3 4 5 6 7
43. I would like to know who would make the decisions in the new system.	0 1 2 3 4 5 6 7

44. I would like to discuss the possibility of using Online Learning.	0	1	2	3	4	5	6	7
45. I would like to know what resources are available if we decide to adopt Online Learning.	0	1	2	3	4	5	6	7
46. I am concerned about my inability to manage all that Online Learning requires.	0	1	2	3	4	5	6	7
47. I would like to know how my teaching or administration is supposed to change.	0	1	2	3	4	5	6	7
48. I would like to familiarize other departments or persons with the progress of this new approach.	0	1	2	3	4	5	6	7
49. I am concerned about evaluating my impact on students in relation to Online Learning.	0	1	2	3	4	5	6	7
50. I would like to revise the Online Learning approach.	0	1	2	3	4	5	6	7
51. I am completely occupied with things other than Online Learning.	0	1	2	3	4	5	6	7
52. I would like to modify our use of Online Learning based on the experiences of our students.	0	1	2	3	4	5	6	7
53. I spend little time thinking about Online Learning.	0	1	2	3	4	5	6	7
54. I would like to excite my students about their part in this approach.	0	1	2	3	4	5	6	7
55. I am concerned about time spent working with nonacademic problems related to Online Learning.	0	1	2	3	4	5	6	7
56. I would like to know what the use of Online Learning would require in the immediate future.	0	1	2	3	4	5	6	7
57. I would like to coordinate my efforts with others to maximize the effects of Online Learning.	0	1	2	3	4	5	6	7
58. I would like to have more information on time and energy commitments required by Online	0	1	2	3	4	5	6	7

Learning.	
59. I would like to know what other faculty are doing in this area.	0 1 2 3 4 5 6 7
60. Currently, other priorities prevent me from focusing my attention on Online Learning.	0 1 2 3 4 5 6 7
61. I would like to determine how to supplement, enhance, or replace Online Learning.	0 1 2 3 4 5 6 7
62. I would like to use feedback from students to change the program.	0 1 2 3 4 5 6 7
63. I would like to know how my role would change when I am using Online Learning.	0 1 2 3 4 5 6 7
64. Coordination of tasks and people (in relation to Online Learning) is taking too much of my time.	0 1 2 3 4 5 6 7
65. I would like to know how Online Learning is better than what we have now.	0 1 2 3 4 5 6 7

Thank you for completing this survey.

Appendix B

10 August 2014
The Director
Distance Learning Center
University of Ibadan
Ibadan, Oyo-State
Nigeria

Dear Sir,
My name is Equi Nwulu. I am the proprietor of the American Christian Academy here in Ibadan, and a doctoral student at Walden University in Minneapolis, Minnesota. I am conducting a research study and would greatly appreciate the participation of your faculty and administrators.
I am attempting to evaluate the utility of the Human Performance Technology (HTP) framework for developing a plan for improving DE in Nigeria. The goal is to use the Behavior Engineering Model (BEM) and Stages of Concern (SoC) to identify the performance gaps as well as faculty/administrator's concerns that act as barriers to using DE in selected postsecondary DE institutions.
Your faculty and administrators can assist me by giving thirty minutes of their time to complete a hardcopy survey. There will be no attempt to identify anyone who participates or chose not to participate in the study.
The research findings will be based on the survey data and any information that could potentially identify the respondent will be kept confidential.
The results from this study will be summarized and sent to you and the participants while the published hard copy will be housed at Walden and ProQuest Libraries.
Thank you for considering my request.
Sincerely,

Equi E. Nwulu

Appendix: C. Permission to use the PROBE Questionnaire

Equi: You are more than welcome to use my Probe Questions and my updated BEM for your research. I have attached three of my related articles and the Word version of my Performance Analysis Worksheet that may have some value to you. Feel free to contact me with any questions that arise in your research.

My best wishes for your continued success at Walden.

Roger
Roger Chevalier, Ph.D., CPT / Improving Workplace Performance / rdc@sonic.net / www.aboutiwp.com / 707 992 0737
A Manager's Guide to Improving Workplace Performance (AMACOM, 2007) Selected for the 2008 ISPI Award of Excellence

Life is good, just not always what we were expecting.

Appendix: D

AIR
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AIR LICENSE AGREEMENT

To: Equi Emmanual Nwulu (Licensee)
4958 Quail Avenue North
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From: Nancy Reynolds
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Austin, TX 78723

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Date: August 5, 2015

Thank you for your interest in using the **Stages of Concern Questionnaire 075** published by SEDL in 2006 in *Measuring Implementation in Schools: The Stages of Concern Questionnaire* as Appendix A, pages 79-82, written by Archie A. George, Gene E. Hall, and Suzanne M. Stiegelbauer; in the book *Taking Charge of Change*, pages 48-49, written by Shirley M. Hord, William L. Rutherford, Leslie Huling-Austin, and Gene E. Hall, in 2006, with a 2nd printing in 2008, and a revised PDF version uploaded in 2014 and available on demand from Lulu.com; and in electronic format as SEDL's *SoCQ Online* accessible at http://www.sedl.org/pubs/catalog/items/cbam21.html.

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I'm e-mailing you a PDF of this License Agreement. Please print and sign one copy below, indicating that you understand and agree to comply with the above terms, conditions and limitations, and send the original back to me. If you wish to keep a copy with original signatures, please print a second copy, and also sign and return it to me and, after I receive and sign it, I'll return it with both of our signatures to you.

Thank you, again, for your interest in using the **Stages of Concern Questionnaire 075**. If you have questions about AIR's License Agreement, please contact me at 800-476-6861, ext. 6548 or 512-391-6548, or by e-mail at nreynolds@air.org.

Sincerely,

Nancy Reynolds — August 7, 2015

Nancy Reynolds for American Institutes for Research — Date signed

Agreed and accepted:

Signature: Equi — 7 August 2015

Date signed

Printed Name: EQUI NWULU

Appendix: E
Dear Faculty/Administrator,

I am a doctoral student in Educational Technology at Walden University. My research is on faculty/administrator's perception on barriers to Distance Education adoption in Nigeria's public postsecondary institutions. I would like to invite you in the collegiate spirit to assist me in this research.

This survey is a hardcopy version that will provide faculty/administrators the opportunity to communicate their perceptions regarding the root causes of the barriers to enhanced DE adoption in our postsecondary institutions. The goal of the survey is to create a better understanding of the environmental and people support barriers to DE adoption that could influence DE policies.

This survey includes all faculties and administrators working in DE either currently or in the past. As a participant, I would highly appreciate your candid views/opinions regarding the survey items. It will take about 30minutes to complete the survey. The researcher will return to collect the completed survey on ……..2015.

Your responses will be strictly confidential and if you require a copy of the outcome of this survey or if you have other questions, please contact me at: enwul001@waldenu.edu or +2348035394333

Thank you,

Equi E. Nwulu

Appendix: F

Thank you/ 1st Reminder

DATE

Dear Survey Volunteer,

It has been one week since you received a hardcopy of my survey regarding your concerns and barriers to DE improvement in your institution for completion.

If you have completed the survey, please accept my sincere appreciation. However, if you have not completed the survey, kindly do so at your earliest convenience. I sincerely count on your assistance in filling out the survey as your experience and opinions are invaluable for a better understanding of the poor performance of DE in Nigeria and the subsequent attempt to proffer solutions.

I thank you for participating in this study.

Sincerely,

Equi E. Nwulu

Appendix: G

Thank you/ 2nd. Reminder

DATE

Dear Survey Volunteer,

Three weeks have gone by since you received a hardcopy of my survey regarding your concerns and barriers to DE improvement in your institution for completion.

If you have completed the survey, please accept my sincere appreciation. However, if you have not completed the survey, kindly do so at your earliest convenience. I sincerely count on your assistance in filling out the survey as your experience and opinions are invaluable for a better understanding of the poor performance of DE in Nigeria and the subsequent attempt to proffer solutions. If you have any questions, please contact me as follows: enwul001@waldenu.edu or +2348035394333

I thank you for participating in this study.

Sincerely,

Equi E. Nwulu

Appendix: H

Thank you/ 3rd and Final Reminder

DATE

Dear Survey Volunteer,

This is my final reminder to faculty and Administrators yet to return their completed forms. I will return to your campus on ….. of October 2015 for the final collection of the completed surveys regarding your concerns and barriers to DE improvement in your institution.

To all of you that have completed the survey, please accept my sincere appreciation. For those yet to complete the survey, kindly do so as my visit on October will be your last chance to participate in this survey. I am sincerely counting on your assistance in filling out the survey as your experience and opinions are invaluable for a better understanding of the phenomena under study and the subsequent attempt to proffer solutions.

I thank you in advance for participating in this study.

Sincerely,

Equi E. Nwulu

Appendix: I

Flyer

Reminder! Reminder!! Reminder!!!

Dear Faculty/Administrators,

This is a kind reminder to please give 30minutes of your valued time to complete my survey regarding your concerns and barriers to DE improvement in your institution.

Your participation is invaluable to understanding the challenges of DE in our postsecondary institutions. Please be a part of the solution.

Thank you.

Equi E. Nwulu

Appendix: J

Flyer

Final Reminder! Final Reminder!! Final Reminder!!!

Dear Faculty/Administrators,

This is a kind reminder to please give 30minutes of your valued time to complete my survey regarding your concerns and barriers to DE improvement in your institution.

Your participation is invaluable to understanding the challenges of

DE in our postsecondary institutions. Please be a part of the solution.

Thank you.

Equi E. Nwulu

Appendix: K

TELEGRAMS..... TELEPHONE.....

MINISTRY OF HEALTH

DEPARTMENT OF PLANNING, RESEARCH & STATISTICS DIVISION

PRIVATE MAIL BAG NO. 5027, OYO STATE OF NIGERIA

Your Ref. No. .....

All communications should be addressed to the Honorable Commissioner quoting

Our Ref. No. AD 13/ 479/ 989

December, 2015

The Principal Investigator,
The Richard W. Riley,
College of Education and Leadership,
Walden University.

Attention: Equi Nwulu

ETHICAL APPROVAL FOR THE IMPLEMENTATION
OF YOUR RESEARCH PROPOSAL IN OYO STATE

This is to acknowledge that your Research Proposal titled: "An Evaluation of the Utility of the Framework for Developing a Plan for Improving DE in Niogeria" has been reviewed by the Oyo state Review Ethical Committees.

2. The committee has noted your compliance. In the light of this, I am pleased to convey to you the full approval by the committee for the implementation of the Research Proposal in Oyo State, Nigeria.

3. Please note that the National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations, in line with this, the Committee will monitor closely and follow up the implementation of the research study. However, the Ministry of Health would like to have a copy of the results and conclusions of findings as this will help in policy making in the health sector.

4. Wishing You all the best.

(Dr) Abbas Gbolahan
Director, Planning, Research & Statistics
Secretary, Oyo State, Research Ethical Review Committee

Appendix L: Confirmation of Receipt of Community Partner Approval - Equi Nwulu

Inbox x

IRB

IRB <irb@waldenu.edu> 3/16/16

to me, Rob

Dear Mr. Nwulu,

This email confirms receipt of the letters of cooperation for the community research partners. As such, you are hereby approved to conduct research with these organizations.

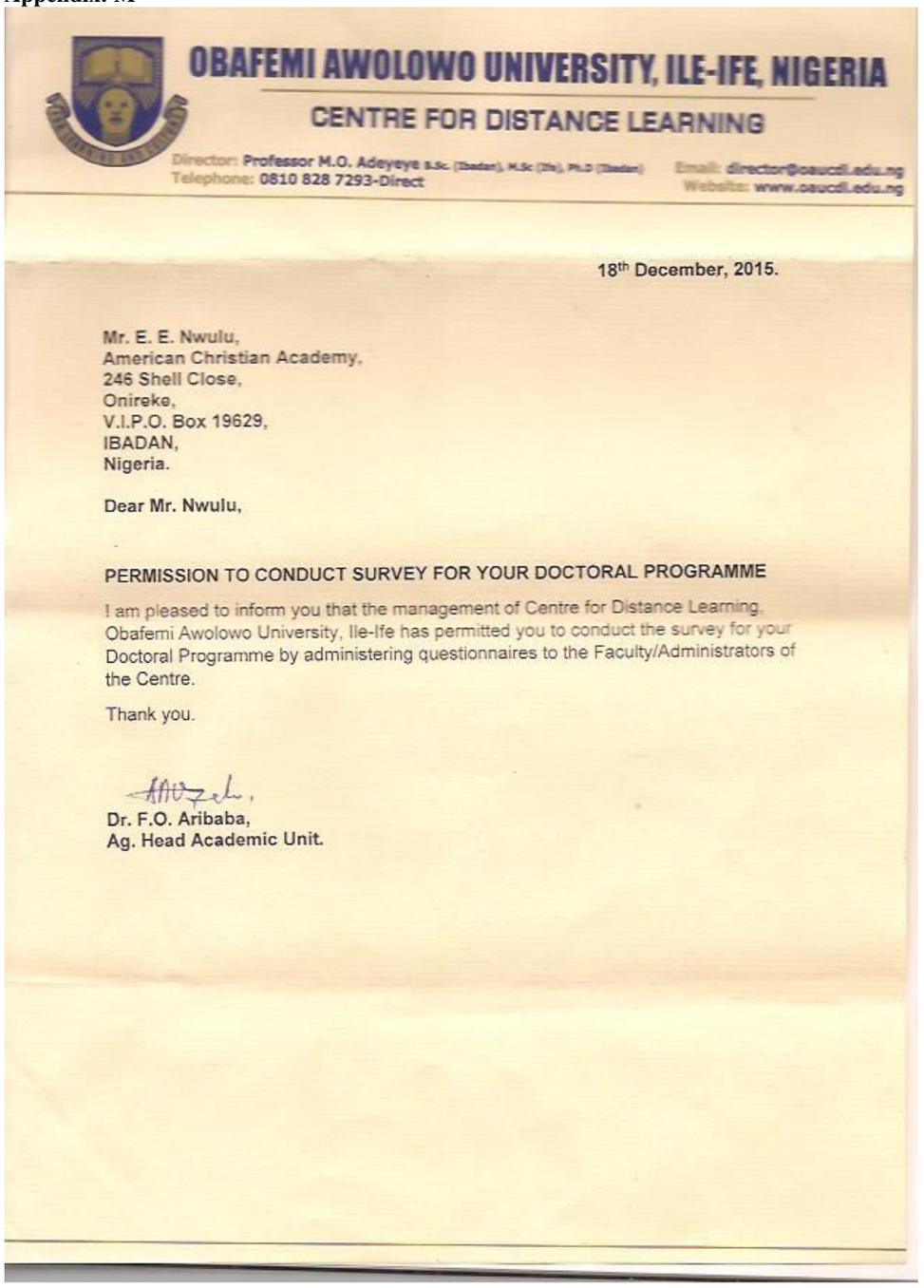
Congratulations!

Libby Munson
Research Ethics Support Specialist, Office of Research Ethics and Compliance

Leilani Endicott
IRB Chair, Walden University

Information about the Walden University Institutional Review Board, including instructions for application, may be found at this link: http://academicguides.waldenu.edu/researchcenter/orec

Appendix: M



OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE, NIGERIA

CENTRE FOR DISTANCE LEARNING

Director: Professor M.O. Adeyeye B.Sc. (Ibadan), M.Sc (Ife), Ph.D (Ibadan) Email: director@oaucdl.edu.ng
Telephone: 0810 828 7293-Direct Website: www.oaucdl.edu.ng

18th December, 2015.

Mr. E. E. Nwulu,
American Christian Academy,
246 Shell Close,
Onireke,
V.I.P.O. Box 19629,
IBADAN,
Nigeria.

Dear Mr. Nwulu,

PERMISSION TO CONDUCT SURVEY FOR YOUR DOCTORAL PROGRAMME

I am pleased to inform you that the management of Centre for Distance Learning, Obafemi Awolowo University, Ile-Ife has permitted you to conduct the survey for your Doctoral Programme by administering questionnaires to the Faculty/Administrators of the Centre.

Thank you.

Dr. F.O. Aribaba,
Ag. Head Academic Unit.

Appendix: N

UNIVERSITY OF IBADAN, IBADAN, NIGERIA

DISTANCE LEARNING CENTRE

Director
PROF. BAYO OKUNADE
B. Sc. (Ibadan), M. Sc., Ph.D. (Ibadan), LLM (Essex)

CABLES & TELEGRAMS: UNIVERSITY OF IBADAN
TELEX 31128NG

Telephone: 0807-759-352-7, 0803-384-436-3
E-mail: director@dlc.ui.edu.ng
bayookunade@gmail.com
Websites: www.dlc.ui.edu.ng

Our Ref: DLC/DR/083

1 December, 2015

Mr. E.E. Nwulu
American Christian Academy
2 4 6 Shell Close
Onireke
U.I.P.O.Box 19629
Ibadan
Nigeria

Dear Mr. Nwulu,

PERMISSION TO CONDUCT SURVEY FOR YOUR DOCTORAL PROGRAMME

I am pleased to inform you that the Management of Distance Learning Centre has agreed that you conduct the survey by administering questionnaires to the faculty/administrators of Distance Learning Centre in the field area for your doctoral research programme.

Thank you.

M.A. Adewumi

DEPUTY REGISTRAR
DISTANCE LEARNING CENTRE
UNIVERSITY OF IBADAN

Appendix: O

Director:
Prof. Ganiyu G. Oke
B.Sc. (Edu), M.A. Ed (Manicie, Indiana), Ph.D. (Lagos)
E-mail: gghills@yahoo.ca
dldirector@unilag.edu.ng
www.unilag.org, www.unilag.edu.ng
Tel.: 08022899159

DISTANCE LEARNING INSTITUTE
UNIVERSITY OF LAGOS
LAGOS, NIGERIA

Ref. N: AD/ADM/DLI/S.1 1st February, 2016

Mr. E. E. Nwulu,
American Christian Academy,
246, Shell Close,
Onireke,
V.I.P.O. Box 19629,
Ibadan,
Oyo State.

Dear Mr. Nwulu,

PERMISSION TO CONDUCT SURVEY

Please the above-named subject matter refers.

I write to inform you that the Director, Distance Learning Institute, University of Lagos has approved that you conduct the survey for your Doctoral Programme by administering questionnaires to the Faculty and Administrators in the Institute.

Thank you.

Yours faithfully,

O.A. Adeyemi-Ademola (Mrs.)
For Deputy Registrar/Institute Secretary

DISTANCE LEARNING INSTITUTE
UNIVERSITY OF LAGOS
AKOKA – YABA.

Appendix: P

NATIONAL OPEN UNIVERSITY OF NIGERIA

(OFFICE OF THE REGISTRAR)

Mrs. Josephine Olasumbo Akinyemi, *FAUA*
B.Sc. (Hons), MPA. MNIM

Headquarters:
14-16 Ahmadu Bello Way,
PMB 80067, Victoria Island,
Lagos, Nigeria.
Mobile: +234 806 310 2206
E-mail: registrar@noun.edu.ng

NOUN/REG/SC/042/VOL.IV

9th March, 2016

Equi E. Nwulu
American Christian Academy
2,4,6 Shell Close
Onireke
U.I.P.O Box 19629
Ibadan
Oyo State

Dear Mr. Nwulu,

RE: LETTER OF INTRODUCTION

Please refer to your letter seeking for permission to collect data for use in your dissertation from the National Open University of Nigeria.

I write to convey approval of your request and to add that this would be of no financial implication on the University.

Thank you.

Omorogieva E. Ileka (Mrs.)
Deputy Registrar (Academic)
For: Registrar

Appendix: Q

Analysis of Variance tables
Stage0 ANOVA

```
            Df Sum Sq Mean Sq F value Pr(>F)
Category    1     61   61.12   1.124  0.292
Residuals   94   5110   54.36

            Df Sum Sq Mean Sq F value Pr(>F)
Gender       1    225  225.28   4.281 0.0413
Residuals   94   4946   52.62

            Df Sum Sq Mean Sq F value  Pr(>F)
Age grp      4    733  183.13   3.754 0.00714 **
Residuals   91   4439   48.78

            Df Sum Sq Mean Sq F value Pr(>F)
Education    4    546  136.38   2.683 0.0364 *
Residuals   91   4626   50.83

            Df Sum Sq Mean Sq F value   Pr(>F)
work dur.    6   1150  191.73   4.244 0.000837 ***
Residuals   89   4021   45.18

                Df Sum Sq Mean Sq F value Pr(>F)
Tech in edu.     6    620  103.38   2.022 0.0709 .
Residuals        89   4551  51.14

       Df Sum Sq Mean Sq F value Pr(>F)
online exper.      6    774  128.92   2.609 0.0224 *
Residuals          89   4398   49.41

                Df Sum Sq Mean Sq F value Pr(>F)
online dev.      6    723  120.50   2.411 0.0332 *
Residuals        89   4448  49.98

                     Df Sum Sq Mean Sq F value Pr(>F)
Online dev. type      4    386   96.56   1.836  0.129
Residuals             91   4785   52.58

            Df Sum Sq Mean Sq F value Pr(>F)
Online use   3    291   96.85   1.825  0.148
Residuals   92   4881   53.05
```

```
Stage 1 ANOVA
            Df Sum Sq Mean Sq F value Pr(>F)
Category    1      4    3.92    0.06  0.807
Residuals   94   6157   65.50

                 Df Sum Sq Mean Sq F value Pr(>F)
Gender           1    224  224.48   3.554 0.0625 .
Residuals        94   5936   63.15

            Df Sum Sq Mean Sq F value Pr(>F)
Age grp      4    772  193.01   3.259 0.0152 *
Residuals   91   5389   59.22

      Df Sum Sq Mean Sq F value Pr(>F)
Education    4    737  184.13   3.089 0.0196 *
Residuals   91   5424   59.61

            Df Sum Sq Mean Sq F value Pr(>F)
work dur    6    964   160.6   2.751 0.0169 *
Residuals   89   5197    58.4

                 Df Sum Sq Mean Sq F value Pr(>F)
Tech in edu       6    849  141.56   2.372 0.0358 *
Residuals        89   5312   59.68

                 Df Sum Sq Mean Sq F value  Pr(>F)
online exper.     6   1337   222.8   4.111 0.00109 **
Residuals         89   4824    54.2

                 Df Sum Sq Mean Sq F value Pr(>F)
online dev.       6    578   96.38   1.536  0.176
Residuals         89   5583  62.73

                 Df Sum Sq Mean Sq F value Pr(>F)
Online dev. type   4    271   67.74   1.047  0.388
Residuals         91   5890   64.73

            Df Sum Sq Mean Sq F value  Pr(>F)
Online use   3    731  243.50   4.125 0.00859 **
Residuals   92   5430   59.03
```

Stage 2 ANOVA

```
            Df Sum Sq Mean Sq F value Pr(>F)
Category    1    140  139.64   2.427  0.123
Residuals   94   5409   57.55

            Df Sum Sq Mean Sq F value Pr(>F)
Gender       1     84   84.29    1.45  0.232
Residuals   94   5465   58.14

            Df Sum Sq Mean Sq F value   Pr(>F)
Age grp      4   1163  290.85   6.035 0.000236 ***
Residuals   91   4386  48.19

            Df Sum Sq Mean Sq F value Pr(>F)
Education    4    685  171.20   3.203 0.0165 *
Residuals   91   4864   53.45

            Df Sum Sq Mean Sq F value Pr(>F)
work dur    6    673  112.10   2.046 0.0677 .
Residuals   89   4876  54.79

                 Df Sum Sq Mean Sq F value Pr(>F)
Tech in edu       6    596   99.29   1.784  0.111
Residuals         89   4953   55.65

                 Df Sum Sq Mean Sq F value Pr(>F)
online exper.     6    477   79.58   1.396  0.225
Residuals         89   5072  56.98

                 Df Sum Sq Mean Sq F value Pr(>F)
online dev.       6    248   41.25   0.693  0.656
Residuals        89   5301   59.57

                 Df Sum Sq Mean Sq F value Pr(>F)
Online dev. type   4    284   70.97   1.227  0.305
Residuals         91   5265   57.86

            Df Sum Sq Mean Sq F value Pr(>F)
Online use   3    627  209.17    3.91 0.0112 *
Residuals   92   4921   53.49
```

```
Stage 3 ANOVA
            Df Sum Sq Mean Sq F value Pr(>F)
Category    1    109  108.75   2.146  0.146
Residuals   94   4764   50.69

            Df Sum Sq Mean Sq F value Pr(>F)
Gender       1    120  119.71   2.367  0.127
Residuals   94   4754   0.57

            Df Sum Sq Mean Sq F value Pr(>F)
Age grp      4    877  219.24   4.992 0.0011 **
Residuals   91   3996   43.92

            Df Sum Sq Mean Sq F value  Pr(>F)
Education    4    872  218.01   4.958 0.00116 **
Residuals   91   4001   43.97

            Df Sum Sq Mean Sq F value  Pr(>F)
work dur    6    869  144.86    3.22 0.00657 **
Residuals   89   4004   44.99

                 Df Sum Sq Mean Sq F value Pr(>F)
Tech in edu       6    768  128.01   2.775 0.0161 *
Residuals        89   4105   46.13

                 Df Sum Sq Mean Sq F value Pr(>F)
online exper.     6    707  117.84   2.517 0.0269 *
Residuals        89   4166   46.81

                 Df Sum Sq Mean Sq F value Pr(>F)
online dev.       6    224   37.30   0.714  0.639
Residuals        89   4649   52.24

                 Df Sum Sq Mean Sq F value Pr(>F)
Online dev. type   4    409  102.29   2.085 0.0891 .
Residuals         91   4464   49.06

            Df Sum Sq Mean Sq F value  Pr(>F)
Online use   3    705  234.86   5.183 0.00236 **
Residuals   92   4169   45.31
```

Stage 4 ANOVA

```
            Df Sum Sq Mean Sq F value Pr(>F)
Category    1    144  143.62   1.699  0.196
Residuals   94   7945  84.52
```

```
            Df Sum Sq Mean Sq F value Pr(>F)
Gender       1    188  188.00   2.237  0.138
Residuals   94   7901  84.05
```

```
              Df Sum Sq  Mean Sq F value  Pr(>F)
Age grp        4   1351    337.7   4.561 0.00211 **
Residuals     91   6738    74.0
```

```
            Df Sum Sq Mean Sq F value  Pr(>F)
Education    4   1217  304.17   4.028 0.00471 **
Residuals   91   6872   75.51
```

```
            Df Sum Sq Mean Sq F value Pr(>F)
work dur    6   1115  185.78   2.371 0.0359 *
Residuals   89   6974  78.36
```

```
                Df Sum Sq Mean Sq F value  Pr(>F)
Tech in edu      6   1386  231.00   3.067 0.00894 **
Residuals        89   6702  75.31
```

```
                 Df Sum Sq Mean Sq F value  Pr(>F)
online exper.    6   1470  244.98   3.294 0.00566 **
Residuals        89   6619  74.37
```

```
                 Df Sum Sq Mean Sq F value Pr(>F)
online dev.      6    899  149.78   1.854 0.0976 .
Residuals        89   7190  80.78
```

```
                 Df Sum Sq Mean Sq F value Pr(>F)
Online dev. type   4    643  160.68   1.964  0.107
Residuals          91   7446   81.82
```

```
            Df Sum Sq Mean Sq F value   Pr(>F)
Online use   3   1670   556.7   7.979 8.74e-05 ***
Residuals   92   6418    69.8
```

Stage 5 ANOVA

```
            Df Sum Sq Mean Sq F value Pr(>F)
Category    1     75   75.33   0.929  0.338
Residuals   94   7624   81.11
            Df Sum Sq Mean Sq F value Pr(>F)
Gender       1    386   386.3   4.966 0.0282 *
Residuals   94   7313   77.8

            Df Sum Sq Mean Sq F value Pr(>F)
Age grp      4    952  237.97   3.209 0.0164 *
Residuals   91   6748  74.15

            Df Sum Sq Mean Sq F value Pr(>F)
Education    4    979  244.80   3.315 0.0139 *
Residuals   91   6721   73.85

            Df Sum Sq Mean Sq F value Pr(>F)
work dur    6   1147  191.16   2.596  0.023 *
Residuals   89   6553  73.63

                Df Sum Sq Mean Sq F value Pr(>F)
Tech in edu      6   1085  180.75   2.432 0.0318 *
Residuals        89   6615  74.33

                 Df Sum Sq Mean Sq F value   Pr(>F)
online exper.     6   1900   316.7   4.861 0.000245 ***
Residuals        89   5799    65.2

                 Df Sum Sq Mean Sq F value Pr(>F)
online dev.       6    733  122.18   1.561  0.168
Residuals         89   6967  78.28

                 Df Sum Sq Mean Sq F value Pr(>F)
Online dev. type   4    674  168.47   2.182 0.0772 .
Residuals         91   7026   77.21

            Df Sum Sq Mean Sq F value   Pr(>F)
Online use   3   1318   439.4   6.335 0.000593 ***
Residuals   92   6381    69.4
```

Stage 6 ANOVA

```
            Df Sum Sq Mean Sq F value Pr(>F)
Category    1     49   49.29   1.019  0.315
Residuals   94   4549   48.39

            Df Sum Sq Mean Sq F value Pr(>F)
Gender       1    160  160.10   3.391 0.0687 .
Residuals   94   4438   47.21

            Df Sum Sq Mean Sq F value   Pr(>F)
Age grp      4    960  240.07   6.006 0.000247 ***
Residuals   91   3638   39.97
            Df Sum Sq Mean Sq F value   Pr(>F)
Education    4    924  231.01   5.722 0.000374 ***
Residuals   91   3674   40.37

            Df Sum Sq Mean Sq F value Pr(>F)
work dur    6    472   78.70   1.698  0.131
Residuals   89   4126   46.36

              Df Sum Sq Mean Sq F value Pr(>F)
Tech in edu    6    705  117.55   2.688 0.0191 *
Residuals     89   3893   43.74

                 Df Sum Sq Mean Sq F value Pr(>F)
online exper.     6    575   95.81    2.12 0.0587 .
Residuals         89   4023   45.20

                 Df Sum Sq Mean Sq F value Pr(>F)
online dev.       6    235   39.19     0.8  0.573
Residuals        89   4363   49.02

                 Df Sum Sq Mean Sq F value Pr(>F)
Online dev. type   4    325   81.28   1.731   0.15
Residuals         91   4273   46.95

            Df Sum Sq Mean Sq F value   Pr(>F)
Online use   3    788  262.83   6.347 0.000585 ***
Residuals   92   3809   41.41
```