STUDENTS’ PERCEPTION ABOUT VIRTUAL CHAT (SYNCHRONOUS) AND DISCUSSION BOARD (ASYNCHRONOUS) COURSE CONTENT DELIVERY

by

George Yiadom-Boakye

An Abstract
of this thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in the School of Technology University of Central Missouri

April, 2011
ABSTRACT

by

George Yiadom-Boakye

Choosing appropriate methods of online delivery has become a problem because, controversies surround the relative learning benefits of synchronous and asynchronous discussions, which are the most common online delivery methods. A study of the perceptions of students about the impact of synchronous (virtual chat) and asynchronous (discussion board) methods of delivery in their contribution to high learning effectiveness was done. An online questionnaire was created and administered to students via blackboard. The test groups were bachelor’s and master’s students and full and part-time working students in the Industrial Management and Technology Programs - University of Central Missouri. A t-Test analysis showed there was no significant difference in the mean perception on learning effectiveness between each groups of students but majority agreed both methods contributed to higher learning effectiveness.
STUDENTS’ PERCEPTION ABOUT VIRTUAL CHAT (SYNCHRONOUS) AND DISCUSSION BOARD (ASYNCHRONOUS) COURSE CONTENT DELIVERY

by

George Yiadom-Boakye

A Thesis
presented in partial fulfillment of the requirements for the degree of
Master of Science
in the School of Technology
University of Central Missouri

April, 2011
STUDENTS’ PERCEPTION ABOUT VIRTUAL CHAT (SYNCHRONOUS) AND DISCUSSION BOARD (ASYNCHRONOUS) COURSE CONTENT DELIVERY

By
George Yiadom-Boakye
April, 2011

APPROVED:

Thesis Chair

Thesis Committee Member

Thesis Committee Member

ACCEPTED:

Chair, School of Technology

Dean, Graduate School

UNIVERSITY OF CENTRAL MISSOURI
WARRENSBURG, MISSOURI
ACKNOWLEDGMENTS

I would like to thank Dr. Ronald Woolsey, the thesis committee chairperson, for making this study possible by sharing with me his expertise and providing his unflinching support. I would like to acknowledge Dr. Suhansa Rodchua and Dr. Jeff Ulmer, thesis committee members for their invaluable guidance and assistance throughout the study. Sincere gratitude also goes to the faculty and staff members, not forgetting my fellow students for their contribution in collecting data for the study. Finally, I would like to thank my family and friends for the support they have provided me in the achievement of my educational goals.
# TABLE OF CONTENTS

LIST OF TABLES.................................................................................................................x

LIST OF FIGURES..............................................................................................................xi

CHAPTER 1: INTRODUCTION..............................................................................................1

  Overview...............................................................................................................................1
  Statement of the Problem.....................................................................................................3
  Purpose of the Study...........................................................................................................5
  Need for the Study...............................................................................................................5
  Research Questions............................................................................................................6
  Hypothesis............................................................................................................................7
  Limitation of the Study........................................................................................................8
  Definition of Terms............................................................................................................8

CHAPTER 2: LITERATURE REVIEW..................................................................................11

  Introduction..........................................................................................................................11
  Learning Management Systems (LMS).............................................................................11
    WebCT-Vista Learning Management System.................................................................13
    Blackboard Learning Management System.................................................................13
    Desire2Learn Learning Management System.............................................................14
  Synchronous E-learning....................................................................................................14
  Asynchronous Communication.........................................................................................17
  Pedagogy............................................................................................................................20
  Learning Styles................................................................................................................22
    Kolb's Learning Theory.................................................................................................23
Statement of Problem……………………………………………………………………59
Purpose of the study……………………………………………………………………59
Research Questions……………………………………………………………………60
Hypothesis………………………………………………………………………………60
Methodology…………………………………………………………………………..61
Results……………………………………………………………………………………63
Conclusion………………………………………………………………………………66
Recommendations………………………………………………………………………67
REFERENCE……………………………………………………………………………69

APPENDICES

A. HUMAN SUBJECT REVIEW APPROVAL AND
   ONLINE QUESTIONNAIRE………………………………………………………80

B. STATISTICAL RESULTS…………………………………………………………86
LIST OF TABLES

1. The Mean Perception and Standard Deviation of the Various Study Groups........................................41

2. t-Test Analysis..........................................................................................................................54
LIST OF FIGURES

1. Frequency Distribution on Bachelor’s and Master’s Degree Students-Virtual Chat………………………………………………………………………………………………………47

2. Frequency Distribution on Bachelor’s and Master’s Degree Students-Discussion Board………………………………………………………………………………………………48

3. Frequency Distribution on Full and Part-Time Working Students-Virtual Chat……………………………………………………………………………………………………50

4. Frequency Distribution on Full and Part-Time Working Students-Discussion Board………………………………………………………………………………………………..52
CHAPTER 1
INTRODUCTION

Overview

The era of information technology has tremendously revolutionized the way we live: whether it is entertainment, communication, business transaction, education and the list goes on. This has resulted in enhanced quality, speed, flexibility, accessibility and efficiency in products and services. Online education which emerged partly due to the continuous improvement in information technology has gained both popularity and significant growth since its inception in the 20th century. The majority of colleges and universities in the U.S and Europe have incorporated some form of online learning into their general curriculum. Curriculum offerings range from hybrid/blended online courses to full online courses; however other institutions utilize different technologies to implement their distance education strategies. Lewis et al. (1999) published a National Center for Education Statistics’ (NCES) survey which found that; distance education programs increased by 72 percent between 1994-95 and 1997-98. An additional 20 percent of institutions surveyed planned to establish distance education programs within three academic years. This means that by now, the 20 percent are in full operation with more and more institutions coming on board. In a 2006/07 survey that was conducted by the NCES and published in 2009; 1175 out of 1448 (81.42 percent) institutions offered any form of distance education and 18.86 percent responded either inapplicable or no. In other results 1129
institutions, representing 77.9 percent of the 1448 institutions offered specifically online courses (National Center for Education Statistics [NCES], 2009).

This rapid growth in online education has created a big market for institutions, corporate entities and individuals. Gartner research services found out that; in only 2003 virtual classroom collaboration software market grew by 19.7 percent in new license sales worldwide amounting to more than $507 million and marked three consecutive years of growth (Clark, 2005).

As online education continues to grow so are the concerns regarding its ability to achieve some of the fundamental educational objectives as the conventional face-to-face instructional delivery method. As the traditional face-to-face course content delivery predominantly involves the instructor standing in front of the student; online course content delivery has been implemented over the years through different methods and technology. The commonly used methods are the blended/hybrid, synchronous and asynchronous (Hrastinski, 2008; Negash & Wilcox, 2008; Johnson, 2008). From the NCES’s 2009 report; 1254 out of 1448 representing 79.70 percent used asynchronous internet-based technologies for instructional delivery at the college level or for credit-granting distance education in 2006/07. In the same report 950 out 1448 representing 65.61 percent used synchronous internet-based technologies for instructional delivery at the college level or for credit-granting distance education in 2006/07 (NCES, 2009). It can therefore be deduced that more institutions prefer the use of asynchronous internet-based technologies to synchronous internet-based technologies. More and more studies need to be done to throw more light on the ongoing debate of the
superiority of either asynchronous or synchronous course content delivery over one another. Notwithstanding this ongoing debate, there are other studies which contend that technology are just tools or vehicles and can therefore be effective only when used in a pedagogically sound way found by Maki & Maki (2003). This study investigated the learning effectiveness and satisfaction of students when asynchronous and synchronous technologies are used to deliver course content. The results will help clarify some of the debatable issues concerning these two methods of delivery.

**Statement of the Problem**

Johnson (2006) indicated that controversy surrounds the relative learning advantages of synchronous and asynchronous text-based discussions. A live chat as a synchronous method of online delivery has been found to pose problems for both instructors and students. Some students sign up for online classes because they need flexible time to schedule their activities (Hines & Pearl, 2004). A percentage of the online students are even workers and parents at the same time and often operate within tight schedules. This set of students may find it difficult to keep up to date on the course activities delivered via the synchronous approach and consequently lead to discouragement on the part of students. As online education increases with students across different geographic regions; obviously, the differences in time zones across geographic borders will also be a major challenge to live chat (synchronous) course delivery. Servonisky, Daniels & Davies (2005) in an article contended that in some cases; faculty members have some of their students serving in the military posted to Iraq, Kuwait or different
countries during their course of study. In a study conducted by Jones et al. (2009), 3 out of 14 students responding to the study expressed that the time of the module (2:00-4:30 pm GMT) was not convenient for them. Among the challenges of the methods of online education will be the ability to achieve a course objective while addressing the needs of students from their geographic location. Considering the relative lack of control over time in synchronous communication, asynchronous method apparently becomes the alternative in addressing the concerns delineated above. However it is very important to clear some of the controversies surrounding the quality of synchronous and asynchronous discussions. That is what this project intends to achieve, by assessing students’ perception about the quality between virtual classroom chat (synchronous) and threaded discussions via discussion board (asynchronous). Sims and Serbrenia (1995) argued that the foundation of learning research must be the individual learner because they are the ultimate focus of any instructional system being utilized. Therefore their experiences, and perspective count in the approaches through which they are taught. The big questions we should ask ourselves as stakeholders in education is; are there any differences between the impact of virtual chat communication and threaded discussion forums on students in terms of what they are suppose to achieve at the end of the course? Soliciting for students’ perception will therefore contribute to the efforts of putting some of these controversies to rest.
Purpose of the Study

The purpose of this study is to investigate the perception of students concerning the impact of synchronous (virtual chat) and asynchronous (discussion board) methods of online delivery in their contribution to high learning effectiveness. This is aimed at clarifying some of the controversies surrounding the quality of synchronous online delivery over asynchronous online delivery and vice versa.

Need for the Study

The findings of this study will be useful to online course content delivery in diverse ways. First of all, it will be helpful in clarifying some of the controversies that surround the merits of asynchronous or synchronous method of delivery over one another.

The results of this study will also aid in the selection of the appropriate method of delivery that is capable of meeting the demands of online students across different geographic regions and time zones. United States’ colleges and universities are rapidly expanding into different geographic locations not by physical presence but via online distance education. Differences exist in time by each region and therefore a method that will help offset this challenge is much needed. There are also U.S military students who are deployed all around the globe who must attend classes online from their locations and hence; the need for a method that can help bridge the gap between the different time zones yet provides an opportunity to engage in real time questions and answers sessions with course instructor and other members of the class. Some online students
pursuing higher education are full time workers and parents. Most of them opted for online courses because they require flexibility to be able to combine studies with work and family. There is therefore the need for tools that can help meet these challenges. This study will provide information on the optimal tool that guarantees the needed flexibility while ensuring enhanced learning effectiveness and satisfaction.

Research Questions

1. Is there a difference in the perception of full-time working students regarding the contribution of virtual classroom chats or threaded discussion forums to learning effectiveness?

2. Is there a difference in the perception of part-time working students concerning the contribution of virtual classroom chats or threaded discussion forums to learning effectiveness?

3. Is there a difference in the perception of bachelor’s degree students as it relates to the contribution of virtual classroom chats or threaded discussion forums to learning effectiveness?

4. Is there a difference in the perception of master’s degree students as it relates to the contribution of virtual classroom chats or threaded discussion forums to learning effectiveness?
Hypothesis

$H_{o1}$: $\mu_1 = \mu_2$ There is no significant difference between the mean numbers full-time working students and part-time working students perceive threaded discussion (Discussion board) in contributing to high learning effectiveness.

$H_{a1}$: $\mu_1 \neq \mu_2$ There is a significant difference between the mean numbers full-time working students and part-time working students perceive threaded discussion (Discussion board) in contributing to high learning effectiveness.

$H_{o2}$: $\mu_3 = \mu_4$ There is no significant difference between the mean numbers full-time working students and part-time working students perceive virtual chat in contributing to high learning effectiveness.

$H_{a2}$: $\mu_3 \neq \mu_4$ There is a significant difference between the mean numbers full-time working and part-time working students perceive virtual chat in contributing to high learning effectiveness.

$H_{o3}$: $\mu_5 = \mu_6$ There is no significant difference between the mean numbers bachelor’s degree and master’s degree students perceive threaded discussion (Discussion board) in contributing to high learning effectiveness.

$H_{a3}$: $\mu_5 \neq \mu_6$ There is a significant difference between the mean numbers bachelor’s degree and master’s degree students perceive threaded discussion (Discussion board) in contributing to high learning effectiveness.

$H_{o4}$: $\mu_7 = \mu_8$ There is no significant difference between the mean numbers bachelor’s degree and master’s degree students perceive virtual chat in contributing to high learning effectiveness.
Hₐ₄: μ₇=μ₈ There is a significant difference between the mean numbers bachelor’s degree and master’s degree students perceive virtual chat in contributing to high learning effectiveness.

**Limitations of the Study**

Perceptions are quite subjective and therefore the results may not be a direct reflection of how synchronous and asynchronous media contribute to learning effectiveness. It should also be noted that, every educational institution offers programs that are a unique blend of its academic environment, institutional policies, culture, demographics, existing technologies and other factors. In view of this, the results may or may not be applicable to other institutions. The sample used in the study was also predominantly exposed to the Black Board learning management system. Different institutions deliver their online programs via different learning management systems. As a result of this, the finding may not be applicable to institutions which use other learning management systems.

**Definition of Terms**

**Asynchronous communication**

Asynchronous communication allows people to connect together at each person’s own convenience and schedule. It enables collaboration over a period of time where by participants located in different places contribute to ongoing discussions at different times (Ashley, 2003). Asynchronous e-learning (online learning method) is commonly facilitated by media such as e-mail and discussion board (Hrastinski, 2008).
Synchronous communication

Synchronous communication enables real-time communication in a “same time-different place” mode. These tools allow people to connect at a single point in time, at the same time. Synchronous tools possess the advantage of being able to engage people simultaneously (Ashley, 2003). Synchronous e-learning (online learning method) is commonly supported by media such as videoconferencing and chat. It has the potential of developing a learning community where learners and teachers experience a more social environment and questions and answers occurring in real time (Hrastinski, 2008).

Discussion board

Discussion board is an asynchronous communication medium for posting and responding to messages. This means that users do not have to be on-line at the same time in order to participate in the discussion. Posts are grouped in ‘threads’ that contain an initial post and all replies. It does not require participants to be logged into the site at the same time (Cornell University [CU], 2008).

Virtual chat

It is a synchronous chat which allows users to interact in a real time from remote locations. Instructors, students, and colleagues can engage in question and answer session

Full-time working students

The Bureau of Labor Statistics stated that employees are categorized as full-time or part-time as defined by their employer. According to current population survey and American Time Use Survey, full-time workers are persons
who work 35 hours or more per week. For the purpose of this study, full–time working students are persons who are working more than 35 hours per week and pursuing a degree (Bureau of Labor Statistics [BLS], 2008).

Part-time working students

According to current population survey and American Time Use Survey, part-time workers are persons who work less than 35 hours per week. For the purpose of this study, part–time working students are persons who are working less than 35 hours per week and pursuing a degree (2008).
CHAPTER 2
LITERATURE REVIEW

Introduction

This chapter comprises findings of studies done on online education and the various long distance course delivery technologies. Internet-based or online learning is increasingly becoming an integral part of teaching and learning in colleges and universities in ways that have never happened before, made possible by the advancement in the World Wide Web and Internet communications. Course content delivery in internet-based learning is achieved by several methods. Some of the methods include the hybrid instruction (face-to-face supplemented by online delivery), asynchronous, synchronous etc. Johnson (2006) found that; studies on two most commonly used methods (synchronous and asynchronous) have revealed some controversies about the superiority of one method over the other. Other studies also suggest that no research has yet proven one method to be better than the other but learning effectiveness may also be influenced by other factors. This chapter therefore focuses on what others have studied in the field of online education.

Learning Management Systems (LMS)

Technology has become an integral part of the educational system contributing to the efforts of enhancing teaching and learning. As the advancement in information technology revolutionizes the way we live and do business; so it is in the way teaching and learning is done. As found by Kulik (1994), research findings caution that the online delivery technology based tools
can be effective in “promoting students understanding if used in a pedagogically sound way”.

The technological software and hardware platform used to support online distance learning and teaching are generally known to be Learning Management Systems (LMS). Other terminologies usually found in the online learning environment are course management systems (CMS) and virtual learning environments (VLE). LMS, CMS and VLE are often used interchangeably but Daniels (2009) indicated that these terms are more region specific, with CMS commonly used in North America and VLE in European countries. The paper however pointed out that, LMS is usually used in the business environment in the training of employees. According to Negash & Wilcox (2008), Learning Management Systems facilitate planning, management, and delivery of e-learning contents. According to the paper, LMS characteristically “maintain a list of student enrollments in courses, manage course access with logins, contain lecture files and lecture notes, support quizzes and assessments, schedule assignments, support e-mail communication, manage threaded discussion forums, facilitate project teams, many-to-many communication among learners and between learners and instructors, and support virtual chats”(2008, p. 5). Others types of LMS have the technological feature for creating assignments, quizzes, providing support for instant messaging, “live” audio and video communication, as well as white boards (2008).

Negash and Wilcox (2008) found thirty five commercial and twelve open source LMS products and there could be more as online education rapidly
expands. Some of the commercially available and open source LMS identified by Negash and Wilcox include ANGEL Learning, Apex Learning, Blackboard, Desire2Learn, eCollege, iCohere, LRN, Moodle, OLAT, Open Campus, Reliant, Sakai, SimplyDigi, Scholar360, WebCT, Bodington, and Claroline.

**WebCT-Vista Learning Management System**

WebCT has been used to augment face-to-face classes; posting lecture notes (PowerPoint slides) and assignments. This platform enables discussion board and e-mail communication between instructor-students and student-student (Negash & Wilcox, 2008).

**Blackboard Learning Management System**

According to David & Deborah (2002), the Blackboard learning system is also designed to support traditional face-to-face classes and long distance education. Mainly for long distance learning; it is capable of synchronous and asynchronous internet based communication through chat rooms and discussion board respectively. Blackboard provides instructors with capabilities for managing the teaching and learning environment. Some of the important capabilities include “content management, content sharing, assessment management, collaboration and communication, assignment and portfolio management and an online grade book” (Larkin & Belson, 2005; Servonsky et al. (2005)). A great and unique feature about the Blackboard technology is the ability for all learners to simultaneously join the same chat room in real time (2005). Mimicking the traditional face-to-face teaching methods is a white board for instructors and students to draw and label pictures and diagrams. Servonsky et al
were of the view that, Blackboard has great utility which has contributed to pushing online education to a different level but has lead to critical recommendations as a result of several years of using this technology at the Hampton University. The study also suggested that future versions of blackboard should be incorporated with a “secure test environment” which can prevent printing or saving of a test. During a virtual chat session, the instructor has the option to turn on and off recording. In the event that, an instructor forgets to record a session; there is no back up or archive for that chat. Therefore it is recommended that automatic recording of virtual chats be the default setting in newer versions of Blackboard and an instant messaging component be added (2005).

Desire2Learn Learning Management System

This system also provides a set of tools for aiding the teaching and learning process in a computer mediated environment. The capabilities built into it are course development, course delivery, communication, collaboration and community building (Doe, 2010). According to Doe, the user-friendliness of its design enables a shortened learning curve and therefore promoting speedy flow of the program. A required and key feature is its built-in evaluation tools for transparent assessment and reporting tools to assist in decisions making.

Synchronous E-learning

Synchronous learning is real time (happening at the same time) interaction between learner-instructor and learner-learner regardless of the physical separation (Shankar, 2007). With this method of communication, students have to
be present at a specific time set by the instructor or academic department. Learners do not have control over what time they want to engage in discussion related to learning. Synchronous learning usually occurs through media such as audio/video conferencing, online chat, listening to live radio broadcast, watching live television broadcast, internet telephony, two-way live satellite broadcast, instant messaging and other emerging technologies (Hrastinski, 2008; Shankar, 2007; Negash, & Wilcox, 2008). Whatever method is used, it requires students and the instructor to meet through the medium selected no matter where each person is located. According to Shankar it has been observed that most students find it difficult to learn without real time communications with their instructors or colleagues. Therefore these people will probably prefer virtual classroom interactions (chat) to threaded discussion forums (discussion board) and e-mail as delivery methods. According to Hrastinski (2008), Robert and Dennis’ cognitive model predicts that synchronous communication increases motivation. This method of communication has been found to show close resemblance to face-to-face communication and consequently, personal participation. Personal participation tends to arouse interest, motivation and convergence on meaning (2009). In a research study conducted to develop, deliver and evaluate an international postgraduate module in e-health by using live interactive webcasting; twelve out of fourteen learners suggested that synchronous methods are mostly associated with interactions and feedback from instructors and their peers (Jones, Maramba, Boulos, & Alexander, 2009). In an online program with students from all over the world, time zone is often a big concern. In the same
research, three out fourteen expressed that the time of the module (2:00-4:30 pm GMT) was not convenient for them (2009).

Johnson (2008) indicated that, no research results have provided any evidence of instructional superiority of synchronous or asynchronous method of computer mediated learning. Research results could not single one out as the reason for high performance or low performance but other factor like motivation, self-regulation and study behavior influenced student’s achievement (2008).

Several works other people have done on synchronous mode of online delivery, point out some of its strengths as well as weaknesses. In a synchronous environment, students and instructors work more collaboratively and experience instant feedback from instructor-student or student-student (Al-Shalchi, 2009; Hrastinski, 2008). Garrison, Terry, & Walter, (2001) published that distance education researches have all emphasized the importance of interaction on the effectiveness of teaching and learning. It helps satisfy the social needs (the sense of belonging to a social community) of instructors and students; which in turn raises the level of motivation, increases personal participation and reduces the degree of isolation (Hrastinski, 2008). Bezuidenhout (2009) also indicated the availability of a social presence is important in the cognitive development of students. In another publication, Piccol, Ahmad, & Ives (2001) added that time flexibility and learner control were also found to be benefits of e-learning environments.
Asynchronous Communication

Asynchronous communication generally refers to electronic bulletin board, discussion board systems and e-mails (Hrastinki, 2008; Palloff, & Pratt, 2001). This type of Internet-based discussion offers students the opportunity to access the bulletin or discussion board at any time and contribute to ongoing discussions without being online at the same time (Hrastinki, 2008; Palloff, & Pratt, 2001). It has therefore become an important component in the implementation of a flexible e-learning system (Hrastinki, 2008). Many universities and academic departments including the University of Central Missouri have used this system to deliver entire degree program or part of the program. Some students sign up for online classes, specifically asynchronous classes because they need flexible time to schedule their activities (Hines & Pearl, 2004; Hrastinki, 2008). A percentage of the online students are workers and parent and often operate within tight schedules. This set of students may find it difficult to keep up to date on the course activities delivered via the synchronous approach and consequently lead to discouragement on the part of students. Again as online education increases with students across different geographic regions; obviously, the differences in time zones across geographic borders will also be a major challenge to live virtual chat (synchronous) course delivery. Servonsky, Daniels & Davies (2005) in an article contended that in some cases; faculty members have some of their students serving in the military posted to Iraq, Kuwait or different country during their course of study. In a study conducted by Jones et al (2009), three out of fourteen students used in the study expressed that
the time of the module (2:00-4:30 pm GMT) was not convenient for them. Among the challenges of the methods of online education will be the ability to achieve a course objective while addressing the needs of students from their geographic location. Unlike synchronous online communication, asynchronous communication does not require students to produce immediate responses and therefore have the luxury of processing information (Hines & Pearl, 2004; Hrastinki, 2008; Al-Schalchi, 2009).

Al-Shalchi (2009) suggested that learners participating in asynchronous discussion have the advantage of having more room to think or research about a topic being studied before responding to a discussion. Meyer (2007) also suggested that asynchronous discussion give students more information and hence more meaningful analysis. According to Murphy (2004), an asynchronous discussion forum is capable of providing all types of communications which are vital to collaborations in an online learning environment. Gilbert and Dabbagh (2005) also indicated that asynchronous discussion can support active learning when students must articulate and negotiate their developing cognitive structure. Murphy (2004) and Thomas (2002) contend that, though asynchronous discussions posses high interactive capacity; it does not always result in cohesiveness or efficient discourse or necessarily promote good learning results but requires student to develop what they describe as ‘purposeful relationships’. That is the intention to do something, achieve something or working together to achieve a common goal they admitted.
Isolation and lack of effective interaction have been found to be some flaws inside the asynchronous communication system (Hrastinki, 2008). Several theories on social interaction, including Vygotsky’s socio-cultural theory emphasizes that full cognitive development requires social interaction (Bezuidenhout, 2009; Hines & Pearl, 2004). Generally, researches on computer mediated learning are divided on the effectiveness of interaction. In one such research, Saunders & Weible (1999) indicated that a report published on Internet Research in 1999; accounting professors who responded to a survey expressed disapproval for the use of internet to deliver courses in their subject area. Eighty two (82%) percent agreed with a statement that student-to-student and instructor –to-student interactions are missing in internet –based classes and therefore making them less valuable to students (Palloff, & Pratt, 2001). On the other side are researches which contend that isolation results because course designers and instructors fail to fully utilize various web resources to create the needed interactivity according to Lynch (2002). Abbey (2000) emphasized that isolation occurs usually because of poor course design. Corroborating the findings of Saunders and Weible are research studies which suggest that students seldom post messages in online discussions published by Guzdial & Turns (2000). Therefore course designers and instructors have the responsibility of sustaining a meaningful discussion. Another challenge to asynchronous online discussions is the tendency of students to respond to new postings; neglecting previous posts leading to premature termination of previous thread discussions.
Pedagogy

According to Conner (2005), pedagogy is literally the art and science of educating children and defines the role of the teacher in education. In a more elaborated explanation on pedagogic model, responsibility is on the teacher to make decisions about what will be learned, the method of learning (teaching style) and when learning should take place (2005). The Educational Resources Information Center (ERIC) considers ‘pedagogy ‘as a synonym for ‘instruction’ (Cullen et al., 2002). Andragogy is a term used to define the art and science of facilitating adult education to distinguish it from pedagogy which is more children oriented (2002). According to this definition, the role of the teacher in proper education cannot be overemphasized. In recent years researcher have discovered that, what really makes a difference and matters more than class size, textbook, teaching method, or course content is the quality of the teacher (Thomas, Wingert, Conant & Register, 2010). They contend that the ability to teach, inspire young minds and control an unruly classroom is innate but can also be taught as is done in teacher education and training (2010).

Theories extensively referred to in children and adult education when discussing pedagogy are Dewey and Lineman theories (Conner, 2005). Teachers have two main functions according to Dewey’s pedagogy model. Firstly, the teacher must provide guidance through the complexities of life and give the young ones opportunity to learn in the natural way by solving relevant problems. Secondly, the teacher must equip the young with the ability to cope adequately with contemporary conditions and to cope with new tasks which an unpredictable
future will bring (Flanagan, 1994). Dewey’s educational theory was much less child-oriented with greater emphasis on a teacher-centered approach (Westbrook, 1993). As traditional pedagogy emphasized the teacher as the knowledge broker and the student as receiver of knowledge, the new pedagogy referred to as critical pedagogy or social constructivism emphasized the student as a learner in a social context and knowledge as produced within a social context (Travers & Decker, 1999).

The need for educational reforms for the improvement in teaching and learning has resulted in a new world of technologically mediated education. The Apple Classroom of Tomorrow (ACOT) is a project launched in the United States about ten years ago to study the productive use of technology. Findings from this project indicated that what transpires inside the classroom is largely the responsibility of the teacher (1999). Studies have shown that online education are comparable to that of face-to-face and due to technology; learning environments have become more democratic as teachers and students have become more respectful of group knowledge, interactions and quality have also increased (Harasim, Starr, Lucio, & Murray, 1996).

Deluca (1992) argued that, for effective technology education to take place teachers must create a balance between teacher-centered and student-centered pedagogies in their technology classrooms. Concerning the balance between teacher-centered and student-centered, Bell (2000) also stated that: learning is a dynamic process, and hence the location of the balance between teacher-directed and student-managed activities are also expected to be dynamic.
In light of this, concerns about integrating e-learning into the pedagogical systems have been the focus of several research studies with terminologies like e-pedagogy (2000). Of course research into new pedagogical systems of online education is very important if we want to improve the quality of teaching and learning in this technology.

There are several research works coming out with new pedagogical models to answer the question of what teaching method works best for online learning. For example Antunes (2008) found that motivating students to be autonomous, sequentially defining collaborative tasks and activities and re-socialization of teachers and students on developing methods and techniques are important in an electronic based learning model.

Learning Styles

A significant amount of research and current literature in education has focused on different learning styles, from kindergarten to the graduate level. Learning style which literally means; the different ways in which people learn information has been defined in many ways. The importance of learning style concept has caught the eyes of educators, parents and the general public (Pashler et al., 2009). Due to the significant attention giving to the importance of learning style, Keef (1988) published that there are agencies like the National Association of Secondary School Principles which has commissioned the construction of a learning style test that will be used across the country. Different learning theories have been proposed over the past three or four decades with the most quoted being the Kolb and Gardener concepts (Muir, 2001).
Kolb’s learning theory

Kolb’s theory describes a four – stage learning cycle or dimensions that individuals pass through in learning and applying concepts. According to this theory, the four learning cycles are concrete experience, reflective observation, abstract conceptualization and active experimentation (Sims & Sims, 1995; Businessballs.com, 2003). Kolb laid down four definitions of individuals based on the combination of two of the four learning cycles or dimensions.

Diverging (concrete experience/reflective observation): Individuals included in this definition are good at generating ideas or brainstorming because they look at things from different perspectives and angles. Characteristically, they prefer to “watch” than “do”, and therefore gather information for problem solving (Sims & Sims, 1995; Businessballs.com, 2003). According to Philbin, Meier & Huffmann (1995), research has found that in a sample of adults comprising a wide range of age and ethnicity, about half of male respondents (48%) preferred assimilator (abstract/reflective) mode, while women respondents were 20%.

R. Sims and Serbrenia J. Sims indicated that the learner is the primary focus of the instructional system. They contend as unfortunate, how many instructors fail to bridge the gap teaching that takes place at the class (macro) level and learning that must take place at the individual (micro) level. This they attributed to the lack of awareness of what constitutes the learning style of the different students in their courses. The paper further indicated that the needs of students are different and changing and therefore courses must be designed to meet the needs of students.
Several literatures have also expressed other categories of student learning styles with the most talk about being visual learning style, auditory learning style and tactile (kinesthetic) learning style (Education Atlas, 2009; Muir, 2001). Others have been found to be logical learning style (mathematics), social learning style (interpersonal) and solitary learning style (intrapersonal).

Visual learning style: This set of learners have been found to learn best when information is presented in visual format. Visual materials can be written, diagrams, videos etc. (Education Atlas, 2009).

Auditory Learning style: This set of individuals learns best by listening or hearing. For example, listening to lecture, an audio tape, or by participating in group discussion. (2009).

Tactile (Kinesthetic) learning Style: This group of people is known to be practical oriented or hands-on-learners. They learn best by physically participating in what is being taught such as laboratory work. (2009). As indicated by Muir (2001), findings from repeated studies have shown that 10% of students learn what they read, 20% of they hear, 30% of what they see, 50% of what they see and hear, 70% of what they say, and 90% of what they say and do.

Learning styles in Computer Mediated Environment

Palloff & Pratt (2001) stated that many technological developments that may help improve online education is being able to accommodate the various student learning styles. For example an auditory learner may feel more comfortable listening to a brief audio clip explaining concepts than reading about it. A visual learner may also do well in an environment that presents mainly text
or uses video clips. A kinesthetic person may prefer activities that require students to conduct research such as searching information on websites (Palloff, & Pratt, 2001, p 7). Kolb & Kolb (2003) emphasized that learning style has an influence on personal academic competence; therefore learners’ interactions with cyber space learning environments should be taken into consideration when constructing a collaborative learning environment. Studies done on learning style in computer mediated environments have shown mixed results (Topcu, 2008). In one of such results Whyte et al. (2005) found strong correlation between students’ learning style and performance in a computer mediated learning environment. Other research findings reported by Wang et al. (2006) are that learning styles are valid predictors of successful interaction in computer mediated learning environments. On the other side of the same coin, some studies published by Larson (1992) found no significant relationship between learning style and its effect on learners in a computer mediated environment. In a similar study to ascertain the impact of learning style on interaction in an asynchronous computer mediated environment, Topcu (2008) found no significance of learning on the interaction.

**Instructional Design**

Sims & Sims (1995) defined instruction as the function of interrelationships between such factors as the organization of the body of knowledge of a discipline, the instructional objectives of a course, the modes of instruction employed by the instructor within the instructional system, and student-based factors such as learning styles, intellectual development, previous
learning, and motivation. That is a summary form; selecting a series of events to facilitate learning.

Instructional design has phases that are both immediate (what should be in the daily content of a specific course) and long-range (involving curricular design at the program-wide level). Systematically designed instruction can greatly affect individual human development (creating an enabling environment for the development of talent to the fullest). Instructional design should be conducted by means of a systematic approach beginning with an analysis of objectives and ending with an evaluated system of instruction to determine if the selected design meets the objectives (1995). Designing instruction is based on the knowledge of how human beings learn because learning is aimed at the student but not the instructor (1995).

Song & Keller (2001) contended that promoting learning in a web-based environment demands that, educators identify components of instruction that increase learning motivation. These factors should be able to motivate learners to pursue and use knowledge or skills acquired in their real lives. An instructional design model that has been widely researched and adopted in so many online learning environments is the Keller’s ARCS Model (1983, 1987) or ARCS Motivational Model. The ARCS Motivation Model consists of four important components for motivating learning. The components comprise; (1) Attention – gaining and sustaining attention to the instructional content; (2) Relevance – refers to learning objectives and future use of learning; (3) Confidence – building
confidence in learning and accomplishment; and (4) Satisfaction – promoting the potential for learning satisfaction (Keller, 1983, 1987).

Amin and Li (2010) in their study contended that distance students more often feel isolated and therefore one way to keep them engaged and feel as being part of group is to involve them in group work.

**Learning Effectiveness**

Learning effectiveness is considered as one of the important five pillars of quality online education identified by the Sloan Consortium (Sloan-C, n.d). According to Sloan-C (2002), learning effectiveness means that learners who complete an online program should receive education that represents the distinctive quality of the institution. That is learning effectiveness of the online program through the institution should equal its other methods such as the conventional face-to-face instruction. Swan is of the view that learning effectiveness must be the first criteria by which the quality of an online education should be judged.

There is a division among educational researchers about whether a teaching medium has a significant impact on learning effectiveness. One school of thought believes that medium has no effect on learning effective but rather “learning effectiveness is a function of good pedagogical practices” (Joy & Garcia, 2000, p.38). Joy and Garcia in their study indicated that, much of the literature have found no significant difference in learning effective between technology-based and conventional teaching media.
Gagne, Briggs & Wager (1992) published in their study; some of the people whose works have advocated instructional method as a determining factor rather than the medium. They include Richard E. Clark, Gagne and colleagues, and Gavriel Salomon (1992). They argued that media do not influence learning but very critical is the instructional method embedded in the structure of the media. The other school of thought is Robert Kozma; who is at the Center for Technology and Learning. According to him media and method are intertwined, playing vital complementary roles. He explains that, media must be designed with very capable tools for a learning process while the instructional method must be designed to leverage the various media tools to enhance learning.

Listed below are some of the research studies relating to the influence of media on learning effectiveness as indicated in Swam (2003):

- Johnson *et al.* comparing the performance of students enrolled in an online graduate course with students taking the same course in a traditional face-to-face environment found no significant difference between the two courses. According to Swan, a blind review process was used to judge quality of major course projects.

- Fallah and Ubell in their study comparing midterm exams scores between online and traditional students at the Stevens Institute of Technology found no significant difference of students’ outcome between the two media.

- Arbaugh also found no significant difference between the grades of traditional and internet-based MBA students.
• Blackley and Curran-Smith in their study of community health nursing students found that online students were able to meet their course objectives and performed as well as their traditional counterparts.

In a similar study, Nesler and Lettus found that students graduating from online programs scored higher ratings on clinical competence than nurses from traditional environment.

Several literary works reveal studies done to measure learning effectiveness based on faculty and student perceptions (2003). Examples of such research include Dobrin’s work, Hoffma’s work, Hiltz among others. In Dobrin’s work, he found that 85 percent of the faculty teaching online courses perceived student learning outcomes were comparable to or better than those found in face-to-face environments. Hoffman and Hiltz used students’ perception to measure learning effectiveness in their study.

**Student Satisfaction**

Student satisfaction is an aspect of online education that has also received significant attention in recent times. Examples of some the studies that have focused on students’ satisfaction include the work of C. Eugene Walker & Erika Kelly, Hsin-Liang Chen & James Patrick Williams, S.R. Palmer & D.M. Holt and other similar works on student satisfaction.

Chiu, Sun, Sun & Ju (2007) indicated that several studies have suggested learner satisfaction to be an important contributor to student retention. Joo, Mimi, & Ha-Jeen (2000) also indicated that student attitudes toward instructional media are related to their motivation and learning outcomes. In this regard, online
instructors and course designers are encouraged to take into account factors that will enhance student satisfaction.

Several factors have been found to contribute to student satisfaction in an online environment. By analyzing the literature one can realized that factors contributing to student satisfaction are generally under two major categories; the online learning environment and the state of the student (individual characteristics). Ramsden and Entwistle (1981) in 1980 established a link between students’ perception of satisfaction with their learning environment and their quality of learning (level of engagement and learning outcomes).

According to Johnston, Killion, & Oomen (2005), literature depicts a wide range of factors that contribute to student satisfaction with online learning, including clarity and relevance of assignments and communication, access to campus based resources, availability of technical support, and, orientation to the course, technology and equipment. All the above delineated factors can be categorized as some of the environmental conditions that can influence the satisfaction of the student.

Johnson also found that individual characteristics affect their behavior and learning perceptions when taking part in online learning (2008). Smart & Cappel (2006) found a characteristic like prior experience with technology; Hollis & Madill identified characteristics such as independent learning, persistence, organization in terms of time management, and self motivation as good for online learning. Gould and Padavano (2006) in their work; ‘7 Ways to Improve Student Satisfaction in Online Courses’ made seven suggestions in improving student
satisfaction. These suggestions are: Post the course syllabus on the web, administer a learning-styles inventory, use team contracts, use a variety of assessments, explain the importance of group work, be flexible, and provide frequent interaction. A study to improve online student satisfaction found that, some factors that may contribute to satisfaction include perceived ‘fairness’ of assessment, personal cognition (self efficacy), computer confidence and locus of control. Others identified based on a survey of 295 online learners from two Taiwanese universities include learner computer anxiety, e-learning course quality, perceived ease of use, and diversity in assessment (Chiu, Sun & Ju, 2007; Sun, Tsai, Finger, Chen, & Yeh, 2008).

Due to the significant impact student satisfaction has on successful online learning it is imperative to consider the factors that contribute satisfaction when choosing a method or developing a course design for online courses.

**Summary**

Internet-based learning takes place predominantly in two distinct modes of text-based discussions; these include real time (Synchronous) and delayed time (asynchronous) communication (Johnson, 2008). Like all other teaching methods, they both have their perceived advantages and disadvantages but several studies have shown evidence that both methods have positively contributed to cognitive and affective outcomes. However there are other studies which have focused on the relative benefits of one communication method over the other. Inglis, Ling, & Joosten (1999) stated that, asynchronous communication provided richer and more inclusive types of interaction. Synchronous communication on the other
hand provided more social interactions; hence providing a greater sense of presence than the asynchronous medium and stimulated spontaneity.

Two schools of thought exist on whether medium influenced learning or not. The first school of thought argued that media do not influence learning but very critical was the instructional method embedded within the medium (Clark, 1994; Gagne, Briggs, & Wager, 1992). The other school of thought lead by Kozma argued that, media and method play complementary roles and therefore media must be designed with very capable tools while instructional methods must be designed to leverage the various media tools to enhance learning. Song & Keller (2001) further added that; promoting learning in a web-based environment requires that, educators identify components of instruction that increase learning and motivation.

Chiu, Sun & Ju (2007) indicated that several studies have suggested learner satisfaction to be an important contributor to student retention. Joo, Mimi, & Ha-Jeen (2000) also indicated that student attitudes toward instructional media are related to their motivation and learning outcomes. In this regard, online instructors and course designers are encouraged to take into account factors that will enhance student satisfaction and learning. Studies done to compare learning effectiveness of asynchronous and synchronous methods of delivery showed no significant difference (Johnson, 2006).
CHAPTER 3

METHODOLOGY

Introduction

As part of the methodology, the researcher described the subjects, research instrument, data collection procedures, and data analysis. Subjects included the number, source and characteristics of the sample. The study also defined the population from which the sample was selected. The research instrument used was an online questionnaire, which provided details and sources of each section. Data collection described all the steps that were followed in gathering data. An analysis of data included a description of the techniques that were used to compile the research findings.

Population and Sample for the Study

The study focused on students who were enrolled in online classes in the Industrial Management (IM) and Technology programs within the School of Technology. These two programs can be completed entirely online and are offered by the School of Technology at the University of Central Missouri. The participants were undergraduate and graduate students who have enrolled in the summer and Fall 2010 classes including IndM 4210 (Industrial Management), IndM 4260 (Organizational Dynamics), IndM 4010 (Current Issues in Industry), EngT 4580 (Quality Systems), and IndM 5230 (Seminar in Industrial Management).
Research Instrument

An online questionnaire was developed to solicit students’ perception to virtual chat and discussion board course content delivery. It was developed largely based on literature review with inputs from professors who have taught in both traditional face-to-face classrooms and online virtual classrooms for several years. The questionnaire was submitted electronically to the Human Subjects of the University of Central Missouri on May 5, 2010 and was approved for use on June 2, 2010. The online questionnaire contained three major sections.

Section one of the instrument was concerned with the understanding of course content when virtual chat and discussion board are used as delivery methods. This section included six questions for the students to rate their level of understanding:

- Answer more questions correctly when queried
- Recalls more of the course content
- Better apply concepts to solving problems
- Better contribute to group discussion on course content
- Course content more clear to me
- Learn more of the course content

A five-point Likert scale was used to measure the understanding of course content ranging from 1 to 5 (Strongly Disagree, Disagree, Neutral, Agree and Strongly Agree).
Section two was concerned with students’ satisfaction when each delivery method mentioned above was used to deliver course content. Under this section were six questions:

- Likely to register for courses delivered through
- Likely to recommend to friends courses delivered through
- Prefers courses delivered through
- Motivated when course content is delivered through
- More convenient for interaction
- More conducive to receiving feedback from instructor

Each question asked students’ perception about their level of satisfaction. A five-point likert scale was also used to measure students’ satisfaction ranging from 1 to 5 (Strongly Disagree, Disagree, Neutral, Agree and Strongly Agree).

There were also two open ended questions which asked students to give a percentage score (between 0 to 100 percent) to their level of understanding and satisfaction when both methods are used to deliver course content.

The last section of the questionnaire was designed to collect demographic data from the online students. There were six question in this section and included some personal, academic and work information.

**Data Collection**

After the questionnaire was approved by the Human Subjects Committee; an online version of the questionnaire was created using the Simple Form & Survey Builder v2.1. This is a website developed by the University of Central Missouri to facilitate the creation of surveys. Questions were entered into the
survey builder which in turn created an online questionnaire based on the specific instructional input.

The survey creation using the Simple Form and Survey Builder v2.1 involved two steps. Step 1: General Survey Information and Step 2: Adding Survey Questions.

In Step 1, the name of the survey was entered which must appear at the top of the survey. The name given to this survey was “Students’ Perceptions about Virtual Chat (Synchronous) and Discussion Board (Asynchronous) Course Content Delivery”. This step also included the regulation of access to the questionnaire. Access was given to everyone without the need for a password or network ID to complete the survey. This was necessary to ensure that students have easy access to the questionnaire and subsequently encouraging students’ participation.

In step 2, actual survey questions were entered into the survey builder and the settings were adjusted to suite the questions asked and the responses desired as can be seen in appendix A. Following the completion of the questionnaire, was activation to make it available online for gathering data. After the activation, a link was automatically created which could be used to access the online questionnaire (http://www.ucmo.edu/surveys/?formID=4470).

Prior to the administration of the online questionnaire, electronic letters were sent to the instructors of the various selected online classes to seek their permission for participation of the online students in their courses. After that, the questionnaire link was made available to participants through Blackboard under
the course area and by e-mail. The participants were limited to undergraduate and graduate students enrolled in online summer and Fall 2010 courses including IndM 4210, IndM 4260, IndM 4010, EngT 4580, and IndM 5230.

Data from returned surveys were automatically collected by the Simple Form & Survey Builder v2.1 after completion and submission. The survey builder automatically processed the raw data and created bar charts and tables for statistical analysis and interpretation.

Data Analysis

Results of the survey were exported from the survey builder into an Excel spreadsheet for analysis. The data was sorted and grouped into four main categories according to the objectives and hypothesis using Excel. The groups were:

- Bachelor’s degree students
- Master’s degree students
- Full-time working students
- Part-time working students

Statistical data of the groups were also entered into the Statistical Package for Social Science (SPSS) version 17 for further analysis. This was chosen to process the data because of its universal acceptance as a computer program for analyzing data. The analysis performed included frequency, mean, standard deviation and independent samples T-test. T-test was used to test the hypothesis because of the comparison between two independent groups on a variable (Sekaran, 2003). According to Sekaran, the t-test compares the means and
standard deviations of two independents groups on a variable and examine if the numerical difference in the two means is significantly different from zero as is postulated by the null hypothesis.

1. Comparison between bachelor’s and master’s students and

2. Comparison between full-time and part-time working students

A 95% level of confidence was established by the researcher to determine whether the observed value was significantly different from the expected value. That is, the researcher was willing to accept a five percent chance of rejecting a null hypothesis (Significant value [sig] < 0.05 means the hypothesis can be rejected).
CHAPTER 4

RESULTS AND DISCUSSION

Introduction

This chapter presents results of the analysis done on survey data obtained from students enrolled in courses from the Industrial Management and Technology programs. These survey results were obtained from students who had enrolled in summer and fall 2010 classes including IndM 4210 (Industrial Management), IndM 4260 (Organizational Dynamics), IndM 4010 (Current Issues in Industry), EngT 4580 (Quality Systems), and IndM 5230 (Seminar in Industrial Management). The first part of the results is the descriptive statistics of the sample while the second part presents the results after testing all four hypotheses.

This chapter also elaborates on the results from the analysis of the survey data and also addresses the research questions. The aim is to clarify some of the controversies that surround the superiority of one method over the other. The areas under discussion included: The perception of bachelor’s and master’s level students on learning effectiveness when discussion board is used to deliver course content, the perception of bachelor’s and master’s level students on learning effectiveness when virtual chat is used to deliver course content, the perception of full-time and part-time working students on learning effectiveness when discussion board is used to deliver course content, the perception of full-time and part-time working students on learning effectiveness when virtual chat is used to deliver course content, the frequency distributions between bachelor’s and master’s level degree students and full-time and part-time working students and finally the t-Test analysis of the four hypothesis presented.
Survey Results

Questions from 29 to 34 were designed to record the demographic characteristics of the sample. According to the response to question 29 which asked students about the type of degree they are working on; with a sample size of 32, 40.6% were working on a bachelor’s degree, 50% were working on a master’s degree and 9.4% were working on doctorate. In question 30 which was pertaining to gender; 78.1% were males while 21.9% were females. Question 31 asked participants about the career they were pursuing and according to the response, half (50%) of them were from the industry, 31.3% were students, 6.3% were from the military, another 6.3% said they belong to other careers not included in the questionnaire list while education and government careers were each 3.1%. The responses to question 32 asked about age showed that, the highest (40.6%) age group were between 21-25, age groups 26-30 and 31-35 each had 15.6%, age groups 36-40, 41-45, 46-50 and those above 50 all had 6.3% each with the age group 16-20 having the least with 3.1%. An important question which was number 33 asked about their employment status and the responses showed that 62.5% of them were full-time workers while 31.3% were part-time workers and 6.3% did not work. The last question on the demographics section was 34 which asked the sample about whether they have had online classes before or if this was their first time in an online course; 81.3% answered ‘Yes’ they had taken online classes before while 18.8% answered that this was their first online course. This implies the majority of the sample had some experience with online classes prior
to responding to the questionnaire. From the demographic data, about 86.67 percent of the master’s students were full-time workers compared to 23.08 percent full-time working undergraduates. In terms of age characteristics, 93.33 percentage of the master’s students were age 26 and above.

Table 1: *The Mean Perception and Standard Deviation of the Various Study Groups*

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>DB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time working students</td>
<td>20</td>
<td>3.3192</td>
<td>0.71864</td>
</tr>
<tr>
<td>Part-time working students</td>
<td>10</td>
<td>2.8983</td>
<td>1.10245</td>
</tr>
<tr>
<td>VC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time working students</td>
<td>20</td>
<td>3.3025</td>
<td>0.87668</td>
</tr>
<tr>
<td>Part-time working students</td>
<td>10</td>
<td>3.3217</td>
<td>1.14644</td>
</tr>
<tr>
<td>DB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor’s</td>
<td>13</td>
<td>2.6474</td>
<td>0.64384</td>
</tr>
<tr>
<td>Master’s</td>
<td>16</td>
<td>3.4656</td>
<td>0.83274</td>
</tr>
<tr>
<td>VC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor’s</td>
<td>13</td>
<td>3.2179</td>
<td>0.89400</td>
</tr>
<tr>
<td>Master’s</td>
<td>16</td>
<td>3.6260</td>
<td>0.91710</td>
</tr>
</tbody>
</table>

Perception on Learning Effectiveness - Discussion Board

Students answering questions from 1 to 6 and 13 to 18 rated their understanding and satisfaction respectively when discussion board was used to deliver course content. The learning effectiveness was then evaluated from the understanding and satisfaction by calculating the average of the two variables. The scale used was a Likert scale (1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree). From Table 1 the mean rate of learning effectiveness by
students pursuing their bachelor’s degree was 2.65 with a standard deviation of 0.64428. That is all students pursuing their bachelor’s degree perceived learning effectiveness of discussion board on a scale of 2.65. On the other hand, students pursuing their master’s degree had a mean of 3.47 and a standard deviation of 0.83239. This implies that the average of how master’s degree students perceived their learning effectiveness when discussion board is used to deliver course content was 3.47 based on the scale defined above. Though there was a difference in the means of the two groups, the difference appears to be insignificant as depicted by the t-Test which will be discussed later in this chapter. Both means (2.65 and 3.47) also appear to be closer to the neutral value which is 3 (neutral) than they are to 2 (disagree) and 4 (agree) respectively. That is both groups of students neither agreed nor disagreed that discussion board contributed to high learning effectiveness. This development might be attributed to factors other than the media such as course design, motivation and learning outcomes. Joo, Mimi & Ha-Jeen (2000) indicated that students’ attitude towards instructional media is related to their motivation and learning outcomes.

The mean perception score of the full-time working students concerning learning effectiveness when discussion board is used to deliver course content was 3.3192 with a standard deviation of 0.71864 while the mean perception score of the part-time working students was 2.8983 with a standard deviation of 1.10245. There was a difference between the mean score of the two groups but this difference was not significant as was shown by the t-Test. The two means also appear to be ‘neutral’ with regards to agreeing or disagreeing. Full-time
workers by virtue of their work schedule and family may experience time constraints and therefore one would have thought that, they would favor discussion board method of course delivery which offered them more time flexibility more than a virtual chat discussion. Part-time workers on the other hand with more time flexibility may favor both methods and therefore expressing neutrality (neutral) as far as discussion board in concerned may not quiet be a deviation from the normal. As Joo, Mimi & Ha-Jeen found; there might have being other important factors such as their motivation and learning outcomes which influenced the perception of the full-time workers and not necessarily the discussion board medium.

As asynchronous discussions are becoming widely used tools in higher learning; it is also imperative that best practices and improved technologies are adopted to enhance its quality. Berry (2008) suggested that asynchronous discussion group size should be retrained to between four and nine students; after a review of several literatures and also from his studies. The study further suggested that:

- Assessment and grading of students’ postings in an asynchronous discussion forum is very essential.
- Instructors need to exercise some level of restrain in the interaction process to avoid dominating the classroom.
- Faculty members need to be trained on how to effectively use asynchronous discussion tools.
Evaluation of asynchronous discussions should be based on defined rubrics.

Asynchronous discussion tools also need to be improved by equipping them with new technologies that will enhance learning experience of learners. An existing technology known as the Voice Thread may be integrated into the various Learning Management Systems to improve learning effectiveness. Instead of a purely text-based discussion; instructors can be able to upload video clips, charts, graphs and other multimedia files to enhance students understanding of certain topics, especially very technical subjects (Bill, n.d). In this era of information technology, visuals have become integral part of students and therefore the ability to engage learning around multimedia content has the potential of stimulating motivation and encouraging participation (n.d).

VoiceThread is an asynchronous discussion method that allows for collaborations using a mixture of text, images, videos and voice comments from students via devices such as microphone or telephone (VoiceThread, 2011). Technologies that allow students to add voice comments to ongoing asynchronous discussions, and also capable of integrating other multimedia files may help to improve the quality of asynchronous delivery methods.

Perception on Learning Effectiveness - Virtual Chat

From questions 7 to 12 and 19 to 24, asked the sample to rate their understanding and satisfaction respectively when virtual chat is used to deliver course content. The learning effectiveness was evaluated from the two parameters. The same scale was used throughout these sets of questions. The
mean perception of the bachelor’s degree students related to learning effectiveness when virtual chat is used to deliver course content was 3.22 with a standard deviation of 0.89457 while the mean perception of master’s degree students was 3.63 and a standard deviation 0.91726. Though there was a difference in the means of the two groups, the difference appears to be insignificant as depicted by the t-Test which will be discussed later in this chapter. Both means (3.22 and 3.63) also fall between 3 (neutral) and 4 (agree). The mean perception of the bachelor’s degree student (3.22) appears to be closer to 3 (neutral) while the mean perception of the master’s degree students appears to be closer to 4 (agree). This indicates that the master’s students seem to be in favor of the virtual chat method of delivery than the bachelor’s students though the difference is insignificant as shown by the t-Test. The picture is the same when master’s students’ perception on virtual chat is compared to their perception on discussion board. It therefore appeared that, the master’s degree students preferred virtual chat methods more than the bachelor’s degree students. The reason could be their tight schedule because, 86.67 percent of the master’s students were full-time workers with majority aged twenty six and above compared to 23.08 percent full-time working undergraduates with majority less than twenty six years old. This set of students usually operates under tight schedule because they may have families to take care of and work full time. There is therefore little time for social interactions and hence lack of the sense of belonging to a social community. Hrastinski (2008) indicated that virtual chats help satisfy the social needs (the sense of belonging to a social community) of instructors and students; which in
turn raises the level of motivation, increases personal participation and reduces the degree of isolation. The desire to belong to a social community might have influenced their perception (3.63) on learning effectiveness when virtual chat was used to deliver course content.

The mean perception of full-time working students and part-time working students was also evaluated. The mean perception score of full-time working students regarding learning effectiveness when virtual chat was used to deliver course content was 3.3025 with standard deviation of 0.87668. The mean perception score of part-time working students on the other hand was 3.3217 and a standard deviation of 1.14644. Similar to the perception on discussion board method; perceptions on virtual chat methods were not different. As already discussed, part-time working students may have a bit of flexibility in their time than full-time working students. Due to this, they may favor both methods provided there is the desired motivation and learning outcome (2008). The perception of the full-time working students on virtual chat may also be attributed to other factors such as the course design but not necessarily the medium. The students’ perception might have also being as a result of another set of factors such as motivation and learning outcomes (Joo, Mimi & Ha-Jeen, 2000). Online students in the Industrial Technology and Industrial Management programs have the opportunity of gaining maximum points of attendance, if they miss a virtual chat by answering the instructor’s questions asked on a topic during the chat session (commonly referred to as ‘chat make-up’).
**Frequency Distributions**

*Figure 1:* Frequency Distribution on Bachelor’s and Master’s Degree Students—Virtual Chat

Figure 1 represents the frequency distribution of the mean perception of learning effectiveness between bachelor’s and master’s degree students when Virtual Chat (VC) is used as a delivery method. As indicated earlier, 13 bachelor’s degree students responded to the questionnaire as well as 16 master’s degree students. From the graph in figure 1, majority of the sample were on the right side of the graph while minority was on the left side. That is, more students either agreed or strongly agreed that discussion board course content delivery contributed to high learning effectiveness. Also, there were more students who answered neutral than students who either disagree or strongly disagree. This gives the indication that, majority of students think virtual chat could have been
the factor which has positively impacted on their understanding and satisfaction (learning effectiveness). This could also be attributed to the presence of other factors such as the quality of instructional design, curriculum design, learning experience, teaching and facilitation (Chao, Saj & Tessier, 2006). Another influential factor could have been the need of belonging to a social group which is one of the strengths of this method of delivery as indicated by Joo, Mimi & Ha-Jeen (2000). Bachelor’s and master’s degree students share a common need of social belongingness and cherish it much.

*Figure 2:* Frequency Distribution on Bachelor’s and Master’s Degree Students-Discussion Board

![Frequency Distribution Between Bachelor's & Master's Degree Students on Learning Effectiveness when DB is Used as a Delivery Method](image)

Figure 2 represents the frequency distribution of the mean perception of learning effectiveness between bachelor’s and master’s degree students when
Discussion Board (DB) is used as a delivery method. As indicated 13 bachelor’s degree students responded to the questionnaire and 16 master’s degree students. Majority of the sample answered neutral, a large number of the sample fell on the right side of the graph in figure 2 while minority was on the left side.

Summarizing the graph, it can be noticed that more students either agreed or strongly agreed discussion board course content delivery contributed to high learning effectiveness. Also there were more students who answered neutral than students who either disagree or strongly disagree. The distribution in figure 2 is quite different from figure 1, in that there was far more master’s degree students than bachelor’s degree students who either agreed or strongly agreed that discussion board method of delivery contributed to high learning effectiveness. On the left side of the graph shows that more bachelor’s degree students than master’s degree students disagreed that, discussion board method of delivery contributed to high learning effectiveness though nobody responded ‘Strongly Disagree’. This development was quite close to the anticipated results between the bachelor’s and master’s student. From the demographic results, majority of the master’s students were full time workers with age 26 and above. These students have to combine work, school and family and therefore operate under tight schedule. Some of them are attracted towards online education due to the need for time flexibility. Characteristically, discussion board offers the luxury of flexible time and this could have probably influenced their position on discussion board as far as learning effectiveness is concerned. Majority of the bachelor’s degree students were traditional students, part-time workers and between the ages 21 and
25. These students may have more flexible schedule compared to the master’s students; this coupled with the desire to fulfill the need for social belongingness might have been the factors which have influenced their perception on discussion board.

*Figure 3:* Frequency Distribution on Full and Part-Time Working Students-Virtual Chat

Figure 3 explains the frequency distribution of the mean perception of learning effectiveness between full-time working and part-time working students when virtual chat is used as a delivery method. There were far more full-time working students; about twenty full-time working students who responded to the questionnaire and ten part-time working students. From the graph, majority of the
sample were on the right side of the graph while very few were on the left side. That is more students either agreed or strongly agreed that virtual chat course content delivery contributed to high learning effectiveness. However, there were few students who answered neutral and students who either disagreed or strongly disagreed as can be seen from the graph. From the graph ‘agree’ received the highest frequency among the full-time working students while ‘neutral’ received the highest frequency among the part time working students. The high frequency on virtual chat course delivery was least likely expected considering the time constraints of full-time working students. The perception that virtual chat contributed to high learning effectiveness by majority of the full-time working students may be attributed to the course design but not necessarily the medium. As part of the course design, online students in the Industrial Technology and Industrial Management programs have the opportunity of gaining maximum points of attendance, if they miss a virtual chat by answering the instructor’s question on a topic during the chat (commonly referred to as “chat make-up”). This factor coupled with the desire to fulfill the need for social belongingness might have contributed to their position on virtual chat method of course delivery.
Figure 4 explains the frequency distribution of the mean perception of learning effectiveness between full-time working and part-time working students when discussion board is used as a delivery method. In all twenty full-time working students also responded to the questionnaire as well ten part-time working students. From the graph, majority of the sample were on the right side of the graph while minority was on the left side as was represented in figure 3. That is more students either agree or strongly agree that discussion board course content delivery contributed to high learning effectiveness. However, there were a
lot more students who answered neutral to discussion board than those who answered neutral to virtual chat when figure 3 and 4 are compared. There were few students who either disagree or strongly disagree as can be seen from the graph. From the graph neutral received the highest frequency among the full-time working students (12 students) and also among the part time-working students (6 students). This graph showed similarity to the graph in figure 3 except that ‘neutral’ turned out to be the highest in frequency among the full-time and part time working students. Both the full-time and part-time working students seems to have the perception that, both virtual chat and discussion board methods of delivery contributed to a high learning effectiveness. Therefore, this suggests that other factors could have accounted for the high learning effectiveness which may include those already discussed above such as the course design, curriculum design, learning experience, teaching and facilitation (Chao, Saj & Tessier, 2006).
The t-Test Analysis

Table 2: t-Test Analysis

<table>
<thead>
<tr>
<th>Groups</th>
<th>Medium</th>
<th>F</th>
<th>Sig.</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full time &amp; Part time working Students</td>
<td>Discussion board</td>
<td>1.361</td>
<td>0.253</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Virtual Chat</td>
<td>0.392</td>
<td>0.536</td>
<td>28</td>
</tr>
<tr>
<td>Bachelor’s &amp; Master’s degree Students</td>
<td>Discussion board</td>
<td>2.317</td>
<td>0.140</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Virtual Chat</td>
<td>0.001</td>
<td>0.975</td>
<td>27</td>
</tr>
</tbody>
</table>

t-Test Analysis on Full-Time and Part-Time Working Students

Hypothesis One

Hypothesis one tests whether full-time and part-time working students perceived differently on threaded discussion (Discussion board) and its contribution to high learning effectiveness. In Table 2, the F statistic for Discussion Board between full-time & part-time working students is 1.361. The observed significance level is 0.253 which is greater than the alpha (α) value (0.05), so the null hypothesis is not rejected, and the alternate is not tenable. The mean perception on Discussion board and its contribution to high learning effectiveness is the same for full-time and part-time working students.
Hypothesis Two

Hypothesis two tests whether full-time and part-time working students perceived differently on virtual chat and its contribution to high learning effectiveness. In Table 2, the F statistic for virtual chat between full-time & part-time working students is 0.392. The observed significance level is 0.536 which is greater than the alpha (α) value (0.05), so the null hypothesis is not rejected, and the alternate is not tenable. The mean perception on virtual chat and its contribution to high learning effectiveness is the same for full-time and part-time working students.

Hypothesis Three

Hypothesis three tests whether bachelor’s and master’s degree students perceived differently on threaded discussion (Discussion board) and its contribution to high learning effectiveness. In Table 2, the F statistic for Discussion Board between bachelor’s & master’s degree students is 2.317. The observed significance level is 0.140 which is greater than the alpha (α) value (0.05), so the null hypothesis is not rejected, and the alternate is not tenable. The mean perception on Discussion board and its contribution to high learning effectiveness is the same for bachelor’s degree and master’s degree students.

Hypothesis Four

Hypothesis four tests whether bachelor’s and master’s degree students perceived differently on virtual chat and its contribution to high learning effectiveness. In Table 2, the F statistic for virtual chat between bachelor’s &
master’s degree students is 0.001. The observed significance level is 0.975 which is greater than the alpha (\(\alpha\)) value (0.05), so the null hypothesis is not rejected, and the alternate is not tenable. The mean perception on virtual chat and its contribution to high learning effectiveness is the same for bachelor’s degree and master’s degree students.

**Summary**

The lack of significant difference in the mean of all four hypotheses nearly agrees with Clark’s argument that media do not determine learning effectiveness but the methods of instruction are the most critical factors (Gagne, Briggs & Wager, 1992). Clark argued that media do not influence learning but very critical is the instructional method embedded in the structure of the media. In the same way the lack of significant difference in the mean of all the hypotheses can be said to agree with Kozma’s argument. Robert Kozma argued that, certain media capabilities are important for learning and therefore instructional methods must be designed to take advantage of the various media tools to enhance learning. Both Clark and Kozma in their arguments alluded to the fact that instructional method is critical in ensuring an effective learning process. Though this study was intended to measure the relative benefits of synchronous and asynchronous methods of course delivery; the findings however showed no significant difference between the two methods in contributing to learning effectiveness. Other factors might have influenced the perception of the sample and not necessarily the media used.
CHAPTER 5
SUMMARY, CONCLUSION, AND RECOMMENDATION

Summary

Online education which has emerged due to the continuous improvement in information technology has gained both popularity and significant growth since its inception in the 20th century. Majority of colleges and universities in the U.S and Europe have incorporated some form of online learning into their general curriculum. They range from hybrid/blended online courses to full online courses; however other institutions utilize different technologies to implement their distance education strategies. Lewis et al. (1999) published an NCES’s survey which found that; distance education programs increased by 72 percent between 1994-95 and 1997-98. Additional 20 percent institutions surveyed planned to establish distance education programs within three years. This means that by now, the 20 percent are in full operation with more and more institutions coming on board. In a 2006/2007 survey that was conducted by the National Center for Education Statistics (NCES) and published in 2009; 1175 out of 1448 (81.42 percent) institutions offered any form of distance education and 18.86 percent responded either inapplicable or no. In another results 1129 institutions, representing 77.9 percent out of the 1448 institutions offered specifically online courses (National Center for Education Statistics [NCES], 2009).

This rapid growth in online education has created a big market for institutions, corporate entities and individuals. Gartner research services found out that; in only 2003 virtual classroom collaboration software market grew by 19.7
percent in new license sales worldwide amounting to more than $507 million and marked three consecutive years of growth (Clark, 2005).

As online education continues to grow so are the concerns regarding its ability to achieve some of the fundamental educational objectives like the conventional face-to-face instructional delivery method. As the traditional face-to-face course content delivery predominantly involves the instructor standing in front of the student; online course content delivery has been implemented over the years through different methods and technology. The commonly used methods are the blended/hybrid, synchronous and asynchronous (Hrastinski, 2008; Negash & Wilcox, 2008; Johnson, 2008). From the NCES’s 2009 report; 1254 out of 1448 representing 79.70 percent used asynchronous internet-based technologies for instructional delivery at the college level or for credit-granting distance education in 2006/07. In the same report 950 out 1448 representing 65.61 percent used synchronous internet-based technologies for instructional delivery at the college level or for credit-granting distance education in 2006/07 (NCES, 2009). It can therefore be deduced that more institutions prefer the use of asynchronous internet-based technologies to synchronous internet-based technologies. More and more studies need to be done to throw more light on the ongoing debate of the superiority of either asynchronous or synchronous course content delivery over one another.
Statement of problem

Some students sign up for online classes because they need flexible time to schedule their activities (Hines & Pearl, 2004). A percentage of the online students are even workers and parents at the same time and often operate within tight schedules. Also as online education increases with students across different geographic regions; obviously, the differences in time zones across geographic borders will also be a major challenge to live chats (synchronous) course delivery. Asynchronous course content delivery could be the ideal approach to meet these challenges. However, according Johnson (2006) controversy surrounds the relative learning advantages of synchronous and asynchronous text-based forms of discussion. Therefore it is very important to clear some of the controversies surrounding the quality of synchronous and asynchronous discussions. That is what this project intends to achieve, by assessing students’ perception about the quality between virtual classroom chat (synchronous) and threaded discussions via discussion board (asynchronous).

Purpose of the study

The purpose of this study was to investigate the perception of students about the impact of synchronous (virtual chat) and asynchronous (discussion board) methods of online delivery in their contribution to high learning effectiveness. This was aimed at clarifying some of the controversies surrounding the superior quality of synchronous online delivery over asynchronous online delivery and vice versa.
Research questions

1. Is there a difference in the perception of full time working students about the contribution of virtual classroom chat or threaded discussion to learning effectiveness?

2. Is there a difference in the perception of part time working students about the contribution of virtual classroom chat or threaded discussion to learning effectiveness?

3. Is there a difference in the perception of bachelor’s degree students about the contribution of virtual classroom chat or threaded discussion to learning effectiveness?

4. Is there a difference in the perception of master’s degree students about the contribution of virtual classroom chat or threaded discussion to learning effectiveness?

Hypothesis

H₀₁: μ₁ = μ₂ There is no significant difference between the mean numbers full-time working students and part-time working students perceive threaded discussion (Discussion board) in contributing to high learning effectiveness.

H₀₂: μ₃ = μ₄ There is no significant difference between the mean numbers full-time working students and part-time working students perceive virtual chat in contributing to high learning effectiveness.
\(H_{o3}: \mu_5 = \mu_6\) There is no significant difference between the mean numbers bachelor’s degree and master’s degree students perceive threaded discussion (Discussion board) in contributing to high learning effectiveness.

\(H_{o4}: \mu_7 = \mu_8\) There is no significant difference between the mean numbers bachelor’s degree and master’s degree students perceive virtual chat in contributing to high learning effectiveness.

**Methodology**

The study focused on students within the Industrial Management (IM) and Industrial Technology (IT) programs within the School of Technology who have enrolled in online classes. The questionnaire comprised two main parts; section on demographics and a section on measuring students’ perception on learning effectiveness when discussion board or virtual chat is used to deliver course content. A five-point likert scale was used to measure the understanding of course content and satisfaction of media ranging from 1 to 5 (Strongly Disagree, Disagree, Neutral, Agree and Strongly Agree).

After the questionnaire was approved by the Human Subjects Committee; an online questionnaire was created using the Simple Form & Survey Builder v2.1. This is a website developed by the University of Central Missouri to facilitate the creation of online surveys. Questions were entered into the ‘survey builder’ which in turn created an online questionnaire based on the specific instructional input.

The survey building using the Simple Form and Survey Builder v2.1 involved two steps. Step 1: General Survey Information and Step 2: Adding
Survey Questions. In Step 1, the name of the survey was entered which must appear at the top of the survey. The name given to this survey was “Students’ Perceptions about Virtual Chat (Synchronous) and Discussion Board (Asynchronous) Course Content Delivery”. This step also included the regulation of access to the questionnaire. Access was given to everyone without the need for a password or network ID to complete the survey. This was necessary to ensure that students have easy access to questionnaire and subsequently encouraging students’ participation.

In step 2, actual survey questions were entered into the ‘survey builder’ and the settings were adjusted to suite the questions asked and the responses desired as can be seen in appendix A. Following the completion of the questionnaire, was activation to make it available online for gathering data. After the activation, a link was automatically created which could be used to access the online questionnaire (http://www.ucmo.edu/surveys/?formID=4470).

Prior to the administration of the online questionnaire, electronic letters were sent to the instructors of the various selected online classes to seek for their permission and participation of the online students in the study. After that, the questionnaire link was made available to participants through Blackboard under the course area and e-mail. The participants were undergraduate and graduate students who have enrolled in online summer 2010 and Fall 2010 classes including IndM 4210, IndM 4260, IndM 4010, Engt 4580, and IndM 5230.

Data from returned surveys were automatically collected by the Simple Form & Survey Builder v2.1s after completion and submission. The ‘survey
builder’ automatically processed the raw data and creates bar chat for statistical analysis. Statistical Package for Social Science (SPSS) version 17 was used for Statistical analysis. This was chosen to process the data because of its universal acceptance as a computer program for analyzing data. T-test was used to test the hypothesis because of the comparison between two independent groups on a variable at a 95% level of confidence (Sekaran, 2003 p. 403).

Results

The mean rate of learning effectiveness by students pursuing their bachelor’s degree was 2.65 with a standard deviation of 0.64428. On the other hand, students pursuing their master’s degree had a mean of 3.47 and a standard deviation of 0.83239. The mean perception of the full-time working students about the learning effectiveness when discussion board is used to deliver course content was 3.3192 with a standard deviation of 0.71864. The mean perception of the part-time working students about learning effectiveness was 2.8983 with a standard deviation of 1.10245.

The mean perception of the bachelor’s degree students about the learning effectiveness when virtual chat is used to deliver course content was 3.22 and a standard deviation of 0.89457 while the mean perception of master’s degree students was 3.63 and a standard deviation 0.91726. The mean perception of full-time working students about learning effectiveness when virtual chat is used to deliver course content was 3.3025 and standard deviation of 0.87668. The mean perception of part-time working students on the other hand was 3.3217 and a standard deviation of 1.14644.
From the first graph there were more students who either agree or strongly agree that discussion board course content delivery contributed to high learning effectiveness. Also there were more students who answered neutral than students who either disagree or strongly disagree. From the second graph, there were more students who either agreed or strongly agreed that discussion board course content delivery contributed to high learning effectiveness. Also there were more students who answered neutral than students who either disagree or strongly disagree. From the third graph there were more students who either agree or strongly agree that virtual chat course content delivery contributed to high learning effectiveness. However, there were few students who answered neutral and students who either disagree or strongly disagree as can be seen from the graph. From the graph ‘agree’ received the highest frequency among the full-time working students while ‘neutral’ received the highest frequency among the part-time working students. From the fourth graph there were more students who either agreed or strongly agreed that discussion board course content delivery contributed to high learning effectiveness. However, there were a lot more students who answered neutral to discussion board than those who answered neutral to virtual chat when figure 3 and 4 are compared. There were few students who either disagree or strongly disagree as can be seen from the graph. From the fourth graph neutral received the highest frequency among the full-time working students (12 students) and also among the part-time working students (6 students).

The first hypothesis (H₀₁: μ₁ = μ₂) tests whether there is a significant difference in the perception of full-time and part-time working students about
threaded discussion (Discussion board) and its contribution to high learning effectiveness. The F statistic for Discussion Board between full-time & part-time working students is 1.361. The observed significance level is 0.253 which is greater than the alpha (α) value (0.05), so the null hypothesis is not rejected, and the alternate is not tenable. The mean perception on Discussion board and its contribution to high learning effectiveness is the same for full-time and part-time working students.

The second hypothesis (Ho2: µ3 = µ4) tests whether there is a significant difference in the perception of full-time and part-time working students about virtual chat and its contribution to high learning effectiveness. The F statistic for virtual chat between full-time & part-time working students is 0.392. The observed significance level is 0.536 which is greater than the alpha (α) value (0.05), so the null hypothesis is not rejected, and the alternate is not tenable. The mean perception on virtual chat and its contribution to high learning effectiveness is the same for full-time and part-time working students.

The third hypothesis (Ho3: µ5=µ6) tests whether there is a significant difference in the mean perceptions of bachelor’s degree and master’s degree students about threaded discussion (Discussion board) and its contribution to high learning effectiveness. The F statistic for Discussion Board between bachelor’s & master’s degree students is 2.317. The observed significance level is 0.140 which is greater than the alpha (α) value (0.05), so the null hypothesis is not rejected, and the alternate is not tenable. The mean perception on Discussion board and its
contribution to high learning effectiveness is the same for bachelor’s degree and master’s degree students.

Hypothesis four (H₀₄: μ₇=μ₈) tests whether there is a significant difference in the mean perception of bachelor’s degree and master’s degree students about virtual chat and its contribution to high learning effectiveness. The F statistic for virtual chat between bachelor’s & master’s degree students is 0.001. The observed significance level is 0.975 which is greater than the alpha (α) value (0.05), so the null hypothesis is not rejected, and the alternate is not tenable. The mean perception on virtual chat and its contribution to high learning effectiveness is the same for bachelor’s degree and master’s degree students.

The lack of significant difference in all four hypotheses agreed with Johnson’s studies which indicated that; no research results have provided any evidence of instructional superiority of synchronous or asynchronous method of computer mediated learning. That is no research results could single out asynchronous or synchronous method of delivery as the reason for high performance or low performance but other factor like motivation, self-regulation and study behavior might influenced student’s achievement (2008).

Conclusion

The analysis of the survey data indicated that, majority of students shared the same perception on learning effectiveness when discussion board or virtual chat is used as a delivery method. Both bachelor’s degree students and master’s degree students either agreed or strongly agreed that both methods contributed to a high learning effectiveness. In the same way, the full-time and part-time
working students also agreed or strongly agreed that both methods contributed to high learning effectiveness. This was further confirmed by the t-Test analysis which showed there was no significant difference between the means of how bachelor’s- master’s students and full-time – part-time working students perceived about both methods. In a nut shell, students did not exhibit a clear cut preference for one particular method as far as learning effectiveness and achievements are concerned. They all perceived that synchronous (virtual chat) and asynchronous (discussion board) had equal and positive impact on learning effective.

The above conclusion is supported by the findings of Johnson (2006) that, no research results have provided any evidence of instructional superiority of synchronous or asynchronous method of computer mediated learning. Research result could not single one out as the reason for high performance or low performance but other factor like motivation, self-regulation and study behavior influenced student’s achievement (2006). Another factor which may have influenced their decision which has been reported by Joo, Mimi & Ha-Jeen (2000) might be the learning outcomes. Other important factors include quality of instructional design, curriculum design, learning experience, teaching and facilitation (Chao, Saj & Tessier, 2006).

**Recommendations**

The findings of this research are generally going to benefit colleges and universities who offer or are planning to offer online education. As the world becomes a global village, colleges and universities like businesses try to penetrate
the global market. There is also keen competition to increase enrolment and have the edge over other institutions. The key to achieving this feat lies in an institution’s ability to provide programs and in a way that will meet the needs of students who find themselves in different geographic locations. Since the study found no significant difference between the utilization of discussion board and virtual chat in terms of learning effectiveness; it is recommended that

- Institutions aiming to expand enrolment of online students across geographic regions should adopt an extensive use of asynchronous method of delivery since it provides time flexibility and student control. According to Piccoli, Ahmad, & Ives (2001) time flexibility and learner control are found to be benefits of e-learning environments. Hines & Pearl (2004) indicated that some students sign up for online classes because they need flexible time to schedule their activities.

- Institutions which offer online postgraduate programs should adopt an extensive use of asynchronous method of delivery since most of them are full-time workers and have family responsibilities. This will serve as a source of motivation because of the inherent time flexibility and student control. Majority of the working population will be encouraged to pursue higher education because of the ability to combine studies with work and family.
REFERENCE


APPENDIX A
HUMAN SUBJECT REVIEW APPROVAL AND
ONLINE QUESTIONNAIRE
6/2/2010

George Yiadom-Boakye  
404 Grover St  
Apt. A  
Warrensburg, MO/64093

Dear George Yiadom-Boakye,

Your research project, 'A Study of Asynchronous (Discussion board) and Synchronous (Virtual Chat) Online Deliveries: Students' Perception on their Impact on Learning Effectiveness and Satisfaction', was approved by the Human Subjects Review Committee on 6/2/2010.

Please note that you are required to notify the committee in writing of any changes in your research project and that you may not implement changes without prior approval of the committee. You must also notify the committee in writing of any change in the nature or the status of the risks of participating in this research project.

Should any adverse events occur in the course of your research (such as harm to a research participant), you must notify the committee in writing immediately. In the case of any adverse event, you are required to stop the research immediately unless stopping the research would cause more harm to the participants than continuing with it.

At the conclusion of your project, you will need to submit a completed Project Status Form to this office. You must also submit the Project Status Form if you wish to continue your research project beyond its initial expiration date.

If you have any questions, please feel free to contact me at the number above.

Sincerely,

Wendy Geiger, Ph.D.  
Associate Dean of The Graduate School  
geiger@urmo.edu

cc: Ronald Woolsey
Students’ Perceptions about Virtual chat (Synchronous) and Discussion Board (Asynchronous) Course Content Delivery

Thank you for your time and effort in taking part in this survey. Your participation is valued greatly.

Please rate the following items as they apply to your UNDERSTANDING of course content using the scale below each item when DISCUSSION BOARD is used to deliver an entire course contents.

1. Answers more questions correctly when queried.

| 12920 | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |

2. Recalls more of the course content

| 12921 | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |

3. Better apply concepts to solving problems

| 12922 | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |

4. Better contribute to group discussions on course content

| 12923 | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |

5. Course content is more clear to me

| 12924 | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |

6. Learn more of the course content

| 12925 | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |

Please rate the following items as they apply to your UNDERSTANDING of course content using the scale below each item when VIRTUAL CHAT is used to deliver an entire course contents.

7. Answers more questions correctly when queried.

| 12928 | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |

8. Recalls more of the course content
<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Strongly Agree</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Strongly Agree</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Strongly Agree</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Strongly Agree</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Strongly Agree</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Strongly Agree</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Strongly Agree</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Strongly Agree</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please rate the following items as they apply to your level of SATISFACTION using the scale below each item when DISCUSSION BOARD is used to deliver an entire course content.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.</td>
<td>Better apply concepts to solving problems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Better contribute to group discussions on course content</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Course content is more clear to me</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Learn more of the course content</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Likely to register for courses delivered through DISCUSSION BOARD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Likely to recommend to friends courses delivered through DISCUSSION BOARD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Prefers courses delivered through DISCUSSION BOARD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Motivated when course content is delivered through DISCUSSION BOARD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>More convenient for interactions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>More conducive to receiving feedback from instructors</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Please rate the following items as they apply to your level of SATISFACTION using the scale below each item when VIRTUAL CHAT is used to deliver an entire course content.

19. Likely to register for courses delivered through VIRTUAL CHAT
   [ ] Strongly Disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly Agree

20. Likely to recommend to friends courses delivered through VIRTUAL CHAT
   [ ] Strongly Disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly Agree

21. Prefers courses delivered through VIRTUAL CHAT
    [ ] Strongly Disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly Agree

22. Motivated when course content is delivered through VIRTUAL CHAT
    [ ] Strongly Disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly Agree

23. More convenient for interactions
    [ ] Strongly Disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly Agree

24. More conducive to receiving feedback from the instructor
    [ ] Strongly Disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly Agree

What percentage (0%-100%) of a course content is likely to be RETAINED when each of the delivery methods below are used to deliver course content?(enter the percentage in the textbox below)

25. Discussion board-------------------
    [ ]

26. Virtual chat-----------------------
    [ ]

What is the percentage (0%-100%) of your SATISFACTION when each of the methods below is used to deliver course content? (enter the percentage in the textbox below)

27. Discussion board-------------------
    [ ]

28. Virtual chat-----------------------
    [ ]
For each of the questions below, select an answer that is applicable to you.

29. Degree working on
   - [ ] Associate
   - [ ] Bachelor's
   - [ ] Master's
   - [ ] Doctorate

30. Gender
   - [ ] Male
   - [ ] Female

31. Type of career
   - [ ] Student
   - [ ] Industry
   - [ ] Service
   - [ ] Education
   - [ ] Military
   - [ ] Government
   - [ ] Other

32. Age
   - [ ] 16-20
   - [ ] 21-25
   - [ ] 26-30
   - [ ] 31-35
   - [ ] 36-40
   - [ ] 41-45
   - [ ] 46-50
   - [ ] Above 50

33. Work Schedule
   - [ ] Full time
   - [ ] Part time
   - [ ] Do not work

34. Is this your first on-line course (Internet-based distance learning)?
   - [ ] Yes
   - [ ] No
APPENDIX B

STATISTICAL RESULTS
<table>
<thead>
<tr>
<th>%Understanding Using Discussion board</th>
<th>%Understanding</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>10.00</td>
<td>3</td>
<td>9.4</td>
<td>9.7</td>
<td>9.7</td>
</tr>
<tr>
<td></td>
<td>20.00</td>
<td>2</td>
<td>6.3</td>
<td>6.5</td>
<td>16.1</td>
</tr>
<tr>
<td></td>
<td>25.00</td>
<td>1</td>
<td>3.1</td>
<td>3.2</td>
<td>19.4</td>
</tr>
<tr>
<td></td>
<td>30.00</td>
<td>1</td>
<td>3.1</td>
<td>3.2</td>
<td>22.6</td>
</tr>
<tr>
<td></td>
<td>35.00</td>
<td>1</td>
<td>3.1</td>
<td>3.2</td>
<td>25.8</td>
</tr>
<tr>
<td></td>
<td>40.00</td>
<td>1</td>
<td>3.1</td>
<td>3.2</td>
<td>29.0</td>
</tr>
<tr>
<td></td>
<td>45.00</td>
<td>1</td>
<td>3.1</td>
<td>3.2</td>
<td>32.3</td>
</tr>
<tr>
<td></td>
<td>50.00</td>
<td>6</td>
<td>18.8</td>
<td>19.4</td>
<td>51.6</td>
</tr>
<tr>
<td></td>
<td>60.00</td>
<td>4</td>
<td>12.5</td>
<td>12.9</td>
<td>64.5</td>
</tr>
<tr>
<td></td>
<td>65.00</td>
<td>2</td>
<td>6.3</td>
<td>6.5</td>
<td>71.0</td>
</tr>
<tr>
<td></td>
<td>70.00</td>
<td>2</td>
<td>6.3</td>
<td>6.5</td>
<td>77.4</td>
</tr>
<tr>
<td></td>
<td>75.00</td>
<td>2</td>
<td>6.3</td>
<td>6.5</td>
<td>83.9</td>
</tr>
<tr>
<td></td>
<td>80.00</td>
<td>1</td>
<td>3.1</td>
<td>3.2</td>
<td>87.1</td>
</tr>
<tr>
<td></td>
<td>90.00</td>
<td>2</td>
<td>6.3</td>
<td>6.5</td>
<td>93.5</td>
</tr>
<tr>
<td></td>
<td>95.00</td>
<td>1</td>
<td>3.1</td>
<td>3.2</td>
<td>96.8</td>
</tr>
<tr>
<td></td>
<td>100.00</td>
<td>1</td>
<td>3.1</td>
<td>3.2</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing</td>
<td>Total</td>
<td>31</td>
<td>96.9</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>System</td>
<td>Total</td>
<td>32</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### The Percentage of Satisfaction - Discussion Board

#### %Satisfaction Using Discussion Board

<table>
<thead>
<tr>
<th>%Satisfaction</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>.00</td>
<td>1</td>
<td>3.1</td>
<td>3.2</td>
<td>3.2</td>
</tr>
<tr>
<td>10.00</td>
<td>4</td>
<td>12.5</td>
<td>12.9</td>
<td>16.1</td>
</tr>
<tr>
<td>20.00</td>
<td>2</td>
<td>6.3</td>
<td>6.5</td>
<td>22.6</td>
</tr>
<tr>
<td>30.00</td>
<td>2</td>
<td>6.3</td>
<td>6.5</td>
<td>29.0</td>
</tr>
<tr>
<td>35.00</td>
<td>2</td>
<td>6.3</td>
<td>6.5</td>
<td>35.5</td>
</tr>
<tr>
<td>40.00</td>
<td>3</td>
<td>9.4</td>
<td>9.7</td>
<td>45.2</td>
</tr>
<tr>
<td>50.00</td>
<td>1</td>
<td>3.1</td>
<td>3.2</td>
<td>48.4</td>
</tr>
<tr>
<td>60.00</td>
<td>4</td>
<td>12.5</td>
<td>12.9</td>
<td>61.3</td>
</tr>
<tr>
<td>65.00</td>
<td>1</td>
<td>3.1</td>
<td>3.2</td>
<td>64.5</td>
</tr>
<tr>
<td>70.00</td>
<td>1</td>
<td>3.1</td>
<td>3.2</td>
<td>67.7</td>
</tr>
<tr>
<td>75.00</td>
<td>2</td>
<td>6.3</td>
<td>6.5</td>
<td>74.2</td>
</tr>
<tr>
<td>80.00</td>
<td>4</td>
<td>12.5</td>
<td>12.9</td>
<td>87.1</td>
</tr>
<tr>
<td>85.00</td>
<td>1</td>
<td>3.1</td>
<td>3.2</td>
<td>90.3</td>
</tr>
<tr>
<td>90.00</td>
<td>1</td>
<td>3.1</td>
<td>3.2</td>
<td>93.5</td>
</tr>
<tr>
<td>100.00</td>
<td>2</td>
<td>6.3</td>
<td>6.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>96.9</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

#### Missing

<table>
<thead>
<tr>
<th>System</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>System</td>
<td>1</td>
<td>3.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### %Understanding Using Virtual Chat

<table>
<thead>
<tr>
<th>Valid</th>
<th>%Understanding</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>.00</td>
<td>1</td>
<td>3.1</td>
<td>3.1</td>
<td>3.1</td>
<td>3.1</td>
</tr>
<tr>
<td>2.00</td>
<td>1</td>
<td>3.1</td>
<td>3.1</td>
<td>6.3</td>
<td></td>
</tr>
<tr>
<td>10.00</td>
<td>2</td>
<td>6.3</td>
<td>6.3</td>
<td>12.5</td>
<td></td>
</tr>
<tr>
<td>20.00</td>
<td>2</td>
<td>6.3</td>
<td>6.3</td>
<td>18.8</td>
<td></td>
</tr>
<tr>
<td>30.00</td>
<td>1</td>
<td>3.1</td>
<td>3.1</td>
<td>21.9</td>
<td></td>
</tr>
<tr>
<td>50.00</td>
<td>3</td>
<td>9.4</td>
<td>9.4</td>
<td>31.3</td>
<td></td>
</tr>
<tr>
<td>55.00</td>
<td>2</td>
<td>6.3</td>
<td>6.3</td>
<td>37.5</td>
<td></td>
</tr>
<tr>
<td>60.00</td>
<td>5</td>
<td>15.6</td>
<td>15.6</td>
<td>53.1</td>
<td></td>
</tr>
<tr>
<td>65.00</td>
<td>1</td>
<td>3.1</td>
<td>3.1</td>
<td>56.3</td>
<td></td>
</tr>
<tr>
<td>70.00</td>
<td>2</td>
<td>6.3</td>
<td>6.3</td>
<td>62.5</td>
<td></td>
</tr>
<tr>
<td>80.00</td>
<td>4</td>
<td>12.5</td>
<td>12.5</td>
<td>75.0</td>
<td></td>
</tr>
<tr>
<td>85.00</td>
<td>2</td>
<td>6.3</td>
<td>6.3</td>
<td>81.3</td>
<td></td>
</tr>
<tr>
<td>90.00</td>
<td>3</td>
<td>9.4</td>
<td>9.4</td>
<td>90.6</td>
<td></td>
</tr>
<tr>
<td>100.00</td>
<td>3</td>
<td>9.4</td>
<td>9.4</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## The Percentage of Satisfaction - Virtual Chat

<table>
<thead>
<tr>
<th>%Satisfaction</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>32</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>.00</td>
<td>1</td>
<td>3.1</td>
<td>3.1</td>
<td>3.1</td>
</tr>
<tr>
<td>2.00</td>
<td>1</td>
<td>3.1</td>
<td>3.1</td>
<td>6.3</td>
</tr>
<tr>
<td>10.00</td>
<td>3</td>
<td>9.4</td>
<td>9.4</td>
<td>15.6</td>
</tr>
<tr>
<td>20.00</td>
<td>1</td>
<td>3.1</td>
<td>3.1</td>
<td>18.8</td>
</tr>
<tr>
<td>25.00</td>
<td>2</td>
<td>6.3</td>
<td>6.3</td>
<td>25.0</td>
</tr>
<tr>
<td>40.00</td>
<td>1</td>
<td>3.1</td>
<td>3.1</td>
<td>28.1</td>
</tr>
<tr>
<td>45.00</td>
<td>1</td>
<td>3.1</td>
<td>3.1</td>
<td>31.3</td>
</tr>
<tr>
<td>50.00</td>
<td>3</td>
<td>9.4</td>
<td>9.4</td>
<td>40.6</td>
</tr>
<tr>
<td>55.00</td>
<td>3</td>
<td>9.4</td>
<td>9.4</td>
<td>50.0</td>
</tr>
<tr>
<td>60.00</td>
<td>1</td>
<td>3.1</td>
<td>3.1</td>
<td>53.1</td>
</tr>
<tr>
<td>70.00</td>
<td>1</td>
<td>3.1</td>
<td>3.1</td>
<td>56.3</td>
</tr>
<tr>
<td>75.00</td>
<td>1</td>
<td>3.1</td>
<td>3.1</td>
<td>59.4</td>
</tr>
<tr>
<td>80.00</td>
<td>6</td>
<td>18.8</td>
<td>18.8</td>
<td>78.1</td>
</tr>
<tr>
<td>85.00</td>
<td>1</td>
<td>3.1</td>
<td>3.1</td>
<td>81.3</td>
</tr>
<tr>
<td>90.00</td>
<td>2</td>
<td>6.3</td>
<td>6.3</td>
<td>87.5</td>
</tr>
<tr>
<td>95.00</td>
<td>1</td>
<td>3.1</td>
<td>3.1</td>
<td>90.6</td>
</tr>
<tr>
<td>100.00</td>
<td>3</td>
<td>9.4</td>
<td>9.4</td>
<td>100.0</td>
</tr>
</tbody>
</table>
### Demographic Information on the Sample

#### Degree working on

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor's</td>
<td>13</td>
<td>40.6</td>
<td>40.6</td>
<td>40.6</td>
</tr>
<tr>
<td>Doctorate</td>
<td>3</td>
<td>9.4</td>
<td>9.4</td>
<td>50.0</td>
</tr>
<tr>
<td>Master's</td>
<td>16</td>
<td>50.0</td>
<td>50.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

#### Gender

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>7</td>
<td>21.9</td>
<td>21.9</td>
<td>21.9</td>
</tr>
<tr>
<td>Male</td>
<td>25</td>
<td>78.1</td>
<td>78.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

#### Type of career

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>1</td>
<td>3.1</td>
<td>3.1</td>
<td>3.1</td>
</tr>
<tr>
<td>Government</td>
<td>1</td>
<td>3.1</td>
<td>3.1</td>
<td>6.3</td>
</tr>
<tr>
<td>Industry</td>
<td>16</td>
<td>50.0</td>
<td>50.0</td>
<td>56.3</td>
</tr>
<tr>
<td>Military</td>
<td>2</td>
<td>6.3</td>
<td>6.3</td>
<td>62.5</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>6.3</td>
<td>6.3</td>
<td>68.8</td>
</tr>
<tr>
<td>Student</td>
<td>10</td>
<td>31.3</td>
<td>31.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>Valid</td>
<td>Frequency</td>
<td>Percent</td>
<td>Valid Percent</td>
</tr>
<tr>
<td>-----------</td>
<td>-------</td>
<td>-----------</td>
<td>---------</td>
<td>---------------</td>
</tr>
<tr>
<td>16-20</td>
<td>1</td>
<td>3.1</td>
<td>3.1</td>
<td>3.1</td>
</tr>
<tr>
<td>21-25</td>
<td>13</td>
<td>40.6</td>
<td>40.6</td>
<td>43.8</td>
</tr>
<tr>
<td>26-30</td>
<td>5</td>
<td>15.6</td>
<td>15.6</td>
<td>59.4</td>
</tr>
<tr>
<td>31-35</td>
<td>5</td>
<td>15.6</td>
<td>15.6</td>
<td>75.0</td>
</tr>
<tr>
<td>36-40</td>
<td>2</td>
<td>6.3</td>
<td>6.3</td>
<td>81.3</td>
</tr>
<tr>
<td>41-45</td>
<td>2</td>
<td>6.3</td>
<td>6.3</td>
<td>87.5</td>
</tr>
<tr>
<td>46-50</td>
<td>2</td>
<td>6.3</td>
<td>6.3</td>
<td>93.8</td>
</tr>
<tr>
<td>Above 50</td>
<td>2</td>
<td>6.3</td>
<td>6.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Work Schedule</th>
<th>Valid</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not work</td>
<td>2</td>
<td>6.3</td>
<td>6.3</td>
<td>6.3</td>
<td></td>
</tr>
<tr>
<td>Full time</td>
<td>20</td>
<td>62.5</td>
<td>62.5</td>
<td>68.8</td>
<td></td>
</tr>
<tr>
<td>Part time</td>
<td>10</td>
<td>31.3</td>
<td>31.3</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is this your first online class</th>
<th>Valid</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>26</td>
<td>81.3</td>
<td>81.3</td>
<td>81.3</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>6</td>
<td>18.8</td>
<td>18.8</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>