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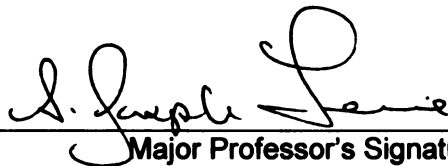
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**LEARNER INTERACTIVITY IN HIGHER EDUCATION: COMPARING
FACE-TO-FACE, HYBRID AND ONLINE INSTRUCTION**

By

Timothy Alan Brannan

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ABSTRACT

Learner Interactivity in Higher Education: Comparing Face-to-face, Hybrid and Online Instruction

By

Timothy Alan Brannan

The purpose of this study was to compare the opinions of students toward the interactions they encounter while taking college courses in a face-to-face, hybrid, and completely online environment. The study used a survey instrument containing open-ended questions asking students to describe how the interactions were encouraged in four categories; student – instructor interactions, student – student interactions, student – content interactions and student – technology interactions. The instrument was sent to a sample of 106 students who had participated in courses using each of the three environments. The findings of this study supported the use of technology in instruction and found that technology can actually increase the four interactions found in the classroom. The study also provides examples of how instructors encouraged these interactions. The other important finding is that instructors should be well versed in education technology, and colleges and universities need to prepare students in the use of technology. Students today will be expected to use technology in the work place, and it is up to institutions of higher education to better prepare these students for the challenges they will face while on the job.

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CHAPTER I

THE PROBLEM

Introduction

Distance education programs have been used to reach and serve students since the development of correspondence courses in the late 19th century (Thomerson and Smith, 1996). With the widespread adoption of the worldwide web, internet delivered courses have provided a vehicle for web-enhanced and virtual learning that is gaining popularity on college and university campuses. Studies of various types of distance education programs have repeatedly indicated that cognitive achievement of distance learning students and traditional classroom students is comparable (ibid, 1996).

However, some of these same studies found that distant students often did not enjoy their classroom experience, did not interact as frequently with fellow students or the instructor, or did not feel as comfortable in the distance classroom settings as did students attending a traditional class (ibid, 1996).

In 1989 Michael Moore proposed a theory of distance education based on the need to accommodate within the classroom three essential interactions: learner-content, learner-instructor, and learner-learner (Moore, 1989). In 1994 Hillman, Willis and Gunawardena augmented Moore's model with a fourth interaction, learner-interface (Hillman, et al, 1994). This interaction addresses learners' accommodation to technological learning platforms.

For the purpose of this study the term face-to-face instruction is defined as a "live" classroom setting where no content is delivered in a technology enhanced format. Hybrid instruction combines both face-to-face and online instruction. Courses delivered

in a hybrid format are those where at least half of the course content is delivered via the worldwide web, and the course also uses face-to-face instruction periodically throughout the semester. Online instruction, on the other hand, is a course where the entire content of the course is delivered via the worldwide web.

It was the interactions in these face-to-face, hybrid, and online instructional environments that were examined in this study. Multiple studies have examined the way traditional and virtual classes are similar and different, but none to date have looked at how a course delivered in these environments impact interaction in the classroom and the student's perception of the learning environment.

Statement of the Problem

Although the popularity of online instruction has increased in recent years, the interactions in courses offered online as compared to other instructional delivery methods has yet to be fully investigated. The importance of interaction in education is practically a given based on Shale and Garrison's work in 1990. They state that in its most fundamental form education is an interaction between teacher, student, and subject content (Shale and Garrison, 1990). Interactions between the instructor and learners and interactions among learners provide the basis for learning. Without interaction, teaching becomes simply passing on content as if it were dogmatic truth, and the cycle of knowledge acquisition to evaluation and validation is nonexistent (ibid, 1990). Sewart proposes that all educational transactions lie somewhere on an interaction continuum with learner-instructor interaction at one end and learner-content at the other (Sewart, 1982). Most students desire some degree of interaction with their instructor and fellow students during a course (Moore and Kearsley, 1996). This may be for the purpose of

getting feedback on their ideas and their learning progress or for social contact (ibid, 1996).

The idea and importance of interaction in distance education is a much-discussed topic (Hillman, et al., 1994). Baath's (1979) focus on two-way communication, Holmberg's (1988) discussion on the use of "guided didactic conversation" in textual design, and Moore's (1989) outline of three specific types of interaction are but a few examples of the treatment of interaction in the literature of distance education (as cited in Hillman, et al, 1994). Moore provides a framework for studying interaction in distance education by identifying the three types of interactions: learner-instructor, learner-learner, and learner-content. Many of the approaches to defining interaction in education fit within the models identified by Moore.

The first interaction described by Moore, learner-content, can be defined as the process of "intellectually interacting with content" to bring about changes in the learner's understanding, perspective, or cognitive structures (Moore, 1989). The second interaction, learner-instructor, examines an instructor's attempt to motivate and stimulate the learner and allows for clarification the learner may need regarding the content of the learning (ibid, 1989). The final interaction, learner-learner, addresses interactions between one learner and another or among groups of learners with or without instructor intervention.

Hillman, Willis and Gunawardena (1994) added a fourth interaction, learner-interface, to Moore's model. A facet of distance education that is increasingly overlooked is the effect of high-technology devices on interaction (ibid, 1994). The learner-interface interaction is accomplished by means of high-technology devices

which serve as the interface, the point or means of interaction, between the learner and his or her content, instructor, and fellow learners (ibid, 1994). As technology increasingly becomes the means of communication between learner-instructor, learner-learner and learner-content, the design of these mediating technologies becomes correspondingly more important (ibid, 1994). The increased use of technology in instruction and the increasing complexity of this “tool for instruction” has led Hillman, Willis and Gunawardena (1994) to define this additional model for interaction. Learner-interface interaction can be defined as the process where the learner must interact with the technological medium in order to interact with the content, instructor, or other learners.

Most of the research to date relating to the topic of distance education has been devoted to the “no significant difference phenomenon” (Russell, 1999). Thomas L. Russell’s compilation of more than 300 comparative research studies suggests that students in distance learning courses learn as well as on-campus, face-to-face students (ibid, 1999). These studies have typically been used by distance educators to defend the quality of their courses and programs against the view that learning takes place only in a physical classroom. What is needed now are new approaches that go beyond examining “no significant difference” between classroom and distance education. Studies where the learning outcomes are not the only variable and research that investigates student perceptions of the four interactions mentioned above are needed.

Purpose

The purpose of this study was to determine if there is a relationship between student perceptions of each of the four interactions: learner-instructor, learner-learner,

learner-content, and learner-interface and the type of course in which the student is enrolled: face-to-face, as a hybrid, and completely online. Data from this research will assist institutions in making informed decisions regarding the adoption of technology in instruction based on which delivery methods promote the highest student-instructor, student-student, student-content, and student-technology interactivity.

Research Questions

Six research questions were used to guide the study. Each of the following questions was asked to determine student perceptions of the interactions and if age or gender played a role in how the students responded to the survey.

Research Question 1:

In what ways do student perceptions differ when students in face-to-face, hybrid, and completely online environments are asked to identify their interactions with the instructor? This question is important in ascertaining how learner-instructor interactions are impacted by the setting in which the instruction is held. Are instructor-student interactions impacted favorably by face-to-face contact?

Research Question 2:

In what ways do student perceptions differ when students in face-to-face, hybrid, and completely online environments are asked to identify their interactions with the other students in the class? Are interactions among students impacted positively or negatively in technologically enhanced classes? Are learners who are hesitant to interact during a face-to-face class less reluctant to communicate with their classmates online?

Research Question 3:

In what ways do student perceptions differ when students in face-to-face, hybrid, and completely online environments are asked to identify their interactions with the course content? This question will provide data regarding accessibility to course content. Do students perceive that having content available online enhances their learning? Does access to this material increase retention of the course content? In what ways does interaction with course content impact students' perceptions of going to class?

Research Question 4:

In what ways do student perceptions differ when students in face-to-face, hybrid, and completely online environments are asked to identify their interactions with the technology used in the class? Does the use of technology provide greater access to learning, or is the technology a barrier to learning? How has technology changed the way students interact with their courses? Has it been for the better or worse?

Research Question 5:

Is age a differentiating factor when student identified interactions in the three different classroom settings are compared? If so, in what ways is it differentiating? Do students who have grown up with technology fare better in a technologically mediated course? How is technophobia impacted by a student's age? Are younger students quicker to try new technologies? Can the age of a student be a predictor for student success in an online or hybrid course?

Research Question 6:

Is gender a differentiating factor when student identified interactions in the three different classroom settings are compared? If so, in what ways is it differentiating?

Does the gender of a student impact how he or she fares in a technologically mediated course? Can the gender of a student be a predictor for success in an online or hybrid course?

Implication and Application of the Study

This study will help to advance the research in the area of distance education, as it explores student perceptions of the four interactions in courses offered face-to-face, as a hybrid, and online.

Need for the Study

There are only two cases presented in the literature studying the effects of combining face-to-face instruction with online instruction and offering these as one of the course delivery methods. More research needs to be completed to determine if student interactions are actually enhanced through a hybrid type of course delivery. In addition, K.C. Green's 2000 Campus Computing Survey reported that assisting faculty in integrating technology into instruction was the single most important information technology issue facing higher education institutions today. Students are demanding access to educational opportunities anytime and anywhere. For the opportunity to be effective, student perceptions of the four interactions need to be examined.

Definition of Terms

Distance education delivery methods range from web-supported or web-enhanced instruction to complete virtual or online delivery. For the purposes of this study the following terms will be used to define these variations.

Face-to-face Instruction

Face-to-face instruction is a course that is delivered at the same time and the same place with the instructor and student present.

Hybrid Instruction

Hybrid instruction is a course that uses both a face-to-face and an online component, often referred to as combination lecture/internet courses.

Online Instruction

Online instruction is a course which is delivered totally virtually via the worldwide web. The instructor and students interact at different times and from different locations.

Blackboard Course Management System

The Blackboard Course Management System is the web-based course management tool that enables online instruction in any of its delivery modes; web-enhanced, hybrid, or online.

Student-Instructor Interaction

Student-instructor interactions are those interactions between the student and the instructor. Moore (1989) presents this interaction as interaction between the learner and the expert who prepared the subject material or some other expert acting as the instructor.

Student-Student Interaction

Student-student interactions are those interactions between students in a course. Moore (1989) presents this interaction as inter-learner interaction between one learner and other learners, alone or in-group settings, with or without the real-time presence of an instructor.

Student-Content Interaction

Student-content interactions are those interactions between the students and course content. Moore (1989) presents this interaction as interaction between the learner and the content or subject of study. Moore (1989) stipulates there cannot be education without this interaction.

Student-Technology Interaction

Student-technology interactions are those interactions between the students and the course management system. This is the interaction Hillman, et al (1994) presents as learner-interface. The learner-interface interaction provides access to instruction, and this access permits students to participate in the other interactions

Outline of the Study

The research study is presented in five chapters. Chapter one has presented the problem, chapter two consists of a review of related literature, chapter three presents the methodology, and chapter four presents a detailed description of the results of the study. Finally, chapter five provides the conclusions and recommendations of the study.

CHAPTER II

REVIEW (OF THE LITERATURE)

Introduction

The literature review is presented in this chapter. Sections include: Definition of Distance Education, History of Distance Education, Distance Education Theory, and Distance Education Theory Related to Interactivity.

Definition of Distance Education

Michael G. Moore, Penn State University, defines the term “distance education” as teaching-learning relationships characterized by separation between learners and teachers. While it is true that distance education is the universe of all educational activities in which learners are separated by space and/or by time, what is of interest and importance to practitioners and theorists alike is the effect that this distance has on instruction, on the learners, the teachers, the forms of communication and interaction, the curriculum, and the management of the program (Moore and Kearsley, 1996). The transaction that we call distance education is the interplay between people who are teachers and learners in environments that have the special characteristic of being separate from one another and a consequent set of special teaching and learning behaviors (ibid, 1996). It is the physical distance that leads to a communication gap, a psychological space of potential misunderstandings between the behaviors of instructors and those of the learners, and this is the transactional distance (ibid, 1996).

In their book *Distance Education – A Systems View*, Moore and Kearsley uses the following definition of distance education:

Distance education is planned learning that normally occurs in a different place from teaching and as a result requires special techniques of course design, special instructional techniques, special methods of communication by electronic and other technology, as well as special organizational and administrative arrangements.

(Moore and Kearsley, 1996)

Because distance education provides instruction in places and times that are convenient for students rather than teacher or teaching institutions, many individuals use the term “distance learning” in place of distance education. Moore understands the authors’ rationale for using the terms. However, he prefers distance education since there is an emphasis not only on the learning but on teaching as well.

Moore goes on to emphasize that distance education is much more than simply using technology in a conventional classroom. It is about the consequences of using technology on such subjects as course design and delivery, interaction and learning, management, and organization (ibid, 1996).

History of Distance Education

The history of distance education in the United States begins with courses delivered by mail. Originally known as correspondence study, the method was called “home study” by private, for-profit schools and “independent study” by the universities (Moore and Kearsley, 1996). The earliest documented home study course offered in the United States was in shorthand.

Study at home became interactive with the development of cheap and reliable mail services that permitted students to correspond with their instructors (ibid, 1996). The academic respectability of correspondence teaching was formally recognized in 1883 when the State of New York authorized the Chautauqua Institute to award degrees

through this method (ibid, 1996). In 1890 the Colliery Engineer School of Mines began to advertise a home study course on mine safety and soon began to offer other courses. In 1891 the Colliery Engineer School of Mines became the International Correspondence Schools (ICS) providing correspondence courses to railroad workers. Today ICS is the largest commercial provider of home study programs in the United States (ibid, 1996).

However, the history of distance education did not begin in the United States but rather in Great Britain. Isaac Pitman began to teach shorthand by correspondence in 1840 soon after the invention of the “Penny Post,” which delivered a letter anywhere in the kingdom for a penny (ibid, 1996). In 1856 a Frenchman, Charles Toussaint, and a German, Gustav Langenscheidt, began to teach languages by correspondence (ibid, 1996).

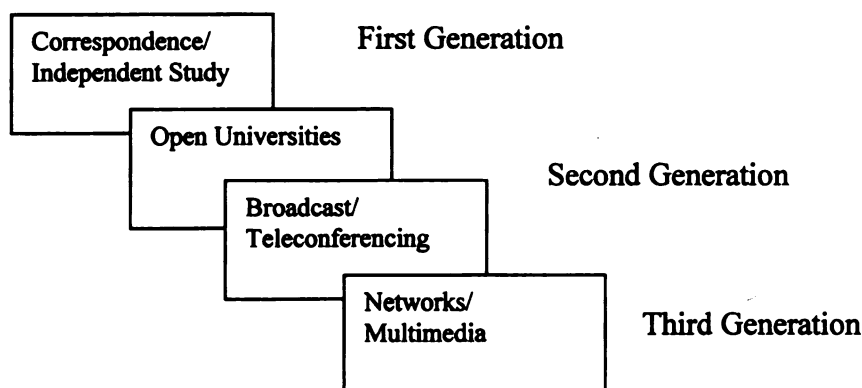
The late 1960s and early 1970s was a time of critical change in distance education. It was a time of experimenting with new media in education and new instructional techniques, which led to the beginning of new educational theorizing (ibid, 1996). The two most important developments were the University of Wisconsin’s Articulated Instructional Media Project (AIM), funded by the Carnegie Corporation from 1964 – 1968, and Britain’s Open University. The purpose of the AIM project was to find ways of articulating various communication media for teaching off-campus students (ibid, 1996). In 1967 the British government set up a committee to plan a revolutionary new educational institution. It would be a nationwide university system with no resident students. It would be large, well funded, and would employ the fullest

range of communications technologies to teach a full university undergraduate curriculum to any adult who wanted such an education (ibid, 1996).

The advent and adoption of various broadcast media, radio and television, became the next wave of technological enhancement in distance education. Recently computer network, multimedia, and now the widespread use of the world-wide-web have allowed access to educational opportunities anytime and anyplace. These technologies have had the largest impact on how students can access instructional content from across the world. The most recent technologies are based on combinations of computers and telecommunications. These technologies include computer conferencing, audio-graphic conferencing, and two-way videoconferencing (ibid, 1996). Access to large-scale course management systems has allowed educational institutions to put course content online which can be accessed from a computer connected to the internet regardless of where that computer is located.

In their book *Distance Education – A Systems View*, Moore and Kearsley provide the following figure, Figure 2.1 – The Evolution of Distance Education, to illustrate the evolution of distance education:

Figure 2.1 The Evolution of Distance Education



Distance Education Theory

Although various forms of distance education have existed since the 1840s and attempts at theoretical explanations of distance education have been undertaken for decades by leading scholars in the field, the need for a theory of distance education has been largely unfulfilled until recently (Simonson, et al, 1999). Holmberg (1986) stated that theoretical considerations give distance educators a touchstone against which decisions can be made with confidence (as cited in Simonson, et al, 1999). In 1988, Homborg reiterated the need for theory stating that,

One consequence of such understanding and explanation will be that hypotheses can be developed and submitted to falsification attempts. This will lead to insights telling us what in distance education is to be expected under what conditions and circumstances, thus paving the way for corroborated practical methodological application.

(as cited in Simonson, et al, 1999)

As early as 1972 Moore expressed concern about the progress of distance education being hindered by lack of attention to what he called the 'macro factors' (Simonson, et al, 1999). Moore indicated that there is a need to describe and define the field of distance education, to discriminate between its various components, and to identify the critical elements of the various forms of learning and teaching (ibid, 1999). Keegan (1995) reaffirmed the continued need for a theory of distance education by stating that a firmly based theory of distance education is one that can provide the touchstone against which decisions – political, financial, educational, and social – can be made with confidence (as cited in Simonson, et al, 1999). Theory would thus cease to be an ad hoc response to a set of conditions arising in crisis situations of problem-solving characteristic of the field of education (Simonson, et al, 1999). In summary, the

need for distance education theory is predicated on the need for a set of related hypotheses that can be used to explain and predict occurrences.

In his book *The Foundations of Distance Education* (1986), Keegan classified distance education theories into three groups: theories of independence and autonomy, theories of industrialization of teaching, and theories of interaction and communication (as cited in Simonson, et al, 1999). A fourth category seeks to explain distance education through a synthesis of existing communication and diffusion theories as well as education philosophies (Simonson, et al, 1999).

Holmberg's (1989) theory of distance education, what he calls "guided didactic conversation," falls into the general category of communication theory (as cited in Simonson, et al, 1999). Holmberg noted that his theory had explanatory value in relating teaching effectiveness to the actual exchange of questions, answers, and arguments in mediated communication (ibid, 1999). Holmberg offers seven background assumptions for his theory.

First, the core of teaching consists of interaction between the teaching and learning parties. Simulated interaction through subject matter presentation in pre-produced courses can subsume part of the interaction by causing students to consider different views, approaches, and solutions and generally to interact with a course. Second, emotional involvement in the study and feelings of personal relation between the teaching and learning parties is likely to contribute to learning pleasure. Third, learning pleasure supports student motivation. Fourth, participation in decision-making is favorable to student motivation. Fifth, strong student motivation facilitates learning. Sixth, a friendly, personal tone and easy access to the subject matter contributes to

learning pleasure, supports student motivation, and, thus, facilitates learning. Seventh, the effectiveness of teaching is demonstrated by students' learning of what has been taught (as cited in Simonson, et al, 1999).

According to Holmberg, several statements characterize distance education. First, all learning concerned with the acquisition of cognitive knowledge and cognitive skills as well as affective learning and some psychomotor learning is effectively provided for by distance education. Second, distance education is based on learning as an individual activity. Learning is guided and supported by noncontiguous means. Third, distance education is open to behaviorist, cognitive, constructivist, and other modes of learning. Fourth, personal relations, study pleasure, and empathy between students and those supporting them (tutors, counselors) are central to learning in distance education. Feelings of empathy and belonging promote students' motivation to learn, influencing learning favorably. And finally, while it is an effective mode of training, distance education runs the risk of leading to the mere fact learning and reproduction of accepted 'truths'. However, it can be organized and carried out in such a way that students are encouraged to search, criticize, and identify positions of their own (as cited in Simonson, et al, 1999).

Distance Education Theory Related to Interactivity

In 1989 Michael Moore proposed a theory of distance education based on the need to accommodate within the distant classroom three essential interactions: learner-content, learner-instructor, and learner-learner (Moore, 1989). The first type of interaction is between the learner and the content or subject of study. This is a defining characteristic of education. Without it there cannot be education, since it is the process

of intellectually interacting with content that results in changes in the learner's understanding, the learner's perspective, or the cognitive structures of the learner's mind (ibid, 1989). Some learning programs are solely content-interactive in nature. They are one-way communications with a subject expert, sometimes assisted by an instructional designer, intended to help distant learners in their study of the subject (ibid, 1989). No other professional teaching expertise is provided, and learning is largely self-directed.

The second type of interaction, regarded as essential by many educators and as highly desirable by many learners, is interaction between the learner and the expert who prepared the subject material or some other expert acting as instructor (ibid, 1989). In this interaction, distance instructors attempt to achieve aims held in common with all other educators. First having planned or been given a curriculum, a program of content to be taught, they seek to stimulate or at least maintain the student's interest in what is to be taught, to motivate the student to learn, to enhance and maintain the learner's interest, including self-direction and self-motivation (ibid, 1989). The instructor is especially valuable in responding to the learners' application of new knowledge. Whatever self-directed learners can do alone for self-motivation and interaction with content presented, they are vulnerable at the point of application (ibid, 1989). They do not know enough about the subject to be sure that they are (1) applying it correctly, (2) applying it as extensively as possible or desirable, or (3) aware of all the potential areas of application (ibid, 1989).

It is the third form of interaction, a new dimension of distance education, which will be a challenge to our thinking and practice in the 1990s and beyond. This is inter-learner interaction between one learner and other learners, alone or in group settings,

with or without the real-time presence of an instructor (ibid, 1989). Through the history of education the class or educational group has more often than not been organized for reasons which have nothing to do with learners' needs (ibid, 1989). At present many classes are organized because the class is the only organizational form known to most teachers and because in the short term, though not usually the long term, it is the cheapest way of delivering the teaching acts of stimulation, presentation, application, evaluation, and student support (ibid, 1989).

Recently, Hillman, Willis and Gunawardena augmented Moore's model with a fourth interaction, learner-interface (Hillman, et al, 1994). This interaction addresses learners' accommodation to technological learning platforms. The learner-interface interaction provides access to instruction, and access permits learners to participate in the other essential learner interactions (ibid, 1994). If the learner-interface interaction fails to occur, students might not participate at any level in other learner interactions (ibid, 1994). In effect, adequate and reliable learner-interface interaction is the keystone to learner involvement. If it fails, learning fails. A desirable outcome of the learner-interface interaction is to render the technology user friendly and transparent (ibid, 1994).

Wagner (1994) has suggested that future considerations of interaction and interactivity should draw upon the results of research from four domains. The first domain Wagner suggests is learning and learning theory in order to better understand human learning capacity. The second domain Wagner presents is in the area of instructional theory where she feels it is necessary to base general performance improvement interventions. The third domain is related to instructional design, so

researchers and practitioners can tailor interventions that address situational contingencies. Finally, the fourth domain related to instructional delivery is designed to encourage the generation of strategies for using interactive delivery systems to achieve interaction in instructional settings. Distance educators may be well served by examining these arenas of activity to determine how interaction has been accommodated (Wagner, 1994). Table 2.1 - Examples of Learning Theories, Instructional Theories, Instructional Design Methods, and Instructional Delivery to be Related to the Construct of Interaction, elaborates on each of these arenas by relating relevant research on interaction to the activity being emphasized within that arena (ibid, 1994).

Table 2.1 - Examples of Learning Theories, Instructional Theories, Instructional Design Methods, and Instructional Delivery to be Related to the Construct of Interaction

Learning Theories <i>Empirically define and describe human learned capabilities.</i>	Instructional Theories <i>Prescribe interventions to improve learning and performance.</i>	Instructional Design <i>Tailors learning and performance prescriptions to fit situational contingencies.</i>	Instructional Delivery <i>Deals with the media and methods of transmitting information and instruction.</i>
Examples of learning theories include but are not limited to • Behaviorism • Perception-based knowledge representation • Meaning-based knowledge representation • Memory encoding and retrieval, elaboration, reconstruction • Problem solving, reasoning, and creative thinking	Examples of instructional theories include but are not limited to • Component Display Theory • Elaboration Theory • ARCS Motivational Theory	• <i>Assessment</i> determines design parameters; analysis identifies “actuals” and “optimals” • <i>Design</i> sets desired outcomes, strategies and tactics, critical resources, project management, and development activities needed to move from actual state to optimal state. • <i>Evaluation</i> looks at system efficacy at formative and summative stages.	• <i>Product concerns</i> related to technology systems, hardware, and software tend to be concerned with interactivity. • <i>Process concerns</i> related to technology integration strategies and application tactics tend to be concerned with interaction.

(Wagner, 1994)

Wagner provides practitioners the best model to refer to when she presents her model of how interaction is accommodated based on research in several domains: learning theory, instructional theory, instructional design, and instructional delivery. By understanding the unique paradigm of distance education and the role interaction plays, instructors will be assured success with students regardless of delivery method.

Distance learning offers many advantages to formal classroom instruction in the ability to reach geographically dispersed or time constrained students. Michael Moore's distance learning theory of three essential interactions learner-content, learner-instructor, and learner-learner provides practitioners a framework on which to build an understanding of the importance of accommodating students' needs within the distant learning classroom including hybrid courses. In addition, Hillman, Willis and Gunawardena's augmentation of Moore's model with a fourth interaction learner-interface, which address learners' accommodation to technological learning platforms, further adds to this framework of the importance of interaction in distance education.

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CHAPTER III

METHODOLOGY

Introduction

The methods for data collection and analysis used in this study are presented in this chapter. Sections include: Introduction, Research Design, Population and Sample, Data Collection, Research Questions, Validity, Reliability, Instrument Development, Criteria for Data Analysis, Statistical Procedures and Limitation of this Type of Study.

Research Design

The study employed a causal-comparative design and used a survey instrument and a focus group to collect the necessary data. This provided both quantitative and qualitative data. A survey instrument (see Appendix II) containing open-ended questions and Likert-type items was used to collect information regarding the students' rating of the four interactions. A survey cover letter (see Appendix V) was sent introducing the study. The focus group was used as a second method of data collection. The focus group instrument and informed consent for focus group form can be found in Appendix III and IV at the end of this study.

Population and Sample

The population for this study included students who attended seven courses at Lansing Community College which were offered via all three instructional methods face-to-face, hybrid, and online during the fall semester of 2001. This population comprises three groups of students who took one of the seven courses offered either face-to-face, as a hybrid, or in an online environment.

Table 3.1 - Course Enrollments by Delivery Method, lists the total student enrollments in the face-to-face, hybrid, and online sections.

Table 3.1 - Course Enrollments by Delivery Method

Course Title	Face-to-Face Enrollment	Hybrid Enrollment	Online Enrollment
Accounting 210	447	14	25
Chemistry 151	228	12	18
Comp Info Sys 203	28	19	35
History 212	321	16	39
Management 225	64	12	17
Marketing 200	105	14	20
Psychology 200	777	19	84
Total	1880	106	238

The largest population is found in the face-to-face courses, then online, and finally the hybrid courses, which had a total of 106 enrollments for Fall 2001. Due to the large size of the population and the disproportionate number of students in the traditional classroom group, a stratified sample using the equal allocation method was used. Using random numbers, 106 face-to-face student and 106 online students were randomly selected for the sample. They joined all 106 hybrid students used in the study.

Out of a sample size of 318, 53 surveys were returned for a response rate of 16.67%. In addition ten students returned the postcard indicating interest in attending the focus group. Out of the ten who indicated interest in attending the focus group, five actually attended the focus group. Reasons cited for not being able to attend included inconvenient time, family/other commitments, and living too far away to attend.

Due to the small number of survey respondents, the study results cannot be generalized beyond the group of individuals who participated in the survey. The

distribution of respondents across different factors was good, however the overall response rate was too low to draw a great deal of meaning from the data.

Data Collection

Two methods for data collection were used in the study. A survey instrument (see Appendix II) containing open-ended questions was used to gather information on how the four interactions, instructor-student, student-student, content-student, technology-student, were encouraged. The survey also included a Likert-type item to collect information regarding the students' rating of each of the four interactions. Demographic information regarding age, computer skill, pursuance of a degree/certificate, and sex was collected from participants in the study.

A focus group was used as a second method of data collection. One focus group consisting of five people responded to the survey that they were interested and attended the focus group. Data from the study was shared with each of these participants, and their feedback to the data presented was recorded via cassette and by a recorder.

Krueger and Casey (2000) suggests that a focus group should be homogeneous and should range in size from four to twelve participants to allow individuals to discuss the questions presented by the researcher. The focus group was conducted to detect patterns and trends from the data gathered from the survey. The focus group interviews were taped and transcribed, serving as the primary data sources. Field notes and any products created by the interviewees were consulted as secondary data. Two researchers attended the focus group, one to moderate the interview while the other took field notes. The following questions were asked to the focus group participants:

1. What meaning/understanding can you draw from the data presented?

2. In what ways is the data different from or the same as what you expected or experienced?
3. In what ways can this data help instructors do a better job?

Analysis of data followed the procedure set forth by Krueger and Casey (2000) and involved three phases. First, the researchers discussed the interview immediately after the participants departed to identify key observations which surfaced during the session. In the second phase, raw data from the interview transcripts were individually analyzed. Thirdly, patterns of evidence were determined and documented.

Research Questions, Validity, Reliability, and Instrument Development

The study employed a causal-comparative design and used a survey instrument and focus groups to collect the necessary data. Several survey instruments used in similar research projects were used to identify possible statements for the instrument. Four cluster areas were identified for question development revolving around student-instructor interaction, student-student interaction, student-content interaction and student-technology interaction. Overall cluster means were calculated to ensure internal consistency between the four interaction questions. Open-ended questions asked students to describe the various interactions described above -describe your interactions with the instructor, with classmates, with the course material, with the technology.

The survey instrument used a Likert-type scale to measure student responses. Because quantitative data such as group means can be generated from a Likert-type scale, it is useful when comparing responses between and among groups used in the study. Borg and Gall (1989) explain that the Likert technique is usually the easiest method for developing an attitudinal measurement instrument. The five point Likert-

type scale was used to ascertain if the students felt the interaction was Excellent (5), Poor (1) or fell between these two points by rating each interaction in the survey.

Criteria for Data Analysis

A set of criteria was defined to assist in the analysis of data. These criteria, defined in table 3.2, provide discrete qualitative descriptors for all means derived through the study.

Table 3.2 – Quantitative Score Representation

Term	Range of Scores
Poor	1.0 – 1.5
Not Good	1.5 – 2.5
Average	2.5 – 3.5
Good	3.5 – 4.5
Excellent	4.5 – 5.0

As is shown in Table 3.2, mean scores between 1.0 and 1.5 are defined as “poor,” mean scores between 1.5 and 2.5 are defined as “not good,” mean scores between 2.5 and 3.5 are defined as “average,” mean scores between 3.5 and 4.5 are defined as “good,” and mean scores between 4.5 and 5.0 are defined as “excellent.”

Statistical Procedures

One-way analysis of variance (ANOVA) tests were first used to analyze the data, however these tests did not appear to show differences therefore paired t -tests were used to see if there were real differences that might have not appeared in the ANOVA. This procedure is described by Hopkins when he states that, “...there’s nothing to say that the p value for the overall effect is any more valid than the p value for individual contrasts. So if you’ve set up your study with a particular contrast in mind go ahead and do that contrast, regardless of the p value for the overall effect. Performing the pre-

planned contrast does not have to be contingent upon obtaining significance for the overall effect.” (Hopkins, 2000)

Limitations of this Type of Study

Based on previous literature and research studies, the Institute for Higher Education Policy released a report to the American Federation of Teachers and the National Education Association regarding the effectiveness of distance education (IHEP, 1999). The report titled “What’s the Difference? A Review of Contemporary Research on the Effectiveness of Distance Learning in Higher Education” was commissioned by the National Education Association (NEA) and The American Federation of Teachers (AFT) to examine the research on distance education. What’s the difference between distance learning and traditional classroom-based instruction? This question has become increasingly prominent, as technology has made distance learning much more common. This report reviews a broad array of research and articles published in the last decade to determine the overall quality of the analysis, the gaps in the research, and the implications of the research for the future. The report finds that the overall quality of the research is questionable and thereby renders many of the findings inconclusive. Numerous gaps in the research require more investigation and information. These gaps include the fact that the research emphasizes student outcomes for individual courses rather than for a total academic program; does not adequately explain why the dropout rates of distance learners are higher; does not address the quality of digital “libraries”; and does not take into account differences among students in how they learn. Implications of the research findings on college access and the

“human factor” in learning also are included. This report reviewed the research and came to the follow conclusions:

1. Of the hundreds of articles written on distance learning, only a small percentage contains original, quantitative research.
2. The bulk of these quantitative studies shows that there is no significant difference in the learning outcomes between online and conventional classes (see Russell 1999).
3. Most of these studies are methodologically flawed in one or more of the following ways:
 - a. There is no attempt to control for extraneous variables, which in turn limits the ability to demonstrate cause and effect.
 - b. Subjects are not randomly selected and thus the ability to generalize from these studies is compromised.
 - c. The validity and reliability of the instruments used to measure student outcomes and attitudes are questionable.
 - d. “Reactive effects” - feelings of students and faculty are not controlled for or explored.
 - e. Reported outcomes are for single courses and not for programs.
 - f. Differences among students are not taken into account.
 - g. Dropout rates for online courses are not explained or taken into consideration.
 - h. Student learning styles relating to technology are not considered.
 - i. There are no theoretical or conceptual frameworks utilized.

(Institute for Higher Education Policy, 1999)

This research attempts to address many of these concerns with this current project. Letter i (above) indicates that in many studies no theoretical or conceptual frameworks are utilized. Although the development of theory is in its infancy with

regard to online or hybrid instruction, there is a growing body of literature that tests and advances the state of distance education theory in this area.

Chapter IV – Findings and Chapter V, Conclusions and Recommendations, helps to address other issues raised by the Institute for Higher Education Policy report.

CHAPTER IV

FINDINGS

Introduction

The study findings are presented in this chapter. Sections include: Course Information, Delivery Type, Demographics, Student – Instructor Interaction, Student – Student Interaction, Student – Content Interaction, Student – Technology Interaction, Blackboard Data and a Summary of Survey Findings and Additional Comments from the Focus Group. The survey question results are presented in the same order as they were asked. In addition the focus group responses are included for each question under that question's section in this chapter.

Course Information

The specific courses and numbers of students who participated in the survey for each course are detailed in Table 4.1 – Distribution and Percentage of Total Participation of Study Participants According to Course.

Table 4.1 – Distribution and Percentage of Total Participation of Study

Participants According to Course

Course	Number of Study Participants	Percent of Total
Accounting 210	6	11.3
Computer Information Systems for Business 203	6	11.3
Chemistry 151	7	13.2
Management 225	7	13.2
Psychology 200	7	13.2
History 212	9	17.0
Marketing 200	11	20.8
Total	53	100.0

Study participants were distributed across all seven courses that were used for the study. Table 4.1 shows that the number of study participants in each of the seven courses ranged from six to eleven. There were six study participants, 11.3% of the total, in both Accounting 210 and Computer Information Systems 203. Seven study participants, 13.2% of the total, were in Chemistry 151, Management 225 and Psychology 200. Nine study participants, 17.0% of the total, were in History 212 and eleven study participants, 20.8% of the total, in Marketing 200.

Table 4.2 – Distribution and Percentage of Total Participation of Study Participants According to College Division groups the courses according to the College Division in which it is administratively located. The number of study participants are shown according to each College Division.

Table 4.2 – Distribution and Percentage of Total Participation of Study Participants According to College Division

Division	Course	Number of Study Participants (%)
Business and Media Careers	• Accounting 210 • Computer Information Systems for Business 203 • Management 225 • Marketing 200	30 (56.6%)
Liberal Studies	• Chemistry 151 • Psychology 200 • History 212	23 (43.4%)
Total		53 (100.0%)

Study participants were distributed across two of the five College Divisions. Table 4.2 shows the number of study participants in each of these two College Divisions. The Business and Media Careers Division had 30 study participants, 56.6%

of the total, and the Liberal Studies Division had 23 study participants, 43.4% of the total.

Delivery Type

The delivery type and numbers of students who participated in the survey for each delivery type is detailed in Table 4.3 – Distribution of Study Participants According to Delivery Type.

Table 4.3 – Distribution of Study Participants According to Delivery Type

Delivery Type	Number of Study Participants	Percent of Total
Face-to-face	17	32.1
Hybrid	15	28.3
Online	21	39.6
Total	53	100.0

The above table shows that the study participants were distributed across the three delivery types. There were 17 study participants, 32.1% of the total, in face-to-face delivered courses. Fifteen study participants, 28.3% of the total, were in hybrid delivered courses and 21 study participants, 39.6% of the total, were in online delivered courses.

Demographics

The demographics section of this study provides additional information on the study participants. These data include the study participants' age, computer skills, gender, and if they were pursuing a degree/certificate at the time they returned the survey.

Each study participants' age and the average age of the entire sample is detailed in Table 4.4 – Study Participants' Age.

Table 4.4 – Study Participants’ Age

Age	Number of Study Participants	Percent of Total
18	2	3.8
19	4	7.5
20	6	11.3
21	5	9.4
22	2	3.8
23	3	5.7
24	4	7.5
25	2	3.8
26	1	1.9
27	2	3.8
28	1	1.9
29	1	1.9
30	3	5.7
32	3	5.7
35	3	5.7
37	1	1.9
39	2	3.8
40	2	3.8
41	1	1.9
45	1	1.9
47	1	1.9
50	1	1.9
57	1	1.9
58	1	1.9
Total	53	100
Average Age	28.62	
Standard Deviation	10.03	

Table 4.4 – Study Participants’ Age shows that the study participants’ ages ranged from 18 to 58 years. The average age of participants in this study was 28.62 years, which is only slightly greater than 27.5 years, the average age of the general student population at the college. As can be expected, the standard deviation was high, 10.03, indicating that the average age shows considerable variance. This can be

considered typical for the non-traditional group of students who enroll at a community college.

Table 4.5 – Study Participants’ Age According to Delivery Type shows the number of students and their mean age and standard deviation for each of the three delivery types.

Table 4.5 – Study Participants’ Age According to Delivery Type

Delivery Type	Number of Students	Mean Age	Standard Deviation
Face-to-face	17	25.88	7.18
Hybrid	15	31.53	14.12
Online	21	28.76	8.24

Table 4.5 shows that the average age of the online students, 28.76, was very similar to the average age of the entire sample which was 28.62. The average age of face-to-face students, 25.88, was less than the entire sample and the average age of hybrid students, 31.53, was more than the entire sample.

Table 4.6 shows the results when multiple T-tests are applied to these data to examine if differences in mean age according to delivery type may have occurred by chance.

Table 4.6 – Examining Differences in Study Participants’ Age According to Delivery Type

Delivery Type	t	df	F	Sig.
Face-to-face to Hybrid	-1.453	30	9.330	.157
Face-to-face to Online	-1.133	36	.210	.265
Hybrid to Online	.742	34	7.402	.463

Table 4.6 shows that the level of significance is .157 for face-to-face compared to hybrid, .265 for face-to-face compared to online, and .463 for hybrid compared to online. This indicates there is no difference between the study participants' age and delivery type.

Table 4.7 – Study Participant Computer Skills shows the reported skill level for the study participants.

Table 4.7 – Study Participant Computer Skills

Skill Level	Number of Students	Percent of Total
Novice	2	3.8
Intermediate	21	39.6
Advanced	24	45.3
Expert	6	11.3
Total	53	100.0

The study participants reported having computer skills that ranged from novice to expert. Few of the study participants indicated they had Novice Skills, 3.8%, or Expert Skills, 11.3%. Most of the study participants, 84.9%, indicated they had Intermediate or Advanced Computer Skills.

Data regarding computer skills were grouped to provide for more meaningful analyses. Table 4.8 shows the distribution of students according to delivery type when Novice and Intermediate skill levels are combined into a Low Skill Level category and Advanced and Expert skill levels are combined into a High Skill Level category

Table 4.8 –Study Participant Computer Skills by Delivery Type

Skill Level	Face-to-Face	Hybrid	Online	Total
Low	6	8	9	23 (43.4%)
High	11	7	12	30 (56.6%)
Total	17	15	21	53 (100%)

Table 4.8 – Study Participant Computer Skills by Delivery Type shows that six face-to-face study participants indicated they had low computer skills and eleven face-to-face study participants indicated they had high computer skills. Eight hybrid study participants indicated they had low computer skills and seven hybrid participants indicated they had high computer skills. Nine online study participants indicated they had low computer skills and twelve online study participants indicated they had high computer skills. More of the study participants indicated High Skill, 56.6%, than indicated Low Skill, 43.4%).

The gender of the students who participated in the survey is detailed in Table 4.9 – Study Participant Gender.

Table 4.9 – Study Participant Gender

Gender	Number of Students	Percent of Total
Male	11	20.8
Female	41	77.4
Missing	1	1.9
Total	53	100.0

The above table shows that 41, or 77.4%, out of a total of 53 students who participated in the study were female. Though more female students are enrolled at the college, 52.4% of total enrollment is female, the gender distribution for the study shows a skewing toward female participation.

The number of study participants who indicated they were seeking a degree or a certificate program at the college is detailed in Table 4.10 – Study Participants Pursuing a Degree or Certificate.

Table 4.10 – Study Participants Pursuing a Degree or Certificate

Degree or Certificate	Number of Students	Percent of Total
Yes	29	54.7
No	23	43.4
Missing	1	1.9
Total	53	100.0

As shown in the above table, twenty-nine students who participated in the study, 54.7% of the total, indicated they were seeking a degree or certificate. Though this percentage appears to be low in relation to what might be expected in higher education, it is not low for a community college that has a mission that is split between higher education credentialing and specific job/skill development. For the entire community college, 55.9% of the students were pursuing a degree or certificate which is close to the percentage of study participants who indicated they were seeking a degree or certificate.

Student – Instructor Interaction

Survey question one asked study participants to indicate in what ways interaction between the instructor and students was encouraged in their course. The students were given space to provide an open-ended response and then were asked to rate the interaction they had witnessed in their course from one (poor) to five (excellent). All responses were grouped and categorized. Those open-ended responses with two or more responses are included in the Open Ended Responses section of this chapter. A complete listing of the open-ended responses for each of the interactions can be found in Appendix I of this study.

Open Ended Responses

A total of 23 study participants provided an open-ended response to the question, “In what ways was interaction between the instructor and students encouraged?” Responses were grouped to allow qualitative analysis. Those responses that were given by two or more respondents are shown in Table 4.11.

Table 4.11 – Student – Instructor Interaction Open-ended Responses

Category of Response	Number of Students
Asking/answering questions	10
Lecture, class discussion	5
Office hours	2

As shown in Table 4.11, the greatest category of response, indicated by 10 study participants, was “Asking/answering questions.” This form of student – instructor interaction is a very basic educational technique that, according to these data, is apparent in face-to-face instruction as well as instruction that is offered online. A second category of response, “Lecture, class discussion,” is also seen as a very basic

educational technique that was identified by the study participants. No category of response was indicated by the study participants that could be considered a unique form of student – instructor interaction for online learning such as emails, phone calls, etc.

Student – Instructor Interaction Rating

Table 4.12 – Student – Instructor Interaction Rating by Total Group, shows the distribution of study participant ratings and the overall mean rating for the student – instructor interaction.

Table 4.12 – Student – Instructor Interaction Rating by Total Group

Rating	Number of Responses
1 Poor	4
2	6
3	5
4	18
5 Excellent	20
Mean	3.83

Table 4.12 shows that the mean rating for student – instructor interaction for the total group is 3.83. Overall, study participants felt the interaction between the instructor and students was “Good” based on the Criteria for Data Analysis defined for this study.

Delivery Type and Student – Instructor Interaction Ratings

Table 4.13 – Student – Instructor Interaction Mean Rating by Delivery Type, shows the calculated mean rating by delivery type.

Table 4.13 – Student – Instructor Interaction Mean Rating by Delivery Type

Delivery Type	Rating
Face-to-face	3.58
Hybrid	3.93
Online	3.95

Table 4.13 shows that all three groups rated the student – instructor interaction as “Good.” Face-to-face students rated the student – instructor interaction 3.58, hybrid students rated the interaction as 3.93, and online students rated the interaction as 3.95. Hybrid and online courses, those that use distance education technology, appear to show higher average ratings than face-to-face courses.

The mean student – instructor interaction ratings for each of the delivery types were analyzed to see if the apparent differences might have occurred by chance. A group of 3 T-tests were used to compare mean ratings between face-to-face and online, face-to-face and hybrid, and hybrid and online. These findings are shown in Table 4.14 – Comparing Delivery Type and Student – Instructor Interaction Rating.

Table 4.14 – Comparing Delivery Type and Student – Instructor Interaction

	Rating			
	t	df	F	Sig.
Face-to-face and online	-.886	36	.357	.381
Face-to-face and hybrid	-.747	30	.461	.344
Hybrid and online	-.044	34	.006	.965

Table 4.14 shows there are no differences for student – instructor interaction that can be attributed to delivery type.

College Division and Student – Instructor Interaction Ratings

Table 4.15 shows the calculated mean student – instructor interaction rating by College Division.

Table 4.15 – Student – Instructor Interaction Mean Rating by College Division

Division	Student – Instructor
Business and Media Careers	3.97
Liberal Studies	3.65

Table 4.15 shows that study participants in Business and Media Careers courses appeared to rate the student – instructor interaction slightly higher than study participants in Liberal Studies courses. The mean rating for Business and Media Careers was 3.97 and the mean rating for Liberal Studies was 3.65.

The mean student – instructor interaction ratings for each of the College Divisions were analyzed to see if the apparent differences might have occurred by chance. A T-test was used to test the difference in the means. This finding is shown in Table 4.16.

Table 4.16 – Comparing College Division and Student – Instructor Interaction Rating

	t	df	F	Sig.
Equal Variances	.894	51	2.542	.117

Table 4.16 – Comparing College Division and Student – Instructor Interaction Rating shows there is no difference for student – instructor interaction that can be attributed to College Division.

Student Age and Student – Instructor Interaction Ratings

Study participants were divided into two age groups of approximately equal size. One group was labeled as the “Young Half” group and included 26 study participants from 18 years to 24 years of age. The other group was labeled as “Old Half” and included 27 study participants from 25 – 58 years of age. Table 4.17 – Student – Instructor Interaction Mean Rating by Age shows the calculated mean student – instructor interaction rating by student age grouping.

Table 4.17 – Student – Instructor Interaction Mean Rating by Age

Age	Number	Student – Instructor
Young Half	26	3.65
Old Half	27	4.00

Table 4.17 shows that “Old Half” study participants appear to rate the student – instructor interaction slightly higher than “Young Half” study participants. The mean rating for “Old Half” study participants was 4.00 and the mean rating for “Young Half” study participants was 3.65.

The mean student – instructor interaction ratings for the two age groupings were analyzed to see if the apparent differences might have occurred by chance. A T-test was used to test the difference in means. This finding is shown in 4.18 – Comparing Age and Student – Instructor Interaction Rating.

Table 4.18 – Comparing Age and Student – Instructor Interaction Rating

	t	df	F	Sig.
Equal Variances	-.994	51	8.908	.325

Table 4.18 shows there is no difference for student – instructor interaction that can be attributed to age grouping.

Computer Skills and Student – Instructor Interaction Ratings

Study participants were grouped according to two broad categories of computer skills to allow for data analysis. Those study participants who indicated novice or intermediate skills were grouped in a “Low Computer Skill” category. The other group was labeled as the “High Computer Skill” category and consisted of those participants who indicated advanced or expert computer skills. Table 4.19 shows the calculated mean student – instructor interaction rating by computer skill.

Table 4.19 – Student – Instructor Interaction Mean Rating by Computer Skill

Computer Skill	Number	Student – Instructor
Low	23	3.65
High	30	3.97

Table 4.19 shows that “High Computer Skill” study participants appear to rate the student – instructor interaction higher than the “Low Computer Skill” study participants. The mean rating for “High Computer Skill” participants was 3.97 and the mean rating for “Low Computer Skill” participants was 3.65

The mean student – instructor interaction ratings for the two computer skill categories were analyzed to see if the apparent differences might have occurred by chance. A T-test was used to test the difference in means. This finding is shown in 4.20 – Comparing Computer Skills and Student – Instructor Interaction Rating.

Table 4.20 – Comparing Computer Skills and Student – Instructor Interaction Rating

	t	df	F	Sig.
Equal Variances	-.894	51	.449	.376

Table 4.20 shows there is no difference for student – instructor interaction that can be attributed to computer skills.

Gender and Student – Instructor Interaction Ratings

Table 4.21 shows the calculated mean student – instructor interaction rating by gender.

Table 4.21 – Student – Instructor Interaction Mean Rating by Gender

Gender	Number	Student – Instructor
Female	11	4.02
Male	41	3.09

Table 4.21 shows that Female study participants appear to rate the student – instructor interaction higher than Male study participants. The mean rating for Female study participants was 4.02 and the mean rating for Male study participants was 3.09.

The mean student – instructor interaction ratings for Females and Males were analyzed to see if the apparent differences might have occurred by chance. A T-test was used to test the difference in means. This finding is shown in Table 4.22 – Comparing Gender and Student – Instructor Interaction Rating.

Table 4.22 – Comparing Gender and Student – Instructor Interaction Rating

	t	df	F	Sig.
Equal Variances	-2.232	50	4.215	.030

Table 4.22 shows there is a mean rating difference for student – instructor interaction that can be attributed to gender ($>.05$). Female study participants, as a group, rate student – instructor interaction higher than male study participants.

Pursuing Degree/Certificate and Student – Instructor Interaction Ratings

Table 4.23 shows the calculated mean student – instructor interaction rating for those students pursuing a degree/certificate and those students not pursuing a degree/certificate.

Table 4.23 – Student – Instructor Interaction Mean Rating by Degree/Certificate

Degree/Certificate	Number	Student – Instructor
Yes	29	3.90
No	23	3.74

Table 4.23 shows that the group of study participants who are pursuing a degree/certificate appear to rate the student – instructor interaction higher than those study participants not pursuing a degree/certificate. The mean rating for those study participants pursuing a degree/certificate was 3.90 and the mean rating for those not pursuing a degree/certificate was 3.74.

The mean student – instructor interaction ratings for the pursuing a degree/certificate groups were analyzed to see if the apparent differences might have occurred by chance. A T-test was used to test the difference in means. This finding is shown in 4.24 – Comparing Pursuing a Degree/Certificate and Student – Instructor Interaction Rating.

Table 4.24 – Comparing Pursuing a Degree/Certificate and Student – Instructor

Interaction

	t	df	F	Sig.
Equal Variances	.437	50	.273	.664

Table 4.24 shows there is no mean rating difference for student – instructor interaction that can be attributed to whether or not a study participant was pursuing a degree/certificate. It is important to note that pursuing a degree is not always the focus for students who attend community college courses.

Analysis of Focus Group Responses of Student – Instructor Interaction Data

The focus group was asked to discuss the data regarding student – instructor interaction. A set of three questions was used to focus the discussion. The first question asked, “What meaning/understanding can you draw from the data presented?” The second asked, “Is the data different from or the same as you expected or experienced?” The third question asked focus group participants, “In what ways can this data help instructors do a better job?”

Focus Group Responses to “What meaning/understanding can you draw from the data presented.” Four themes emerged from the first discussion question. First, the focus group immediately recognized that the mean scores increased from face-to-face to online, and they were quick to point out that there is an increased expectation of interaction in an online class. They were impressed that the online rating is higher. Second, the focus group discussed how the delivery of information changes from face-to-face to online. They felt that the instructor encouraged more interaction with his/her students by providing content online and tools that would encourage interaction – for example, discussion boards or via email message. Third, the focus group participants felt quiet students may interact more online. These students may be more introverted in face-to-face situations and online classes may offer less peer pressure. Fourth, the focus group liked online classes because of the interaction. They felt everyone in an online

class gets an opportunity to share his/her ideas and online instructors encourage interaction.

Focus Group Responses to “Is the data different from or the same as you expected or experienced?” Two themes emerged from the second discussion question. The focus group felt that the online interaction between the instructor and the student exceeded their expectations. The focus group participants who have taken online classes stated that there was always prompt response to student inquiries. The focus group participants were surprised that the face-to-face rating was as high as it was. Many stated that in their experience it was not uncommon to sit through a face-to-face class and not even interact at all with the instructor.

Focus Group Responses to “In what ways can this data help instructors do a better job?” There were three ways in which focus group participants felt the data could help instructors do a better job. First, the focus group participants felt it was important that the instructor match the different learning styles of the students who are taking the course. Students have different ways of learning and the focus group felt instructors should make an attempt to meet these different learning styles. In addition, the focus group participants also stated that instructors should survey the students before class to see what they would like to learn and then “check-in” with them as the semester progresses to see if student needs are being met. Second, instructors need to look at the data presented in the study and attempt to change their techniques to encourage student – instructor interaction. By using this data, instructors will be able to encourage interaction between the students and themselves. Finally, instructors need to be willing to take questions, comments, and criticism from students.

Student – Student Interaction

Survey question two asked study participants to indicate in what ways interaction between and among the students was encouraged in their course. The students were given space to provide open-ended responses and then were asked to rate the interaction they had witnessed in their course from one (poor) to five (excellent). All responses were grouped and categorized. Those open-ended responses with two or more responses are presented. A complete listing of the open-ended responses for student – student interaction can be found in Appendix I of this study.

Open Ended Responses

A total of 16 study participants provided an open-ended response to the question, “In what ways was interaction between and among students encouraged?” Responses were grouped to allow qualitative analysis. Those responses that were given by two or more respondents are shown in Table 4.25.

Table 4.25 – Student – Student Interaction Open-ended Responses

Category of Response	Number of Students
We had to work in teams/group projects	5
Class discussion	5
Compared/shared notes	2
Worked in labs for one session each week, allowed for discussion between lab partners	2

As shown in Table 4.25, the greatest categories of response, indicated by five study participants were that they worked in teams and/or on group projects and another five students indicated that the instructor encouraged interaction through discussion. Two other categories, compared/shared notes and by having the students work in labs

for one session each week, allowing for discussion between lab partners were each identified by two study participants.

Student – Student Interaction Rating

Table 4.26 – Student – Student Interaction Rating by Total Group, shows the distribution of study participant ratings and the overall mean rating for the student – student interaction.

Table 4.26 – Student – Student Interaction Rating by Total Group

Rating	Number of Responses
1 Poor	6
2	10
3	8
4	16
5 Excellent	13
Mean	3.37

Table 4.26 shows the mean rating for the student – student interaction rating for the total group is 3.37. Overall, study participants felt the interaction between and among the students was “Average” based on the Criteria for Data Analysis defined for this study.

Delivery Type and Student – Student Interaction Ratings

Table 4.27 – Student – Student Interaction Mean Rating by Delivery Type shows the calculated mean rating by delivery type.

Table 4.27 – Student – Student Interaction Mean Rating by Delivery Type

Delivery Type	Rating
Face-to-face	3.11
Hybrid	2.93
Online	3.90

Table 4.27 shows that two of the groups, face-to-face and hybrid, rated the student – student interaction as average. Face-to-face students rated the student – student interaction 3.11 and hybrid students rated the interaction as 2.93. Online students rated the interaction as 3.90, or good. Study participants in the online group appear to show higher average ratings than face-to-face or hybrid course groups.

The mean student – student interaction ratings for each of the delivery types were analyzed to see if the apparent differences might have occurred by chance. A group of 3 T-tests were used to compare mean ratings between face-to-face and online, face-to-face and hybrid, and hybrid and online. These findings are shown in Table 4.28 – Comparing Delivery Type and Student – Student Interaction Rating.

Table 4.28 – Comparing Delivery Type and Student – Student Interaction Rating

	t	df	F	Sig.
Face-to-face and online	-1.845	36	3.110	.073
Face-to-face and hybrid	.378	30	1.366	.708
Hybrid and online	-2.352	34	.215	.025

Table 4.28 shows there are no differences for student – student interaction when face-to-face and online, and face-to-face and hybrid are compared. However, the student – student interaction ratings of hybrid and online students are different ($>.05$) when hybrid and online students are compared – with online students rating the interaction higher.

College Division and Student – Student Interaction Ratings

Table 4.29 shows the calculated mean student – student interaction rating by College Division.

Table 4.29 – Student – Student Interaction Mean Rating by College Division

Division	Student – Instructor
Business and Media Careers	3.47
Liberal Studies	3.26

Table 4.29 shows that study participants in Business and Media Careers courses appeared to rate the student – student interaction higher than study participants in Liberal Studies courses. The mean rating for Business and Media Careers was 3.47 and the mean rating for Liberal Studies was 3.26.

The mean student – student interaction ratings for each of the College Divisions were analyzed to see if the apparent differences might have occurred by chance. A T-test was used to test the difference in the means. This finding is shown in Table 4.30.

Table 4.30 – Comparing College Division and Student – Student Interaction

Rating

	t	df	F	Sig.
Equal Variances	.547	51	.143	.587

Table 4.30 – Comparing College Division and Student – Student Interaction Rating shows there is no difference for student – student interaction that can be attributed to College Division.

Student Age and Student – Student Interaction Ratings

Study participants were divided into two age groups of approximately equal size. One group was labeled as the “Young Half” group and included 26 study participants from 18 years to 24 years of age. The other group was labeled as “Old Half” and included 27 study participants from 25 – 58 years of age. Table 4.31 – Student – Student Interaction Mean Rating by Age shows the calculated mean student – student interaction rating by student age grouping.

Table 4.31 – Student –Student Mean Rating by Age

Age	Number	Student – Student
Young Half	26	3.31
Old Half	27	3.44

Table 4.31 shows that “Old Half” study participants appear to rate the student – student interaction slightly higher than “Young Half” study participants. The mean rating for “Old Half” study participants was 3.44 and the mean rating for “Young Half” study participants was 3.31.

The mean student – student interaction ratings for the two age groupings were analyzed to see if the apparent differences might have occurred by chance. A T-test was used to test the difference in means. This finding is shown in 4.32 – Comparing Age and Student – Student Interaction Rating.

Table 4.32 – Comparing Age and Student – Student Interaction Rating

	t	df	F	Sig.
Equal Variances	-.366	51	3.459	.716

Table 4.32 shows there is no difference for student – student interaction that can be attributed to age grouping.

Computer Skills and Student – Student Interaction Ratings

Study participants were grouped according to two broad categories of computer skills to allow for data analysis. Those study participants who indicated novice or intermediate skills were grouped in a “Low Computer Skill” category. The other group was labeled as the “High Computer Skill” category and consisted of those participants who indicated advanced or expert computer skills. Table 4.33 shows the calculated mean student – student interaction rating by computer skill.

Table 4.33 – Student – Student Interaction Mean Rating by Computer Skill

Computer Skill	Number	Student – Student
Low	23	3.00
High	30	3.67

Table 4.33 shows that “High Computer Skill” study participants appear to rate the student – student interaction higher than the “Low Computer Skill” study participants. The mean rating for “High Computer Skill” participants was 3.67 and the mean rating for “Low Computer Skill” participants was 3.00.

The mean student – student interaction ratings for the two computer skill categories were analyzed to see if the apparent differences might have occurred by chance. A T-test was used to test the difference in means. This finding is shown in 4.34 – Comparing Computer Skills and Student – Student Interaction Rating.

Table 4.34 – Comparing Computer Skills and Student – Student Interaction

Rating

	t	df	F	Sig.
Equal Variances	-1.824	51	4.168	.074

Table 4.34 shows there is no difference for student – student interaction that can be attributed to computer skills.

Gender and Student – Student Interaction Ratings

Table 4.35 shows the calculated mean student – student interaction rating by gender.

Table 4.35 – Student – Student Interaction Mean Rating by Gender

Gender	Number	Student – Student
Female	11	3.49
Male	41	3.09

Table 4.35 shows that Female study participants appear to rate the student – student interaction higher than Male study participants. The mean rating for Female study participants was 3.49 and the mean rating for Male study participants was 3.09.

The mean student – student interaction ratings for Females and Males were analyzed to see if the apparent differences might have occurred by chance. A T-test was used to test the difference in means. This finding is shown in Table 4.36 – Comparing Gender and Student – Student Interaction Rating.

Table 4.36 – Comparing Gender and Student – Student Interaction Rating

	t	df	F	Sig.
Equal Variances	-.866	50	.004	.391

Table 4.36 shows there is no difference for student – student interaction that can be attributed to gender.

Pursuing Degree/Certificate and Student – Student Interaction Ratings

Table 4.37 shows the calculated mean student – student interaction rating for those students pursuing a degree/certificate and those students not pursuing a degree/certificate.

Table 4.37 – Student – Student Interaction Mean Rating by Degree/Certificate

Degree/Certificate	Number	Student – Student
Yes	29	3.45
No	23	3.35

Table 4.37 shows that the group of study participants who are pursuing a degree/certificate appear to rate the student – student interaction higher than those study participants not pursuing a degree/certificate. The mean rating for those study participants pursuing a degree/certificate was 3.45 and the mean rating for those not pursuing a degree/certificate was 3.35.

The mean student – student interaction ratings for the pursuing a degree/certificate groups were analyzed to see if the apparent differences might have occurred by chance. A T-test was used to test the difference in means. This finding is shown in 4.38 – Comparing Pursuing a Degree/Certificate and Student – Student Interaction Rating.

Table 4.38 – Comparing Pursuing a Degree or Certificate and Student – Student Interaction

	t	df	F	Sig.
Equal Variances	.265	50	.004	.792

Table 4.38 shows there is no mean rating difference for student – student interaction that can be attributed to whether or not a study participant was pursuing a degree/certificate.

Analysis of Focus Group Responses of Student – Student Interaction Data

The focus group was asked to discuss the data regarding student – student interaction. A set of three questions was used to focus the discussion. The first question asked, “What meaning/understanding can you draw from the data presented?” The second asked, “Is the data different from or the same as you expected or experienced?” The third question asked focus group participants, “In what ways can this data help instructors do a better job?”

Focus Group Responses to “What meaning/understanding can you draw from the data presented.” Three themes emerged from the first discussion question. The focus group felt that online discussion must cause the interaction to increase. One focus group participant stated they had a heated debate online. In addition, the focus group participants discussed that in an online class, students find it easier to “speak” to one another online. They dubbed this “talking to the screen” where some students may feel free to voice their opinions when not in a face-to-face classroom setting. Lastly, the focus group participants felt the online instructor encouraged more interaction. This was a general statement and the amount of interaction that was encouraged depended on the instructor.

Focus Group Responses to “Is the data different from or the same as you expected or experienced?” The focus group felt that the data presented was expected; they expected more online interaction as the grade was dependent on it. Again, the

focus group reiterated students felt free to speak to one another online. The computer provided them a sense of security and that online students felt more anonymous because they weren't in a face-to-face class.

Focus Group Responses to “In what ways can this data help instructors do a better job?” There were two ways in which focus group participants felt the data could help instructors do a better job. First, the focus group participants felt it was important that the instructor change the classroom environment and have more group assignments. However, some student's fail to “carry their own weight” in online group assignments and the grade depends on the group's final project. Some instructors have group members evaluate other group members and this is counted in the individual's grade for the group project. This peer evaluation would ensure group members receive a proper participation grade.

Student – Content Interaction

Survey question three asked students to indicate in what ways interaction between the course content and the students was encouraged in their course. The students were given space to provide open-ended responses and then were asked to rate the interaction they had witnessed in their course from one (poor) to five (excellent). All responses were grouped and categorized. Those open-ended responses with two or more responses are presented. A complete listing of the open-ended responses for each of the student – content interaction can be found in Appendix I of this study.

Open Ended Responses

A total of 12 study participants provided an open-ended response to the question, “In what ways was interaction between the course content and the students encouraged?” Responses were grouped to allow qualitative analysis. Those responses that were given by two or more respondents are shown in Table 4.39.

Table 4.39 – Student – Content Interaction Open-ended Responses

Category of Response	Number of Students
Lecture, class discussion, internet, textbook	2

As shown in Table 4.39, only one response category was indicated by two or more study respondents. The response, “Lecture, class discussion, via the internet and the textbook” was identified by two study participants and suggests that interaction between students and the course content occurred through a variety of methods.

Student – Content Interaction Rating

Table 4.40 – Student – Content Interaction Rating by Total Group, shows the distribution of study participant ratings and the overall mean rating for student – content interaction.

Table 4.40 – Student – Content Interaction Rating by Total Group

Rating	Number of Reponses
1 Poor	1
2	3
3	10
4	13
5 Excellent	21
Mean	4.04

Table 4.40 shows that the mean rating for student – content interaction for the total group is 4.04. Overall, study participants felt the interaction between the course content and the students was “Good” based on the Criteria for Data Analysis defined for this study.

Delivery Type and Student – Content Interaction Ratings

Table 4.41 – Student – Content Interaction Rating by Delivery Type shows the calculated mean rating by delivery type.

Table 4.41 – Student – Content Interaction Rating by Delivery Type

Delivery Type	Rating
Face-to-face	3.88
Hybrid	3.93
Online	4.28

Table 4.41 shows that all three groups rated the student – content interaction as “Good.” Face-to-face students rated the student – content interaction 3.88, hybrid students rated the interaction as 3.93, and online students rated the interaction as 4.28.

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The mean ratings suggest there is no difference between delivery type when student – content interaction mean ratings are compared.

The mean student – content interaction ratings for each of the delivery types were analyzed to see if there may be any differences. A group of 3 T-tests were used to compare mean ratings between face-to-face and online, face-to-face and hybrid, and hybrid and online. These findings are shown in Table 4.42 – Comparing Delivery Type and Student – Content Interaction Rating.

Table 4.42 – Comparing Delivery Type and Student – Content Interaction Rating

	t	df	F	Sig.
Face-to-face and online	-1.224	32	.154	.230
Face-to-face and hybrid	-.128	28	1.672	.899
Hybrid and online	-.913	30	3.479	.368

Table 4.42 shows there are no differences for student – content interaction that can be attributed to delivery type.

College Division and Student – Content Interaction Ratings

Table 4.43 shows the calculated mean student – content interaction rating by College Division.

Table 4.43 – Student – Content Interaction Mean Rating by College Division

Division	Student – Instructor
Business and Media Careers	4.19
Liberal Studies	3.86

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Table 4.43 shows that study participants in Business and Media Careers courses appeared to rate the student – content interaction higher than study participants in Liberal Studies courses. The mean rating for Business and Media Careers was 4.19 and the mean rating for Liberal Studies was 3.86.

The mean student – content interaction ratings for each of the College Divisions were analyzed to see if the apparent differences might have occurred by chance. A T-test was used to test the difference in the means. This finding is shown in Table 4.44.

Table 4.44 – Comparing College Division and Student – Content Interaction

Rating				
	t	df	F	Sig.
Equal Variances	1.081	46	6.880	.285

Table 4.44 – Comparing College Division and Student – Content Interaction Rating shows there is no difference for student – content interaction that can be attributed to College Division.

Student Age and Student – Content Interaction Ratings

Study participants were divided into two age groups of approximately equal size. One group was labeled as the “Young Half” group and included 26 study participants from 18 years to 24 years of age. The other group was labeled as “Old Half” and included 27 study participants from 25 – 58 years of age. Table 4.45 – Student – Content Interaction Mean Rating by Age shows the calculated mean student – content interaction rating by student age grouping.

Table 4.45 – Student – Content Interaction Mean Rating by Age

Age	Number	Student – Content
Young Half	26	4.04
Old Half	27	4.04

Table 4.45 shows that “Old Half” study participants appear to rate the student – instructor interaction the same as the “Young Half” study participants. The mean rating for “Old Half” and the “Young Half” study participants was 4.04.

The mean student – content interaction ratings for the two age groupings were analyzed to see if the apparent differences might have occurred by chance. A T-test was used to test the difference in means. This finding is shown in 4.46 – Comparing Age and Student – Content Interaction Rating.

Table 4.46 – Comparing Age and Student – Content Interaction Rating

	t	df	F	Sig.
Equal Variances	-.011	46	3.634	.991

Table 4.46 shows there is no difference for student – content interaction that can be attributed to age grouping.

Computer Skills and Student – Content Interaction Ratings

Study participants were grouped according to two broad categories of computer skills to allow for data analysis. Those study participants who indicated novice or intermediate skills were grouped in a “Low Computer Skill” category. The other group was labeled as the “High Computer Skill” category and consisted of those participants who indicated advanced or expert computer skills. Table 4.47 shows the calculated mean student – content interaction rating by computer skill.

Table 4.47 – Student – Content Interaction Mean Rating by Computer Skill

Computer Skill	Number	Student – Content
Low	23	4.05
High	30	4.04

Table 4.47 shows that “Low Computer Skill” study participants appear to rate the student – content interaction slightly higher than the “High Computer Skill” study participants. The mean rating for “Low Computer Skill” participants was 4.05 and the mean rating for “High Computer Skill” participants was 4.04.

The mean student – content interaction ratings for the two computer skill categories were analyzed to see if the apparent differences might have occurred by chance. A T-test was used to test the difference in means. This finding is shown in 4.48 – Comparing Computer Skills and Student – Content Interaction Rating.

Table 4.48 – Comparing Computer Skills and Student – Content Interaction

Rating

	t	df	F	Sig.
Equal Variances	.034	46	.047	.973

Table 4.48 shows there is no difference for student – content interaction that can be attributed to computer skills.

Gender and Student – Content Interaction Ratings

Table 4.49 shows the calculated mean student – content interaction rating by gender.

Table 4.49 – Student – Content Interaction Mean Rating by Gender

Gender	Number	Student – Content
Female	11	4.11
Male	41	3.91

Table 4.49 shows that Female study participants appear to rate the student – content interaction slightly higher than Male study participants. The mean rating for Female study participants was 4.11 and the mean rating for Male study participants was 3.91.

The mean student – content interaction ratings for Females and Males were analyzed to see if the apparent differences might have occurred by chance. A T-test was used to test the difference in means. This finding is shown in Table 4.50 – Comparing Gender and Student – Content Interaction Rating.

Table 4.50 – Comparing Gender and Student – Content Interaction Rating

	t	df	F	Sig.
Equal Variances	-.554	45	1.142	.582

Table 4.50 shows there is no difference for student – content interaction that can be attributed to gender.

Pursuing Degree/Certificate and Student – Content Interaction Ratings

Table 4.51 shows the calculated mean student – content interaction rating for those students pursuing a degree/certificate and those students not pursuing a degree/certificate.

Table 4.51 – Student – Content Interaction Mean Rating by Degree/Certificate

Degree/Certificate	Number	Student – Content
Yes	29	4.04
No	23	4.09

Table 4.51 shows that the group of study participants who are not pursuing a degree/certificate appear to rate the student – content interaction higher than those study participants pursuing a degree/certificate. The mean rating for those study participants

not pursuing a degree/certificate was 4.09 and the mean rating for those pursuing a degree/certificate was 4.04.

The mean student – content interaction ratings for the pursuing a degree/certificate groups were analyzed to see if the apparent differences might have occurred by chance. A T-test was used to test the difference in means. This finding is shown in 4.52 – Comparing Pursuing a Degree/Certificate and Student – Content Interaction Rating.

Table 4.52 – Comparing Pursuing a Degree/Certificate and Student – Content Interaction

	t	df	F	Sig.
Equal Variances	-.164	45	.010	.871

Table 4.52 shows there is no mean rating difference for student – content interaction that can be attributed to whether or not a study participant was pursuing a degree/certificate.

Analysis of Focus Group Responses of Student – Content Interaction Data

The focus group was asked to discuss data regarding student – content interaction. A set of three questions was used to focus the discussion. The first question asked, “What meaning/understanding can you draw from the data presented?” The second asked, “Is the data different from or the same as you expected or experienced?” The third question asked focus group participants, “In what ways can this data help instructors do a better job?”

Focus Group Responses to “What meaning/understanding can you draw from the data presented.” Two themes emerged from the first discussion question. The focus

group discussed the fact that students must interact with content in an online class. The online environment provides a user-friendly place to host content for the course. Face-to-face courses offer more flexibility with course content based on student reactions. It is easier for an instructor to reduce or change the content of the course in these courses versus an online class where the content is already posted.

Focus Group Responses to “Is the data different from or the same as you expected or experienced?” The focus group felt that the data presented was expected; hybrid courses were used as an example of a course that had a “little bit of everything” where the instructor supports the content face-to-face and encourages students to work with the content online. The focus group also states that the online experience allowed students to understand homework better and they could go back and review past lectures. The students had “notes at their fingertips” and could receive instant gratification online – feedback, grades online, etc.

Focus Group Responses to “In what ways can this data help instructors do a better job?” There were three ways in which focus group participants felt the data could help instructors do a better job. Again, the focus group participants felt it was important that the instructor ask students their expectations. The focus group participants stated that Blackboard should be used for all classes to provide internet links, announcements, syllabus, assignments, lecture notes, discussion, group work, and email. This way a student could access the course content at anytime and would be able to check his/her grades. Focus group participants felt instructors could explain and define the course more clearly and could post “thoughts for the day” in Blackboard as a way to increase interaction with course content.

Student – Technology Interaction

Survey Question Four asked students to indicate in what ways interaction between the technology and the students was encouraged in their course. The students were given space to provide open-ended responses and then were asked to rate the interaction they had witnessed in their course from one (poor) to five (excellent). All responses were grouped and categorized. Those open-ended responses with two or more responses are presented. A complete listing of the open-ended responses for student – technology interaction can be found in Appendix I of this study.

Open Ended Responses

A total of 15 study participants provided an open-ended response to the question, “In what ways was interaction between the technology and the students encouraged?” Responses were grouped to allow qualitative analysis. Those responses that were given by two or more respondents are shown in Table 4.53.

Table 4.53 – Student – Technology Interaction Open-ended Responses

Category of Response	Number of Students
Blackboard was not used	10

As shown in 4.53, the greatest category of response, indicated by 10 study participants, was “Blackboard was not used.” Blackboard, internet-based course management software, is available for all instructors to use in their courses – face-to-face, hybrid, or online. Interestingly, though the question asked the respondent to identify ways interaction was encouraged, 10 study participants chose to share the idea that interaction was not encouraged because Blackboard was not used. These 10 respondents all participated in face-to-face courses.

Student – Technology Interaction Rating

Table 4.54 – Student – Technology Interaction Rating by Total Group shows the distribution of study participant ratings and the overall mean rating for the student – technology interaction.

Table 4.54 – Student – Technology Interaction Rating by Total Group

Rating	Number of Responses
1 Poor	4
2	1
3	8
4	10
5 Excellent	20
Mean	3.95

Table 4.54 shows that the mean rating for student – technology interaction for the total group is 3.95. Overall, study participants felt the interaction between the technology and the students was “Good” based on the Criteria for Data Analysis defined for this study.

Delivery Type and Student – Technology Interaction Ratings

Table 4.55 – Student – Technology Interaction Mean Rating by Delivery Type, shows the calculated mean rating by delivery type.

Table 4.55 – Student – Technology Interaction Mean Rating by Delivery Type

Delivery Type	Rating
Face-to-face	3.11
Hybrid	4.13
Online	4.21

Table 4.55 shows that face-to-face study participants rated the student – technology interaction as 3.11 or “Average.” Both hybrid and online study participants rated the student – technology interaction as “Good.” Hybrid study participants rated

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the interaction as 4.13 and online study participants rated the interaction as 4.21. As would be expected, as the delivery type changed from no technology (face-to-face) to some technology (hybrid) to all technology (online) the mean student – technology interaction rating increased.

The mean student – technology interaction ratings for each of the delivery types were analyzed to see if any apparent differences might have occurred by chance. A group of 3 T-tests were used to compare mean ratings between face-to-face and online, face-to-face and hybrid, and hybrid and online. These findings are shown in Table 4.56 – Comparing Delivery Type and Student – Technology Interaction Rating.

Table 4.56 – Comparing Delivery Type and Student – Technology Interaction

	Rating			
	t	df	F	Sig.
Face-to-face and online	-2.246	26	9.441	.033
Face-to-face and hybrid	-1.665	22	1.903	.110
Hybrid and online	-.214	32	3.677	.832

Table 4.56 – Comparing Delivery Type and Student – Technology Interaction Rating shows there are no differences for student – technology interaction that can be attributed to delivery type when face-to-face students are compared to hybrid students and when hybrid students are compared to online students. However, the student – technology interaction ratings of face-to-face and online students are different ($>.05$)

when face-to-face and online students are compared – with online students rating the interaction higher.

College Division and Student – Technology Interaction Ratings

Table 4.57 shows the calculated mean student – technology interaction rating by College Division.

Table 4.57 – Student – Technology Interaction Mean Rating by College Division

Division	Student – Technology
Business and Media Careers	4.22
Liberal Studies	3.65

Table 4.57 shows that study participants in Business and Media Careers courses appeared to rate the student – technology interaction higher than study participants in Liberal Studies courses. The mean rating for Business and Media Careers was 4.22 and the mean rating for Liberal Studies was 3.65.

The mean student – technology interaction ratings for each of the College Divisions were analyzed to see if the apparent differences might have occurred by chance. A T-test was used to test the difference in the means. This finding is shown in Table 4.58.

Table 4.58 – Comparing College Division and Student – Technology Interaction

Rating

	t	df	F	Sig.
Equal Variances	1.480	41	3.687	.147

Table 4.58 – Comparing College Division and Student – Technology Interaction Rating shows there is no difference for student – technology interaction that can be attributed to College Division.

Student Age and Student – Technology Interaction Ratings

Study participants were divided into two age groups of approximately equal size. One group was labeled as the “Young Half” group and included 26 study participants from 18 years to 24 years of age. The other group was labeled as “Old Half” and included 27 study participants from 25 – 58 years of age. Table 4.59 – Student – Technology Interaction Mean Rating by Age shows the calculated mean student – technology interaction rating by student age grouping.

Table 4.59 – Student – Technology Interaction Mean Rating by Age

Age	Number	Student – Technology
Young Half	26	3.58
Old Half	27	4.42

Table 4.59 shows that “Old Half” study participants appear to rate the student – technology interaction higher than “Young Half” study participants. The mean rating for “Old Half” study participants was 4.42 and the mean rating for “Young Half” study participants was 3.58.

The mean student – technology interaction ratings for the two age groupings were analyzed to see if the apparent differences might have occurred by chance. A T-test was used to test the difference in means. This finding is shown in 4.60 – Comparing Age and Student – Technology Interaction Rating.

Table 4.60 – Comparing Age and Student – Technology Interaction Rating

	t	df	F	Sig.
Equal Variances	-2.246	41	9.122	.030

Table 4.60 shows there is a mean rating difference for student – technology interaction that can be attributed to age ($>.05$). Older study participants, as a group, rate student – technology interaction higher than younger study participants.

Computer Skills and Student – Technology Interaction Ratings

Study participants were grouped according to two broad categories of computer skills to allow for data analysis. Those study participants who indicated novice or intermediate skills were grouped in a “Low Computer Skill” category. The other group was labeled as the “High Computer Skill” category and consisted of those participants who indicated advanced or expert computer skills. Table 4.61 shows the calculated mean student – technology interaction rating by computer skill.

Table 4.61 – Student – Technology Interaction Mean Rating by Computer Skill

Computer Skill	Number	Student – Technology
Low	23	3.48
High	30	4.41

Table 4.61 shows that “High Computer Skill” study participants appear to rate the student – technology interaction higher than the “Low Computer Skill” study participants. The mean rating for “High Computer Skill” participants was 4.41 and the mean rating for “Low Computer Skill” participants was 3.48.

The mean student – technology interaction ratings for the two computer skill categories were analyzed to see if the apparent differences might have occurred by

chance. A T-test was used to test the difference in means. This finding is shown in 4.62 – Comparing Computer Skills and Student – Technology Interaction Rating.

Table 4.62 – Comparing Computer Skills and Student – Technology Interaction

Rating				
	t	df	F	Sig.
Equal Variances	-2.559	41	3.021	.014

Table 4.62 shows there is a mean rating difference for student – technology interaction that can be attributed to computer skills ($>.05$). Study participants who have higher computer skills, as a group, rate student – technology interaction higher than study participants with low computer skills.

Gender and Student – Technology Interaction Ratings

Table 4.63 shows the calculated mean student – technology interaction rating by gender.

Table 4.63 – Student – Technology Interaction Mean Rating by Gender

Gender	Number	Student – Technology
Female	11	4.00
Male	41	3.83

Table 4.63 shows that Female study participants appear to rate the student – technology interaction higher than Male study participants. The mean rating for Female study participants was 4.00 and the mean rating for Male study participants was 3.83.

The mean student – technology interaction ratings for Females and Males were analyzed to see if the apparent differences might have occurred by chance. A T-test was used to test the difference in means. This finding is shown in Table 4.64 – Comparing Gender and Student – Technology Interaction Rating.

Table 4.64 – Comparing Gender and Student – Technology Interaction Rating

	t	df	F	Sig.
Equal Variances	-.292	40	.025	.771

Table 4.64 shows there is not a mean rating difference for student – technology interaction that can be attributed to gender.

Pursuing Degree/Certificate and Student – Technology Interaction Ratings

Table 4.65 shows the calculated mean student – technology interaction rating for those students pursuing a degree/certificate and those students not pursuing a degree/certificate.

Table 4.65 – Student – Technology Interaction Mean Rating by Degree/Certificate

Degree/Certificate	Number	Student – Technology
Yes	29	3.74
No	23	4.16

Table 4.65 shows that the group of study participants who are not pursuing a degree/certificate appear to rate the student – technology interaction higher than those study participants pursuing a degree/certificate. The mean rating for those study participants not pursuing a degree/certificate was 4.16 and the mean rating for those pursuing a degree/certificate was 3.74.

The mean student – technology interaction ratings for the pursuing a degree/certificate groups were analyzed to see if the apparent differences might have occurred by chance. A T-test was used to test the difference in means. This finding is shown in 4.66 – Comparing Pursuing a Degree/Certificate and Student – Technology Interaction Rating.

Table 4.66 – Comparing Pursuing a Degree/Certificate and Student – Technology

Interaction

	t	df	F	Sig.
Equal Variances	-1.060	40	.857	.296

Table 4.66 shows there is no mean rating difference for student – technology interaction that can be attributed to whether or not a study participant was pursuing a degree/certificate.

Analysis of Focus Group Responses of Student – Technology Interaction Data

The focus group was asked to discuss the data regarding student – technology interaction. A set of three questions was used to focus the discussion. The first question asked, “What meaning/understanding can you draw from the data presented?” The second asked, “Is the data different from or the same as you expected or experienced?” The third question asked focus group participants, “In what ways can this data help instructors do a better job?”

Focus Group Responses to “What meaning/understanding can you draw from the data presented.” Four themes emerged from the first discussion question. The focus group discussed the fact that for courses online and in a hybrid format the technology is required and that they would expect a higher student – technology interaction score. The group also felt that there should be an assessment of technology competence or tools provided to increase internet capabilities before classes began each semester. The focus group discussed the fact that technology is being used in many courses and that more electronic resources should be made available by the college. The group agreed

that online students should have technology skills – basic computer knowledge and web skills.

Focus Group Question Answers to “Is the data different from or the same as you expected or experienced?” The focus group made the point that the data presented was the same as they expected in that technology use in hybrid and online courses was a requirement. In addition, they felt that a basic understanding of productivity tools and computer uses should be expected for any class not just online classes at the college.

Focus Group Question Answers to “In what ways can this data help instructors do a better job?” There were multiple ways in which focus group participants felt the data could help instructors do a better job. Again, the focus group felt that Blackboard should be used for all classes regardless of delivery method. Face-to-face classes should take advantage of technology available. The focus group participant’s felt it was important that the instructor spend the first week of the semester on technology required for the class and that the college offer workshops on technology use. The focus group participants also stated that the course catalog should reflect technology knowledge as a requirement and that a technology skills assessment should be used by the college. This way students would know the skill level required for a specific class similar to the way math and writing skills assessments are currently used. They also made it a point to mention that the college should ensure that the instructors are proficient with the technology and to make sure that the technology doesn’t detract from the course content. The focus group also made the point that internet connectivity can be a problem in some cases and that the software might detract from the course content so instructors must ensure the use of the technology fits.

Blackboard Data

Survey question five asked students to indicate if Blackboard was used in their class. If the answer was yes, they were then asked to indicate how Blackboard was used during the semester. Table 4.67 – Blackboard Use shows the number of students who responded they used Blackboard in their class.

Table 4.67 – Blackboard Use

	Number of Responses	Percent
Yes	41	77.4
No	12	22.6
Total	53	100

Table 4.67 shows that 41 out of 53, 77%, of the respondents to the survey stated they used Blackboard in their course. This is surprisingly high due to the fact that this was the first semester Blackboard was available to face-to-face instructors.

Table 4.68 – How Blackboard Was Used, shows how Blackboard was used in the study participant's course.

Table 4.68 – How Blackboard Was Used

Category of Response	Number of Students	Percent
Announcement	38	16.7
Email	29	12.8
Syllabus	38	16.7
Course Documents	36	15.9
Discussion Board	36	15.9
Assessment	25	11.0
Chat	8	3.5
Group work	17	7.5
Total responses	227	100.0

Table 4.68 shows that out of the total 227 responses, 38 students indicated they used the announcement and syllabus feature of Blackboard in their course; this

represented 16.7% of the total responses respectively. Thirty-six students indicated they used course documents posted on Blackboard (15.9%) and 36 students also indicated they used the discussion board (15.9%). Twenty-nine students indicated that email was used in Blackboard, or 12.8% of the responses, followed by 25 who indicated assessments in their courses were delivered via Blackboard (11% of the total responses). Finally, 17 indicated group work (7.5%), and 8 used the Blackboard chat feature (3.5%).

In addition to asking students about how student – technology interaction was encouraged, the survey asked students to comment on the Blackboard Course Management System. A total of six study participants provided a response. Table 4.69 – Comments on Blackboard shows how the students responded to the open-ended question “Comments on Blackboard.” All responses were grouped and categorized. Those open-ended responses with two or more responses are included. A complete listing of the open-ended responses for comments on Blackboard can be found in Appendix I of this study.

Table 4.69 – Comments on Blackboard

Category of Response	Number of Students
Very good site, easy to use	2
In other courses it has been very helpful & fun	2

Table 4.69 shows that two students responded that Blackboard was easy to use. Two other study participants stated in other courses it had been very helpful and fun.

Summary of Survey Findings and Additional Comments from the Focus Group

This section of the study summarizes the survey data presented. In addition, additional thoughts and reflections from the focus group are included.

Delivery Type and the Four Interactions

Table 4.70 – Combined Ratings for the Four Interactions based on Delivery Type shows the study participant mean interaction rating for each of the delivery types.

Table 4.70 – Combined Ratings for the Four Interactions based on Delivery Type

Delivery Type	Student – Instructor	Student – Student	Student – Content	Student – Technology
Face-to-face	3.58	3.11	3.88	3.11**
Hybrid	3.93	2.93*	3.93	4.13
Online	3.95	3.90*	4.28	4.21**

* Difference for Student – Student Interaction that can be attributed to Hybrid and Online delivery type (>.05)

** Difference for Student – Technology Interaction that can be attributed to Face-to-face and Online delivery type (>.05)

Table 4.70 shows that the mean interaction ratings for each of the hybrid and online delivery types appear higher than the face-to-face mean ratings with the exception of one, student – student interaction. Overall, study participants felt instructors encouraged the four interactions more in technologically mediated courses. In fact, the interaction ratings increased progressively from no technological delivery in the class, to some technological delivery and finally courses completely delivered via technology – with the exception of student – student interaction.

College Division and the Four Interactions

Table 4.71 – Combined Ratings for the Four Interactions Based on College Division shows the study participant mean interaction ratings for courses based on the

college division - either Business and Media Careers Division and Liberal Studies Division.

Table 4.71 – Combined Ratings for the Four Interactions Based on College Division

Division	Student – Instructor	Student – Student	Student – Content	Student – Technology
Business and Media Careers	3.97	3.47	4.19	4.22
Liberal Studies	3.65	3.26	3.86	3.65

Table 4.71 shows that the mean interaction ratings for all four types of interaction appear higher for courses in the Business and Media Careers Division. Overall, study participants who took courses from the Business and Media Careers Division provided a higher average rating for the four interactions than study participants who took courses from the Liberal Studies Division.

Age and the Four Interactions

Table 4.72 – Combined Ratings for the Four Interactions Based on Age shows the study participant mean interaction rating for the age grouping “Young Half” and “Old Half.”

Table 4.72 – Combined Ratings for the Four Interactions Based on Age

Age	Student – Instructor	Student – Student	Student – Content	Student – Technology
Young Half	3.65	3.31	4.04	3.58*
Old Half	4.00	3.44	4.04	4.42*

* Difference for Student – Technology Interaction that can be attributed to age ($>.05$)

Table 4.72 shows that the mean interaction ratings appear higher for the “Old Half,” 25 – 58 year, age group, except for student – content interaction where the mean rating was the same. Overall, older study participants rated the four interactions higher.

Computer Skills and the Four Interactions

Table 4.73 – Combined Ratings for the Four Interactions Based on Computer Skills shows the study participant mean rating for the low and high computer skill groupings.

Table 4.73 – Combined Ratings for the Four Interactions Based on Computer Skills

Computer Skills	Student – Instructor	Student – Student	Student – Content	Student – Technology
Low	3.65	3.00	4.05	3.48*
High	3.97	3.67	4.04	4.41*

* Difference for Student – Technology Interaction that can be attributed to computer skills (>.05)

Table 4.73 shows that the mean interaction ratings appear higher for study participants who had “High,” advanced or expert, computer skills. The one exception was student – content interaction where the mean ratings were almost identical. Overall, study participants who had higher computer skills rated the interactions higher.

Gender and the Four Interactions

Table 4.74 – Combined Ratings for the Four Interactions Based on Gender shows the study participant mean rating by gender.

Table 4.74 – Combined Ratings for the Four Interactions Based on Gender

Gender	Student – Instructor	Student – Student	Student – Content	Student – Technology
Female	4.02*	3.49	4.11	4.00
Male	3.09*	3.09	3.91	3.83

* Difference for Student – Instructor Interaction that can be attributed to gender (>.05)

Table 4.74 shows that mean interaction ratings appear higher for female study participants. Overall, female study participants rated the four interactions higher than male study participants.

Pursuing Degree/Certificate and the Four Interactions

Table 4.75 – Combined Ratings for the Four Interactions Based on Degree/Certificate shows the study participant mean rating for each of the interactions based on if a study participant was pursuing a degree or certificate at the institution when the survey was returned.

Table 4.75 – Combined Ratings for the Four Interactions Based on Degree/Certificate

Degree/Certificate	Student – Instructor	Student – Student	Student – Content	Student – Technology
Yes	3.90	3.45	4.04	3.74
No	3.74	3.35	4.09	4.16

Table 4.75 shows that the mean interaction ratings for the student – instructor and student – student interactions appear higher for study participants who were seeking a degree or certificate. The mean ratings were almost identical for student – content interaction. Study participants who were not seeking a degree or certificate rated student – technology interaction higher.

Additional thoughts/reflections from the Focus Group

Upon completion of examining the data from the four interactions, focus group participations were asked to reflect back upon the time they had spent and to provide additional thoughts. Focus group participants originally weren't sure they would like online or hybrid, but now they stated they liked it better. Respondents shared that

online courses offer more flexibility, however the delivery method should be based on the instructor or subject. They also reiterated their earlier comments that instructors should assess learning styles and that the technology will help them with their current jobs. They felt the college should move more support services online – e.g. counseling center, and technology could help with parking, meetings, and student services. They suggested that orientation at the college could be done online.

CHAPTER V

DISCUSSION, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Introduction

The conclusions, implications, and recommendations from the study's data collection and analysis are presented in this chapter. Sections include: Purpose, Research Questions, Discussion, Conclusion, Implications, and Recommendations.

Purpose

The purpose of this study was to determine if there is a relationship between student perceptions of each of the four interactions student – instructor, student – student, student – content, and student – technology and the delivery type of the course in which the student is enrolled, face-to-face, as a hybrid, and online. Data from this research will assist institutions in making informed decisions regarding the adoption of technology in instruction based on which delivery methods promote the highest student – instructor, student – student, student – content, and student – technology interactivity.

This section presents the conclusions that were drawn from the research and discusses each of the four interactions as they relate to the delivery type of the course in which the student was enrolled. Implications will be drawn from the conclusions and recommendations made regarding further research in the area of interactivity in higher education.

Research Questions

Six research questions were used to guide the study. Each of the following questions was asked to determine student perceptions of the interactions and if age or

gender played a role in how the students responded to the survey. The six questions are included here from Chapter One of this study for the reader's review.

Research Question 1:

In what ways do student perceptions differ when students in face-to-face, hybrid, and completely online environments are asked to identify their interactions with the instructor?

Research Question 2:

In what ways do student perceptions differ when students in face-to-face, hybrid, and completely online environments are asked to identify their interactions with the other students in the class?

Research Question 3:

In what ways do student perceptions differ when students in face-to-face, hybrid, and completely online environments are asked to identify their interactions with the course content?

Research Question 4:

In what ways do student perceptions differ when students in face-to-face, hybrid, and completely online environments are asked to identify their interactions with the technology used in the class?

Research Question 5:

Is age a differentiating factor when student identified interactions in the three different classroom settings are compared?

Research Question 6:

Is gender a differentiating factor when student identified interactions in the three different classroom settings are compared?

Discussion

In 1989, Michael Moore proposed a theory of distance education based on the need to accommodate within the distant classroom three essential interactions: learner-content, learner-instructor, and learner-learner (Moore, 1989). Hillman, Willis and Gunawardena (1994) augmented Moore's model with a fourth interaction, learner-interface. This interaction addresses learners' accommodation to technological learning platforms. This section presents the conclusions that were drawn from the research and discusses each of the four interactions as they relate to the delivery type of the course in which the student was enrolled. In addition, related literature will introduce each of the interactions.

Student – Instructor Interaction

Moore's second type of interaction, regarded as essential by many educators and as highly desirable by many learners, is the interaction between the learner and the expert who prepared the subject material or some other expert acting as instructor (Moore, 1989). In this interaction, instructors attempt to achieve aims held in common with all other educators. First having planned or been given a curriculum or a program of content to be taught, they seek to stimulate or at least maintain the student's interest in what is to be taught, to motivate the student to learn, and to enhance and maintain the learner's interest including self-direction and self-motivation (ibid, 1989). The

instructor is especially valuable in responding to the learners' application of new knowledge. The learners do not know enough about the subject to be sure that they are (1) applying it correctly, (2) applying it as extensively as possible or desirable, or (3) aware of all the potential areas of application (ibid, 1989). This was the first interaction this study examined.

The student responses to the ways in which interaction between the instructor and student was encouraged support a traditional teaching methodology by asking and answering questions and by lecture and class discussion. These statements support the traditional delivery of instruction, face-to-face.

Overall, students felt the interaction between the instructor and students was good. However, when examining how students rated the interaction between the instructor and student by delivery type, face-to-face rated this interaction 3.58 (average to good), hybrid 3.93 (good), and online 3.95 (good). This study shows a trend that student – instructor interactions are impacted favorably by the use of technology in the classroom, not only by face-to-face interaction with the instructor.

The focus group responses support the previous statement that interactions between the instructor and student are impacted favorably by the use of technology in the classroom. Members of the focus group indicated that they agree the mean scores increased from face-to-face to online as an expectation of interaction increased in the online environment. Delivery of information changes from face-to-face to online and quiet students may interact more online due to a perception of less peer pressure. Everyone gets his or her say online. Instructors tended to encourage interaction online versus a face-to-face class where the instructor would typically lecture.

Members of the focus group felt that instructors at the college should use the data presented in this study to identify what works well with students, as different learning styles suit different learners. Instructors need to attempt to change their techniques and to survey students before class to see what they would like to learn. During the semester the instructors need to “check in” with students on teaching progress and to see if student expectations are being met. Instructors need to be willing to take questions, comments, and criticism from students.

When testing for significance between the variables delivery type, computer skills, course type, pursuance of a degree or certificate, and age the results were all negative in relation to student – instructor interaction. However, when comparing gender and student – instructor interaction rating, the level of significance is at .030, which shows there is an apparent difference between the study participant’s gender and student – instructor interaction at a 95% confidence level. When reviewing the data female study participant’s rated the student – instructor interaction “Good,” 4.02, versus male study participants who rated the student – instructor interaction “Average,” 3.09.

The student rating by delivery type presents the ever-increasing role technology has in the classroom and how instructors must change their way of thinking about the integration of technology with instruction. It is not surprising that the focus group highlighted the fact that student – instructor interaction increased as the technology became the delivery method. Instructors must learn to transition from strict lecture to facilitative learning regardless of the delivery method of the instruction. Adopting a “guide on the side” mentality versus a “sage on the stage” philosophy will enable instructors to see how technology can actually increase interaction with their students.

Another important point indicated by the open-ended questions and the focus group related to checking in with students both at the beginning of and during the semester. By adapting lessons to the needs of the students in the class and ensuring their individual learning styles are being accounted for, an instructor will increase the students' level of satisfaction of the learning experience.

Student – Student Interaction

The third interaction Moore proposes is inter-learner interaction between one learner and other learners, alone or in group settings, with or without the real-time presence of an instructor (Moore, 1989). Through the history of education the class or educational group has more often than not been organized for reasons that have nothing to do with learners' needs (Moore, 1989). At present many classes are organized because the class is the only organizational form known to most teachers and because in the short term, though not usually the long term, it is the cheapest way of delivering the teaching acts of stimulation, presentation, application, evaluation, and student support (Moore, 1989). This was the second interaction to be addressed by this study.

The student responses to the ways in which interaction between and among the students was encouraged included working in teams/group projects, via class discussion, by comparing/sharing notes, and by working in a laboratory environment. With the adoption of Blackboard as a course management tool, working in teams/groups and holding a class discussion can be facilitated through the use of technology.

Overall, students felt that the interaction between and among students was average. In fact, 11 of the 13 student – student interactions were rated below 3.5 (good). The student – student interaction ratings were the lowest of all forms of interaction

studied. Interaction has long been considered the key to success in traditional classroom (Fulford and Zhang, 1993). Students experiencing higher levels of interaction have been shown to have more positive attitudes and higher levels of achievement than those experiencing less interaction (ibid, 1993). One of the keys components of good teaching is the intellectually stimulating exchange of ideas, those meaningful interactions that occur between teachers and students and among students themselves (Vrasidas and McIsaac, 1999). This student – student interaction is critical to supporting the learning environment, regardless of delivery type. However, when examining how students rated the interaction between and among students by delivery type, face-to-face students rated this interaction 3.11 (average), hybrid students 2.93 (average) and online students 3.90 (good). Again, this study shows a trend that student-student interactions are impacted favorably by the use of technology in the classroom, especially for completely online courses where the instructor may grade students based on their interactions between one another.

The focus group targeted two points relating to student – student interaction, the fact that online interaction between students was encouraged and the instructors assigned group projects. Student – student interaction online was rated good as compared to average for the hybrid and face-to-face delivery. This data was the same as what the focus group expected as online interaction between and among students was not only encouraged, but the student’s final grade depended on participating in discussion forums and posting responses to other students’ work and group projects. The only problem the focus group had with group projects required for online courses was an inequity created among group members when one of the group failed to

participate – or goes “AWOL,” absent with out leave, a military acronym, as they put it. Many instructors have prepared for this inequity by having group members evaluate each other’s contribution and that being a portion of the student’s grade.

The focus group felt it would be beneficial to have more group projects and allow students to work with one another and share ideas. The hybrid class would be an excellent way for group work to continue even when the class meets only half of the time face-to-face.

When testing for significance between the variables computer skills, course type, pursuance of a degree or certificate, age, or gender the results were all negative in relation to student – student interaction. However, when comparing hybrid to online delivery types, online study participants rated student – student interaction higher than hybrid study participants.

Student – Content Interaction

The first type of interaction Moore introduced in 1989 is between the learner and the content or subject of study. Without interaction with course content, there cannot be education since it is the process of intellectually interacting with content that results in changes in the learner’s understanding, the learner’s perspective, or the cognitive structures of the learner’s mind (Moore, 1989). This was the third interaction addressed in this study.

The student responses to the ways in which interaction between the course content and student was encouraged were all over the board. The only multiple response was “Lecture, class discussion, internet, book” where 2 students answered this

way. This indicates that instructors at the college need to encourage students to interact with course content, perhaps by providing more course content online.

Overall, students felt the interaction between the course content and students was good. However, when examining how students rated the interaction between the course content and student by delivery type, face-to-face rated this interaction 3.88 (good), hybrid 3.93 (good) and online 4.28 (good). This study shows a trend that student – content interactions are impacted favorably by the use of technology, especially for online courses where all of the course content is online.

The focus group agreed with the data, especially in regards to the fact that instructors put more content online and required students to interact with that content in online classes. In fact, the students in the focus groups wished more instructors would use the technology to put more content online regardless of delivery type. They would like to see Blackboard used in the following ways for all classes: internet links, announcements, syllabus, assignments, lecture notes, discussion, group work, and email. If a student missed class for any reason, he or she should be able to access the system to see what was missed.

When testing for significance between the variables delivery type, computer skills, course type, pursuance of a degree or certificate, age, or gender the results were all negative in relation to student – content interaction.

Student – Technology Interaction

In 1994, Hillman, Willis and Gunawardena (1994) augmented Moore's model with a fourth interaction learner-interface. This interaction addresses learners' accommodation to technological learning platforms. The learner-interface interaction

provides access to instruction, and access permits learners to participate in the other essential learner interactions (Hillman, et al, 1994). If the learner-interface interaction fails to occur, students might not participate at any level in other learner interactions (ibid, 1994). In effect, adequate and reliable learner-interface interaction is the keystone to learner involvement. If it fails, learning fails. A desirable outcome of the learner-interface interaction is to render the technology user friendly and transparent (ibid, 1994). The fourth research question in this study deals with the interaction between the technology and the students.

The student responses to the ways in which interaction between the technology and students was encouraged were a majority “Blackboard was not used.” This can be attributed to the follow-up question “Did Your Class Use Blackboard?” and will be addressed later. Overall, students who used technology in their class liked the course management system – Blackboard.

Overall, students felt the interaction between the technology and the students was good. However, when examining how students rated the interaction between the technology and students by delivery type, face-to-face rated this interaction 3.11 (average), hybrid 4.13 (good) and online 4.21 (good). It is not surprising that technology-student interactions are impacted favorably by the use of technology in the classroom. It is interesting to point out that the student – technology interaction rating for the hybrid class (face-to-face and online) was very close to that of the online rating.

The focus group agreed that student – technology interaction was impacted favorably with the use of technology in the classroom, especially since hybrid and online courses required the use of Blackboard. The focus group had many good

suggestions which included the college's course catalog should reflect technology knowledge as a requirement and that the college should provide a technology skills assessment with follow up workshops on technology use. The overall theme from the survey and focus group is that all classes should take advantage of the technology available. This is critical, as once students graduate from college they will be expected to use technology in their professions, and the college should prepare them for this challenge.

When testing for significance between the variables course type, pursuance of a degree or certificate, or gender, the results were all negative in relation to student – technology interaction. When comparing delivery type and student – technology interaction rating, the level of significance is at .014, which shows there is an apparent difference between the delivery type and student – technology interaction at a 95% confidence level. This is not surprising due to the fact that the level of student – technology interaction is much greater in courses that are delivered directly via technology or a substantial portion of the course is delivered via technology. In addition, when comparing computer skill groupings, the “High Computer Skill” group rated student – technology interaction higher than the “Low Computer Skill” group. The level of significance is at .014, which shows there is an apparent difference between the skill level grouping and student – technology interaction at a 95% confidence level. It makes sense that study participants who report having better computer skills would rate student – technology interactions higher than those who report having novice or intermediate computer skills.

The study participants in the “Old Half” age grouping, 25 – 58 years, rated student – technology interaction higher than the “Young Half” age grouping. This also showed a level of significance at .030, which shows there is an apparent difference between the age and student – technology interaction at a 95% confidence level. One could conclude this is based on the experience an older worker has using technology in the workforce versus younger students who may have better computer skills, but less experience in application of the technology. As computer use and the adoption of Blackboard by instructors for their face-to-face course increases, the researcher theorizes that the difference between delivery type and the student – technology interaction would decrease.

Blackboard

Survey question five asked students to indicate if Blackboard was used in their class. Overall, 41 out of a total of 53, 77.4%, students who participated in the survey stated they used Blackboard in their class. This is a fascinating fact, as 5 students out of the total 17 in face-to-face delivered courses must have used the Blackboard course management system in their class. Fall semester 2001 is the first semester all courses at the college had Blackboard course sites available for instructors to use. Further investigation would be needed and a follow-up study performed to see what the adoption rate of this technology was during that first semester. Face-to-face instructors could have used Blackboard for communication, discussion, and quizzes or as a place to post content. The purpose of this study was not to discover this; however, it is interesting to the researcher that almost thirty percent of the respondents in the face-to-

face delivery stated they used Blackboard the first semester it was available to instructors for use.

The next part of the data presented was how instructors used Blackboard in their classes. Students could select how Blackboard was used in eight different categories. Out of the total 227 responses, 38 students indicated they used the announcement and syllabus feature of Blackboard in their course; this represented 16.7% of the total responses respectively. Thirty-six students indicated they used course documents and the discussion board or 15.9% of the total responses. Twenty-nine students indicated that email was used in Blackboard, or 12.8% of the responses, followed by 25 who indicated assessments in their courses were delivered via Blackboard, 11% of the total responses. Finally, 17 indicated group work (7.5%), and 8 used the Blackboard chat feature (3.5%).

It is not surprising that the announcement, syllabus, course documents, discussion board, email, and assessment features were used as often as shown above. These are the integral components of any course management system, and for a hybrid or online class to be successful, any or all of the key features listed previously would be critical components of course design and delivery of course content. In fact, the college has adopted an online instructor-training program which demonstrates the use and application of these various features in order to ensure a successful learning experience.

Comments from students regarding the use of Blackboard as a course management tool ranged from very easy to use to “a real pain since the computer isn’t trustworthy.” Students were quick to state that their course wouldn’t have worked well

in Blackboard, supporting the focus group's point that not all courses are suited for a completely online environment.

Since this was the first semester the college implemented a data integration project between the student information system and course management system (Blackboard), some technical difficulties were experienced at the beginning of the semester. Many of the problems noted by students participating in the study and focus groups were due to difficulties with their own computer equipment and/or their internet service provider. Slow connection speeds to the internet will continue to be an issue until high speed access is available and affordable to student populations.

Conclusion

This study has demonstrated that the use of technology can actually increase student perceptions relating to the four interactions found in the classroom, even though the results cannot be generalized beyond the students who participated due to the limited number of responses. In addition, the study also provides examples of how instructors encouraged these interactions. The other important finding is that instructors should be well versed in education technology, and colleges and universities need to prepare students in the use of technology. Students today will be expected to use technology in the work place, and it is up to institutions of higher education to better prepare these students for the challenges they will face while on the job.

It is important to note that the online students rated the four interactions slightly higher than both the face-to-face and hybrid students. In a few cases, the difference was significant and demonstrates a commitment from instructors to encourage interaction between and among the students, and to ensure the online students have access to course

content. The fact that the student – technology interaction and delivery type test for significance was positive should provide the institution with incentive to provide training to both faculty and students so the technology skills of both groups will improve.

When asked to reflect on the hour and a half spent discussing the four types of interaction, the focus group had some interesting thoughts and suggestions to enhance the learning for the students. Initially, members of the group were skeptical about taking a class online or as a hybrid. Now, however, they like their experience better in those types of classes even though it boils down to the instructor teaching the section. They were also quick to add that the delivery method selected for courses should be based on the subject, as not all subjects are suited for online delivery, and instructors should be well prepared and know the subject as well as the technology before trying to teach a hybrid or online class.

Focus group members also reiterated a need for assessing the learning styles of students at the beginning of the semester and for instructors to “check in” during the semester on the progress of the course. More college services need to take advantage of technology and adopt alternatives to delivering student services from traditional, face-to-face methods. Finally, the students were happy the college was allowing them the opportunity to use technology and for emphasizing it in the instruction they received, as the students are well aware that they will be expected to use technology in the workforce.

In conclusion, technology, like any other classroom instructional tool, is only as good as the user. Preparation of instructors and students is critical to the successful

infusion of technology in the classroom. This study has demonstrated that the four interactions in higher education can be supported as well, if not better, through the use of technology and that student's perceptions of the interactions validate that these interactions need to be encouraged regardless of the delivery type.

Implications

This study has implications for college and university administrators in planning course delivery and provides valuable student opinions of the interactions they encounter while taking courses in one of the three delivery methods: face-to-face, hybrid and online. In addition, instructors can use the data gathered here to better understand how the four interactions student – instructor, student – student, student – content and student – technology work in the various delivery methods and how to leverage technology to assist the instruction, not to be the instruction.

Technology can be used by instructors to communicate with students, store documents and course content, and as a way for students to interact with one another. It is important that the technology used in the class does not take away from the instruction but assists the instructor in facilitating the learning. The technology should support the learners and provide a vehicle for delivering the instruction, not as an “add on” which doesn't increase the experience of the students.

Instructors need to be sure to ask students about their expectations and learning styles at the beginning and during the course. By checking in the instructor will ensure the student is comfortable with the course content, the use of technology in the classroom, and with other students in the course. It is important that the instructor examines his or her class teaching style and facilitates the learning with the student. It

is apparent from the comments made during this study that the students are motivated and have expectations to learn specific topics. They are willing to sit through lectures. However, students participating in this study rated technologically facilitated learning, hybrid and online, higher in all four interactions with the exception of student – student where face-to-face was rated slightly higher than hybrid delivery.

In addition, colleges and universities that infuse technology across instruction will better prepare students for the challenges they face in the job market, as they will be expected to use technology while at work. Again, for the population of this study the students are expected to use technology in the workplace, and they expect the instructors to be well versed on not only the technology of their field but of using technology in the classroom.

Recommendations

Colleges and universities should use the data presented as supportive of the use of technology in instruction. Students are willing to use technology to access information and in many cases, prefer being able to access their course anytime and anyplace. Preparation of instructors and the conversion of face-to-face materials online need to be carefully planned and implemented remembering that the technology should not replace the instruction but rather enhance or reinforce the course content. Instructors need to ensure they are checking in with students at the beginning, middle, and at the end of the semester to make sure course objectives are being met. Different student learning styles also need to be planned for and met.

The various course management systems available today make it possible for instructors to promote all four interactions found in traditional, face-to-face classes

through the use of the tools the technology offers. By using discussion boards, email, and chat, instructors are able to increase interactions with and among their students. Course documents and announcements allow students to access course content which otherwise might not have been available to them in a face-to-face class. In addition, an online grade book allows students to keep track of their progress throughout the semester.

Finally, student's demand for enhancing their technology skills is increasing as they understand that future and continued employment may well be based on how adept they are at using technology in the workplace. Colleges and universities across the nation need to understand and ensure they are preparing students for the challenges they will face in competitive job markets. Many times students who are familiar with and are willing to use technology will get a job over an individual who has better academic preparation but who is unfamiliar with current technology used in the workplace.

Suggestions for Future Research

Trend data needs to be gathered throughout the academic year. This study only offers a look at the first semester when Blackboard was used by seven different courses via three different delivery methods, face-to-face, hybrid, and online. Although the online study participants appear to rate the interactions higher in all cases, the small sample size prevented the researcher from drawing concrete conclusions and a larger study would provide more conclusive data. During the fall semester in 2002, the college offered over 30 different courses using the three different delivery methods. In addition, more than 400 instructors have received training on how to adopt technology in the

classroom. It would be interesting to see how these instructors have fared using the three different delivery methods.

Based on this study and the open-ended responses for the different interaction types, a taxonomy of potential forms of interaction, student – instructor interactions, student – student interactions, student – content interactions and student – technology interactions, could be developed and used by study participants to share their perceptions of the interactions they encountered. This taxonomy could also be developed for instructors to see if the interactions they encouraged matched the ones the students experienced.

Finally, it would be interesting to check on instructor perceptions on the four interactions using the three delivery methods, especially since many instructors are now teaching in multiple delivery formats. How did your face-to-face, hybrid, and online classes compare with one another? Have you made any changes to the way you teach due to the infusion of technology in your classroom? How much has the use of technology impacted your other classes? Are you spending more/less time preparing or delivering your instruction?

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APPENDIX I: OPEN-ENDED RESPONSES FOR EACH INTERACTION

STUDENT – INSTRUCTOR INTERACTIONS

Category of Response	Number of Students
Asking/answering questions	10
Lecture, class discussion	5
Office hours	2
During experiments the instructor would walk around the room to check on the students	1
We consistently held group discussions about the topics we were learning in class	1
Instructor went over homework everyday	1
It wasn't encouraged, the teacher just stood in front of the class talking for hours	1
By giving assignments	1
Scenarios	1

STUDENT – STUDENT INTERACTIONS

Category of Response	Number of Students
We had to work in teams/group projects	5
Class discussion	5
Compared/shared notes	2
Worked in labs for one session each week, allowed for discussion between lab partners	2
We never did anything together as groups. I never even knew any of the student's names	1
None was encouraged	1

STUDENT – CONTENT INTERACTIONS

Category of Response	Number of Students
Lecture, class discussion, internet, book	2
We had 5 – 6 “case study” papers to do throughout the semester in which we were “forced” to use concepts from our book	1
Omitting the traditional exams, quizzes, & tests and working on a project similar to real world projects – developing a marketing plan	1
We were given several weekly assignments as well as bi-weekly papers to stay on task	1
Had to write a report of our choice on a topic covered in class. This allowed the students to	1

more deeply explore a topic of interest	
Example html files on the instructors website and other code from another web page on the internet	1
The course followed the syllabus and all students had to work on the experiments that was assigned for that date	1
Homework was assigned each time class met and the previous assignment was gone over by the instructor, then a test was given on the material	1
All we did was take notes and take tests. We did do one book report, but that's it	1
Attend study groups and access the answer book for the problems	1
Lectures on every chapter using slides, worksheets and practice quizzes	1

STUDENT – TECHNOLOGY INTERACTION

Category of Response	Number of Students
Blackboard was not used	10
Used Excel to chart lab results	1
Blackboard was a wonderful help in this class, announcements, practice quizzes and assignments were put on so it could be accessed at your own convenience	1
We posted reports for extra credit and to retrieve assignments if we were unable to attend class	1
Website assignments	1
Grade and assignments on blackboard	1

COMMENTS ON BLACKBOARD

Category of Response	Number of Students
Very good site, easy to use	2
In other courses it has been very helpful & fun	2
Not all courses can use Blackboard. This course especially wouldn't have worked out by using Blackboard (Marketing 200)	1
Ok, but a real pain since the computer isn't trustworthy – crashes a lot or the internet isn't dialing up correctly	1

APPENDIX II: CLASS SURVEY INSTRUMENT

The purpose of this study is to compare the opinions of students about the interactions they encounter while taking college courses in a face-to-face, hybrid, and online environment. The study uses a survey instrument asking you to identify interactions in four categories; student-instructor interactions, student-student interactions, student-content interactions and student-technology interactions. You will then be asked to rate the interactions on a scale of one (poor) to five (excellent). Your participation in the survey is voluntary, and you indicate your voluntary consent by returning the survey instrument in the stamped envelope provided. You may skip certain questions if you want and stop your participation at any time without penalty. Please contact Tim Brannan at (517) 483-1703 if you have any questions.

1. In what ways was interaction between the instructor and students encouraged?

Please rate the interaction between the instructor and students:

Poor 1 2 3 4 5 Excellent

Comments:

2. In what ways was interaction between and among the students in the class encouraged?

Please rate the interaction between and among the students:

Poor 1 2 3 4 5 Excellent

Comments:

3. In what ways was interaction between the course content and students encouraged?

Please rate the interaction between the course content and students:

Poor 1 2 3 4 5 Excellent

Comments:

4. In what ways was interaction between the technology (Blackboard) and students encouraged?

Please rate the interaction between the technology and students:

Poor 1 2 3 4 5 Excellent

Comments:

5. Did your class use Blackboard? ____ Yes ____ No

If YES, please check the lines below to indicate how Blackboard was used during the semester.

____ Announcement
____ Email
____ Syllabus
____ Course Documents
____ Discussion Board
____ Assessment
____ Chat
____ Groupwork

Comments about Blackboard:

Your Age:

Your Computer skills: ____ No experience ____ Novice ____ Intermediate

____ Advanced ____ Expert

Are you seeking a degree at LCC?: ____ Yes ____ No

If YES which degree? _____

Sex: ____ Male ____ Female

Thank you for taking the time to complete this survey! Please return in the enclosed envelope or mail to Tim Brannan, PO Box 20, Dewitt, MI 48820.

APPENDIX III: FOCUS GROUP INSTRUMENT

The purpose of this study is to compare the opinions of students about the interactions they encounter while taking college courses in a face-to-face, hybrid, and online environment. The study uses a focus group to validate the survey's findings relating to interactions in four categories; student-instructor interactions, student-student interactions, student-content interactions and student-technology interactions. You will then be asked the following questions and your responses tape-recorded. Your participation in the survey is voluntary, and you indicate your voluntary consent by signing the consent form. You may skip certain questions if you want and stop your participation at any time without penalty

What meaning/understanding can you draw from the data presented?

Is the data different from or the same as you expected or experienced?

In what ways can this data help instructors do a better job?

Your Age:

Your Computer skills: ☐ No experience ☐ Novice ☐ Intermediate
☐ Advanced ☐ Expert

Are you seeking a degree at LCC?: ☐ Yes ☐ No

If YES which degree? _____

Sex: ☐ Male ☐ Female

APPENDIX IV: INFORMED CONSENT FOR FOCUS GROUP

Thank you for agreeing to participate in this focus group addressing learner interactivity in higher education. By signing this form, you give the research team your permission to share data collected from a focus group detailing with three different types of instruction: face-to-face, hybrid, and online.

Your participation in this focus group is completely voluntary. The researchers will be the only people seeing your remarks and your input will be kept confidential and anonymous. Lastly, your privacy will be protected to the maximum extent allowable by law.

Thank you again for your cooperation and help with improving learner interactions in higher education. If you have any particular questions about this study, please contact:

Dr. Joe Levine
Dissertation Chair
409 Agriculture Hall
Michigan State University
(517) 355-6580

Dr. Dave Krueger
Co-interviewer
409 Agriculture Hall
Michigan State University
(517) 355-6580

Tim Brannan
Co-interviewer
11685 Prestle Ct.
Dewitt, MI 48820
(517) 668-0104

If you have questions about being a human subject of research you may contact Ashir Kumar, M.D., Chair, University Committee on Research Involving Human Subjects at 355-2180 or ucrihs@msu.edu.

I, _____, agree to participate in the Learner Interactivity in Higher Education Focus Group conducted by Dr. Krueger and Tim Brannan.

I, _____, agree to allow my voice to be audio-taped while participating in the Learner Interactivity in Higher Education Focus Group conducted by Dr. Krueger and Tim Brannan.

Signed: _____

Date: _____

APPENDIX V: SURVEY COVER LETTER

{Date}

Dear {Name}:

I am writing you to ask your cooperation in completing the enclosed survey instrument to determine interactions found in Lansing Community College courses fall semester 2001. The purpose of this study is to compare the opinions of students about the interactions they encounter while taking college courses in a face-to-face, hybrid, and online environment. The study uses a survey instrument asking you to identify interactions in four categories; student-instructor interactions, student-student interactions, student-content interactions and student-technology interactions. You will then be asked to rate the interactions on a scale of one (poor) to five (excellent).

Your participation in the survey is voluntary, and you indicate your voluntary consent by returning the survey instrument in the stamped envelope provided. The survey has been designed for you to respond in approximately 20 minutes. No individual respondents will be identified in any results or research reports. Your privacy will be protected to the maximum extent allowable by law.

A follow-up focus group is planned to occur over the summer. If you are interested in participating in this even, please indicate your interest on the enclosed postcard and mail. The focus group is designed to take approximately one hour and will be tape-recorded.

If you have questions about being a human subject of research you may contact Ashir Kumar, M.D., Chair, University Committee on Research Involving Human Subjects at 355-2180 or ucrihs@msu.edu.

Thank you in advance for taking time to share your options regarding interactions you encounter while taking courses at Lansing Community College. If you have any particular questions about this study, please call Dr. Joe Levine at (517) 355-6580 or myself at (517) 483-1703.

Sincerely,

Tim Brannan
Director of Distance Learning

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