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Traditional classroom versus distance learning approaches in providing eduactaion for students at the College of Applied Science and Technology at RIT

Ryan Griske

Traditional Classroom versus Distance Learning Approaches in Providing Education for Students at the College of Applied Science and Technology at RIT

By

Ryan M. Griske

Thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Information Technology

Department of Information Technology
Rochester Institute of Technology

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ABSTRACT

This thesis discusses the current controversial issue of traditional classroom vs. distance learning approaches in higher education institutions using a case study in the College of Applied Science and Technology at RIT. The most important question addressed in the thesis is, "Are distance learning methods effective for addressing university-level learning goals?" (Kathleen Davey, 1999, p. 45). There are currently many disputes between educational researchers on this issue.

The first four chapters cover details of the proposal stage as previously approved by the Thesis Committee. Chapter One briefly introduces this issue and several important terms used throughout the thesis (e.g., distance learning, traditional classroom, and self-directing learning). Chapter Two presents an in-depth review and analysis of educational and psychological theories and research literature. Chapters Three and Four present principal research questions explored in addressing this issue, as well as ways that relevant data was obtained and analyzed using an action research methodology.

The next three chapters discuss the data collection and analysis stage. Chapter Five presents data secured from surveyed RIT administrators' interviews and questionnaire responses. Chapter Six describes data collected and analyzed based on observations in both the traditional classroom and distance learning sections of the surveyed course. Chapters Seven and Eight provide the results of data collection and analysis activities completed for instructors and students in the same two sections. These chapters include operational definitions, visual graphs, tables, and analytical interpretations of the data collected.

The last three chapters present conclusions based on the data and analyses previously documented. Chapter Nine discusses gaps between instructors' teaching styles and students' learning styles for the surveyed course. Chapter Ten compares RIT's university learning goals with the viewpoints and performance of instructors and students in both the traditional classroom and distance learning sections, and recommends ways to alleviate the performance discrepancies detected. Chapter Eleven presents serendipitous findings and limitations of the study.

The general answer to the most important question addressed in the thesis is that current RIT distance learning methods are not as effective as needed to fully comply with university-level learning goals. However, Chapter Ten concludes that both traditional classroom and distance learning methods can be much more successful in meeting these goals if RIT implements the recommendations presented in this chapter and explores other ways to enhance both environments of the education system.

TABLE OF CONTENTS

INDEX OF TABLES

INDEX OF FIGURES

ACKNOWLEDGMENTS

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Chapter 1

INTRODUCTION

Kathleen Davey defines "distance learning" as: "Any time a teacher defines, constructs, and organizes learning experiences directed toward specific learning goals, outcomes, and experiences that can be accomplished with the teacher and the student(s) separated by time and/or distance" (1999, p. 44).

"Traditional classroom" is the physical environment where "a body of students (meets) regularly to study the same subject" under the guidance of the teacher (Merriam-Webster Collegiate Dictionary, 1994), where either authoritarian adult education or democratic adult education can be provided. Ben M. Cherrington explains that in a classroom setting, authoritarian adult education involves instructor-centered teaching and democratic adult education involves learner-centered teaching (Knowles, 1990, pp. 36 - 37).

Kathryn Patricia Cross describes a "self-directed" learning experience as a learning environment where the teacher is the facilitator of learning and the students use a self-planned style (self-learning pace, self-learning style, and freedom of choices) (1981, pp. 186-198). Many research educators agree that adult learners should be "self-directed" learners based on the andragogical model (discussed later in my thesis).

"Distance education" is very popular in colleges and universities today, but it is not a new concept. "Distance" courses were first offered in Europe and the United States in the 1850's. How could this method of education be accomplished in the past despite the fact that the society had no Internet nor advanced computer technologies? Educators simply used the mail, radio, television, and other available media. Today, numerous educators believe that in the future, all institutions of higher learning will offer many courses though the distance learning method. Why? The cost of providing education in institutions is increasing much faster than the inflation rate. These institutions are therefore looking for cost-efficient alternatives such as the Internet and virtual classrooms in order to avoid a financial crisis in providing education to college students (Neal, 1999, pp 40 - 41).

The National Center for Educational Statistics estimates that the number of college students under age 25 will increase by about 20 % from 1995 to 2007 compared to only a 4 % increase in the number of college students age 25 and over. The article written by Neal points out that there is no proof that college students under age 25 will prefer to be educated through distance learning rather than in a traditional classroom setting. Very few high school graduates have adequate "self-directed" habits for completing tasks, since most were dependent on their teachers for feedback on their performance. The distance learning method requires motivation, perseverance, self-discipline, organization, and time management skills, but limited feedback is provided to students because students and teachers are far apart from each other (Neal, 1999, pp. 41 - 42).

Why are young adults not sufficiently "self-directed"? Malcolm Knowles states that the American culture modifies the natural rate of growth in self-direction (See Figure 1). Students should be ready to be self-directed by the age of 18, but the cultural rate of growth in self-direction results in most young adults becoming self-directed between the ages of 20 and 30 (Knowles, 1990, pp. 55 - 56).

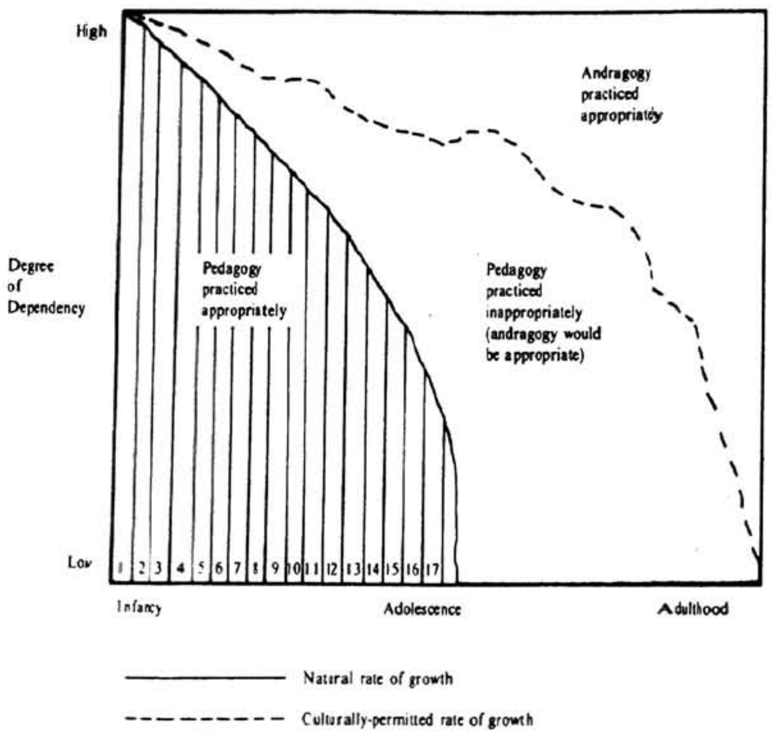


Figure 1.1 Natural rate of growth in self-direction vs. cultural rate of growth in self-direction
Credit: Knowles, 1990, p. 56.

Ed Neal's writing implies that he believes distance learning is a "self-directed" learning experience and states that courses offered through traditional classrooms should continue to increase during the 21st century. Neal's argument is confirmed by Maudsley's statement -- "Awareness of one's own process in learning is a prerequisite for self-directed distant study" ("Optimum Conditions For Adult Learners", p. 1).

Some attributes of "distance learning", however, do not appear to fit into the definition of "self-directed" learning and the andragogical model in current literature. Kathleen Davey's article asks us, "Are distance learning methods effective for addressing university-level learning goals?" (1999, p. 45). What are university-level learning goals? Are they following the andragogical model? Are distance learning methods more effective than traditional classroom methods in satisfying university-level learning goals and the andragogical model? Dr. Gerald Grow observed that "the goal of the educational process is to produce self-directed lifelong learners. Many current education practices in public schools and universities do more to perpetuate dependency than to create self-direction" ("Foster Self-Directed Learning", p. 1). In my thesis, distance learning and traditional classroom approaches were compared and contrasted in terms of teaching methods, learning styles, and learning environments.

The focus of the study was a convenience sample consisting of both sections of the same undergraduate course (distance learning and traditional classroom) at the College of Applied Science and Technology at RIT. The methodology of this study included techniques provided by the epistemological belief and sociocultural theories. The findings were analyzed and compared against the perspective transformation theory, andragogy, the Staged Self-Directed Learning model, and self-directed learning principles. These theories will be detailed in the next sections.

Chapter 2

LITERATURE REVIEW

2.1 Overview

Principles of the sociocultural theory were used as the basis of developing and completing the case study. Sociocultural theorists have previously used this theory in adult education research. Information Technology, including expansion of distance learning courses to educate students, is a major factor in shaping the social and cultural environment in the United States. Sociocultural settings affect how adults learn and what adults want to learn (Bonk & Kim, 1998, pp. 74 - 76). Kathryn Patricia Cross logically concludes that educational researchers should look at the current variables of adult learning in order to obtain a better understanding of adult learners' current needs (1981, p. 246). Mezirow's concept of perspective transformation, the epistemological belief theory, the staged self-directed learning model, andragogy, pedagogy, and self-directed learning principles were also used to supplement the sociocultural theory for providing an in-depth analysis and comparison of traditional classroom and distance learning methods.

2.2 Historical Review of the Sociocultural Theory and Research Literature

Lev S. Vygotsky is regarded as the father of the sociocultural theory. He was born on November 5, 1896, in Orscha, Belorussia, where he was raised by his middle-class Jewish parents. He received a very good education and was accepted by the Medical School of Moscow University at the age of 18 after his university graduation in 1917. He became well-versed in a range of subjects at the University of Moscow (literature, law, theater, philosophy, and psychology), but his interest shifted "to the areas of development of psychology, education, and psychopathology" at the age of 28. He wrote "The Psychology of Art" as his Ph.D. thesis in 1925 even though he was not formally trained in psychology (Overdorff, 1998; Guerra; "Lev Vygotsky"; Ratner, 1998).

Vygotsky enthusiastically developed many new concepts and theories about educational psychology until 1934, when he died of tuberculosis. For example, he stated that adult characteristics are based on environmental conditions. His psychological theories emphasized the aspects of culture and society. He read about pedagogy and performed psychology experiments. Educators and psychologists in the United States were unaware of his famous works until the 1960's because the U.S.S.R. prevented these works from being published and released to the world for many years (Overdorff, 1998; Guerra; "Lev Vygotsky"; Ratner, 1998).

<u>Thought and Language</u> and <u>Mind in Society</u>, Vygtosky's most famous works, discussed how learning and development take place in cultural and social contexts. These works led to the development of the sociocultural theory. However, <u>Mind in Society</u> emphasized more of this theory's principles than <u>Thought and Language</u>. Vygotosky concluded that each child's development is based on organic mechanicism and mastery in using tools. "Signs and words" are the first social devices of each child's life, which develop him or her into a better problem-solving learner. Social experiences also determine how each child uses his or her tools. Therefore, "...complex human structure is the product of a

development process deeply rooted in the links between individual and social history" (Vygtosky, 1978, pp. 1 - 30).

Vygtosky also introduced a very important concept regarding interpsychological vs. intrapsychological development. He stated that each child's development begins with interpsychological events (interactions with people). Then, it goes to the next stage called the intrapsychological event -- inner mental process (pp. 56 - 57). A child's learning and development are inter-related because development is the primary determinant of learning. Vygtosky created a very important term -- actual development level -- and defined it as "the level of development of a child's mental functions that has been established as a result of certain already completed developmental cycles" or the level of development "as determined by independent problem solving". This term led to a new concept called the zone of proximal development (ZPD). ZPD is the difference between the actual development level and the development level which has the potential to solve problems with assistance by experts and/or peers (pp. 85 - 86).

Vygtosky believed that children can do many things better under guidance, and that ZPD should be used to determine how effective learning is in the educational environment. He also theorized that internal development processes and learning can expand only if the child interacts with other people in his or her society. Finally, his writings pointed out that psychologists should concentrate on "how external knowledge and abilities in children become internalized" (pp. 86 - 91).

The introduction to Mind in Society explained how Vygtosky developed his ideas and theories. He used other people's empirical studies, many of which were pilot investigations, and analyzed them for creating his concepts. Vygtosky's work focused on the process rather than the performance of children's development, whereas performance is usually emphasized in American psychologists' research works. His critics suggest that research should be done in real world settings rather than in laboratories (pp. 11 - 14).

As Vygtosky's works were slowly introduced to American psychologists and educators, J. V. Wertsch became very committed to the sociocultural theory. He redefined and expanded this theory, leading to the present-day definition that it is the basic concept which explains how human functions respond to current social and cultural settings. The three parts of this theory are: (1) genetic/development analysis of understanding mental functions; (2) higher-order mental functioning in individuals that develops through social experience; and (3) influences of tools and signs (technologies of communicating ideas) on individuals' social and psychological activities (Bonk & Kim, 1998, p. 69).

There are six sociocultural concepts that are related to the sociocultural theory. They are zones of proximal development, internalization, scaffolding, intersubjectivity, cognitive apprenticeship, and assisted learning. Brief definitions of these concepts are presented below.

1. The zone of proximal development (ZPD) is the difference between the learner's current problem-solving ability and the learner's potential problem-solving ability with support from instructors and other "experts".
2. Internalization is the process of developing higher mental functions from social experience. In other words, students apply their newly-learned skills to different situations in the real world.
3. Scaffolding is the teaching method used to help the learner to master his or her problem-solving (task) skills.
4. Intersubjectivity is how a group of learners analyzes specific situations in the world.
5. Cognitive apprenticeship is the relationship between the guider and the learner in terms of developing new skills using real world experiences.
6. Assisted learning is any way of helping the student to learn something new (pp. 69 - 72).

Related to the fifth and sixth concepts, the article provides ten sociocultural teaching techniques (modeling, coaching, scaffolding and fading, questioning, encouraging articulation, developing exploration, getting student reflection, developing cognitive task structuring, providing positive feedback, and creating direct instruction) (p. 72).

ZPD can be used to measure the overall effects of the learning environment on the development of students' independent problem-solving abilities. One or more of the sociocultural influences listed above (internalization, scaffolding, intersubjectivity, cognitive apprenticeship, and assisted learning) can change the ZPD over time. As the difference, or ZPD "gap", between potential and actual development levels becomes smaller, a person's independent problem-solving ability becomes greater. For instance, effective scaffolding and assisted learning (such as sufficient Information Technology tools) can help a student to perform problem-solving tasks more independently. The student's actual development level will move toward his or her potential development level. For students, smaller ZPD will generally result in greater academic and workplace success (pp. 67 – 83).

An ineffective learning environment (e.g., insufficient educational resources and inappropriate teaching methods) can lead to a larger ZPD "gap" between potential and actual development levels. The larger the ZPD gap, the more likely a student is to fail in accomplishing independent problem-solving tasks. The article written by Bonk and Kim recommends that college educators should do research in adult education using these sociocultural concepts in order to minimize college students' ZPDs and improve academic success (pp. 67 – 83).

Here is an example of how the sociocultural theory was applied in Information Technology research. The sociocultural setting was the computer room, where children and undergraduate students became the subjects of this study. The cultural artifacts were 20 computers, a scanner, a printer, Internet access, video games, and two languages (English and Spanish). Experimental subjects played different video games together. What was the primary conclusion of this study? There were no leaders or people with supreme authority. Children and adults were equal participants who learned from each other in this activity. This conclusion validated Vygotsky's fundamental idea that each learning environment should have a balance of control between teacher and students, the development of trust between teacher and students, appropriate tools and materials, and shared perceptions of roles as learners. ("Applications of Vygotsky", pp. 2 - 3).

2.3 Relationship Between the Sociocultural Theory and the Thesis Topic

Vygotsky constructed the sociocultural theory based on the pedagogical model (the education model of teaching children). Most sociocultural theorists currently believe that the sociocultural theory can be extended to adult learning, but there have only been a few studies on adult learning using a sociocultural approach to validate this belief. Many sociocultural theorists agree that adult education requires "more active, collaborative, and authentic learning experiences" because adults are accustomed to the real world. Adult learners should therefore have self-directed opportunities to have a measure of control in the learning process (Bonk & Kim, 1998, pp. 67 - 82).

Information Technology, including new collaboration tools and electronic work environments, has significantly changed adult interactions as well as learning. The problem in many of today's colleges and universities is that adult learners' changing needs and traditional, teacher-centered programs often clash. New technologies are considered to be sociocultural tools or cultural artifacts which change learning formats, ways of obtaining knowledge, and human learning/development. Therefore, higher education institutions should reevaluate their teaching methods by examining how instructors and adults interact, how instructors teach, and what kinds of learning assistance adult learners need in current cultural and social settings. One of the most interesting research questions is how "young adults can be adapted to self-initiated learning opportunities after 12 years of teacher-centered education" (pp. 67 - 82).

The sociocultural theory implies that traditional classroom and distance learning approaches should be compared using the six sociocultural concepts mentioned above (ZPD, internalization, scaffolding, intersubjectivity, cognitive apprenticeship, and assisted learning). The article entitled ""Learning Theories: Social Constructivism: Introduction" uses the quote -- "the type and quality of these cognitive tools (which include information technologies) determines, to a much greater extent than they do in Piaget's theory, the pattern and rate of development" to support this theory (p. 1). Each approach uses different types and qualities of Information Technology.

Are the type and quality of Information Technology artifacts the main determinants of these sociocultural concepts? The following diagram obviously shows that cultural artifacts are indeed among the main determinants of human development and learning. Without cultural artifacts, there will be no stimulus (social events), development (motives, perception, emotion, sensation, recall, and needs), behavior (action), and learning (cognitive schemata). This thesis therefore explored how the type and quality of Information Technology artifacts shape stimuli in each approach, and the consequences of different stimuli in terms of these sociocultural concepts.

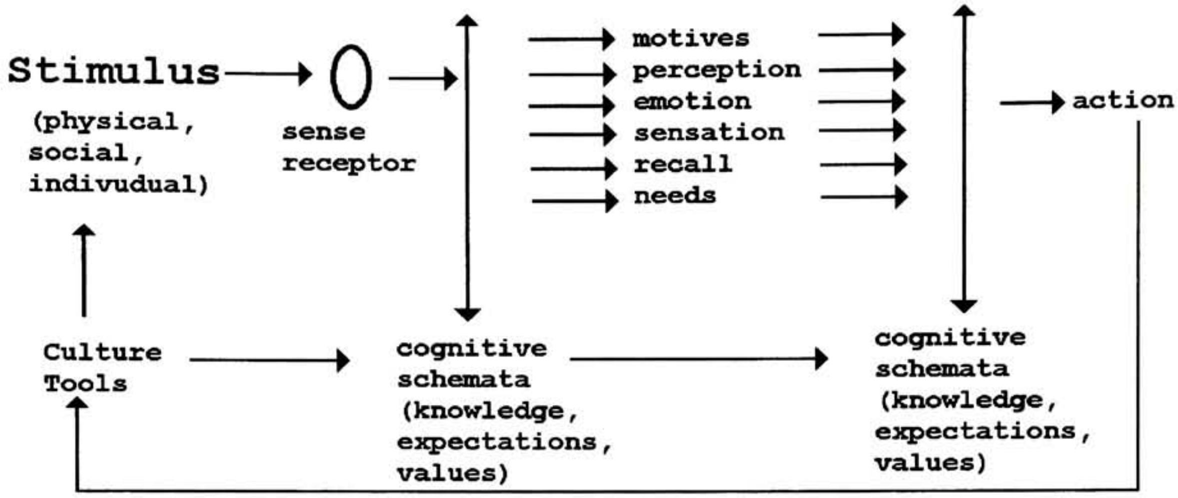


Figure 2.1 How cultural tools and stimulus influence the ways of behaving in the society.
Credit: Dr. Carl Ratner, 1998.

2.4 Other Theories As Supplements of the Sociocultural Theory

2.4.1 Mezirow's Concept of Perspective Transformation

Mezirow's concept of perspective transformation (1978) discusses how new perspective comes from a combination of new learning and existing knowledge (Cross, 1981, pp. 231 - 232). This concept is closely related to the zone of proximal development (ZPD) in the sociocultural theory. Since ZPD is the difference between the potential development level with assistance and the actual development level, and because development determines learning, it is logical to conclude that a smaller ZPD indicates the development of a new perspective. How can be this concept be verified and quantified? The epistemological beliefs theory appears to be the most appropriate tool, as discussed below.

2.4.2 Epistemological Beliefs Theory

The article written by Dr. Marlene Schommer defines epistemological concepts as "beliefs about the nature of knowledge and learning ... in very practical terms" (1998, p. 129). Expanding upon this definition, the Epistemological Beliefs Theory relates to an individual's perspectives about controlling, expanding, and using personal knowledge, which can significantly influence his or her academic and future workplace performance (pp. 129 – 135).

In her remarks about this theory, the author states that success of training is based on (students' and instructors') knowledge of epistemological beliefs (p. 135). I therefore considered it very important for my thesis to obtain information about epistemological beliefs for the two surveyed sections in an attempt to determine if the traditional classroom and distance learning students as well as their instructors had different perspectives of learning, and if the distance learning students were more self-directed than the traditional classroom students. My intention was to use this and other information to explore possible relationships for each surveyed section as a whole between the students' general characteristics (gender, age, college year level, major, etc.), their epistemological beliefs, their learning styles (communication, study, and work habits), their success rates (final course grades), and their instructors' learning/teaching viewpoints. Consequently, I developed questionnaires to obtain the data needed to address these issues (refer to Chapters 8, 9, and 10) based on information about aspects of the theory presented in the following table.

Aspects of the Epistemological Beliefs Theory	**General Questions Related to Each Aspect**	**Conclusions Based on Answers to Questions**
Source of knowledge	Where does knowledge come from? From guiders with authority? From experiences?	Believers in obtaining knowledge primarily from authority figures tend to be very dependent. Believers in obtaining knowledge from life experiences are usually able to work independently.
Organization or structure of knowledge	In what ways can knowledge be acquired? Isolated parts of a subject? The whole array of related concepts?	Believers in learning isolated parts of a subject like to memorize facts. Believers in learning interrelated parts of a subject simultaneously usually do well with both facts and applications.
Stability of knowledge	How often does knowledge change? Unchanging or changing knowledge?	Believers in changing knowledge are flexible in learning new material. Believers in unchanging knowledge can be resistant to new subjects.
Speed of learning	How quickly can learning occur? Slow or quick learning?	Believers in slow learning spend a lot of time in examining new information. Believers in quick learning spend much less time in studying.
Control of learning	Is the ability to learn fixed (innate) or changing?	Believers in an innate ability to learn perceive mistakes as their fault. Believers in a changing ability to learn use mistakes as their learning experiences.

Table 2.1 Aspects of the Epistemological Beliefs Theory
Credit: Dr. Marlene Schommer, 1998, pp. 129 – 135.

2.4.3 Staged Self-Directed Learning Model

Dr. Gerald Grow developed the Staged Self-Directed Learning Model (SSDL). It is a matrix of teaching styles and learning styles.

Stage	Self-Directing Degree	Student	Teacher
1	Low	Dependent	Authority, Coach
2	Moderate	Interested	Motivator, Guide
3	Little High	Involved	Facilitator
4	High	Self-directed	Consultant, Delegator

Table 2.2 The Staged Self-Directed Learning Model (SSDL)
Credit: Dr. Gerald Grow, 1991.

<u>Stage 1 Description</u>
The learning environment is teacher-centered because students are dependent on teachers for providing instruction about problem solving and tasks. Examples are basic courses, organized drills, and formal lectures.

<u>Stage 2 Description</u>
The learning environment is mostly teacher-centered, since the teachers still provide instructions, high standards, and assignments to their students. In some courses, however, the students may be allowed to choose assignments to complete. Examples are traditional college courses, expert demonstrations, and training programs.

<u>Stage 3 Description</u>
Students already have basic skills and knowledge from past learning experiences. They can work with other learners and teachers, who can offer resources and guidance to help them develop their skills. However, teachers and students jointly make decisions about learning goals in the beginning. Students can become more self-paced and self-directed as they progress in their learning. The learning environment is mostly student-centered, but teachers can intervene in the learning process to make sure that students are able to master new skills. Examples are group projects.

<u>Stage 4 Description</u>
The learning environment is student-centered because learners have self-directed abilities to set their own pace, goals, and standards with little or no help from guiders. Teachers need to help students to be on the right track in learning something new on their own. Examples are independent study courses designed by learners (1991, pp. 1 - 10).

Dr. Grow also designed the following table summarizing matches and mismatches in teaching styles vs. learning styles. Numbers in the table represent the stages or style identifications shown in Table 2 above.

Identification styles	Teacher #1	Teacher #2	Teacher #3	Teacher #4
Student #4	Severe Mismatch	Mismatch	Near Match	Match
Student #3	Mismatch	Near Match	Match	Near Match
Student #2	Near Match	Match	Near Match	Mismatch
Student #1	Match	Near Match	Mismatch	Severe Mismatch

Table 2.3 Matches and mismatches in the Staged Self-Directed Learning Model (SSDL)
Credit: Dr. Gerald Grow, 1991.

Explanations of Some Mismatching Situations

T1/S4 Mismatch
Students are strong self-directed learners, but teachers are firm believers in the authoritative education system. Students are very likely to be rebellious and uncooperative learners who do not appreciate almost total authority and control from their guiders. Teachers would be very frustrated in this kind of learning environment because they would find out that they are unable to control their students.

T1/S3 Mismatch
Students love to be very involved and a little self-directed in learning something new. Teachers still could be too authoritative and controlling over students. It's common for this mismatch to occur when working adults return to college because they are used to learning many things on their own in the workplace.

T4/S1 Mismatch
Students are used to following directions, plans, and instructions under the strict authority of their guiders. The situation requires students to be completely self-directed in setting their own pace and learning goals. Students would get lost in this kind of environment because they would not know what to do without any help from their passive guiders.

Dr. Grow's main conclusion from the SSDL model is that educators should think about how to move adult learners from the first stage to the final stage gradually. Not all adult learners are self-directed, although many of them have this potential. It's also important to remember "how difficult it is for a teacher to move from being a requirement to being just one among many choices in how to learn" (1991, pp. 1 - 7).

Why is the SSDL model necessary for my thesis? The SSDL model describes how well teachers and students can match with each other in traditional classroom and distance learning environments at RIT. It also pinpoints how important it is for teachers and students to change any mismatched styles. My thesis therefore discussed how these changes can best be accomplished to improve, not worsen, the interaction between teachers and students in RIT adult education.

The SSDL model indicates that successful matches between scaffolding, cognitive apprenticeship, and assisted learning will lead to smaller ZPD "gaps" for students (i.e., differences between the potential and actual development levels). Smaller ZPD gaps increase students' chances for their academic and future workplace success. Alexis Benson, a critic of Vygotsky's Thought and Language, states that instruction and social environment (culture, society, and experience) are prerequisites of development, while Vygotsky declared that students can learn better if the zone is larger. Regardless of which theory we believe is most correct, it appears that the students and teacher should jointly agree on the activities and social interaction in the learning environment which are most appropriate, with the teacher being the expert who "can model the appropriate solution, assist in finding the solution, and monitor the student's progress" (pp. 4 - 5).

2.4.4 Pedagogy Versus Andragogy

Malcolm Knowles developed a very important table for comparing two main education models called pedagogy and andragogy. The definition of pedagogy is "the art and science of helping children learn", whereas andragogy focuses on adult learning (Cross, 1981, p. 222). Knowles divided student attributes into five categories (self-concept, experience, readiness, time perspective, and orientation to learning) and educational modeling elements into seven categories (climate, planning, diagnosis of needs, formulation of objectives, design, activities, and evaluation).

Type	**Pedagogy**	**Andragogy**
Self-concept	Dependent learners	Mostly self-directed learners
Experience	Not important at all	Important
Readiness	Biological learning	Social learning
Time perspective	Almost no application	Application learning
Orientation to learning	Emphasis on subject	Emphasis on problem

Table 2.4 Assumptions About Learners
Credit: Cross, 1981, p. 224.

Type	Pedagogy	Andragogy
Climate	Authoritative and formal	Respectful and informal
Planning	Teacher	Both teacher and student
Diagnosis of needs	Teacher	Both teacher and student
Formulation of objectives	Teacher	Both teacher and student
Design	Subject matter	Problem solving
Activities	Teacher's techniques	Experimental techniques by student
Evaluation	Teacher	Both teacher and student

Table 2.5 Design Elements
Credit: Cross, 1981, p. 224.

Knowles believed that both the pedagogical and andragogical models could be used for children and adults, depending on situational settings. Several education researchers have documented different viewpoints toward these models. Gage and Kidd pointed out that much of the current literature prescribes a learner-centered environment for adult education, and that these models serve as theories of teaching rather than theories of learning. Their arguments imply that we need to develop a deeper understanding how adult students learn instead of how adult teachers should instruct. (Cross, 1981, pp. 222 - 228).

Knowles provided an excellent summary of how andragogy should be implemented in adult education. He stated that adult learners should be able to use facts and information to solve the problems, motivate themselves, participate in group discussions, and demonstrate self-directed and independent learning skills. In return, teachers of adult students should act as guiders who facilitate learning by producing class exercises, providing life-oriented materials, and minimizing lectures. They should also possess three important attributes: realness, a caring/respectful attitude, and an excellent understanding of needs (1990, pp. 26 - 87).

Theories developed by his colleagues are interestingly similar to Knowles' ideas. Carl R. Rogers proposed a student-centered approach under which the learning environment should have no direct teaching, no learning threats, student-centered learning, and differentiated perception (testing in real situations). Watson discussed "an 'open', non-authorization atmosphere" that can enhance adult learning through development of creativity, improvement of self-confidence, and growth of self-reliance and independence. The final statement about andragogy is that an "education is a cooperative rather than an operative art" due to characteristics of adult learners (pp. 26 - 87).

2.4.5 Self-directing Principles

The missing part of andragogy is a lack of in-depth self-directing principles. The definition of self-directing learning, or "learning how to learn", is the process of "possessing or acquiring the knowledge and skill to learn effectively in whatever learning situation learners encounters" ("Learning How To Learn", p. 1). Adult learners should be able to control "what they want to learn", "how they want to learn", and "when they want to learn" ("The Self-Directed Learner", p. 1). The subskills of self-directing learning are taking control of personal learning plans, analyzing learning strengths and weaknesses, developing learning styles, understanding personal experiences, mastering modern learning technologies, participating in group discussions, and learning from guiders' experiences ("Learning How To Learn", pp. 1 - 2).

What are the benefits of self-directed learning? Adult learners tend to develop their "spirit of inquiry" and "asking questions" abilities in analyzing evidence and developing conclusions. The capacity to transfer knowledge also becomes greater when adult learners have opportunities to apply new facts to different situations using their problem-solving and reasoning skills. Consequently, adult learners will have a better awareness of "perception, inquiry, learning, and growth" as well as self-understanding of their learning process ("The Advantages of Fostering Self-Directed Learning", pp. 1 - 2).

2.5 Application of the Theories for the Thesis

Which model(s) did RIT traditional classroom and distance learning approaches follow? Was there "an 'open', non-authorization atmosphere" or a closed, authorization atmosphere? What were the reasons for RIT instructors' choices? What were college students' reactions toward choices made by RIT instructors? Were RIT instructors aware of how college students learn? Did adult learners' studying habits differ in traditional classroom and distance learning methods at RIT? Were there gaps between the RIT education system, the andragogical model, and self-directing principles? What were the reasons for any gaps? These are some of the questions I explored in my thesis, with education models, Watson's discussion, and the epistemological belief theory serving as vehicles for explaining why matches or mismatches in the SSDL model occurred, and how effective scaffolding, cognitive apprenticeship, and assisted learning were.

The table on the next page presents four sets of expected conclusions based on changes in a teacher's scaffolding methods and students' epistemological beliefs assuming no extremely large differences, initially between the instructor's and students' perspectives about learning. These changes affect the success of cognitive apprenticeship and assisted learning, and the size of ZPD gaps. For example, the table shows that cognitive apprenticeship and assisted learning are not effective when teacher's scaffolding methods change dramatically and students' epistemological beliefs remain almost the same, and vice versa. The result of weak cognitive apprenticeship and assisted learning is a large ZPD gap for students. The table therefore proved to be very helpful in analyzing the effectiveness of the surveyed traditional classroom and distance learning environments at RIT.

Educational Setting	Changes in a teacher's scaffolding methods	Changes in students' epistemological beliefs	Degree of success in cognitive apprenticeship and assisted learning	Students' ZPD Gap
1	Small	Large	Weak	Large
2	Large	Small	Weak	Large
3	Small	Small	Strong	Small
4	Large	Large	Strong	Small

Table 2.6 Expected conclusions based on changes in teacher's scaffolding methods vs. students' epistemological beliefs

Educational Setting 1 Description

A teacher does not significantly change his or her teaching style, but a large change occurs in students' perspectives about learning and knowledge. Cognitive apprenticeship and assisted learning would not be very successful, and therefore students' actual development would not move significantly toward their potential development.

Example: A teacher decides to maintain an authoritative teaching style, but students become more self-directed in their learning styles. The students may therefore resist learning new concepts and using the resources suggested by their teacher. As a result, they would not acquire new knowledge nor develop new skills.

Educational Setting 2 Description

A teacher changes his or her teaching style significantly, but students' perspectives about learning and knowledge remain about the same. The result would be ineffective cognitive apprenticeship and assisted learning, and students' ZPD gap would not decrease noticeably.

Example: A teacher becomes much more authoritative, but students remain self-directed. The students may not depend on their teacher for instruction and resources because of their conflicting beliefs about learning. This may lead to weak development of the students' new skills.

Educational Setting 3 Description

An instructor's teaching style and students' perspectives about learning and knowledge remain consistent. This environment should result in successful cognitive apprenticeship and assisted learning, and a reduction in the students' ZPD gap.

Example: A teacher is authoritative, and students are dependent on their teacher for most of their learning. The students should be able to absorb instruction from their teacher and use suggested resources very well. Consequently, the students will develop new skills and thus reduce their ZPD gap.

Educational Setting 4 Description

An instructor's teaching style and students' perspectives about learning and knowledge change significantly. This environment should foster successful cognitive apprenticeship and assisted learning, and a narrowing of the ZPD gap.

Example: A teacher shifts from the "Authority, Coach" to the "Consultant, Delegator" teaching style, and pedagogical students become andragogical learners. The teacher and students should be very motivated to work together in learning new things and using available resources. In turn, the students' actual development would move significantly toward their potential development due to improvements in their independent learning skills.

Chapter 3

DISCUSSION OF AREAS BEING RESEARCHED

3.1 Overview

Since the "Literature Review" section describes each theory relevant to this thesis and its potential applications, the case study should furnish important answers about specific research questions pertaining to the theories as they relate to the RIT educational environment.

3.2 Principal Research Questions

The case study focused on three sociocultural concepts (scaffolding, cognitive apprenticeship, and assisted learning) as they relate to Information Technologists. The concepts of ZPD, internalization, and intersubjectivity were only addressed generally, since they belong to the field of education psychology and thus require psychological interpretations for a detailed examination that is beyond the scope of this thesis. The principal questions that were addressed in the thesis through the case study are presented below.

<u>First question</u>

What are RIT's goals for distance learning and traditional classroom methods? Which education model (andragogy or pedagogy) is most closely matched with RIT's university learning goals at various undergraduate levels?

<u>Second question</u>

What are the characteristics of traditional classroom and distance learning environments at RIT?

2a. Resources
2b. Physical locations
2c. Communication methods

Third question

How do traditional classroom and distance learning environments shape scaffolding and cognitive apprenticeship in RIT's distance learning and traditional classroom methods? Which education model (andragogy or pedagogy) is most closely matched with shaped scaffolding in each method?

3a. Teaching styles based on the Staged Self-Directed Learning Model (SSDL)
3b. Teaching environments based on two education models (andragogy and pedagogy)

Fourth question

How do traditional classroom and distance learning environments shape RIT students' epistemological beliefs and their learning styles (dependent to self-directing) in distance learning and traditional classroom methods under the categories of cognitive apprenticeship and assisted learning? Which education model (andragogy or pedagogy) do most students prefer?

4a. Studying habits based on the Staged Self-Directed Learning Model (SSDL)
4b. Studying environments based on two education models (andragogy and pedagogy)

Fifth question

Which are the methods that produce the largest and smallest gaps between instructors' teaching styles (scaffolding and cognitive apprenticeship) and students' learning styles/epistemological beliefs (cognitive apprenticeship and assisted learning) at RIT?

5a. Analysis based on the table of matches and mismatches in the Staged Self-Directed Learning Model
5b. Analysis based on possible changes in teachers' scaffolding methods vs. college students' perspectives

Sixth question

Which is the method that matches with RIT's university learning goals the least? The best? How should RIT's educational techniques be modified to eliminate performance discrepancies?

Chapter 4

METHODOLOGY

4.1 Overview

The case study at RIT was completed using action research as the primary methodology because this approach can be used "to test the assumptions of educational theory in practice" and "generate genuine and sustained improvements in schools" (Burwell; Pathways). Action research is the "active" research model that analyzes current practices and devises solutions to improve the performance of an organization (Pathways, p. 1). This chapter presents more information about action research and describes in detail the procedures used in completing the research necessary to prepare my thesis using this methodology. Delimitations and limitations of the case study are also discussed.

4.2 Action Research Methodology

4.2.1 Definition

Action research is defined as "the systematic study of attempts to improve educational practice by groups of participants by means of their own practical actions and by means of their own reflection upon the effects of those actions" (Gabel, 1995, p. 1). It is a "cogenerative [and cyclical] process" where the action researchers and members of a local community (i.e., educational environment) work together to research, understand, and improve the needs of the local community through recommended actions (Greenwood & Levin, 1998, p. 4 & p. 93). The main principle of action research is that research processes, research results, actions (application of research results), and community members' abilities/skills are interrelated. The general aims of this research are to satisfy the needs and interests of the local community's members continually, and to help the local community's members to have better control over their own situations (p. 4, p. 18, & pp. 93 – 94).

4.2.2 Historical Highlights

Kurt Lewin, a social psychologist who escaped from Nazi Germany to the United States, invented an "Action Research" methodology in 1943 by conducting an experiment "on the use of tripe as a part of the regular daily diet of American families" because the U.S. government was looking for a substitute for beef as food during World War II (Greenwood & Levin, 1998, pp. 16 - 17). He trained several housewives to cook tripe for dinner and observed the effects on their families' daily eating habits. Lewin and these housewives were therefore co-participants in this experiment. As a result, he developed the concept of group dynamics where members of a group and a facilitating researcher work together to "solve real-life problems" (pp. 16 – 19).

Great Britain experienced massive industrial destruction during World War II. The British government hired the Tavistock Institute of Human Relations to study how to improve human performance while the country's industry was being rebuilt (p. 20). Tavistock and Einar Thorsrud, a Norwegian psychologist who had strong links with this institute, decided to use Lewin's work as the basis of conducting the Norwegian Industrial Democracy Project, a group of "participative" experiments in different companies designed to improve conditions in the workplace. The result of this project was more effective organizational systems compared with the previous systems. Tavistock developed three new organizational concepts as a result of these experiments: 1) sociotechnical thinking – recognizing the direct relationship between technology and employees; 2) psychological job demands – increasing workers' freedom to customize personal working conditions; and 3) semiautonomous groups – a production system in which workers are responsible for many jobs at the same time while helping and learning from each other (pp. 20 – 24).

Several Swedish automobile companies subsequently adopted Tavistock's new organizational concepts and the action research methodology to improve their production systems. In 1972, UCLA professor Louis Davis used the same concepts to design better industrial systems. He believed in the interrelationships between technology and people in enhancing productivity. In 1980, UCLA personnel conducted a 14-day workshop in Toronto to explain the concepts of this methodology to people from Canada and the United States. J.M. Juran and W.E. Deming, two American business gurus, later used the concepts to assist Japanese industry to become more productive. Today, many industries and educational systems worldwide embrace the action research methodology as a primary tool in redesigning organizational systems and processes to meet their needs (pp. 24 – 27, pp. 215 - 233).

4.2.3 Description

Action research is an "interdisciplinary" methodology which has proven to be effective for various fields, including anthropology, engineering, and education (Greenwood & Levin, 1998, p. 8). It can be completely qualitative, completely quantitative, or a combination of both, depending on the situations to be researched in the local community. The qualitative and quantitative techniques that may be used include "surveys, statistical analyses, interviews, focus groups, ethnographies, and life histories". Greenwood and Levin, the authors of "Introduction to Action Research", strongly agree that action research can also be "scientific research", which is defined as "investigative activity capable of discovering that the world is or is not organized as our preconceptions lead us to expect and suggest grounded ways of understanding it" (pp. 6 –7 & pp. 67 – 68). The General Systems Theory (GST), which is usually associated with the science and engineering fields, employs a methodology where a group of individuals is responsible for dynamic actions related to certain systems. Action research is clearly consistent with the GST because both include such important concepts as the following: (1) continuously investigating the results of implemented actions by a group of individuals within the whole system; (2) treating all community members as scientists who can use their operating system knowledge to make improvements; (3) believing in a strong relationship between thought (theory) and action; and (4) testing a theory by attempting to solve real-life problems within a local community. Through iterative/dynamic activities and solid teamwork, action research can therefore produce "scientifically meaningful results" (pp. 53 – 65 & pp. 69 – 76).

Action research is a combination of three elements: research, participation, and action. Community-based research is important in this methodology because members of a local community are generally one of the most important sources in securing knowledge about particular situations through data gathering, data analysis, social action, etc. Participation between the researcher and community members is also a critical key in the methodology, not only in gaining an understanding of real-life situations but also in developing the best possible solutions that will be acceptable to the local community. Action is then needed to review recommended solutions and to approve, implement, and continuously assess the effectiveness of those that are determined to be desirable to enhance the local community. An effective action researcher facilitates the entire process by working with members of a local community to implement and progress through the methodology, with the objective of creating and acting on recommended solutions that hopefully will result in community improvements (pp. 7 – 8 & p. 122).

In contrast, traditional social research emphasizes acquiring knowledge only from so-called experts. As stated above, action researchers believe that "the knowledge of local people" is also critical in the process of developing conclusions and making decisions. Consequently, action researchers are usually somewhat skeptical about the validity of existing theories based solely on experts' opinions. The effective action researcher therefore works closely with members of a local community so they can learn from each other and thereby gain a better understanding of the situations in question, devise the best possible solutions, and put these solutions into actions acceptable to the community (pp. 95 – 96, p. 98, p. 113 – 114, & p. 115).

To help ensure a smooth progression through the methodology, an action researcher should exhibit characteristics of a "friendly outsider". That is, he or she should should maintain a balance between criticizing and supporting existing local community systems and remain flexible in working with community members, since local organizations are often resistant to changes recommended by someone outside of the community (pp. 104 – 107).

4.2.4 Steps in the Methodology

More traditional research methodologies usually start with hypotheses and end with conclusions verifying or discrediting the hypotheses, based on fieldwork and analysis. By contrast, the action research methodology includes the following cyclical group of steps:

1. Identifying research questions.
2. Collecting data ("fieldwork").
3. Analyzing data ("reflection").
4. Drawing conclusions.
5. Implementing new actions.
6. Periodically reviewing the effectiveness of new actions.
7. Changing action plans, if necessary.

These steps are designed to address problems, topics, or situations deemed worthy of study and potential improvement (Wadsworth; Gabel; Padak; Greenwood & Levin).

4.2.5 Basis for Using the Methodology

Action research was appropriate for my study because its purpose was to compare and contrast aspects of the RIT traditional classroom and distance learning environments as they relate to each other and to RIT university learning goals (i.e., to address topics rather than hypotheses). By using and examining the validity of existing educational theories, this methodology provided an effective way to collect and analyze data, and to recommend improvements in overall educational practices while strengthening the relationship between the researcher (myself), the researched (teachers/students), and the researched for (future teachers/students/administrators) (Wadsworth, 1998, pp. 8 - 13).

Only the first four steps of this methodology were completed because of limited time and a lack of authority to implement changes in the RIT educational environment. As Chapter 10 recommends, future RIT researchers should complete the remaining cycles based on my recommendations and further research for both the traditional classroom and distance learning environments.

4.3 Research Procedures

4.3.1 Introduction – Sample Population and Delimitations

Rather than randomly selecting participants from the entire population, I selected a "convenience" sample of 63 students, their two different instructors, and their additional helpers (e.g., tutors) for the case study from two sections (traditional classroom and distance learning) of the same undergraduate level course at RIT's College of Applied Science and Technology. The anticipated characteristics of the students were that most of them would be between the ages of 18 and 20, at the sophomore level, and in CAST majors, but some students had different majors and were at different levels (e.g., some of them probably took this course as an elective to satisfy graduation requirements).

Why were additional helpers part of the convenience sample population? The concepts of scaffolding, cognitive apprenticeship, and assisted learning state that students can get help from a variety of sources. Therefore, guiders could include teachers, Information Technology, tutors, other students, and library resources, all of which can help shape the learning environment.

To supplement data related to the convenience sample population, the case study also focused on RIT's university learning goals and the utilization of *Information Technology* at RIT. Interviews with appropriate RIT administrators, documents pertaining to RIT educational strategies, and RIT web sites provided information about these subjects. Personal observations in the traditional classroom and of the First Class client/server software conferences provided additional insights about how *Information Technology* was used in both sections of the surveyed course.

The delimitations of the case study were intended to provide the best measure of control in comparing data for both methods (distance learning and traditional classroom) and analyzing how well actual RIT educational processes address RIT's university learning goals in the time available to conduct the study. Since the surveyed participants were not randomly selected, however, readers of this thesis should not generalize that the conclusions and recommendations presented are necessarily applicable to the entire CAST or RIT populations. Rather, they are presented to address issues that, in my opinion, are likely to be important to other RIT courses and areas. I therefore consider the conclusions and recommendations to be valuable and worthy of further study and consideration despite the fact that they are not statistically supportable at this time.

4.3.2 Principal Research Questions

The first four principal research questions were addressed during data collection, whereas the last two principal research questions used interpreted data for performing an in-depth analysis and drawing conclusions.

4.3.2.1 First Question

What are RIT's goals for distance learning and traditional classroom methods? Which education model (andragogy or pedagogy) is most closely matched with RIT's university learning goals at various undergraduate levels?

Relevant Data and Instrumentation: The First Part of the Question

What are RIT's goals for distance learning and traditional classroom methods?
Relevant Data
1. RIT's principal short-term and long-term goals pertaining to education 2. RIT's internal and external assumptions about technology, education, and related matters 3. RIT student statistics pertaining to education levels (enrollments, retention rate, etc.) 4. The administrative hierarchy of RIT's current educational system
Instrumentation
1. Notebook to record the results of interviews with RIT administrators, researchers, tutors, and student government members 2. Documentary evidence from RIT web pages and strategic documents

Data Collection Procedures: The First Part of the Question

1. I e-mailed or called ten RIT administrators, three researchers, five Information Technology major tutors, and three members of the student government for interview appointments to obtain the relevant data. The criteria I used for selecting these people are presented in the following table.

Selection Criteria	
People Contacted	**Reason for Selection**
Three top RIT executives	To obtain an overview of the RIT educational system as a whole
Three College of Applied Science and Technology administrators	To secure pertinent facts about the College of Applied Science and Technology educational system in general
Two Information Technology major administrators	To gain an understanding of the educational system for the Information Technology major
Two Distance Learning administrators	To obtain in-depth details about the RIT distance learning environment
Three researchers	To secure additional data about surveyed students from RIT records
Five Information Technology major tutors	To gain an understanding of how tutors interact with Information Technology students
Three members of the student government	To determine how students and the RIT educational system personnel communicate with each other

Two top RIT executives, two College of Applied Science and Technology administrators, two Information Technology major administrators, and two members of the student government agreed to personal interviews with me. One top RIT executive, two Distance Learning administrators, the three researchers, and one Information Technology major tutor volunteered to answer my questions via e-mail. The rest of the people contacted rejected my requests for interviews.

2. I conducted all interviews with RIT administrators first. At the beginning of each interview, I asked the interviewee to sign an informed consent form. I then began by asking the following three interview questions.

    A. What are RIT's short-term and long-term educational strategies for assuring the best possible undergraduate traditional classroom and distance learning environments? Are you aware of any studies or publications about this topic? If so, how can I obtain copies of these documents?

    B. Can you provide me with any statistics and other information for RIT undergraduate students that might relate to their success in completing traditional classroom and distance learning courses? Examples might include: (a) high school and non-RIT college grades, honors, and activities; (b) SAT, ACT, and other college or class level entrance scores, (c) RIT honors, activities, organizations, jobs held while attending RIT, and grades for specific classes taken; and (d) previous employment information.

C. What are your most important contributions to the success you and your students have achieved in the RIT traditional classroom and distance learning environments? Please be specific.

I reviewed the answers and formulated several follow-up questions to obtain additional information. Each of these interviews were completed in about 30 minutes, on the average. When I was satisfied with the information from each RIT administrator, I asked that he or she complete the RIT administrator questionnaire (see further details in the second part of the first question section). Six out of nine interviewed administrators completed the RIT administrator questionnaires.

3. I then conducted the remaining interviews with two members of the student government, one Information Technology major tutor, and the three RIT researchers. My interview questions for these people varied, based in part on the RIT administrators' responses.

4. Finally, I reviewed RIT web pages and strategic documents suggested to me by the RIT administrators.

Relevant Data and Instrumentation: The Second Part of the Question

Which education model (andragogy or pedagogy) is most closely matched with RIT's university learning goals at various undergraduate levels?
Relevant Data
As discussed in the "Literature Review" section, assumptions that college administrators make about college students' learning viewpoint (based on experience and available data) include self-concept, experience, readiness, time perspective, and orientation to learning. Administrators make decisions about how to design the learning environment -- climate, planning, diagnosis of needs, formulation of objectives, activities, and evaluation -- based on their assumptions. Relevant data about these assumptions was therefore requested from RIT administrators, based on Knowles' andragogical vs. pedagogical model (see Tables 2.4 and 2.5).
Instrumentation
RIT administrator questionnaires (see Appendix C)

Data Collection Procedures: The Second Part of the Question

1. I secured six completed questionnaires (both written and electronic) from the RIT administrators and keyed the responses into a database system.

2. I summarized and analyzed the questionnaire responses to determine whether the administrators' viewpoints most closely matched with the andragogical or pedagogical educational models. Relevant details about the questionnaires and my summarization/analysis process are presented in the next two sections.

Explanation of Information Requested on the RIT Administrators' Questionnaire

As previously mentioned under "Relevant Data", the administrators' learning viewpoint is defined as the collection of different perspectives about students' learning preferences and traits (self-concept, experience, readiness, time perspective, and orientation to learning). Information about these perspectives was requested through the questionnaires, as follows.

Type	Operational definition
Self-concept	How much students depend on instructors in the range of a total dependent attitude to a total self-directed attitude.
Experience	How important students' life experiences are to the learning environment.
Readiness	Why students are ready to learn something new (biological development or social experiences).
Time perspective	Which is the best method for students to learn based on the readiness of students? Applications or facts? Both?
Orientation to learning	Which is the best classroom setting? Subject matter discussion or hands-on problem solving activities?

Self-concept

Related question on the questionnaire
Most of RIT students need _____ instruction and guidance. Constant Occasional Minimal
Explanation of the question
"Constant" denotes a totally dependent attitude. "Occasional" denotes a mixed dependent and self-directed attitude. "Minimal" denotes an almost totally self-directed attitude.

Experience

Related question on the questionnaire
Students' life experiences are ______ in developing their ability to learn. A very important factor Helpful, but not essential Not an important factor
Explanation of the question
These choices dictate the importance of students' life experiences.

Readiness

Related question on the questionnaire
Instructors should primarily consider students' ______ in designing teaching methods for a course. Biological development Social experiences
Explanation of the question
Biological development means that students are expected to be ready to learn something new only because of their age and human development. Social experiences motivate students to learn something new regardless of age and human development.

Time perspective

Related question on the questionnaire
RIT students learn the best by studying ____. Facts Applications Both
Explanation of the question
"Facts" means rote learning (memorizing details). "Applications" means problem solving. "Both" is a combination of facts and related applications.

Orientation to learning

Related question on the questionnaire
Which is more important to RIT students? Subject matter Problem solving
Explanation of the question
Subject matter is information acquired primarily through topic discussions in the classroom or DL environment. Problem solving involves hands-on application activities.

The administrators' teaching viewpoint is defined as the collection of different perspectives that influences educators' development of a teaching environment (climate, planning, diagnosis of needs, formulation of objectives, design, activities, and evaluation), based in part on their learning viewpoint discussed above. Information about these perspectives was also solicited through the questionnaires, as follows.

Type	Operational definition
Climate	The intensity of the classroom setting (formal and authoritative, or informal and respectful)
Planning	Who does planning, diagnosis of needs, and formulation of objectives? Instructor, students, or both?
Diagnosis of needs	
Formulation of objectives	
Design	What will the course emphasize? Subject matter discussion, problem solving activities, or both?
Activities	How should activities be completed? Using the instructor's techniques, students' experimental techniques, or both?
Evaluation	Who completes the course evaluation(s)? Instructor, students, or both?

Climate

Related question on the questionnaire
The learning climate for RIT courses is generally _______. Formal and controlled entirely by instructors Informal with instructor/student sharing of responsibilities
Explanation of the question
The first choice means that an instructor is authoritative in enforcing rules and choosing teaching methods for his or her courses. The second choice indicates that students and an instructor share their responsibilities for structuring the learning environment.

Course responsibilities

Related question on the questionnaire
___________ should be responsible for course… … objectives formulation. … structure planning. … student needs assessment. … effectiveness evaluations.
Explanation of the question
The choices are the students, the instructor, or both.

Design

Related question on the questionnaire
_____ should be emphasized in college courses. Subject matter discussions Problem solving activities Both
Explanation of the question
The choices denote administrators' preferences for including subject matter discussions, problem solving activities, or both to provide the best learning environment for RIT students.

Activities

Related question on the questionnaire
Course activities should use _________. Instructor's techniques Students' experimental techniques Both
Explanation of the question
The choices indicate whether the administrators feel that instructor's techniques, students' experimental techniques, or both provide the best means of completing course activities.

Administrators' Viewpoints Compared With Knowles' Educational Models

1. The surveyed administrators' responses to each question were mathematically summarized for comparison of their perspectives to Knowles' pedagogical and andragogical models, as explained below.

Basic Formula

Count (CT)	Number of responses	Σ	Sum
Assigned Weight of Pedagogy (AWP)	Intensity of pedagogy	n	nth item
Average Weight (AW)	$\Sigma (CT_n \times AWP_n) / \Sigma (CT)$		
Pedagogy	(AW)		
Andragogy	100 - (AW)		
Overall Average	Average of All Average Weights		

Note: 75 is the highest weight for intensity of pedagogy and 25 is the lowest weight. These weights are arbitrary numbers assigned only for analytical purposes in helping to identify patterns in the survey results (i.e., the weights are not intended to be totally objective measures of the survey results, and their mathematical validity and reliability are therefore still to be determined through further study beyond the scope of this thesis). n means a sequence of responses to a question on the questionnaire. For example, n = 1, 2, 3…

Sample Analysis of Learning Viewpoint Format

Note: X's represent the numbers presented in the charts using this format in Chapter 5.

	Count	Assigned Weight Of Pedagogy	Pedagogy	Andragogy
Self-concept				
Constant	X	75	X	
Occasional	X	50	X	
Minimal	X	25	X	
		Average Weight	X	X
Experience				
A very important factor	X	25	X	
Helpful, but not essential	X	50	X	
Not an important factor	X	75	X	
		Average Weight	X	X
Readiness				
Biological development	X	75	X	
Social experiences	X	25	X	
Learning styles	X	50	X	
		Average Weight	X	X
Time perspective				
Facts	X	75	X	
Applications	X	25	X	
Both	X	50	X	
		Average Weight	X	X
Orientation to Learning				
Subject matter	X	75	X	
Problem solving	X	25	X	
		Average Weight	X	X
		Overall Average	**X**	**X**

Sample Analysis of Teaching Viewpoint Format

Note: X's represent the numbers presented in the charts using this format in Chapter 5.

	Count	Assigned Weight Of Pedagogy	Pedagogy	Andragogy
Climate				
Formal	X	75	X	
Informal	X	25	X	
Both	X	50	X	
		Average Weight	X	X
Planning				
The instructor	X	75	X	
The students	X	25	X	
The instructor and students	X	50	X	
		Average Weight	X	X
Formulation of objectives				
The instructor	X	75	X	
The students	X	25	X	
The instructor and students	X	50	X	
		Average Weight	X	X
Diagnosis of needs				
The instructor	X	75	X	
The students	X	25	X	
The instructor and students	X	50	X	
		Average Weight	X	X
Evaluation				
The instructor	X	75	X	
The students	X	25	X	
The instructor and students	X	50	X	
		Average Weight	X	X
Design				
Subject matter discussions	X	75	X	
Problem solving activities	X	25	X	
Both	X	50	X	
		Average Weight	X	X
Activities				
Instructor's techniques	X	75	X	
Students' experimental techniques	X	25	X	
Both	X	50	X	
		Average Weight	X	X
		Overall Average	**X**	**X**

2. I then constructed comprehensive summaries of the administrators' learning and teaching viewpoints using the following formats and averages from the preceding tables to illustrate whether their overall perspectives as a group most closely matched the pedagogical or andragogical educational model.

Note: X's represent the numbers presented in the charts using this format in Chapter 5.

Sample Comprehensive Summary of Learning Viewpoint Format

Type	Pedagogy	Andragogy
Self-concept	X	X
Experience	X	X
Readiness	X	X
Time perspective	X	X
Orientation to learning	X	X
Overall Preference (Average)	**X**	**X**

Sample Comprehensive Summary of Teaching Viewpoint Format

Type	Pedagogy	Andragogy
Climate	X	X
Planning	X	X
Formulation of objectives	X	X
Diagnosis of needs	X	X
Evaluation	X	X
Design	X	X
Activities	X	X
Overall Preference (Average)	**X**	**X**

4.3.2.2 Second Question

What are the characteristics of traditional classroom and distance learning environments at RIT?

Relevant Data and Instrumentation

Relevant Data	
Traditional Classroom	**Distance Learning**
1. Physical locations (06-A205 and 12-3105 classrooms) a. Attributes (colors, temperature, noise levels, light level) b. Attendance c. Class durations d. Number of fatigued students e. Number of questions / comments f. Classroom resources i. Instructor's usage of the white markerboard ii. Course handouts iii. Number of questions/ comments	1. Virtual location (First Class conference) a. Chat sessions i. Attendance ii. Number of lines typed by an instructor and students b. Electronic handouts c. Electronic study guides d. Questions and answers conference e. Discussion entries conference
2. General resources a. Course textbooks and materials b. Course assignments c. Course exams d. Library materials e. Communication methods such as e-mails, phone calls, face-to-face contacts, faxes, etc. f. RIT tutors	2. General resources a. Course textbooks and materials b. Course assignments c. Course exam d. Library materials e. Communication methods such as e-mails, phone calls, face-to-face contacts, faxes, etc. f. RIT tutors g. Internet / distance learning services
3. Success rate a. Components of the course (exam and assignment submission) b. Final grades	3. Success rate a. Components of the course (exam and assignment submission) b. Final grades

Instrumentation
1. A separate observation notebook for each section (Traditional Classroom and Distance Learning) 2. Documentary evidence from the course syllabus, course handouts, chat session transcripts, and RIT web pages 3. Database and statistics software used to store and summarize data from my observations

Data Collection Procedures

1. For the traditional classroom section, I attended every class except one (I was ill on September 30, 1999). I always sat in the back of the classroom. My notes for each class included the room number, starting and ending class times, starting and ending class break times, number of early and late students, number of students raising their hands for comments/questions, number of handouts, colors, light intensity, noise intensity (as determined from hearing students), indoor temperature, outdoor temperature (from the Weather Channel), number of diagrams and words on the white markerboard, number of fatigued (sleeping and yawning) students, and additional notes/comments about interesting or unusual happenings.

   For the distance learning section, I took notes every week by going into the First Class client/server software. I recorded the number of questions/answers, study guides, discussion entries, and electronic handouts in my observation notes. I also printed out and examined all chat session transcripts, study guides, electronic handouts, questions/answers, and discussion entries. I categorized questions/answers and discussion entries by subjects (e.g., technology issues, course information, assignments, etc.). While I was analyzing each chat session transcript, I noted the number of students participating and the number of lines typed by the instructor and the students. I accessed the First Class assignments/final exam drop box and counted the number of early, late, "on time", and missing submissions for each assignment and the take-home final exam.

2. At the end of the Fall Quarter 1999, I asked the instructors from both sections to send a complete list of the students' grades to me.

3. I typed the data from my observation notebooks into my database, and using statistics software, I then constructed visual bar, line, and pie graphs to provide numerous summary reports of characteristics for both RIT learning environments (see Chapter 6). I also analyzed the conditions of the traditional classrooms using previous Navy research studies referenced in the next section.

Criteria for Determining the Suitability of Classroom Conditions

Criteria from Navy Research Studies for a Suitable Learning Environment	
Colors	Soft colors (white, green, blue)
Temperature	68-74 degrees F
Noise Level	Somewhat quiet (no more than 45 decibels)
Light Level	Bright (Full spectrum tubes but no traditional fluorescent lights)

Credit: Knirk & Montague, 1992, pp. 1 - 2

Information about these conditions for the two surveyed sections, and comparisons of the conditions with the above criteria, are presented in Chapter 6.

4.3.2.3 Third Question

How do traditional classroom and distance learning environments shape scaffolding and cognitive apprenticeship in RIT's distance learning and traditional classroom methods? Which education model (andragogy or pedagogy) is most closely matched with shaped scaffolding in each method?

<u>Relevant Data and Instrumentation</u>

Relevant Data
Instructors' teaching styles significantly influence the RIT learning environment. Factors which can affect teaching styles include the instructors' teaching viewpoints, cultures/backgrounds, and their assumptions about college students' learning viewpoints. Therefore, the relevant data needed to define these factors for the surveyed instructors were identified as the following: 1. Observed and requested details about their distance learning or classroom teaching styles. 2. General characteristics of each instructor (gender, age range in years, type of instructor, tenure status, tenure length in years, type of high school education, college education level, type of college education, social background, and computer literacy). 3. Learning viewpoints about their students' self-concept, experience, readiness, time perspective, and orientation to learning (as previously defined in Table 2.4). 4. Teaching viewpoints about designing and implementing the learning environment for their courses, based on the educational modeling elements of climate, planning, diagnosis of needs, formulation of objectives, activities, and evaluation (as previously defined in Table 2.5).
Instrumentation
1. Notebook to record the results of interviews with RIT instructors 2. RIT instructor questionnaires (See Appendix D and E) 3. Documentary evidence from the course syllabus, course handouts, and course materials 4. Database and statistics software used to store and summarize data from the survey results

Important Definitions and Related Data Collection/Analysis Techniques

Scaffolding	Definition
	The teaching method used to help the learner to master his or her problem-solving (task) skills
	Data Collection
	• General characteristics from questionnaire responses • Learning viewpoint from questionnaire responses • Teaching viewpoint from questionnaire responses • Details of teaching styles from interviews and observations
	Final Analysis
	• Identification of specific teaching styles using the Staged Self-Directed Learning Model (SSDL) • Identification of each teaching environment as corresponding most closely to the andragogical or pedagogical model

Cognitive Apprenticeship	Definition
	The relationship between the guider and the learner in terms of developing new skills using real world experiences.
	Data Collection
	• General characteristics from questionnaire responses • General tasks, including communication systems, from questionnaire responses • Details of teaching styles from interviews and observations
	Final Analysis
	• Identification of specific interactions using the Staged Self-Directed Learning Model (SSDL) • Identification of each interacting environment as corresponding most closely to the andragogical or pedagogical model

Data Collection and Analysis Procedures

1. I passed out initial questionnaires to the instructors of both surveyed sections during the 5th week of the Fall Quarter, 1999. Both instructors returned their completed informed consent forms and questionnaires to me very promptly.

2. I repeated the first step at the 9th week of the quarter to determine if there had been changes in the instructors' learning and teaching viewpoints, job responsibilities, and contacts with students as the quarter progressed. These final questionnaires included all the same questions plus a few new ones about the instructors' job responsibilities and contacts with students. The instructors were again very prompt in returning their completed informed consent forms and questionnaires to me.

3. At the end of the quarter, I conducted interviews with both instructors and asked various questions based on my observations of the classes and chat sessions. I interviewed the traditional classroom instructor on the campus of RIT and the distance learning instructor via the First Class client/server software.

4. I typed all questionnaire responses into my database, and using statistics software, I constructed various graphs to provide summary reports about both instructors' learning and teaching viewpoints to determine whether they most closely matched the andragogical or pedagogical educational models (see the next sections and Chapter 7).

5. I typed summaries of my interview data and constructed visual bar graphs to identify differences between the instructors' responses to questions about learning and teaching viewpoints for the 5^{th} and 9^{th} week questionnaires, the number of the instructors' working hours per week, and the average number of the instructors' contacts with students per week (see Chapter 7).

Explanation of Information Requested on the RIT Instructors' Questionnaire

Information about the following general characteristics was requested because they can significantly influence the shaping of an instructor's learning and teaching viewpoints.

General Characteristics	
Gender	Male or Female
Age Range (In Years)	25-40 or Over 40
Type of Instructor	Distance Learning, Traditional Classroom, or Both
Tenure Status	Part-time or Full-time
Tenure Length (In Years)	How long an instructor has been teaching at the college (0-5 or 6-10, or 11+)
Type of HS Education	Public or Private
College Education Level	B.S/B.A, M.S/M.A, or Doctorate
Type of College Education	Public or Private
Social Background	Who made decisions pertaining to education for an instructor when he or she was a student? Myself or my teachers and other people
Computer Literacy	Level of computer expertise Low, Medium, or High

As previously discussed under "Relevant Data", the instructors' learning viewpoint is defined as the collection of different perspectives about students' learning preferences and traits (self-concept, experience, readiness, time perspective, and orientation to learning). Information about these perspectives was requested through the questionnaires, as follows.

Type	**Operational definition**
Self-concept	How much students depend on instructors in the range of a total dependent attitude to a total self-directed attitude.
Experience	How important students' life experiences are to the learning environment.
Readiness	Why students are ready to learn something new (biological development or social experiences).
Time perspective	Which is the best method for students to learn based on the readiness of students? Applications or facts? Both?
Orientation to learning	Which is the best classroom setting? Subject matter discussion or hands-on problem solving activities?

Type	Related Question On The Questionnaire
Self-concept	Most of my students need _____ instruction and guidance from me. Constant Occasional Minimal
	"Constant" denotes a totally dependent attitude. "Occasional" denotes a mixed dependent and self-directed attitude. "Minimal" denotes an almost totally self-directed attitude.
Experience	My students' life experiences are ______ in developing their ability to learn. A very important factor Helpful, but not essential Not an important factor
	These choices dictate the importance of students' life experiences.
Readiness	I primarily consider my students' ______ in designing my teaching methods for a course. Biological development Social experiences
	Biological development means that students are expected to be ready to learn something new only because of their age and human development. Social experiences motivate students to learn something new regardless of age and human development.
Time perspective	My students learn the best by studying ____. Facts Applications Both
	"Facts" means rote learning (memorizing details). "Applications" means problem solving. "Both" is a combination of facts and related applications.
Orientation to learning	Which is more important to my students? Subject matter Problem solving
	Subject matter is information acquired primarily through topic discussions in the classroom or DL environment. Problem solving involves hands-on application activities.

The instructors' teaching viewpoint is defined as the collection of different perspectives that influences their development of a teaching environment (climate, planning, diagnosis of needs, formulation of objectives, design, activities, and evaluation), based in part on their learning viewpoint discussed above. Information about these perspectives was also solicited through the questionnaires, as follows.

Type	**Operational definition**
Climate	The intensity of the classroom setting (formal and authoritative, or informal and respectful)
Planning	Who does planning, diagnosis of needs, and formulation of objectives? Instructor, students, or both?
Diagnosis of needs	
Formulation of objectives	
Design	What will the course emphasize? Subject matter discussion, problem solving activities, or both?
Activities	How should activities be completed? Using the instructor's techniques, students' experimental techniques, or both?
Evaluation	Who completes the course evaluation(s)? Instructor, students, or both?

Type	Related Question On The Questionnaire
Climate	The learning climate for my courses is generally _______. Formal and controlled entirely by me Informal with instructor/student sharing of responsibilities
	The first choice means that an instructor is authoritative in enforcing rules and choosing teaching methods for his or her courses. The second choice indicates that students and an instructor share their responsibilities for structuring the learning environment.
Planning Diagnosis of needs Formulation of objectives Evaluation	___________ should be responsible for course… … objectives formulation. … structure planning. … student needs assessment. … effectiveness evaluations.
	The choices are the students, the instructor, or both.
Design	_____ should be emphasized in college courses. Subject matter discussions Problem solving activities Both
	The choices denote instructors' preferences for including subject matter discussions, problem solving activities, or both to provide the best learning environment for RIT students.
Activities	Course activities should use _________. Instructor's techniques Students' experimental techniques Both
	The choices indicate whether the instructors feel that instructor's techniques, students' experimental techniques, or both provide the best means of completing course activities.

Additional Questions on the Final Questionnaire	
Question(s)	**Purpose**
How many E-mails ______ and phone calls ______ do you receive in an average week from your students? How many individual conferences do you have in an average week with your students? ______ What are the three or four most common subjects of the student: . . . a. E-mails? b. Phone calls? c. Conferences?	Answers to these questions were requested to help determine the effectiveness of cognitive apprenticeship/communication between the instructor and students.
How many hours do you spend in an average week on Academic Research? ____ Course Preparation? ____ Teaching Courses? ____ Grading? ____ Other Job- Related Activities (specify: ______________________________)?	The amount of time spent on course-related tasks is one of the factors that can influence the success of scaffolding.

Instructors' Viewpoints Compared With Knowles' Educational Models

The surveyed instructors' responses to each question were mathematically summarized for comparison of their perspectives to Knowles' pedagogy and andragogy models, as explained below.

Basic Formula

Count (CT)	Number of responses*	Σ	Sum
Assigned Weight of Pedagogy (AWP)	Intensity of pedagogy	n	nth item
Average Weight (AW)	$\Sigma (CT_n \times AWP_n) / \Sigma (CT)$		
Pedagogy	(AW)		
Andragogy	100 - (AW)		
Overall Average	Average of All Average Weights		

Note: 75 is the highest weight for intensity of pedagogy and 25 is the lowest weight. These weights are arbitrary numbers assigned only for analytical purposes in helping to identify patterns in the survey results (i.e., the weights are not intended to be totally objective measures of the survey results, and their mathematical validity and reliability are therefore still to be determined through further study beyond the scope of this thesis). n means a sequence of responses to a question on the questionnaire. For example, n = 1, 2, 3…

*The number of responses is one because there is only one response to each question in both the traditional classroom and distance learning environments.

Lookup Teaching Style Table based on the Staged Self-Directed Learning Model (SSDL)

Teaching Style	Pedagogy Weight
Authority, Coach	62.5 or higher
Motivator, Guide	50 - 62.4
Facilitator	37.5 - 49.9
Consultant, Delegator	37.4 or lower

Interval for each teaching style = 12.4

Note: Interval is calculated as the difference between the highest weight for intensity of pedagogy and the lowest weight for intensity of pedagogy divided by the number of learning styles. As with the assigned weights, each interval is an arbitrary value used only for analytical purposes in helping to identify and classify survey result patterns. The interval values believed to be appropriate for this purpose (to aid in analyzing patterns) were determined after my research was completed, and their mathematical validity and reliability are still to be determined through further study beyond the scope of this thesis.

Sample Analysis of Learning Viewpoint Format

Note: X's represent the numbers or text presented in the charts using this format in Chapter 7.

Traditional Classroom	5th week	9th week	Assigned Weight Of Pedagogy	5th week Pedagogy	5th week Andragogy	9th week Pedagogy	9th week Andragogy
Self-concept							
Constant	X	X	75	X		X	
Occasional	X	X	50	X		X	
Minimal	X	X	25	X		X	
			Average Weight	X	X	X	X
Experience							
A very important factor	X	X	25	X		X	
Helpful, but not essential	X	X	50	X		X	
Not an important factor	X	X	75	X		X	
			Average Weight	X	X	X	X
Readiness							
Biological development	X	X	75	X		X	
Social experiences	X	X	25	X		X	
			Average Weight	X	X	X	X
Time perspective							
Facts	X	X	75	X		X	
Applications	X	X	25	X		X	
Both	X	X	50	X		X	
			Average Weight	X	X	X	X
Orientation to Learning							
Subject matter	X	X	75	X		X	
Problem solving	X	X	25	X		X	
Both	X	X	50	X		X	
			Average Weight	X	X	X	X
			Overall Average	X	X	X	X
			Learning Viewpoint	XXXXXXXXX		XXXXXXXXX	

Distance Learning	5th week	9th week	Assigned Weight Of Pedagogy	5th week Pedagogy	5th week Andragogy	9th week Pedagogy	9th week Andragogy
Self-concept							
Constant	X	X	75	X		X	
Occasional	X	X	50	X		X	
Minimal	X	X	25	X		X	
			Average Weight	X	X	X	X
Experience							
A very important factor	X	X	25	X		X	
Helpful, but not essential	X	X	50	X		X	
Not an important factor	X	X	75	X		X	
			Average Weight	X	X	X	X
Readiness							
Biological development	X	X	75	X		X	
Social experiences	X	X	25	X		X	
			Average Weight	X	X	X	X
Time perspective							
Facts	X	X	75	X		X	
Applications	X	X	25	X		X	
Both	X	X	50	X		X	
			Average Weight	X	X	X	X
Orientation to Learning							
Subject matter	X	X	75	X		X	
Problem solving	X	X	25	X		X	
Both	X	X	50	X		X	
			Average Weight	X	X	X	X
			Overall Average	X		X	
			Learning Viewpoint	XXXXXXXXX		XXXXXXXXX	

Sample Analysis of Teaching Viewpoint Format

Note: X's represent the numbers or text presented in the charts using this format in Chapter 7.

Traditional Classroom							
			Assigned Weight	**5th week**		**9th week**	
	5th week	**9th week**	**Of Pedagogy**	**Pedagogy**	**Andragogy**	**Pedagogy**	**Andragogy**
Climate							
Formal	X	X	75	X		X	
Informal	X	X	25	X		X	
			Average Weight	X	X	X	X
Formulation of objectives							
The instructor	X	X	75	X		X	
The students	X	X	25	X		X	
The instructor and students	X	X	50	X		X	
			Average Weight	X	X	X	X
Planning							
The instructor	X	X	75	X		X	
The students	X	X	25	X		X	
The instructor and students	X	X	50	X		X	
			Average Weight	X	X	X	X
Diagnosis of needs							
The instructor	X	X	75	X		X	
The students	X	X	25	X		X	
The instructor and students	X	X	50	X		X	
			Average Weight	X	X	X	X
Evaluation							
The instructor	X	X	75	X		X	
The students	X	X	25	X		X	
The instructor and students	X	X	50	X		X	
			Average Weight	X	X	X	X
Design							
Subject matter discussions	X	X	75	X		X	
Problem solving activities	X	X	25	X		X	
Both	X	X	50	X		X	
			Average Weight	X	X	X	X
Activities							
Instructor's techniques	X	X	75	X		X	
Students' experimental techniques	X	X	25	X		X	
Both	X	X	50	X		X	
			Average Weight	X	X	X	X
			Overall Average	X	X	X	X
			Teaching Viewpoint	XXXXXXXXX		XXXXXXXXX	

Distance Learning	5th week	9th week	Assigned Weight Of Pedagogy	5th week Pedagogy	5th week Andragogy	9th week Pedagogy	9th week Andragogy
Climate							
Formal	X	X	75	X		X	
Informal	X	X	25	X		X	
			Average Weight	X	X	X	X
Formulation of objectives							
The instructor	X	X	75	X		X	
The students	X	X	25	X		X	
The instructor and students	X	X	50	X		X	
			Average Weight	X	X	X	X
Planning							
The instructor	X	X	75	X		X	
The students	X	X	25	X		X	
The instructor and students	X	X	50	X		X	
			Average Weight	X	X	X	X
Diagnosis of needs							
The instructor	X	X	75	X		X	
The students	X	X	25	X		X	
The instructor and students	X	X	50	X		X	
			Average Weight	X	X	X	X
Evaluation							
The instructor	X	X	75	X		X	
The students	X	X	25	X		X	
The instructor and students	X	X	50	X		X	
			Average Weight	X	X	X	X
Design							
Subject matter discussions	X	X	75	X		X	
Problem solving activities	X	X	25	X		X	
Both	X	X	50	X		X	
			Average Weight	X	X	X	X
Activities							
Instructor's techniques	X	X	75	X		X	
Students' experimental techniques	X	X	25	X		X	
Both	X	X	50	X		X	
			Average Weight	X	X	X	X
			Overall Average	X	X	X	X
			Teaching Viewpoint	XXXXXXXXX		XXXXXXXXX	

I then constructed comprehensive summaries of the instructors' learning and teaching viewpoints using the following formats and averages from the preceding tables to illustrate whether their overall perspectives most closely matched the pedagogy or andragogy educational model for both the 5th and 9th week surveys.

Note: X's represent the numbers or text presented in the charts using this format in Chapter 7.

Sample Comprehensive Summaries of Learning and Teaching Viewpoints Format

Type	5th week				9th week			
	Traditional Classroom		Distance Learning		Traditional Classroom		Distance Learning	
	P	A	P	A	P	A	P	A
Self-concept	X	X	X	X	X	X	X	X
Experience	X	X	X	X	X	X	X	X
Readiness	X	X	X	X	X	X	X	X
Time perspective	X	X	X	X	X	X	X	X
Orientation to learning	X	X	X	X	X	X	X	X
Overall Preference (Average)	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Teaching Style	**XXXXX**		**XXXXX**		**XXXXX**		**XXXXX**	

Type	5th week				9th week			
	Traditional Classroom		Distance Learning		Traditional Classroom		Distance Learning	
	P	A	P	A	P	A	P	A
Climate	X	X	X	X	X	X	X	X
Formulation of objectives	X	X	X	X	X	X	X	X
Planning	X	X	X	X	X	X	X	X
Diagnosis of needs	X	X	X	X	X	X	X	X
Evaluation	X	X	X	X	X	X	X	X
Design	X	X	X	X	X	X	X	X
Activities	X	X	X	X	X	X	X	X
Overall Preference (Average)	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Teaching Style	**XXXXX**		**XXXXX**		**XXXXX**		**XXXXX**	

Note: P = Pedagogy and A = Andragogy

4.3.2.4 Fourth Question

How do traditional classroom and distance learning environments shape RIT students' epistemological beliefs and their learning styles (dependent to self-directing) in distance learning and traditional classroom methods under the categories of cognitive apprenticeship and assisted learning? Which education model (andragogy or pedagogy) do most students prefer?

Relevant Data and Instrumentation

Relevant Data

Students' success in an educational environment can be greatly influenced by such factors as the environment itself (e.g., instructors' teaching/learning viewpoints and the propriety of physical sites) as well as by each individual student's personality, level of maturity, academic viewpoints/habits, future goals, and culture/background. Therefore, the relevant data needed to define as many of these factors as possible for each of the surveyed students were identified as the following:

1. General characteristics and academic success factors for each student (gender, age range in years, major, origin, student status, college year level, type of high school education, social background, computer literacy, future goals, verbal SAT score, math SAT score, cumulative GPA, and final course grade).

2. Epistemological beliefs as previously defined in Section 2.4.2 (source of knowledge, organization of knowledge, stability of knowledge, method of learning*, speed of learning, and control of learning).

3. Learning styles (communication, work, and study habits).

4. Learning sites (favorite location, dominant colors, average temperature, noise level, light level, and number of people in the location).

* I added this aspect because in the context of my thesis, it is important to know if students prefer rote learning (memorizing facts) or conceptual learning (problem-solving applications).

Instrumentation

1. Data from the RIT Institutional Research Center

2. RIT student questionnaires (see Appendix F and G)

3. Database and statistics software used to store and summarize data from the survey results

<u>Data Collection and Analysis Procedures</u>

1. I passed out initial questionnaires to the students of both surveyed sections during the 5th week of the Fall Quarter, 1999. Sixteen of the thirty-four students in the traditional classroom section, and five of the twenty-nine students in the distance learning section, returned their completed informed consent forms and questionnaires to me.

2. I repeated the first step at the 9th week of the quarter to determine if there had been changes in the students' epistemological beliefs, learning styles, and learning sites as the quarter progressed. These final questionnaires included all the same questions plus a few new ones about "communication habits" (see the section entitled "Explanation of Information Requested on the RIT Students' Questionnaire" on page 56). Twenty-five of the thirty-one students in the traditional classroom section, and five of the twenty-seven students in the distance learning section, returned their completed informed consent forms and questionnaires to me.

3. I typed all data from the RIT Institutional Research Center and from the questionnaire responses into my database, and using statistics software, I constructed various visual graphs and tables to provide summary reports about the students' general characteristics, epistemological beliefs, learning viewpoints, learning sites, and academic success factors.

4. After analyzing the raw data, I constructed additional tables for each surveyed section as a whole to illustrate the strength of relationship between each general student characteristic and the students' success (final grade) in the course, and to determine whether their epistemological beliefs most closely matched the andragogical or pedagogical educational model (see the next sections and Chapter 8).

5. I interpreted the effectiveness of participating students' learning sites based on guidelines from previous Navy research studies (see the next sections and Chapter 8).

Important Definitions and Related Data Collection/Analysis Techniques

Cognitive Apprenticeship	**Definition**
	The relationship between the guider and the learner in terms of developing new skills using real world experiences.
	Data Collection
	• General characteristics from questionnaire responses • Epistemological beliefs from questionnaire responses • Communication methods from questionnaire responses • Learning sites from questionnaire responses • RIT statistics and other data for the entire course sections
	Final Analysis
	• Identification of specific student/instructor interactions using the Staged Self-Directed Learning Model (SSDL) • Identification of each interacting preference as corresponding most closely to the andragogical or pedagogical model

Assisted Learning	**Definition**
	Any way of helping the student to learn something new.
	Data Collection
	• General characteristics from questionnaire responses • Epistemological beliefs from questionnaire responses • Work and study habits from questionnaire responses • Learning sites from questionnaire responses • RIT statistics and other data for the entire surveyed course sections
	Final Analysis
	• Identification of specific learning styles using the Staged Self-Directed Learning Model (SSDL) • Identification of each learning preference as corresponding most closely to the andragogical or pedagogical model

Determining the Strength of Relationships

I identified patterns in the student data summaries mentioned above (for gender, age, major, origin, student status, college year level, type of high school education, verbal SAT scores, math SAT scores, cumulative GPA, and final grades) to determine the strength of relationship between each general student characteristic and the students' success in each surveyed section, as measured by final course grades. Using "college year level" with hypothetical grades as an example:

College Year Level	Final Course Grade Average
Freshmen	2.56
Sophomore	2.78
Junior	3.04
Senior	3.24
Graduate	3.45

In this hypothetical example, the data pattern shows that there is a fairly strong relationship between college year level and final grades.

Strength of Relationship to Students' Final Grades (Sample Chart Format Used in Chapter 8)

	Very Strong	Strong	Intermediate	Weak	Very Weak	N/A*
General Characteristics of All Students						
Gender						
Age						
Major						
Origin						
Student Status						
College Year Level		X				
Type of HS Education						
SAT Scores						
Verbal						
Math						
Cumulative GPA						

*Not applicable, or insufficient data to determine relationships

Explanation of Information Requested on the RIT Students' Questionnaire

General Characteristics Data

General Characteristics	
Type	**Definition**
Gender	Male or Female
Age Range (In Years)	Under 21, 21 – 25, or Over 25
Majors	Information Technology or Other Majors
Origin	Original Residence (American or International)
Student Status	Part-time or Full-time
College Year Level	Freshmen, Sophomore, Junior, Senior, Graduate
Type of HS Education	Public or Private
Social Background	Who made decisions pertaining to education for a student? Myself or my teachers and other people
Computer Literacy	Level of computer expertise Low, Medium, or High
Future Goal	What are students' future goals? Become an employee, an executive, a professor, or other profession

Epistemological Beliefs Data

Epistemological beliefs are defined as students' beliefs pertaining to knowledge and learning (see Chapter 2 – Literature Review). Participating students expressed their beliefs in the questionnaires completed during the 5th and 9th weeks of the Fall Quarter, 1999.

Type of belief	Operational definition
Source of knowledge	Where does knowledge come from? Teachers, life experiences, or both?
Organization of knowledge	How can knowledge be learned and organized? Separated parts of a topic, the whole topic at once, or both, depending on the subject matter?
Stability of knowledge	How often does knowledge change? Never, rarely, sometimes, or often?
Method of learning*	Which is the best type of learning for a student? Memorizing facts, applying facts to a given situation, or both?
Speed of learning	How quickly can learning occur? The answer can be in a range from very slow to very fast.
Control of learning	Is the ability to learn fixed (innate) or changing? How often can learning change? Never, rarely, sometimes, or often?

<u>**Source of knowledge**</u>

Related question on the questionnaire
Most of my knowledge has been acquired from _______. Teachers Life Experiences Equally from Teachers/Life Experiences
Explanation of the question
The choices indicate whether an individual's knowledge has come from teachers as guiders, life experiences, or both.

Organization of knowledge

Related question on the questionnaire
I acquire knowledge best by learning about interrelated parts of a topic ________. Separately At the same time Either separately or at the same time, depending on the topic
Explanation of the question
The choices denote how a student organizes interrelated parts of a topic for his or her optimum learning.

Stability of knowledge

Related question on the questionnaire
After learning about a topic, I believe my knowledge of the subject will _____ change in the future. Never, Rarely, Sometimes, or Often
Explanation of the question
The choices indicate if and how often the student feels his or her knowledge of a subject can be changed after first learning about it.

Method of learning

Related question on the questionnaire
I prefer to expand my knowledge by ___________. Acquiring facts Solving problems Acquiring facts and using them to solve problems
Explanation of the question
The choices denote how students can best expand their knowledge.

Speed of learning

Related question on the questionnaire
I have a ____ learning speed. Very slow, Slow, Average, Fast, Very Fast, or Varied (Depending on topic)
Explanation of the question
The choices indicate how a student feels about her or his learning speed.

Control of learning

Related question on the questionnaire
My ability to learn new things ______ changes. Never, Rarely, Sometimes, or Often
Explanation of the question
The choices mean how often students feel their learning ability can be changed.

Students' Viewpoints Compared With Knowles' Educational Models

The surveyed students' responses to each question were mathematically summarized for comparison of their perspectives to Knowles' pedagogy and andragogy models, as explained below.

Basic Formula			
Count (CT)	Number of responses	Σ	Sum
Assigned Weight of Pedagogy (AWP)	Intensity of pedagogy	n	nth item
Average Weight (AW)	$\Sigma (CT_n \times AWP_n) / \Sigma (CT)$		
Pedagogy	(AW)		
Andragogy	100 - (AW)		
Overall Average	Average of All Average Weights		

Note: 75 is the highest weight for intensity of pedagogy and 25 is the lowest weight. These weights are arbitrary numbers assigned only for analytical purposes in helping to identify patterns in the survey results (i.e., the weights are not intended to be totally objective measures of the survey results, and their mathematical validity and reliability are therefore still to be determined through further study beyond the scope of this thesis). n means a sequence of responses to a question on the questionnaire. For example, n = 1, 2, 3...

Lookup Learning Style Table For Epistemological Beliefs based on the Staged Self-Directed Learning Model (SSDL)

Student Style	Pedagogy Weight
Dependent	62.5 or higher
Interested	50 - 62.4
Involved	37.5 - 49.9
Self-directed	37.4 or lower

Interval for each student style = 12.4

Note: Interval is calculated as the difference between the highest weight for intensity of pedagogy and the lowest weight for intensity of pedagogy divided by the number of learning styles. As with the assigned weights, each interval is an arbitrary value used only for analytical purposes in helping to identify and classify survey result patterns. The interval values believed to be appropriate for this purpose (to aid in analyzing patterns) were determined after my research was completed, and their mathematical validity and reliability are still to be determined through further study beyond the scope of this thesis.

Sample Analysis of Participating Students' Epistemological Beliefs Format

Note: X's represent the numbers or text presented in the charts using this format in Chapter 8.

Traditional Classroom	5th week	9th week	Assigned Weight Of Pedagogy	5th week Pedagogy	5th week Andragogy	9th week Pedagogy	9th week Andragogy
Source of knowledge							
Teachers	X	X	75	X		X	
Both	X	X	50	X		X	
Life Experiences	X	X	25	X		X	
			Average Weight	X	X	X	X
Organization of knowledge							
Separately	X	X	25	X		X	
Both	X	X	50	X		X	
At the same time	X	X	75	X		X	
			Average Weight	X	X	X	X
Stability of knowledge							
Never	X	X	75	X		X	
Rarely	X	X	56	X		X	
Sometimes	X	X	44	X		X	
Often	X	X	25	X		X	
			Average Weight	X	X	X	X
Method of learning							
Acquiring facts	X	X	75	X		X	
Solving problems	X	X	25	X		X	
Both	X	X	50	X		X	
			Average Weight	X	X	X	X
Speed of learning							
Very slow	X	X	75	X		X	
Slow	X	X	65	X		X	
Average	X	X	50	X		X	
Fast	X	X	35	X		X	
Very fast	X	X	25	X		X	
Varied	X	X	50	X		X	
			Average Weight	X	X	X	X
Control of learning							
Never	X	X	75	X		X	
Rarely	X	X	56	X		X	
Sometimes	X	X	44	X		X	
Often	X	X	25	X		X	
			Average Weight	X	X	X	X
			Overall Average	X	X	X	X
			Student Style	XXXXX		XXXXX	

Distance Learning							
			Assigned Weight	5th week		9th week	
	5th week	9th week	Of Pedagogy	Pedagogy	Andragogy	Pedagogy	Andragogy
Source of knowledge							
Teachers	X	X	75	X		X	
Both	X	X	50	X		X	
Life Experiences	X	X	25	X		X	
			Average Weight	X	X	X	X
Organization of knowledge							
Separately	X	X	25	X		X	
Both	X	X	50	X		X	
At the same time	X	X	75	X		X	
			Average Weight	X	X	X	X
Stability of knowledge							
Never	X	X	75	X		X	
Rarely	X	X	56	X		X	
Sometimes	X	X	44	X		X	
Often	X	X	25	X		X	
			Average Weight	X	X	X	X
Method of learning							
Acquiring facts	X	X	75	X		X	
Solving problems	X	X	25	X		X	
Both	X	X	50	X		X	
			Average Weight	X	X	X	X
Speed of learning							
Very slow	X	X	75	X		X	
Slow	X	X	65	X		X	
Average	X	X	50	X		X	
Fast	X	X	35	X		X	
Very fast	X	X	25	X		X	
Varied	X	X	50	X		X	
			Average Weight	X	X	X	X
Control of learning							
Never	X	X	75	X		X	
Rarely	X	X	56	X		X	
Sometimes	X	X	44	X		X	
Often	X	X	25	X		X	
			Average Weight	X	X	X	X
			Overall Average	X	X	X	X
			Student Style	XXXXX		XXXXX	

I then constructed comprehensive summaries of the participating students' epistemological beliefs using the following formats and averages from the preceding tables to illustrate whether their overall perspectives most closely matched the pedagogy or andragogy educational model for both the 5th and 9th week surveys.

Sample Comprehensive Summary of Participating Students' Epistemological Beliefs Format

Note: X's represent the numbers or text presented in the charts using this format in Chapter 8.

Type	5th week				9th week			
	Traditional Classroom		Distance Learning		Traditional Classroom		Distance Learning	
	P	A	P	A	P	A	P	A
Source of knowledge	X	X	X	X	X	X	X	X
Organization of knowledge	X	X	X	X	X	X	X	X
Stability of knowledge	X	X	X	X	X	X	X	X
Method of learning	X	X	X	X	X	X	X	X
Speed of learning	X	X	X	X	X	X	X	X
Control of learning	X	X	X	X	X	X	X	X
Overall Preference (Average)	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Student Style	**XXXXX**		**XXXXX**		**XXXXX**		**XXXXX**	

Note: P = Pedagogy and A = Andragogy

Learning Style Data

The learning style is defined as how a student customizes his or her communication, work, and study habits to establish an effective learning environment.

Aspect of learning style	Operational definition
Communication habits	How often do students communicate with each other, their instructor, and RIT tutors? What are their common communication technologies? E-mail, phone, fax, or face-to-face contact?
Doing assignments	How do students complete their assignments? Do they work on them a little each day, do them at the last minute, or never do them?
Studying for exams	How do students study for their exams? Do they study a little each day, cram the night before, or rely on their memory?

Communication habits

Related question on the questionnaire
Initial Questionnaire I ___________ communicate with … * Never Rarely Sometimes Often Final Questionnaire How many times in an average week do I communicate with * by E-mail? ____ Phone? ____ Face-to-face contact? ____ Fax? ____ Other (specify: _______________)? _____ * There were three parts to this question, with each specifying either "my classmates", "my instructor", or "RIT tutors"
Explanation of the questions
The choices indicate how often students communicate with their classmates, their instructor, and RIT tutors. The question was presented in more general terms in the initial questionnaire than in the final questionnaire because I felt that the students may not have yet established their communication systems for the surveyed course early in the Fall Quarter, 1999.

Doing assignments

Related question on the questionnaire
In completing my assignments, I usually _______. Work on them a little each day Do them at the last minute Usually do not complete them
Explanation of the question
The choices denote how students complete their assignments.

Studying for exams

Related question on the questionnaire
To prepare for my exams, I usually ___________. Study a little each day Cram the night before Seldom/never study and rely on my memory
Explanation of the question
The choices indicate how students study for their exams.

The responses for these questions were analyzed to determine their consistency with the students' responses to related epistemological belief questions.

Learning Site Data

Learning sites are defined as the locations where students complete assignments, study for exams, and obtain assistance. Previous navy studies about learning sites have indicated that dominant colors, average temperature, noise level, light level, and the number of people in the location are major factors that affect how well students learn (Knirk & Montague, 1992, pp. 1 – 2).

Aspect of learning site	Operational definition
Favorite location	The student's most common physical location for completing assignments, studying for exams, and obtaining assistance. Examples could be libraries, bedrooms, and offices.
Dominant colors	The most common colors in the student's favorite location for each task shown above.
Average temperature	The most common temperature in the student's favorite location for each task shown above.
Noise level	The most common noise level in the student's favorite location for each task shown above.
Light level	The most common light level in the student's favorite location for each task shown above.
Number of people in the location	The number of people generally present in the student's favorite location for each task shown above.

Related questions on the questionnaire*
My favorite location: ____________________
Dominant color: ____________________
Average temperature: (Choices were Below 68F, Between 68F and 72F, or Above 72F)
Average noise level: (Choices were Very quiet, Somewhat quiet, Medium, Somewhat loud, or Very loud)
Average light level: (Choices were Very bright, Bright, Medium, Dark, or Very dark)
Number of people in this location: (Choices were 0-5, or 6 Or More)

* There were three parts to this question, each beginning with either "Doing assignments", "Studying for exams", or "Obtaining assistance".

Criteria for Determining the Suitability of Students' Learning Sites

Criteria from Navy Research Studies for Students' Learning Sites	
Colors	Soft colors (white, green, blue)
Temperature	68-74 degrees F
Noise Level	Somewhat quiet (no more than 45 decibels)
Light Level	Bright (Full spectrum tubes but no traditional fluorescent lights)

Credit: Knirk & Montague, 1992, pp. 1 - 2

Information about students' learning sites with the above criteria, are presented in Chapter 8.

4.3.2.5 Fifth Question

Which are the methods that produce the largest and smallest gaps between instructors' teaching styles (scaffolding and cognitive apprenticeship) and students' learning styles/epistemological beliefs (cognitive apprenticeship and assisted learning) at RIT?

Relevant Data and Instrumentation

Relevant Data
1. Comprehensive summaries of the participating instructors' learning and teaching viewpoints (see Section 4.3.2.3 and Chapter 7) 2. Comprehensive summaries of the participating students' epistemological beliefs (see Section 4.3.2.4 and Chapter 8)
Instrumentation
1. The Staged Self-Directed Learning Model (See section 2.4.3) 2. Table 2.6 entitled "Expected conclusions based on changes in teacher's scaffolding methods vs. students' epistemological beliefs" 3. Database and statistics software used to store and summarize data from the survey results

Data Analysis Procedures

Based on the relevant data already secured, I constructed the following tables for inclusion in Chapter 9.

1. Gap analysis tables identifying matches and mismatches for the two surveyed sections between instructors' teaching styles and students' learning styles/epistemological beliefs

2. "Differences in Pedagogy" tables illustrating changes in pedagogical tendencies for both instructors and participating students between the 5th and 9th week surveys

3. "Differences in Pedagogical Preferences" tables identifying differences between the surveyed instructors' and their students' pedagogical preferences

4. Final summary tables for both surveyed sections, based on data from the preceding tables and the SSDL model mentioned above, to illustrate and analyze the following: (a) Changes in each instructor's scaffolding methods and students' epistemological beliefs; (b) The effectiveness of cognitive apprenticeship and assisted learning; (c) The ZPD gap; (d) The degree of match/ mismatch between each instructor's scaffolding methods and their students' epistemological beliefs; and (e) The students' success rate for each surveyed section as measured by the actual class GPA.

4.3.2.6 Sixth Question

Which is the method that matches with RIT's university learning goals the least? The best? How should RIT's educational techniques be modified to eliminate performance discrepancies?

Relevant Data and Instrumentation

Relevant Data
1. Comprehensive summaries of the participating administrators' learning and teaching viewpoints (see Section 4.3.2.1 and Chapter 5)
2. Comprehensive summaries of the participating instructors' learning and teaching viewpoints, and of the participating students' epistemological beliefs (see Sections 4.3.2.3 and 4.3.2.4, and Chapters 7 and 8).
Instrumentation
1. The Staged Self-Directed Learning Model (See section 2.4.3)
2. Database and statistics software used to store and summarize data from the survey results

Data Analysis Procedures

1. Based on the relevant data already secured, I constructed the following tables for inclusion in Chapter 10.

   A. "Differences in Pedagogical Preferences" tables identifying differences between the participating administrators' and instructors' pedagogical preferences, and between the participating administrators' and students' pedagogical preferences, for both the 5th and 9th week surveys. Note that each participating administrator was surveyed only one time during the study (i.e., rather than at both the 5th and 9th weeks), and that the administrators' questionnaire responses were based on the RIT educational environment as a whole rather than on separate traditional classroom and distance learning categories.

B. Gap analysis tables for both surveyed sections, based on data from the preceding tables and the SSDL model mentioned above, to identify the magnitude of performance discrepancies between the administrators' teaching/student learning viewpoints and both the instructors' teaching styles and their students' learning styles.

RIT performance discrepancies are differences between intended and actual design elements of the RIT learning environment and college students' actual learning styles. If college students' learning styles match with RIT learning goals as well as their instructors' teaching styles, the RIT performance discrepancy should be very small. The following table shows various conditions that affect the magnitude of the RIT performance discrepancy.

First condition	RIT instructors' instructional design	RIT students' learning styles	Performance Discrepancy
RIT university learning goals	Match	Match	No
Second condition	RIT instructors' instructional design	RIT students' learning styles	Performance Discrepancy
RIT university learning goals	Match	Mismatch	Yes
Third condition	RIT instructors' instructional design	RIT students' learning styles	Performance Discrepancy
RIT university learning goals	Mismatch	Match	Yes
Fourth condition	RIT university learning goals	RIT students' learning styles	Performance Discrepancy
RIT instructors' instructional design	Mismatch	Match	Yes

Table 4.1 Conditions of performance discrepancies

Instructional technologists suggest that performance discrepancies can be minimized through changes in at least one of four areas -- communication, instruction, motivation/ attitude, and environment (Performance Discrepancy Worksheet/Flowchart). Compiled information from data collection for previous questions was used to help measure the RIT performance discrepancy in the gap analysis tables for both methods of instruction and to find out which area(s) contributed most to the discrepancy.

2. I developed a "Performance Report Card" for inclusion in Chapter 10, as explained below, to evaluate both learning environments as compared with RIT's university learning goals and suggested guidelines from the literature review.

The main topics addressed in the performance report card are available resources, scaffolding, cognitive apprenticeship, and assisted learning, which were broken down into the following sub-topics.

Sub-topics Under Available Resources - Student-Faculty Ratio, Classes, Course Materials, Handouts, Assignments/Exams, Information and Communications Technology

Sub-topics Under Scaffolding - Course Execution by Instructor, Class Execution by Instructor

Sub-topics Under Cognitive Apprenticeship - Class Attendance, Class Participation, Communicating with Instructors, Communicating with Classmates, Communicating with RIT Tutors

Sub-topics Under Assisted Learning - Work Habits, Study Habits, Submission of Assignments and Exams, Usage of Learning Resources, Choice of Learning Sites

Both learning environments were evaluated for each sub-topic category based on data analyses documented in Chapters 5-8, using the following evaluation scheme format.

Evaluating scheme for each sub-topic category

Traditional Classroom	**Distance Learning**	**Definition**
√		The traditional classroom section was more consistent with RIT goals than the distance learning section.
	√	The distance learning section was more consistent with RIT goals than the traditional classroom section.
√	√	Both sections were equally consistent or inconsistent with RIT goals.

A sample performance report card from Chapter 10 is presented below to illustrate the format used for each of the sub-topics presented above. Note that RIT information and goals were not available or applicable to certain sub-topics.

Sample Performance Report Card Format

Category	Traditional Classroom	Distance Learning
Student-Faculty Ratio	√	√

RIT Information

The average student-faculty ratio outside of NTID was 11:1.

RIT Goal

"Distance learning classes need to [have] a reasonable class size to maximize student/instructor interactions. There is no magic number, but a fallacy [takes place when distance learning courses have the same or more students than the same traditional classroom courses.]"

Evaluation Rationale

Both sections had very high student-faculty ratios compared to the RIT average. These ratios for the traditional classroom and distance learning sections were 34:1 and 29:1, with the distance learning section having almost same number of students as the traditional classroom section.

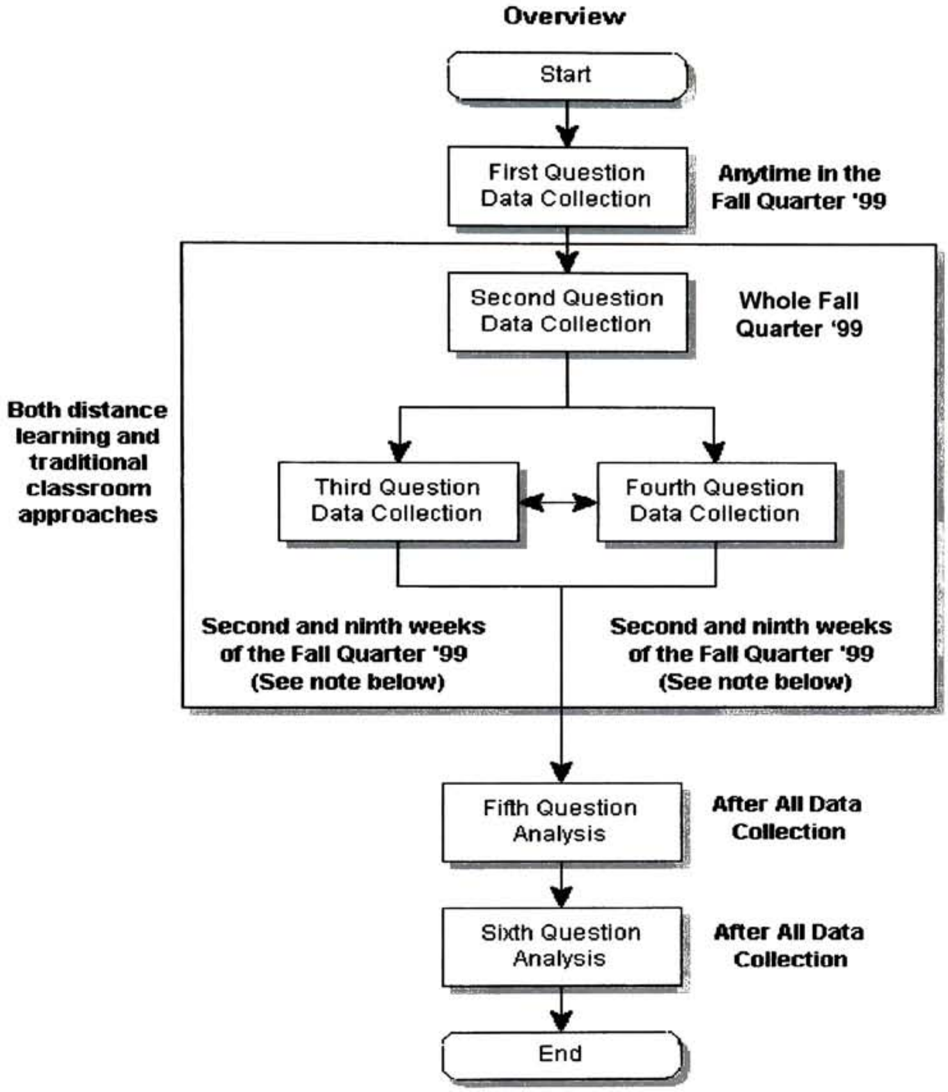
3. I then summarized all of the performance report cards using the table format shown below. The actual table presented in Chapter 10 contains a value for each "X" indicating the number of sub-topics checked under a main topic for each of the surveyed sections. The check marks for retention rate and average class GPA in the actual table identifies the section(s) with the lowest number of students who withdrew and with the highest average class GPA for the course.

Sample Summary of Performance Report Card Format

Main Topic	Number of Sub-Topics Checked	
	Traditional Classroom	**Distance Learning**
Available Resources	X	X
Scaffolding	X	X
Cognitive Apprenticeship	X	X
Assisted Learning	X	X
Final Results	**Traditional Classroom**	**Distance Learning**
Retention Rate		
Average Class GPA		

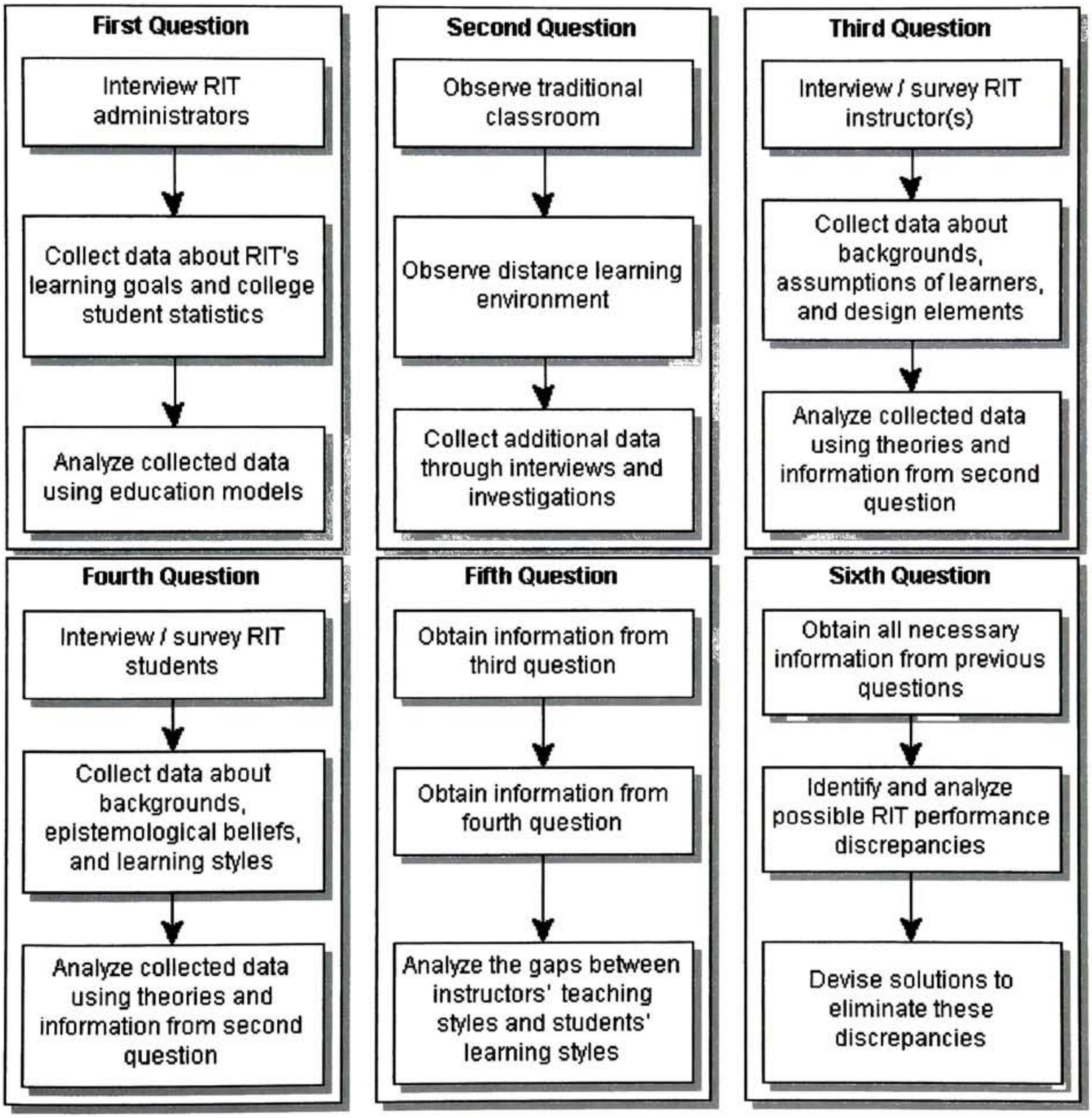
4. Finally, I presented recommendations at the end of Chapter 10 to alleviate RIT performance discrepancies identified in the thesis based on my previous analyses, suggested guidelines from the literature review, RIT's university learning goals, and research sources.

4.3.2.7 Intended Timeline and Summary of Research Procedures



Note: The second and ninth weeks of the Fall Quarter '99 should have produced the most effective data collection from students and instructors. Students and instructors were ready to start working together after the drop/add period. The ninth week was between the last day of 'W' and the final exam week. During the ninth week, students and instructors should have been able to describe their complete learning experiences in their courses because they did not feel too pressured about the 'W' date or final exams at that time.

Summary of Research Procedures



4.4 Limitations

The biggest challenges to successful completion of the case study were:

1. Finding the same instructor for both sections of the same undergraduate course. If the case study included two different instructors from both sections of the same undergraduate course, they were very likely to have different teaching philosophies and styles. This situation would skew data for some variables in the case study because different teaching styles would affect how RIT students responded in the questionnaires/surveys at the end of the quarter.
2. Obtaining permission to access all data needed to reach accurate and valid conclusions. The thesis committee members might have been able to assist in obtaining the required permissions.
3. Preventing, or at least detecting, indirect and invisible factors that influenced the RIT learning environment. Examples are weather conditions and personal situations.

Chapter 5

DATA COLLECTION – RIT ADMINISTRATORS

5.1 Overview

The main focus of this chapter is to provide in-depth answers to the first principal questions documented in Chapters 3 and 4.

What are RIT's goals for distance learning and traditional classroom methods? Which education model (andragogy or pedagogy) is most closely matched with RIT's university learning goals at various undergraduate levels?

The chapter presents data from interviews with and questionnaires completed by RIT administrators. The first part consists of an introduction to the RIT educational system as well as related statistics, external and internal assumptions, RIT major strategy, and other strategies. The second part discusses RIT administrators' learning and teaching viewpoints as determined from the questionnaire responses. Finally, the chapter identifies RIT's education model as principally being andragogy or pedagogy.

5.2 Interviews With RIT Administrators

Nine RIT administrators were asked to answer three questions during my interviews (see Appendix B – Interview Questions For Administrators), plus additional questions based on their responses. A brief investigation of the RIT student government and the Information Technology tutoring center also provided more information about how the RIT educational system works.

5.2.1 RIT Educational System

The RIT educational system (see Figure 5-1 on the next page) shapes the components of the learning environments (traditional classroom and distance learning). New York State and the RIT Board of Trustees are external forces that enable RIT to be an accredited institution. The RIT President and Provost/Vice President for Academic Affairs are the top-level management for all Academic Affairs (academic colleges, academic services, and academic research). Academic services provide customer services such as course technologies, students' records, library materials, and others to each course in every academic department. Each academic college is administered by a dean and assistant dean(s). The Information Technology (IT) major is a part of the College of Applied Science and Technology. Together, the department head, two chairpersons, and the IT advisory board with members from external corporations design the curriculum for the IT major. IT faculty, instructors, and local/remote students participate in RIT learning environments directly. RIT students can give feedback about academic matters to RIT student government members, who in turn address academic issues to the Provost/Vice President for Academic Affairs.

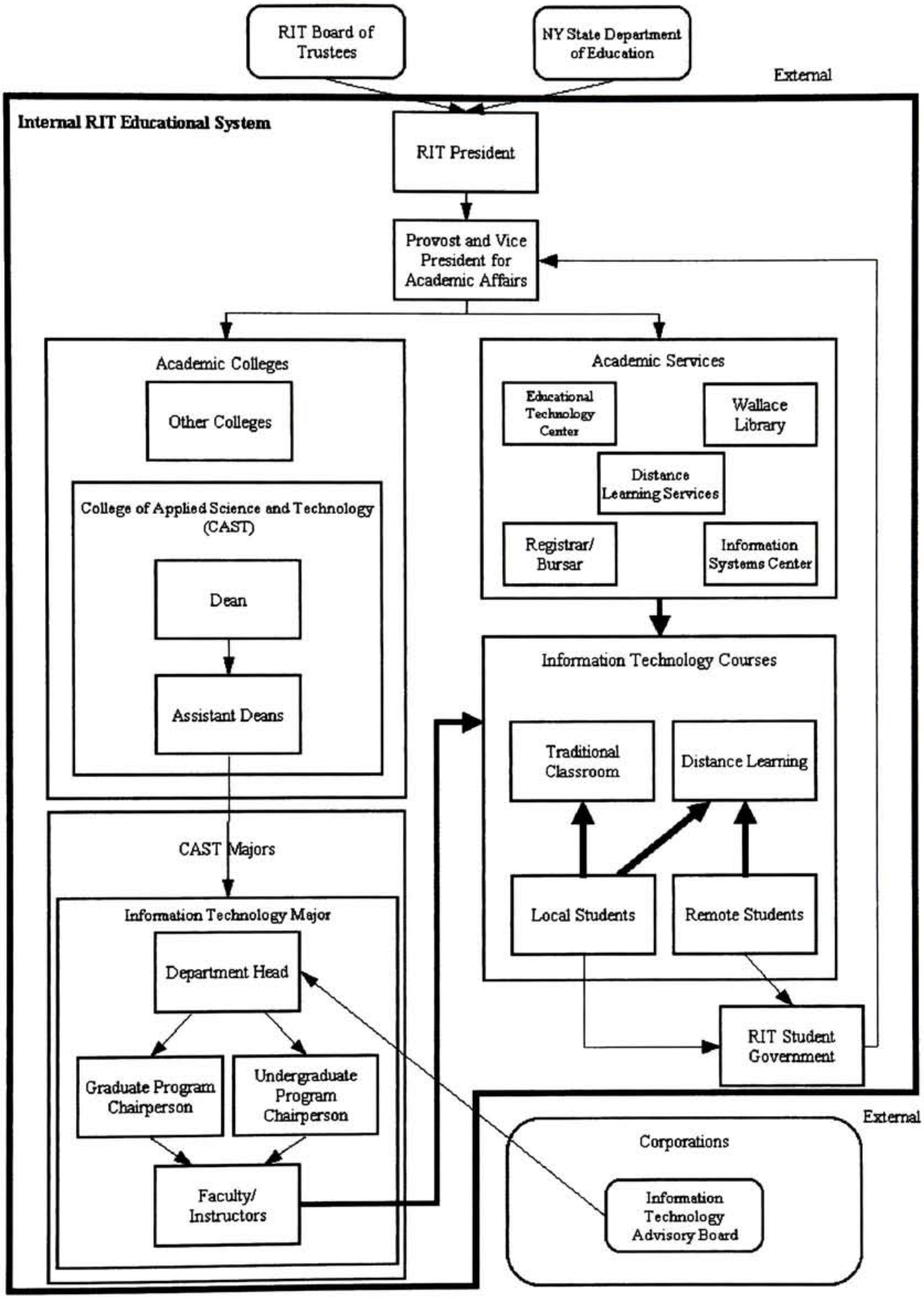


Figure 5.1 RIT Educational System. Credit: Interviews With RIT Administrators.

Analytic Details About the RIT Educational System

1. How does the RIT student government play a role in this system?

The RIT student government and "major student organizations (MSO's) [e.g., Asian and Hispanic clubs] represent large segments of the student population. Through various means, including weekly meetings with student government, these groups [MSO's] may bring the concerns of their constituen[ts] to light. Academic senators accomplish the same function for students in their colleges." <u>Most of the students' concerns at RIT have focused on needs out of the classroom environment</u>. The only exception identified during interviews was that "one student brought up the issue of social security numbers as identification numbers. [The RIT student government] has been in communication with Dr. Stanley McKenzie on the matter (as a student, not representing student government) and social security numbers should be removed from students' identification numbers by the Winter Quarter 1999-2000".

(Credit: Interview with the RIT student government.)

Since classroom concerns are rarely discussed, the RIT student government has not been a strong factor that influences the distance learning and traditional classroom environments at RIT.

2. How does the Information Technology Advisory Board play a role in this system?

The IT advisory board consists of business people from various corporations in the United States.

What are the main responsibilities of the IT Advisory Board?

"We have been asked to act as a sounding board for new programs, provide input on emerging technologies in our specific industries, and discuss RIT initiatives and [the] co-op program. To provide 'real world' feedback to the faculty regarding what we would like to see in graduates and what degree curriculum could produce the desired results. The part that the IT council plays is to review a proposed curriculum for validation of its acceptance and usability in industry."

How often does the IT Advisory Board review the Information Technology curriculum?

"About once every one or two years."

What are the main factors that influence proposing a new curriculum (or changing existing curriculum) for the Information Technology major?

"The dynamic nature of the environment demands new approaches, methods, and tools to perform support IT. At the moment, the key drivers are Knowledge Management, Document Management, Internet/Intranet/Extranet, Information Portals, etc."

(Credit: Interviews with two members of the IT advisory board.)

The IT Advisory Board can be a strong external force for influencing the IT major in terms of designing a new IT curriculum. However, it is not the biggest factor in shaping the traditional classroom and distance learning environments at RIT because the members do not meet regularly nor frequently, and for the most part, they are "reactive" rather than "proactive" because they primarily discuss proposals already made by the IT department at RIT.

3. Why are tutors excluded from Figure 5.1?

Tutors from the Information Technology lab usually tutor programming courses only (C++, Visual Basic, and Java). There were no available help resources in the IT lab for both sections of the course which was selected for my research study.

(Credit: Interview with one of the tutors from the IT lab.)

4. What do the bold arrows represent in Figure 5.1?

The bold arrows represent the most important and strongest forces for influencing directions taken in both learning environments at RIT: faculty/instructors, remote/local students, and academic services. The best excerpt from my interviews that explains why faculty/instructors are one of the strongest forces is as follows:

"<u>Individual faculty and their departments</u> are responsible for the quality of education both in the classroom and through distance learning. They have the <u>expertise</u> regarding the professional needs of business and industry in this field. It is their professional responsibility to guarantee high quality education."

The following tables show how these forces contribute to both learning environments. The tables present data related to the concept of "how cultural tools and stimulus influence the ways of behaving in the society" (see Figure 2.1 on page 8).

1. Academic services and departments provide <u>cultural tools</u> (types of Information Technology, course textbooks, and other learning resources).
2. <u>Stimulus</u> in both learning environments consists of instructors and students.
3. <u>Cognitive schema</u> is a combination of knowledge from instructors/students and knowledge from types of Information Technology, course textbooks, and other learning resources.
4. High-quality teaching and good student learning activities should be appropriate <u>actions</u> in both learning environments.

Both learning environments at RIT can be successful only if all four components (cultural tools, stimulus, cognitive schema, and actions) of these learning environments are implemented very well.

Traditional Classroom Section For All Majors

AREAS OF CONCERN	**RESPONSIBILITY**
Academic advising	College or Academic Department
Advising students about RIT procedures and processes	Student Affairs on college life; college or department on academic matters
Course content	Academic Department and Course Instructor
Course evaluation	Academic Department, Course Instructor, [and students]
Course goals/objectives	Academic Department
Course grades, including course withdrawals	Course Instructor
Course materials distribution	Course Instructor
Course materials selection and preparation	Academic Department and Course Instructor
Course materials production	Academic Department and Course Instructor
Course on-campus meetings/examinations	Course Instructor
Course scheduling	College and Academic Department
Curriculum development	Academic Department
Faculty development for TC	College and Academic Department
Hardware/software acquisition for TC faculty	College and Academic Department
Hardware/software setup/support for TC faculty	Academic Department
Hardware/software/IP connection for students	Information Systems Center
Identify emerging TC technologies	Educational Technology Center
Install and maintain TC technologies	Academic Department and Educational Technology Center
Obtaining copyright clearances	Educational Technology Center
Orientation of students to TC	Academic Department
Quality of course/faculty/student support services	Academic Department
Quality of instruction	Academic Department and Course Instructor
Respond to student concerns about course/curriculum	College and Academic Department
Respond to student concerns about instructor	Academic Department
Respond to student/faculty concerns about TC technologies	College and Academic Department
Respond to student/faculty concerns about TC practices	College and Academic Department

Table 5.1 Responsibilities in Traditional Classroom Section.
Credit: interviews with RIT administrators.

Distance Learning Section For All Majors

AREAS OF CONCERN	**RESPONSIBILITY**
Academic advising	Academic Department
Advising students about RIT procedures and processes	Distance Learning Services/Academic Department
Coordinate non-DL support services for students/faculty	Distance Learning Services
Course content	Course Instructor
Course evaluation	Academic Department
Course goals/objectives	Course Instructor
Course grades, including course withdrawals	Course Instructor
Course materials distribution	Distance Learning Services
Course materials selection and preparation	Course Instructor
Course materials production	Distance Learning Services/Course Instructor
Course on-campus meetings/examinations	Course Instructor/Academic Department
Course scheduling	Academic Department
[Curriculum development]	[Academic Department]
Evaluation of support services	Distance Learning Services
Facilitating student course withdrawals for remote students	Distance Learning Services/Academic Department
Faculty development for DL	Distance Learning Services
Hardware/software acquisition for DL faculty	Academic Department
Hardware/software setup/support for DL faculty	Distance Learning Services
Hardware/software/IP connection for students	DL Students
Identify emerging DL technologies	Distance Learning Services
Install and maintain DL technologies	Distance Learning Services
Obtaining copyright clearances	Distance Learning Services
Orientation of students to DL	Distance Learning Services
Quality of course/faculty/student support services	Distance Learning Services
Quality of instruction	Academic Department
Respond to student concerns about course/curriculum	Course Instructor/Academic Department
Respond to student concerns about instructor	Course Instructor/Academic Department
Respond to student/faculty concerns about DL technologies	Distance Learning Services
Respond to student/faculty concerns about DL practices	Distance Learning Services

Table 5.2 Responsibilities in Distance Learning Section.
Credit: http://www.rit.edu/~609www/ch/faculty/orient7.htm

5.2.2 RIT Statistics, External Assumptions, and Internal Assumptions

Some important RIT highlights and statistics in the videotape entitled "President Simone's Community Address 1999" are:

1. RIT is proud to excel in many areas (high freshmen applications, excellent class sizes, excellent tuition discount rates, strong merit scholarships, high number of out-of-state students, and more).

2. RIT was ranked as "21st most wired university and 3rd leading distance education university" in 1999.

3. Interdisciplinary programs are starting to grow at RIT.

4. RIT should work on one of its worst weaknesses – retention rate (only 62 % in 1998). RIT President Simone affirmed that "each RIT faculty is responsible for the success of each RIT student!"

5. RIT encounters two other major problems.

    a. Freshmen enrollment increases every year. It leads to proposing construction of new buildings, which increases costs! To avoid the additional costs of more buildings on the campus of RIT, the faculty needs to teach more courses during the summer and offer more courses on Fridays and Saturdays.

    b. RIT must keep up with other competing universities in terms of technology, knowledge of industry needs, and related matters. This can be accomplished by increasing interdisciplinary majors, revamping the IT lab (new computer technologies and projects), teaching students to understand today's product life cycle, and emphasizing design/development/manufacturing.

6. "RIT deliberately maintains a low student-faculty ratio (approximately 11:1 outside of NTID; NTID is closer to 3:1)". (Credit for #6 statement: Interview with one of the RIT administrators.)

RIT made 49 external assumptions and 40 internal assumptions in the Learning and Careers 2004: The Strategic Plan for the Rochester Institute of Technology document, with the major assumptions related to this thesis being presented on the next page (1994, pp. 4– 11).

External assumptions

"Colleges and universities will need to be prepared for the impact that changes in economic, social, political, and technological conditions will have on students and the campus culture" (p. 5). RIT must prepare both traditional classroom and distance learning students for the changing workplace in terms of advanced technology and new knowledge. Based on four factors below, RIT also must change its existing educational system (e.g., increase the number of distance learning courses) in order to attract the students from Rochester, New York, the United States of America, and the world.

1. "The growth of a global economy will create more of an interdependency among nations..." and "highly tuition-dependent and market-sensitive institutions will need to attract learners from local, regional, national, and international markets to remain viable" (p. 4).

2. "Advanced technology, [including Information Technology], and sophisticated knowledge will continue to grow as driving economic factors" and "the nature of work is changing dramatically (e.g., work at home with electronic access to the "workplace"...) ..." (p. 5 & p. 8).

3. "A new source of competition will come from corporate training and proprietary educational enterprises. Non-educational institutions will increasingly offer educational credentials, and there will be growing competition in the area of distance learning" (p. 7).

4. There is the increasing trend of single parent families and families with both working spouses in the United States of America. It leads to another trend – a growing number of adult, part-time learners (pp. 5 - 6). At the same time, more and more companies are demanding "tailor-made programs for their employees, and work force pressures will increasing affect how people attend schools" (p. 8).

Internal assumptions

Some of RIT's important academic strengths are: (1) a good number of different academic programs with excellent national and international reputations; (2) emphasis on strong "teaching"; (3) academic department expertise in curriculum and technology; and (4) a fairly low student/faculty ratio. In spite of its strengths, RIT needs to work on its "institutional support for quality teaching", weak and inconsistent guidelines for evaluating faculty/staff/administrators/programs, insufficient market research to determine the needs of various learning populations, deficient advising systems, students' dissatisfactions with RIT, and low retention rate (pp. 9 – 10).

Important expectations about the RIT learning population by the year 2000	
Overall part-time enrollment	34 % to 40 % of the total population
Distance learning	1.8 % to 8 % of the total credit hours offerings
International enrollment	5 % to 7 % of the total enrollment

Table 5.3 RIT important expectations about its learning population by the year 2000
Credit: Learning and Careers 2004: The Strategic Plan for the Rochester Institute of Technology, 1994, p. 24.

5.2.3 RIT Major Strategy

Learning and Careers 2004: The Strategic Plan for the Rochester Institute of Technology is the most important document I discovered in my research that describes RIT strategic objectives in critical areas such as career discovery, teaching and learning, student experience, learning populations, program portfolio, seamless university, collegiality and community, external partnerships, and productivity. Strategies presented in the document are somewhat dynamic based on recommendations for feedback from faculty, staff, administrators, and students (pp. iv - 1).

RIT's main vision is, "The Rochester Institute of Technology will lead higher education in preparing students for successful career development over their lifetimes" (p. 3).

An excerpt from my interviews that seems to describe RIT's main vision is as follows:

"Our major strategy is to deliver high quality education to a variety of student audiences in a variety of formats most [conducive] to student needs. Individual faculty and their departments are responsible for the quality of education both in the classroom and through distance learning."

What are the main factors that determine how high quality education can be provided to a variety of student audiences?

"There are two separate questions. (1) High quality means that the subject matter is at the appropriate level for the degree program and will enable the student to move into a successful career over a lifetime. (2) Variety of audiences means students beyond typical 18-22 year [old] full-time students. [This] includes adult students, part-time students, older people re-tooling career, minorities, etc."

Related to RIT's main vision, one of the RIT administrators stated,

"Because the distance learning environment hosts the same courses, faculty and students that a traditional one does, factors of success and failure tend to be the same."

5.2.4 Details about other strategic objectives related to the RIT Major Strategy

The videotape entitled "President Simone's Community Address 1999", Learning and Careers 2004: The Strategic Plan for the Rochester Institute of Technology, and interview responses identified the following information and other strategic objectives that are related to the RIT major strategy.

1. A combination of diverse values is very important to the American educational system. This concept is called "One America" – Learning, thinking, and working.

2. The RIT educational systems should be shaped to meet the demands of the 21st century, especially new technologies and the Internet. Suggestions made to accomplish this objective include:

    a. "Increase faculty expertise and comfortableness with technology. Example: programs such as Faculty Institute for Teaching and Technology. During the summer, the Faculty Institute for Teaching and Technology focuses on enhancing teaching and learning in both traditional and asynchronous settings."

    b. "The Distance Learning Plan includes a fund for helping faculty develop technology-related teaching skills, including the offering of release time. Faculty Evaluation and Development funds ... can support faculty development in distance learning."

    c. "Maintain up-to-date laboratories and equipment."

3. The Information Systems Center and Educational Technology Center are the most important customer service resources for students, faculty, parents, RIT departments, and people outside of the RIT environment.

    a. "Strong support from [the] ETC office of distance learning [is required] to develop courses and help with technical implementation."

    b. "Professional development and support for faculty is expected."

    c. "[For] distance learning, the Provost [provides] resource support to ETC and faculty to develop distance learning modules for their courses. Usually we give faculty a reduced teaching load for one quarter to prepare new distance learning classes."

4. Academic advising, quality of customer service, and academic departments are very essential for increasing the enthusiasm and motivation of RIT students, as follows.

    a. Why does RIT emphasize academic advising and student counseling?

    "In order to increase the retention and graduation rates." The ETC videotape entitled "President Simone's Community Address 1999" mentions that one of RIT's most important priorities is to improve its student retention rate because in the school year 1998-99, it was only 62 %! In other words, only 62 % of incoming freshmen seven years ago have graduated from RIT. RIT stated that "each RIT faculty is responsible for the success of each RIT student", as described by the formula "Failure of RIT faculty = Failure of RIT student".

5. Academic programs should continue to change due to market research, as evidenced by the following interview excerpts (presented in President Simone's videotape).

    a. "While all of [RIT] statistics are important to the quality and predictive expectations of traditional students, most of those statistics are not as critical for distance learning students. Why? Most distance learning students are working adults. They are motivated to go back to school for several reasons: promotions, change of career, desire for lifelong learning. Because it is difficult to measure the intensity of those desires, a predictive model of success in distance learning is not as well defined as [for] traditional students."

    b. "As it relates to RIT's distance learning strategies in general, RIT wants the total credit hours generated by distance learning (section 90 courses) to increase from 4% to 10% over a 6 year period starting in 1997. I know in distance learning, we try to make sure that a student has as much access to experiences "outside" of the classroom … [as] possible, which contribute to an overall educational experience (i.e. virtual union, streaming, sporting and cultural events, etc.)"

    c. "IT (Information Technology) advisory board [should review] curriculum and provide future trends and vision."

    d. "External review includes review by a regional body, middle states, that controls RIT accreditation of programs. Also, the Institute has instituted a campus-wide program review every 3-5 years."

6. The following interview excerpts indicate that RIT is aware that "adults and traditional students are used to a lecture-type pedagogical style that is reinforced in K-12 education."

    a. Instructors should use more "extensive participation and interactive techniques" in both learning environments.

       "RIT is currently in a transitional stage in terms of its use of computer technology to enhance learning (both within the traditional classroom and via distance learning). All colleges are currently engaged [in] the process of examining teaching effectiveness and ways in which the use of technology can enhance that effectiveness. RIT is committed to adopting technology as a driver of enhanced effectiveness, not for productivity or for its own sake."

       "Many classes can use a combination of classroom discussion with distance learning instruction outside of class – e.g. rather than 4 hours a week of classroom lecture, the class could be two hours of distance learning and two hours in class each week."

Why is a combination of classroom discussion and distance learning instruction necessary? What kind of distance learning instruction should RIT students receive?

"Lectures are not [an] effective teaching methodology. 'Information' can be learned by students more effectively through other technical presentation where students proceed at their own pace. Classroom should be used for discussion and faculty/student interaction on issues, problems, applications, not for a teacher talking for 2 hours while students passively listen. All kinds. Some are straight videos, some are chat sessions or bulletin board conferencing, but with the Web, almost any kind of delivery and student interaction and problem solving is possible."

b. RIT should encourage <u>all</u> undergraduate students to become "strong self-motivated learners" to increase their chances of success.

1) RIT administrators have "the anecdotal impressions that the older (more mature) students [are], the higher probability they will succeed in a distance learning course. The traditional classroom provides more physical contact and structure than a typical distance course does. This puts pressure on the student to keep up with assignments and do the lectures on their own time. Some students (usually folks who 'have a life', i.e., a family and a full-time job) like the flexibility of [a] distance learning course because they can do the course on their own time. Traditional students (18-19 years old) often have trouble because they put off finishing their assignments."

2) "Personal learning style is believed to determine success more than test scores and achievement levels."

3) "As far as what some of RIT administrators know in Distance Learning, traditional (18-22 yrs old), full time students are not as successful in completing a distance learning course as compared to their part-time equivalent and even less compared to the part-time adult learner (36-40 yrs. old). In The Distance Learners' Guide, ed. by George Connick (1999) the characteristics of a successful distance learner are: high motivation, independent, active learners, have good organizational and time management skills, have the discipline to study without external reminders, and can adapt to new learning environments."

4) "Success in distance learning courses has been found to be related to the student's developmental and intellectual maturity. This means that undergraduate students in the age group 18-22 are less likely to be successful than students who have more developmental maturity (e.g., 35 yrs old) as well as intellectual maturity from previous educational experiences. In all cases, successful distance learning students are highly self-motivated, self-directed, skilled at time management, and assertive."

5) "For Distance Learning, the sensitivity of the instructor to the needs of the students, their prior knowledge levels, and their interests are very important.

Also important are clear organization of the course, articulation of the instructor's expectations of students, frequent feedback on performance, and variety in teaching techniques and technologies. Research also suggests that high expectations for student performance is important."

c. Student/faculty interaction should be emphasized.

1) "Flexibility on both sides (distance learning and traditional classroom) [leads to] increased student/instructor interaction [because] students respond more in this format than the static 10 or 12 students who are responders in a traditional classroom."

2) "There are many ways to increase student/instructor interaction. The instructor can be proactive using a Socratic method, asking questions of specific students. Teams could be used in the classroom that encourage participation and the instructor takes a mentoring or moderator role with them. Distance learning [courses] offers opportunities for more one-on-one interactions through this format of direct questioning and discussion between students and teacher. It is also more time consuming for the instructor—writing takes LONGER than talking. Distance learning classes need to [have] a reasonable class size to maximize student/instructor interactions. There is no magic number, but <u>a fallacy</u> [takes place when Distance learning courses have the same or more students than the same traditional classroom courses.]"

7. "Strong teaching" is very important to the RIT strategic objectives, as described by the following interview excerpts.

a. What does "strong teaching" mean?

"Faculty are expected to (1) prepare solid course syllabi which describe the goals of courses; (2) prepare and organize course materials thoroughly; (3) regard teaching as their most important professional responsibility; and (4) distribute course evaluations to students to provide feedback and to help department heads evaluate their performance."

b. "The Faculty Evaluation and Development Plan gives each college money every year for development opportunities for their faculty—especially around teaching effectiveness issues [in the traditional classroom environment]."

8. The interviews conducted for this thesis and President Simone's videotape indicate that RIT needs more feedback from students about how well RIT is performing.

a. How can RIT encourage students to provide input? What kind of input do students give?

"
1. Participate in the Student Government.
2. Conscientiously serve on university committees when asked.
3. Participate in Institute Council monthly meetings.
4. [Attend] quarterly pizza meetings with President Simone and Vice President McKenzie.
5. Encourage students to communicate directly with faculty and administration to answer questions and resolve problems."

The following tables summarize what faculty, staff, administrators, and students should do to enhance both learning environments at RIT (Learning and Careers 2004, 1994, pp. 18 – 26).

<table>
<tr><th>Task</th><th>Faculty</th><th>Staff</th><th>Administrators</th></tr>
<tr><td>Design RIT curricula to respond to the changes in the workplace.</td><td>X</td><td></td><td></td></tr>
<tr><td>Conduct research in order to know what changes are needed in majors and disciplines.</td><td>X</td><td></td><td></td></tr>
<tr><td>Make some efforts to be student mentors (or advisors).</td><td>X</td><td>X</td><td>X</td></tr>
<tr><td>Teach students about their development needs.</td><td>X</td><td>X</td><td></td></tr>
<tr><td>Show available learning resources to students.</td><td>X</td><td>X</td><td></td></tr>
<tr><td>Maintain high-quality teaching methods (Implement and evaluate learning approaches appropriately).</td><td>X</td><td></td><td></td></tr>
<tr><td>State clear and specific expectations to students.</td><td>X</td><td>X</td><td></td></tr>
<tr><td>Discuss diversity issues.</td><td>X</td><td>X</td><td>X</td></tr>
<tr><td>Provide instructional support and appropriate technological tools.</td><td></td><td></td><td>X</td></tr>
<tr><td>Develop positive interactions with all members of the RIT community.</td><td></td><td></td><td>X</td></tr>
<tr><td>Create interactions between faculty, staff, and students in the classroom and distance learning environments.</td><td>X</td><td>X</td><td></td></tr>
<tr><td>Perform recruitment and marketing activities.</td><td>X</td><td>X</td><td>X</td></tr>
<tr><td>Develop new systems of recruiting students and support services.</td><td colspan="3" rowspan="2">RIT</td></tr>
<tr><td>Construct K-12 remedial programs to prepare students for college-level courses.</td></tr>
</table>

Table 5.4 Division of important tasks in the RIT learning environments.
Credit: Learning and Careers 2004: The Strategic Plan for the Rochester Institute of Technology, 1994, pp. 18 – 26.

RIT students' tasks	
Explore changing aspects of their majors and new careers (other programs).	**Communicate with other members of the RIT community.**
Understand their own developmental needs.	**Show their respectful behavior at RIT.**
Take advantage of learning resources (technologies).	**Help RIT to learn new and specific issues of students' needs.**

Table 5.5 RIT students' important tasks in the RIT learning environments.
Credit: Learning and Careers 2004: The Strategic Plan for the Rochester Institute of Technology, 1994, pp. 18 – 26.

What must be included in all RIT degree programs?	
Core competencies (math, science, and Liberal Art courses)	**Experimental learning**
Applications of knowledge and technology	**Diversity and multiculturalism issues**
Option of the learning environment **(Distance Learning or Traditional Classroom)**	

Table 5.6 What must be included in all RIT degree programs?
Credit: Learning and Careers 2004: The Strategic Plan for the Rochester Institute of Technology, 1994, p. 26.

Note: I added the option of the learning environment (blue text) to this table because it is very important for any student to decide which learning environment is best for her or him today based on available Information Technologies and demographic changes in the world (i.e., access to the learning environments and demands of the workplace).

5.3 Survey of RIT Administrators

Data regarding RIT administrators' learning and teaching viewpoints were collected from questionnaires in the Fall Quarter 1999 (see Appendix C – RIT Education Questionnaire For Administrators). The section entitled "Pedagogy Versus Andragogy" under the chapter "Literature Review" provides details and summaries of learning and teaching viewpoints. Six out of the nine RIT administrators volunteered to fill out the questionnaires. This section consists of three parts (learning viewpoint, teaching viewpoint, and overall analysis of survey results).

5.3.1 RIT Administrators Survey Results – Learning Viewpoint

The learning viewpoint is defined as the collection of different perspectives about the learning environment (self-concept, experience, readiness, time perspective, and orientation to learning).

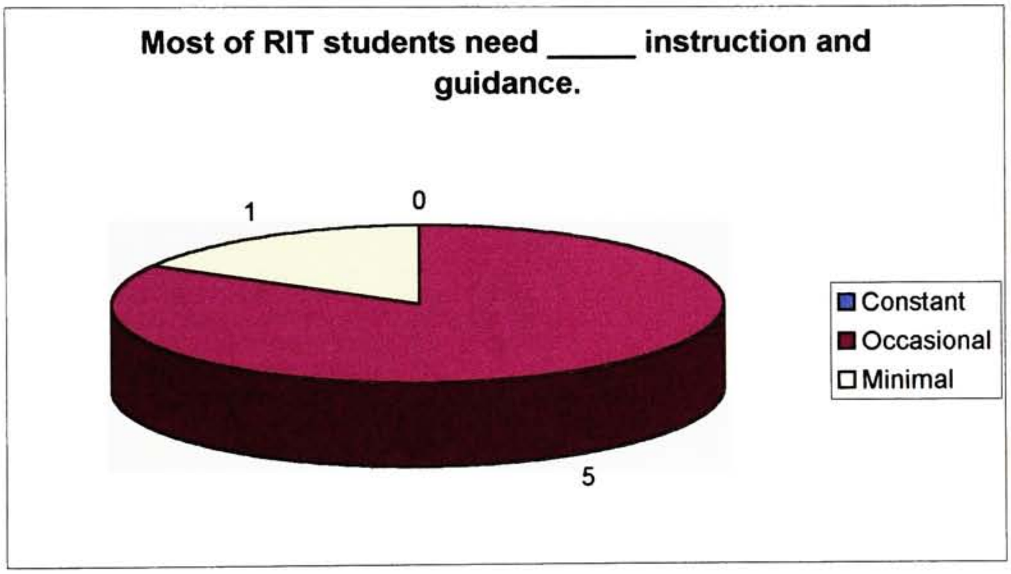
Type	Operational definition
Self-concept	How much students depend on instructors in the range of a total dependent attitude to a total self-directed attitude.
Experience	How important students' life experiences are to the learning environment.
Readiness	Why students are ready to learn something new (biological development or social experiences).
Time perspective	Which is the best method for students to learn based on the readiness of students? Applications or facts? Both?
Orientation to learning	Which is the best classroom setting? Subject matter discussion or hands-on problem solving activities?

Table 5.7 Operational definitions of aspects of the learning viewpoint

Self-concept

Related question on the questionnaire
Most of RIT students need _____ instruction and guidance. Constant Occasional Minimal
Explanation of the question
"Constant" denotes a totally dependent attitude. "Occasional" denotes a mixed dependent and self-directed attitude. "Minimal" denotes an almost totally self-directed attitude.

Result:



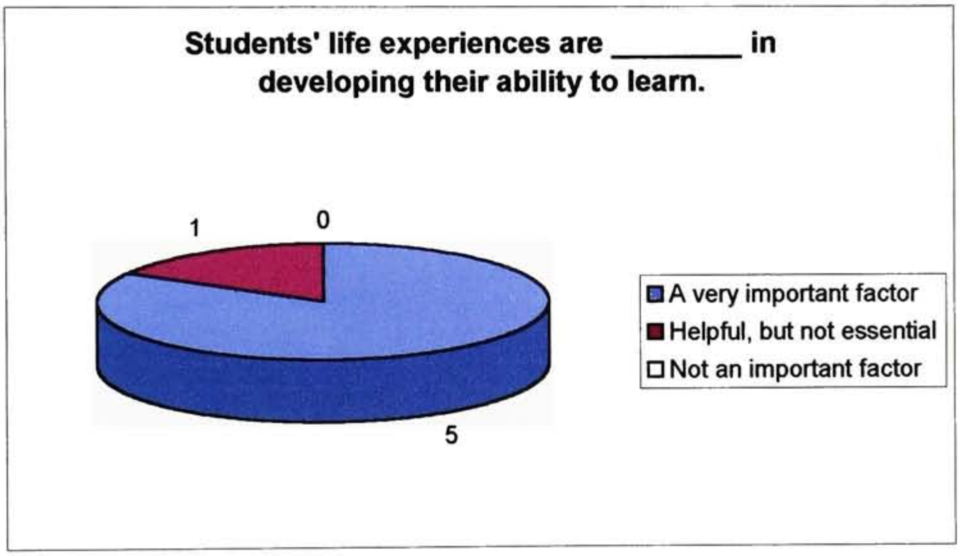
Mode (Most Frequent Response): Occasional (5 RIT administrators)
Matched Education Model: Both pedagogy and andragogy

Interpretation:
Most of the RIT administrators strongly believe that their students are both dependent and self-directed. In other words, most students sometimes depend on instructors for instruction and guidance, but not always. This indicates both adult and child learners' levels of dependence.

Experience

Related question on the questionnaire
Students' life experiences are ______ in developing their ability to learn. A very important factor Helpful, but not essential Not an important factor
Explanation of the question
These choices dictate the importance of students' life experiences.

Result:



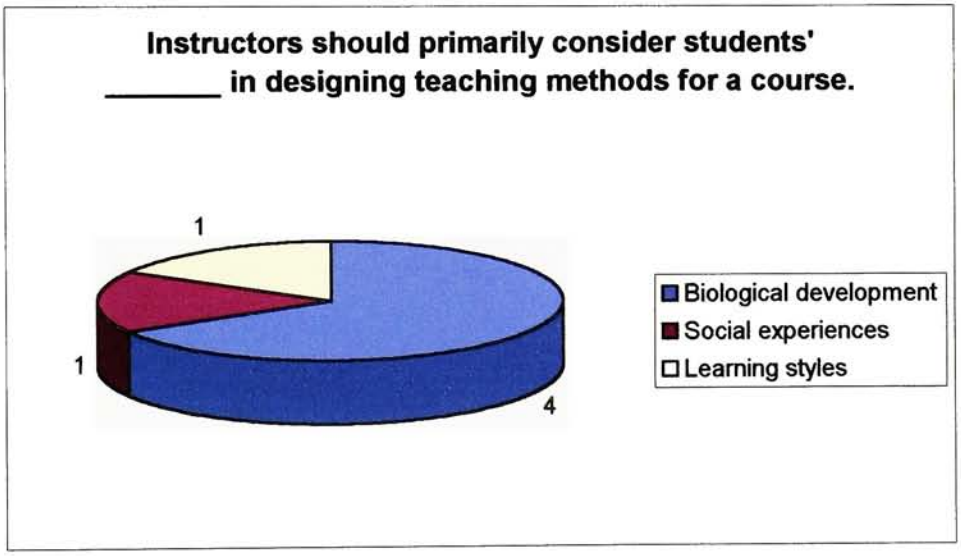
Mode (Most Frequent Response): A very important factor (5 RIT administrators)
Matched Education Model: Andragogy

Interpretation:
Most of the RIT administrators believe in the importance of students' life experiences in developing their ability to learn. Adult learners usually learn something new based on their life experiences rather than on their instructors' guidance.

Readiness

Related question on the questionnaire
Instructors should primarily consider students' ______ in designing teaching methods for a course. Biological development Social experiences
Explanation of the question
Biological development means that students are expected to be ready to learn something new only because of their age and human development. Social experiences motivate students to learn something new regardless of age and human development.

Result:



Note: The third choice, "Learning styles", was written in by one of the RIT administrators.

Mode (Most Frequent Response): Biological development (4 RIT administrators)
Matched Education Model: Pedagogy

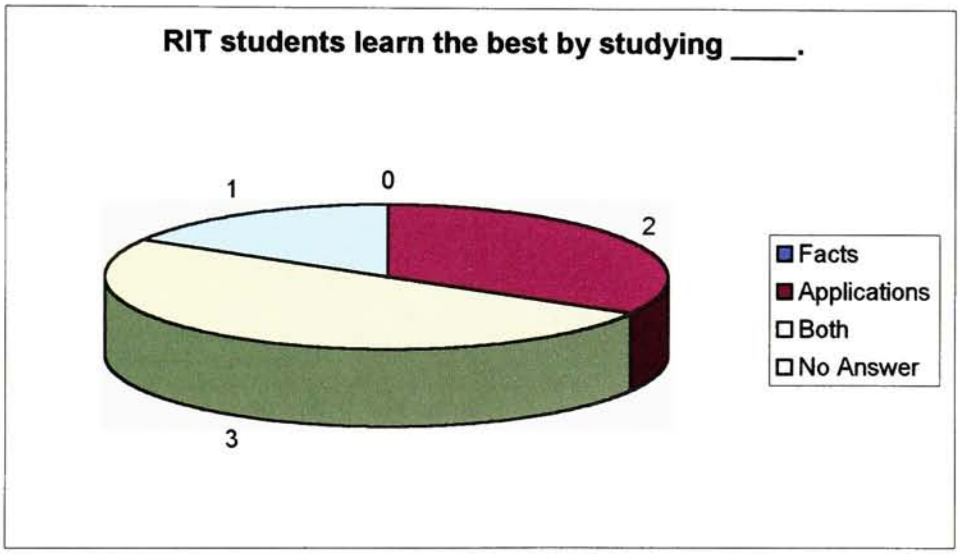
Interpretation:
Most of the RIT administrators think that appropriate ages and human development determine if students are ready to learn something new. For instance, any 18-year-old student should be ready for RIT freshmen courses, such as Calculus. This belief strongly contradicts Lev Vygotsky's philosophy of social experiences.

It was interesting to find that one of the RIT administrators believes in analyzing students' learning styles (students' own methods of learning something new) rather than relying on biological development and social experiences.

Time perspective

Related question on the questionnaire
RIT students learn the best by studying ____. Facts Applications Both
Explanation of the question
"Facts" means rote learning (memorizing details). "Applications" means problem solving. "Both" is a combination of facts and related applications.

Result:



Mode (Most Frequent Response): Both (3 RIT administrators)
Matched Education Model: Both pedagogy and andragogy

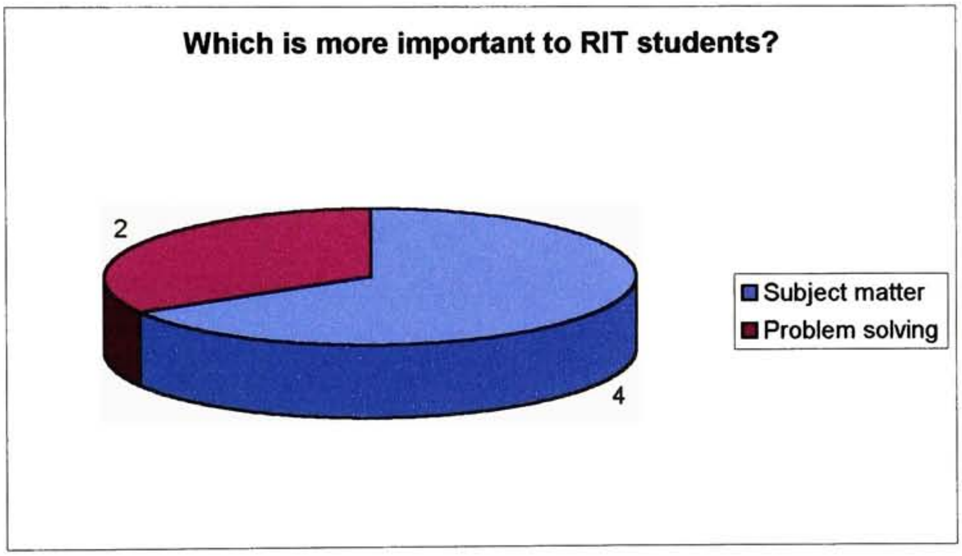
Interpretation:
Half of the RIT administrators surveyed clearly believe that students should use a combination of facts and applications in the RIT learning environment. For instance, students might memorize an economics formula and apply it to various simulated or real-life business situations at the same time.

It was interesting to note that one of the RIT administrators provided no answer to this question.

Orientation to learning

Related question on the questionnaire
Which is more important to RIT students? Subject matter Problem solving
Explanation of the question
Subject matter is information acquired primarily through topic discussions in the classroom or DL environment. Problem solving involves hands-on application activities.

Result:



Mode (Most Frequent Response): Subject matter (4 RIT administrators)
Matched Education Model: Pedagogy

Interpretation:
Surprisingly, most of the RIT administrators believe that students prefer subject matter discussions rather than hands-on problem solving activities. The result indicates that these administrators feel that college students do not appreciate the importance of problem solving tasks, even though 5 out of the 6 administrators feel that students learn best by studying applications or a combination of facts and applications (refer to the previous question).

5.3.2 RIT Administrators Survey Results – Teaching Viewpoint

The teaching viewpoint is defined as the collection of different perspectives that influences educators' development of a teaching environment (climate, planning, diagnosis of needs, formulation of objectives, design, activities, and evaluation).

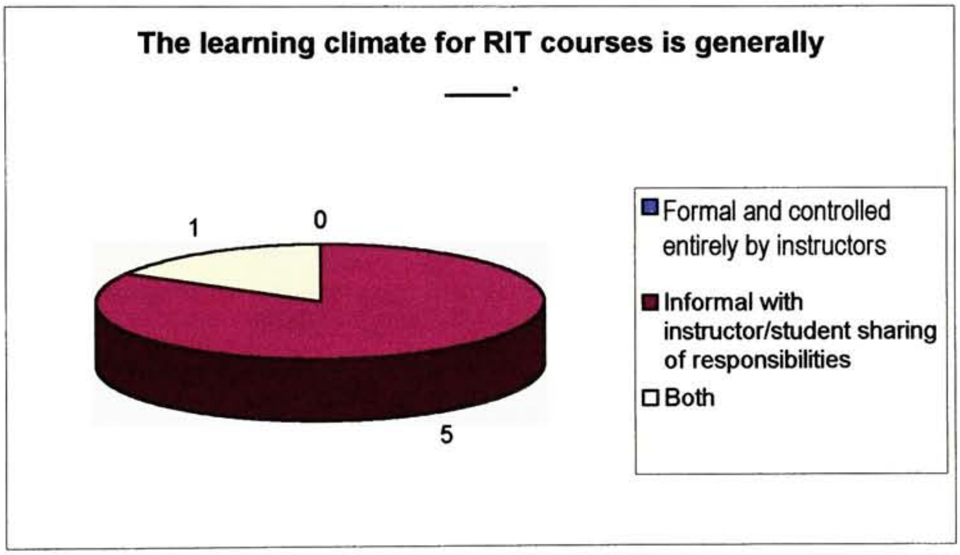
Type	Operational definition
Climate	The intensity of the classroom setting (formal and authoritative, or informal and respectful)
Planning	Who does planning, diagnosis of needs, and formulation of objectives? Instructor, students, or both?
Diagnosis of needs	
Formulation of objectives	
Design	What will the course emphasize? Subject matter discussion, problem solving activities, or both?
Activities	How should activities be completed? Using the instructor's techniques, students' experimental techniques, or both?
Evaluation	Who completes the course evaluation(s)? Instructor, students, or both?

Table 5.8 Operational definitions of aspects of the teaching viewpoint

Climate

Related question on the questionnaire
The learning climate for RIT courses is generally _______.   Formal and controlled entirely by instructors   Informal with instructor/student sharing of responsibilities
Explanation of the question
The first choice means that an instructor is authoritative in enforcing rules and choosing teaching methods for his or her courses. The second choice indicates that students and an instructor share their responsibilities for structuring the learning environment.

Result:



Mode (Most Frequent Response): Informal with instructor/student sharing of responsibilities (5 RIT administrators)

Matched Education Model: Andragogy

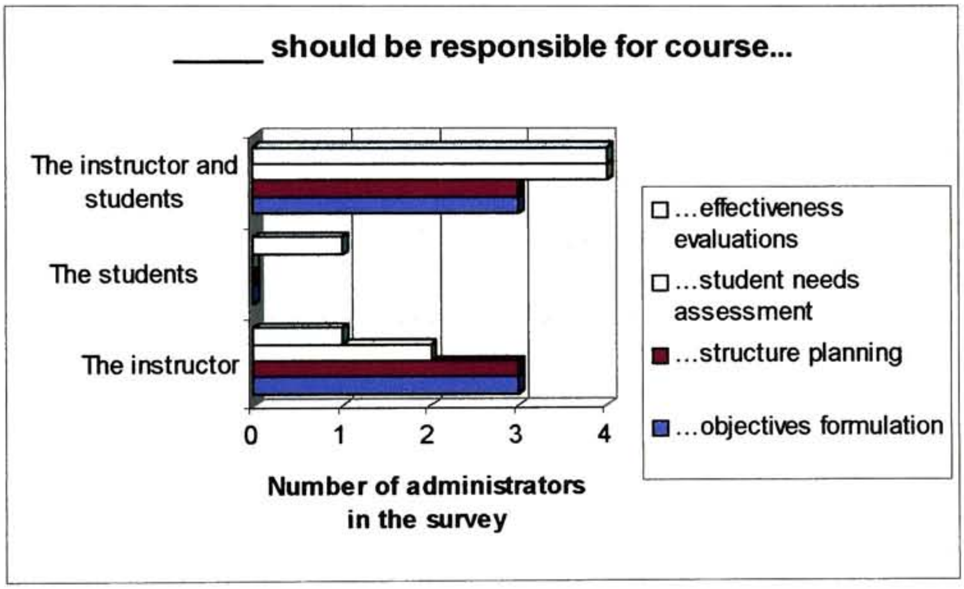
Interpretation:
Most of the RIT administrators surveyed agree that it is important for instructors and college students to jointly structure a course learning climate.

One of the RIT administrators wrote in "Both" and told me that the learning climate should be adjusted as a course progresses in order to match with specific types of college students.

Course responsibilities

Related question on the questionnaire
___________ should be responsible for course... ... objectives formulation. ... structure planning. ... student needs assessment. ... effectiveness evaluations.
Explanation of the question
The choices are the students, the instructor, or both.

Result:



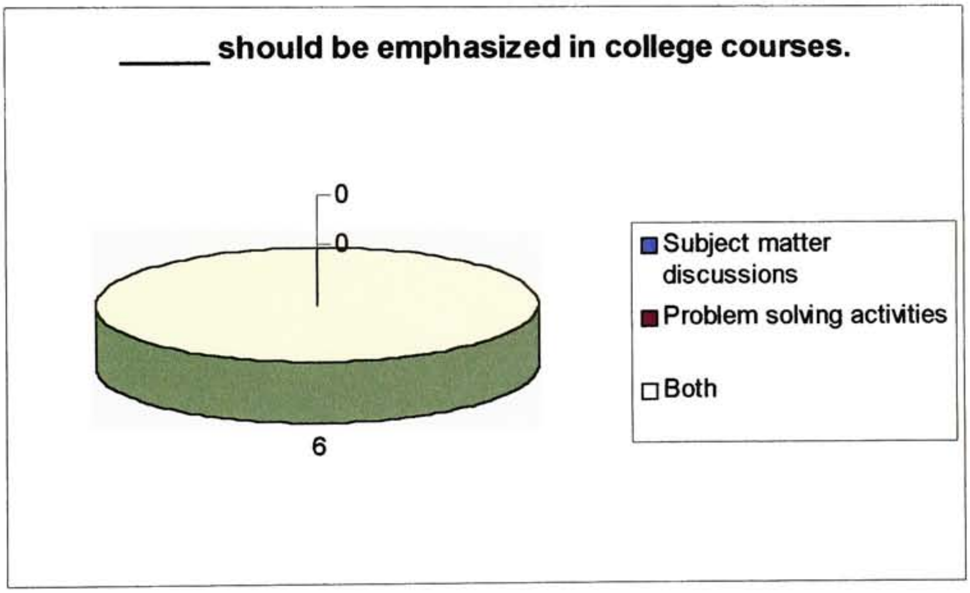
Mode (Most Frequent Responses): The instructor and students (14 Choices)
Matched Education Model: Pedagogy and Andragogy

Interpretation:
This result indicates that most of the RIT administrators surveyed believe that the instructor and students should generally share the responsibilities for planning and evaluating a course, although half of the RIT administrators feel that the instructor should be solely responsible for structure planning and objective formulation.

Design

Related question on the questionnaire
_____ should be emphasized in college courses. Subject matter discussions Problem solving activities Both
Explanation of the question
The choices denote administrators' preferences for including subject matter discussions, problem solving activities, or both to provide the best learning environment for RIT students.

Result:



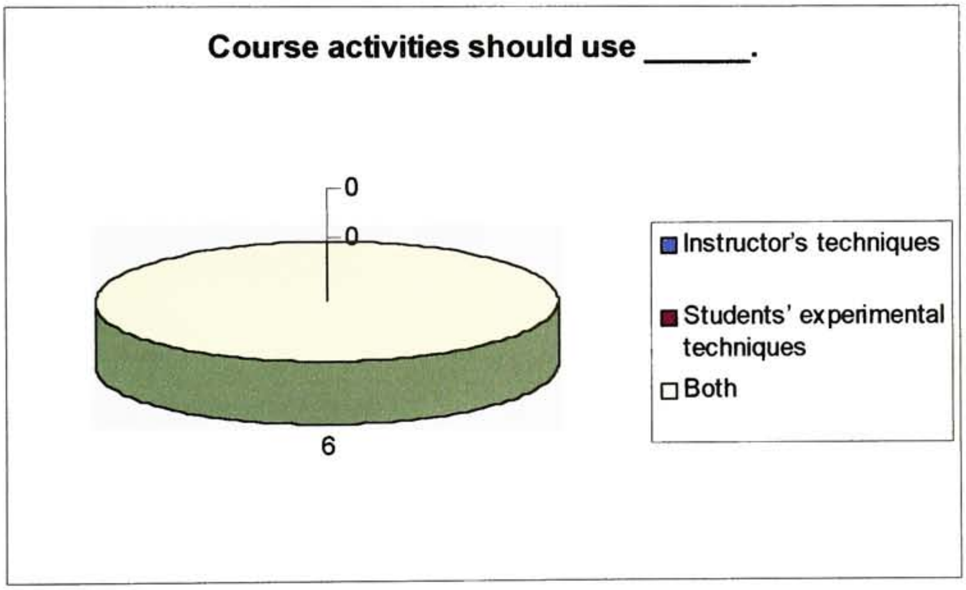
Mode (Most Frequent Response): Both (6 RIT administrators)
Matched Education Model: Pedagogy and Andragogy

Interpretation:
Every RIT administrator surveyed concludes that each course should include both subject matter discussions and problem solving activities so that students can gain experience in applying the facts that they learn.

Activities

Related question on the questionnaire
Course activities should use ________. Instructor's techniques Students' experimental techniques Both
Explanation of the question
The choices indicate whether the administrators feel that instructor's techniques, students' experimental techniques, or both provide the best means of completing course activities.

Result:



Mode (Most Frequent Response): Both (6 RIT administrators)
Matched Education Model: Pedagogy and Andragogy

Interpretation:
Every RIT administrator surveyed perceives that college students should rely on instructor's techniques, but also use their own experimental techniques to complete course activities, especially problem solving tasks. This belief illustrates a combination of expository teaching (lectures and demonstrations of instructor's techniques) and discovery learning (hands-on activities using experimental techniques).

5.3.3 Comprehensive Analysis and Summary of RIT Administrators' Survey Results

5.3.3.1 Comprehensive Calculation and Analysis of RIT Administrators' Survey Results

Basic Formula			
Count (CT)	Number of responses	Σ	Sum
Assigned Weight of Pedagogy (AWP)	Intensity of pedagogy	n	nth item
Average Weight (AW)	$\Sigma (CT_n \times AWP_n) / \Sigma (CT)$		
Pedagogy	(AW)		
Andragogy	100 - (AW)		
Overall Average	Average of All Average Weights		

Note: 75 is the highest weight for intensity of pedagogy and 25 is the lowest weight. These weights are arbitrary numbers assigned only for analytical purposes in helping to identify patterns in the survey results (i.e., the weights are not intended to be totally objective measures of the survey results, and their mathematical validity and reliability are therefore still to be determined through further study beyond the scope of this thesis). n means a sequence of responses to a question on the questionnaire. For example, n = 1, 2, 3…

Analysis of Learning Viewpoint

	Count	Assigned Weight Of Pedagogy	Pedagogy	Andragogy
Self-concept				
Constant	0	75	0	
Occasional	5	50	250	
Minimal	1	25	25	
		Average Weight	45.8	54.2
Experience				
A very important factor	5	25	125	
Helpful, but not essential	1	50	50	
Not an important factor	0	75	0	
		Average Weight	29.2	70.8
Readiness				
Biological development	4	75	300	
Social experiences	1	25	25	
Learning styles	1	50	50	
		Average Weight	62.5	37.5
Time perspective				
Facts	0	75	0	
Applications	2	25	50	
Both	3	50	150	
No Answer	1	N/A		
		Average Weight	33.3	66.7
Orientation to Learning				
Subject matter	4	75	300	
Problem solving	2	25	50	
		Average Weight	58.3	41.7
		Overall Average	**45.8**	**54.2**

Analysis of Teaching Viewpoint

	Count	Assigned Weight Of Pedagogy	Pedagogy	Andragogy
Climate				
Formal	0	75	0	
Informal	5	25	125	
Both	1	50	50	
		Average Weight	29.2	70.8
Planning				
The instructor	3	75	225	
The students	0	25	0	
The instructor and students	3	50	150	
		Average Weight	62.5	37.5
Formulation of objectives				
The instructor	3	75	225	
The students	0	25	0	
The instructor and students	3	50	150	
		Average Weight	62.5	37.5
Diagnosis of needs				
The instructor	2	75	150	
The students	0	25	0	
The instructor and students	4	50	200	
		Average Weight	58.3	41.7
Evaluation				
The instructor	1	75	75	
The students	1	25	25	
The instructor and students	4	50	200	
		Average Weight	50.0	50.0
Design				
Subject matter discussions	0	75	0	
Problem solving activities	0	25	0	
Both	6	50	300	
		Average Weight	50.0	50.0
Activities				
Instructor's techniques	0	75	0	
Students' experimental techniques	0	25	0	
Both	6	50	300	
		Average Weight	50.0	50.0
		Overall Average	**51.8**	**48.2**

5.3.3.2 Comprehensive Summary of RIT Administrators' Survey Results

Comprehensive Summary of Learning Viewpoint

Type	Pedagogy	Andragogy
Self-concept	45.8	54.2
Experience	29.2	70.8
Readiness	62.5	37.5
Time perspective	33.3	66.7
Orientation to learning	58.3	41.7
Overall Preference (Average)	**45.8**	**54.2**

Table 5.9 Comprehensive Summary of Learning Viewpoint.

Comprehensive Summary of Teaching Viewpoint

Type	Pedagogy	Andragogy
Climate	29.2	70.8
Planning	62.5	37.5
Formulation of objectives	62.5	37.5
Diagnosis of needs	58.3	41.7
Evaluation	50.0	50.0
Design	50.0	50.0
Activities	50.0	50.0
Overall Preference (Average)	**51.8**	**48.2**

Table 5.10 Comprehensive Summary of Teaching Viewpoint.

Interpretation and Analysis of Summary Results

The above overall preference figures indicate that the RIT administrators surveyed generally feel that the RIT teaching environment should be developed using the guidelines of both the pedagogical model and andragogical model because they have mixed beliefs about how their college students learn and perceive most of their students as having both child-like/dependent and adult/self-directed learning attributes. For example, most of these administrators believe students' life experiences are a very important factor in their ability to learn, but most also indicated that students' biological development (i.e., age) rather than students' social experiences is of primary importance in designing teaching methods for a course. They also perceive that students learn best by studying either applications or a combination of facts and applications, but two-thirds also indicated that subject matter is more important to students than problem solving (i.e., applications). Dr. Gerald Grow would be not surprised to learn that these RIT administrators, like many others in American universities, appear to believe that the development of educational practices should continue to foster dependency more than self-direction.

As stated in Chapter One, Malcolm Knowles concluded through his research that American students should be self-directed by the age of 18 (which, in my opinion, includes such characteristics as the independent ability to successfully apply facts learned to problem solving situations), but that the cultural rate of growth of these students results in most young adults becoming self-directed somewhere between the ages of 20 and 30. Many sociocultural theorists would be displeased to learn that RIT administrators advocate principles of both the pedagogical model and andragogical model in the teaching environment because of their perceptions about American college students. According to the current sociocultural theory in Chapter Two, the andragogical model prepares college students to be good adult/self-directed learners in the workplace, which has a strong demand for adult interactions, problem solving, and teamwork, and is greatly influenced by the availability of Information Technology tools (collaboration and electronic tools). Therefore, <u>RIT college education should help provide students with a transition in learning styles from the pedagogical model (high school) to the andragogical model (workplace)</u>. This means that RIT administrators should consider developing undergraduate educational practices using the andragogical model a bit more than the pedagogical model. Otherwise, RIT students will not be as successful in their college careers nor in their future workplace situations, which require solid self-directed learning habits.

Chapter 6

DATA COLLECTION – OBSERVATIONS OF TRADITIONAL CLASSROOM AND DISTANCE LEARNING ENVIRONMENTS

6.1 Overview

The main focus of this chapter is to provide in-depth answers to the second principal question documented in Chapters 3 and 4.

What are the characteristics of traditional classroom and distance learning environments at RIT?

The chapter presents data from observations and investigations relating to characteristics of both the traditional classroom and distance learning environments for the surveyed course. The first part describes the traditional classroom environment in terms of physical locations, resources, and communication methods. The second part covers the distance learning environment using the same categories.

6.2 Traditional Classroom Section

6.2.1 Physical Locations

Students and their instructor from the traditional classroom section of the selected course in my study met in the classroom 06-A205 located in the College of Liberal Arts building every Tuesday, and in the classroom 12-3105 located in the College of Business building every Thursday. Different conditions of these rooms (e.g., available resources, colors, temperatures, noise levels, light levels, etc.) shaped teaching, learning, and communication methods. This section discusses and analyzes the physical locations of two classrooms using a combination of tables and visual graphs.

06-A205 Classroom

There are narrow left and right rows and a wide center row of soft chairs on a slanted floor. The flat stage floor contains a table, podium, chalkboard, projector, and several chairs. The stage wall holds a huge white markerboard, two amplifiers, and a movie screen. Available technologies (slide projectors, video camera, etc.) are in the controller room in the back of the classroom. The dominant colors of the classroom are bone white and gray. This classroom is lighted by over 30 sets of fluorescent lights on the center "flat" ceiling and over 30 sets of bulbs on two curved left and right ceilings. The following table summarizes the physical properties of this classroom.

Building - Room	06 – A205
Room Type	Lecture Hall
Capacity	Seats 349
Priority	Day: Liberal Arts Evening: Registrar
Seating	Theater Tablet Arm Chairs
Writing Surface	Chalk Board [And White Board]
Instructor Station	Podium Table
A/C	[No Available Data]
Handicap Access	Wheel Chair Accessible
Lighting	Dimming
Projector	Overhead Projector
Sound Support	Amplifier Mixer Microphone-Cabled Microphone-Wireless Speakers
Telephone	Telephone Jack Available
TV\VCR	Television & VCR
Windows	[None]
Computer Support	
B-Jack	Ethernet
Projector	CRT Projector

Table 6.1 Properties of the 06-A205 classroom
Credit: http://disted.rit.edu/classrooms/

The set of visual graphs on the following three pages displays various environmental qualities and my observations of the 06-A205 classroom.

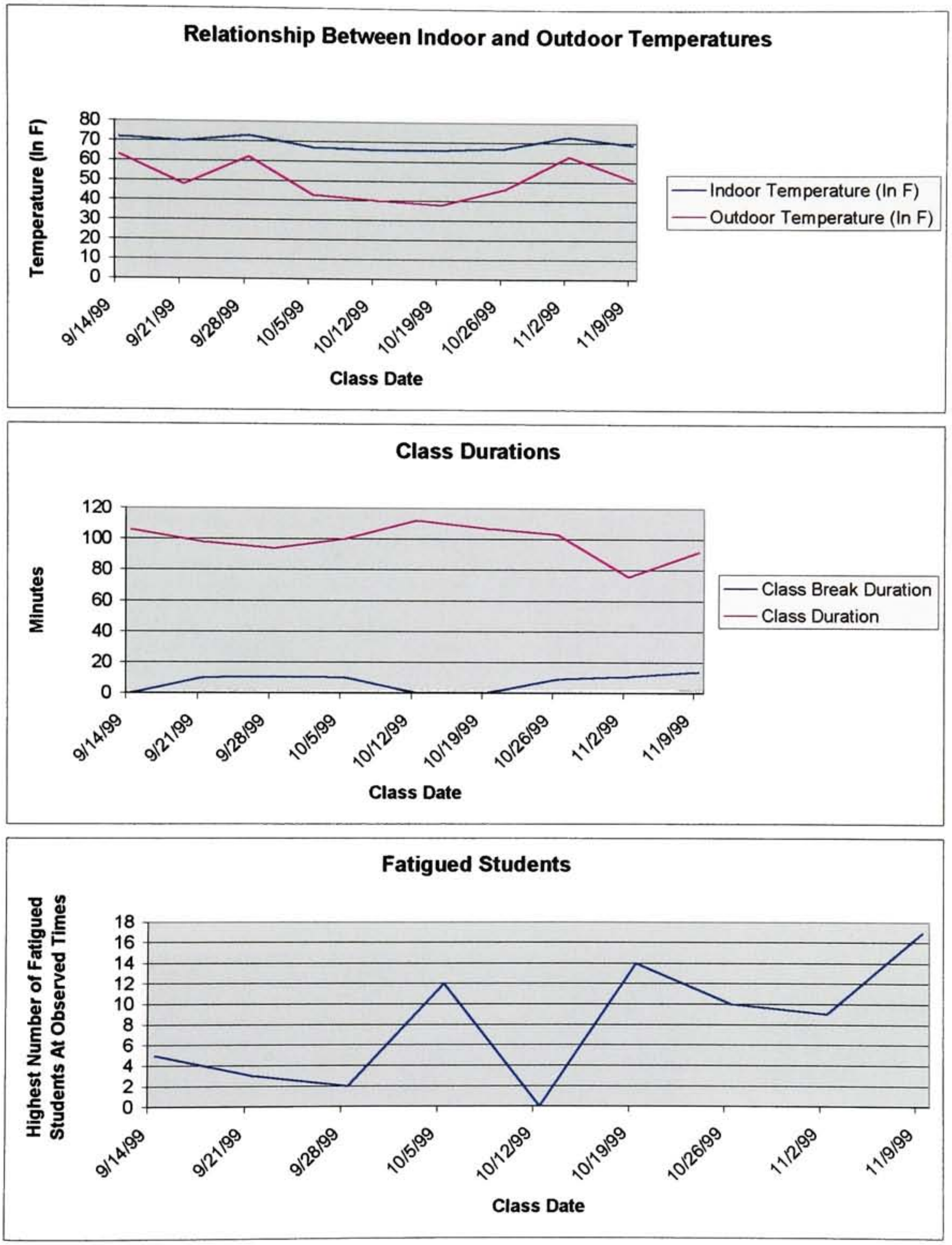
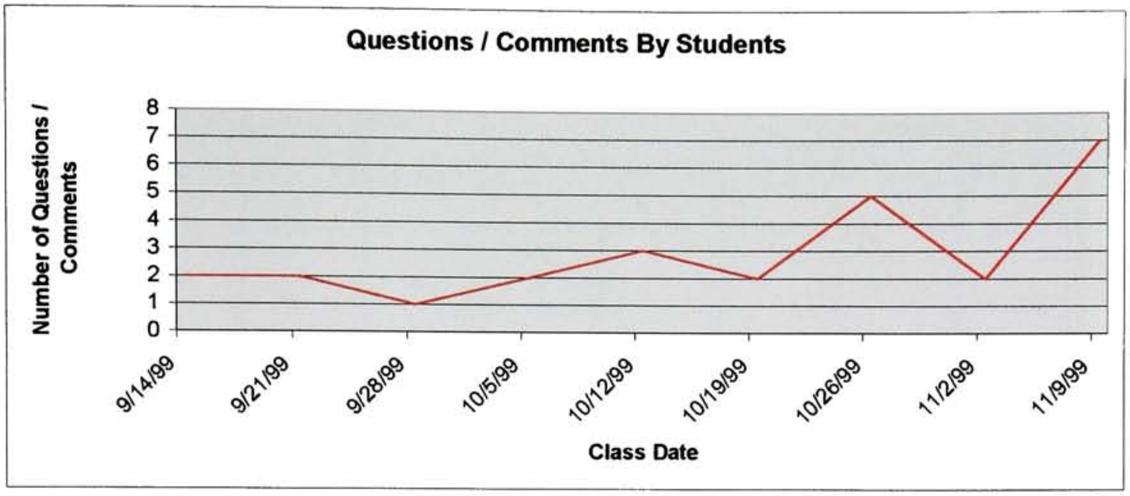
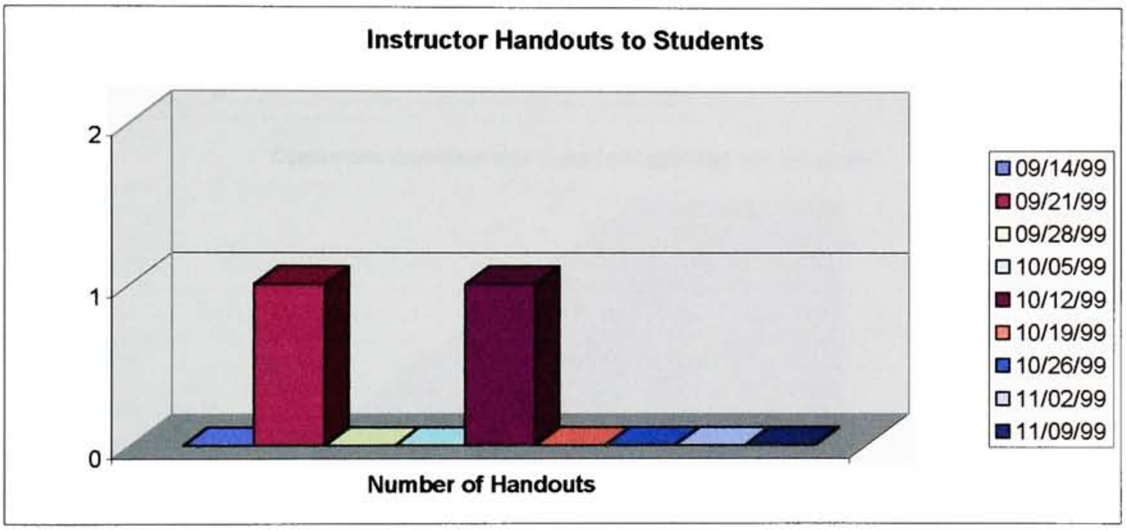


Figure 6.1 Qualities and Observations of the 06-A205 Classroom – Part I





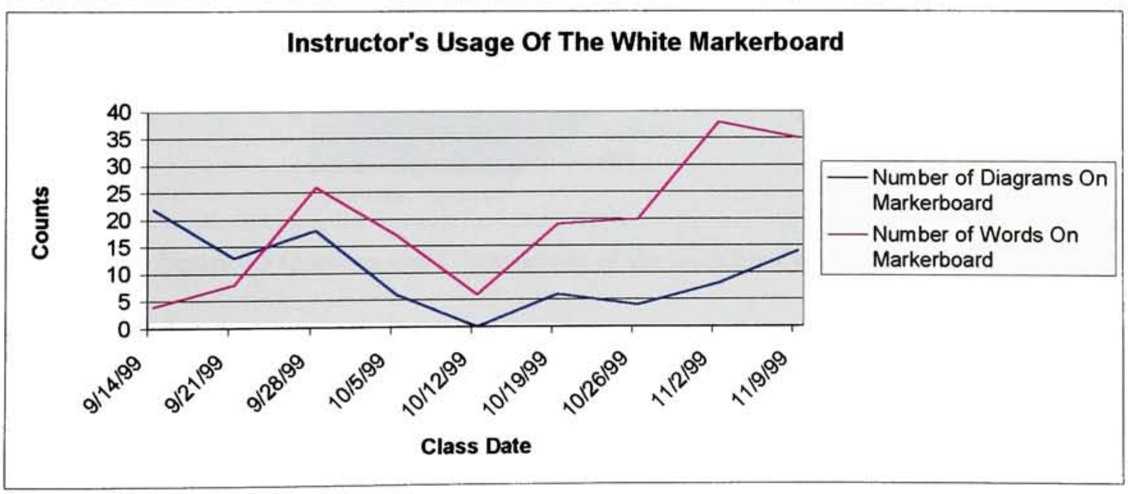
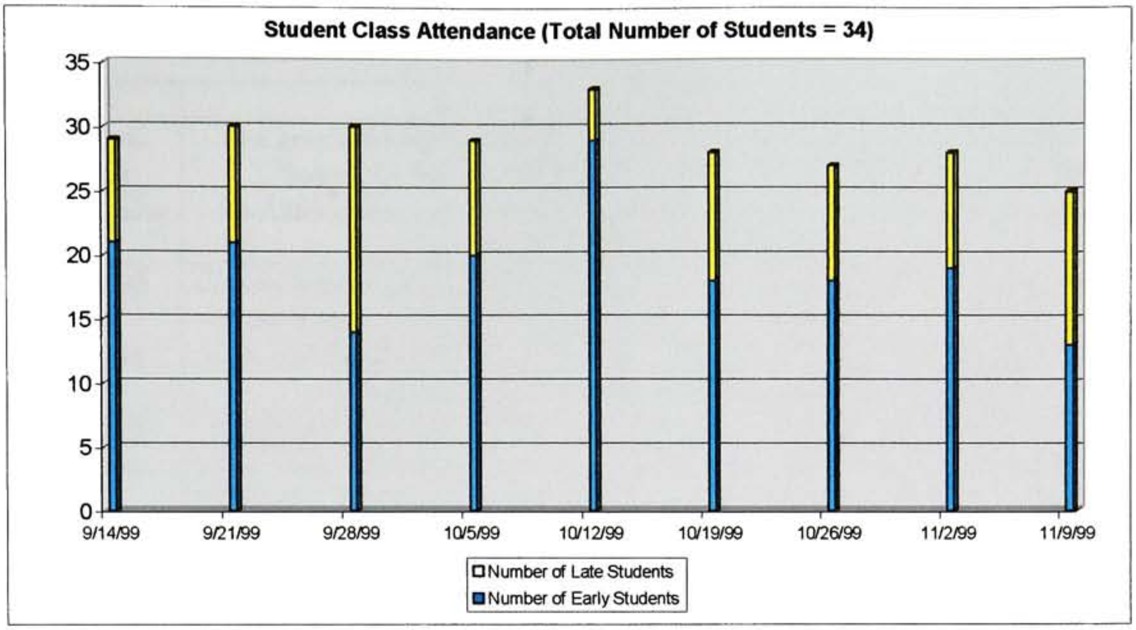


Figure 6.2 Qualities and Observations of the 06-A205 Classroom – Part II



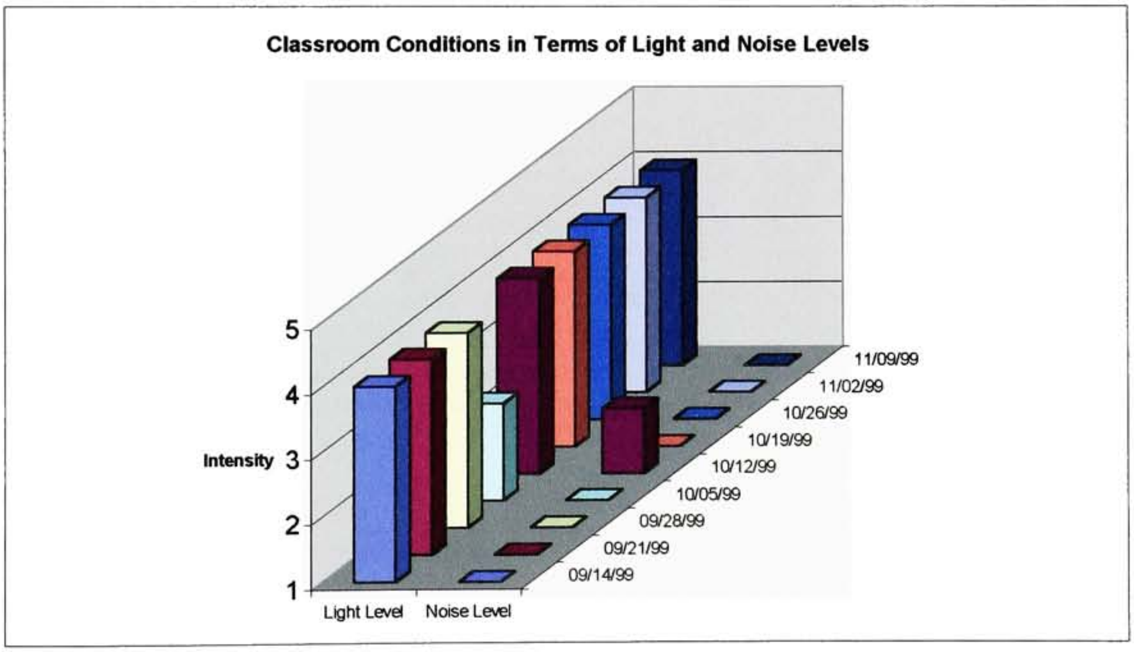


Figure 6.3 Qualities and Observations of the 06-A205 Classroom – Part III

Analysis of the Preceding Graphs

Topic	Analysis
Indoor vs. outdoor temperatures	The graph shows a parallel between indoor and outdoor temperatures. The lower the outdoor temperature, the lower the temperature in the 06-A205 classroom. Therefore, daily outdoor temperatures appear to affect indoor temperatures in this room.
Class and break durations	Classes between September 14 and October 26 lasted over 100 minutes for most of the time, but classes after October 26 were much shorter. Break durations were usually about 10 minutes. Note: October 12 was the mid-term exam day. That's why class duration was the longest for all classes.
Fatigued students	"Fatigued students" identifies students who yawn, lay on the desk or hands, or sleep. The students were fresh and anxious to learn in the beginning of the Fall Quarter. As the mid-term weeks approached, more students became fatigued. The students became fresh and anxious to learn again for a very short time after the mid-term weeks. The number of fatigued students then increased dramatically, possibly due to among other end-of-quarter stress things!
Questions and comments by students	The students usually raised only two or three questions/ comments in typical classes, but they became more participative at the end of the Fall Quarter. This indicates that the instructor was using the expository teaching style (lectures and demonstrations) for about two-thirds of the classes.
Handouts	The instructor of this section provided only two hard-copy handouts to students in this room during the Fall Quarter.
Usage of the white markerboard	The instructor began the quarter by drawing many diagrams rather than writing words on the white markerboard. However, the instructor ended the quarter by writing a lot of words and using fewer diagrams.
Student class attendance	Of the 34 students registered for the course, between 25 and 30 students usually attended each class except for the mid-term day (October 12). However, the pattern shows that there were slight declines in total and "on-time" class attendance after October 12. Many students were late for the September 28 and November 9 classes.
Classroom conditions	The intensity of noise and light levels were measured on a scale of between 1 (weakest) and 5 (strongest). Both levels were generally consistent. The light level was somewhat above average (not too bright nor too dark). There were almost no loud noises in the 06-A205 classroom for the whole Fall Quarter.

12-3105 Classroom

There are rows of crowded hard chairs on an orange floor in this classroom. The stage floor is 8 inches higher than the orange floor and contains a table, podium, projector, video cassette recorder, television, and several chairs. The stage wall has a huge white markerboard and a movie screen. The dominant colors of the classroom are orange and brown. This classroom's light level is controlled by 12 sets of fluorescent lights on a flat ceiling. The following table summarizes the physical properties of this classroom on the next page.

Building - Room	12 - 3105
Room Type	Classroom
Capacity	Seats 58
Priority	Day: CAST Evening: BUSINESS
Seating	Tablet Arm Chairs
Writing Surface	White Board
Instructor Station	Podium Table
A/C	Y
Handicap Access	Wheel Chair Accessible
Lighting	Dimming
Projector	Overhead Projector
Telephone	Telephone Jack Available
TV\VCR	Cable Television & VCR
Windows	Blinds
Computer Support	
B-Jack	Ethernet
Projector	[Not Available Data]

Table 6.2 Properties of the 12-3105 classroom
Credit: http://disted.rit.edu/classrooms/

The set of visual graphs on the following three pages displays various environmental qualities and my observations of the 12-3105 classroom.

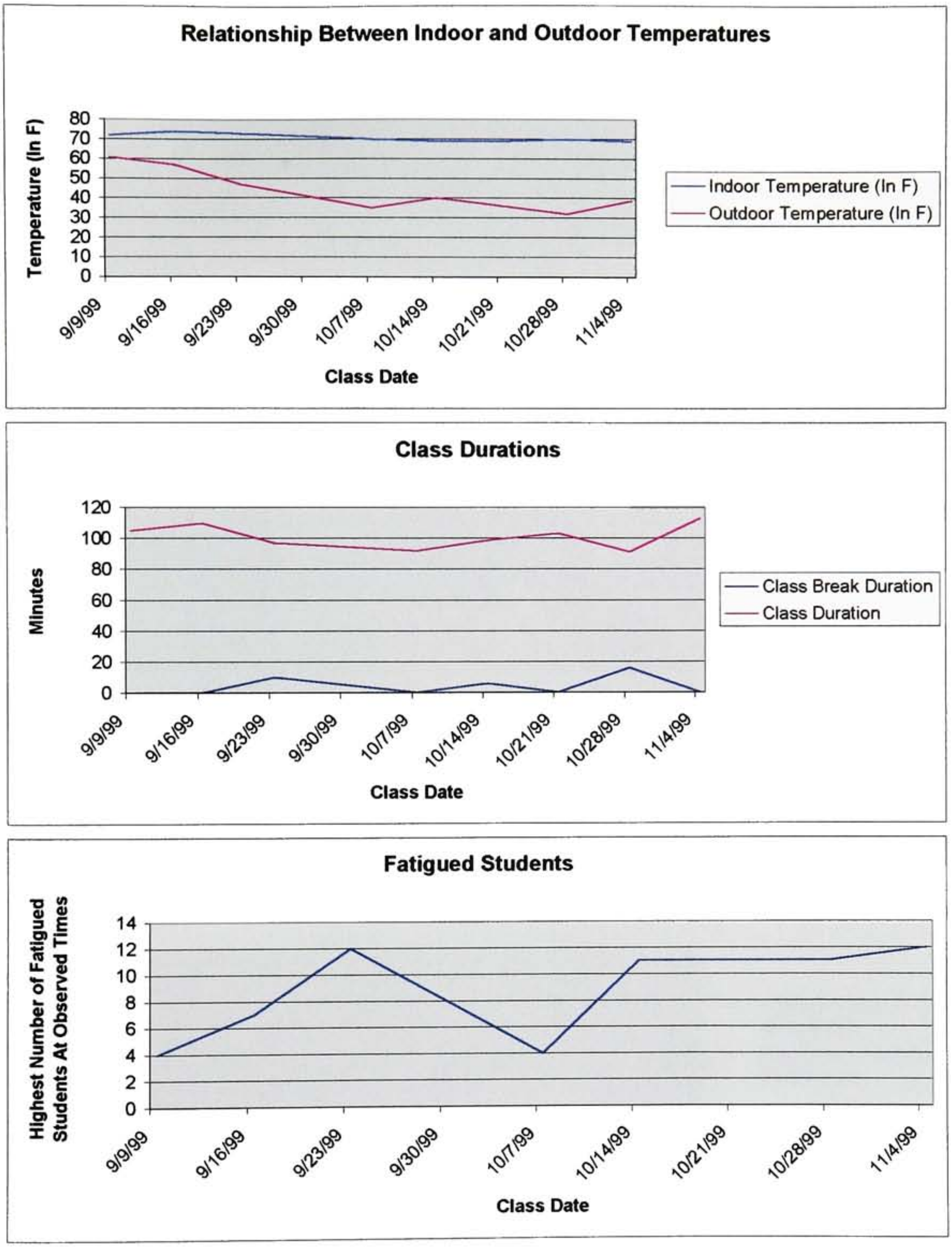


Figure 6.4 Qualities and Observations of the 12-3105 Classroom – Part I

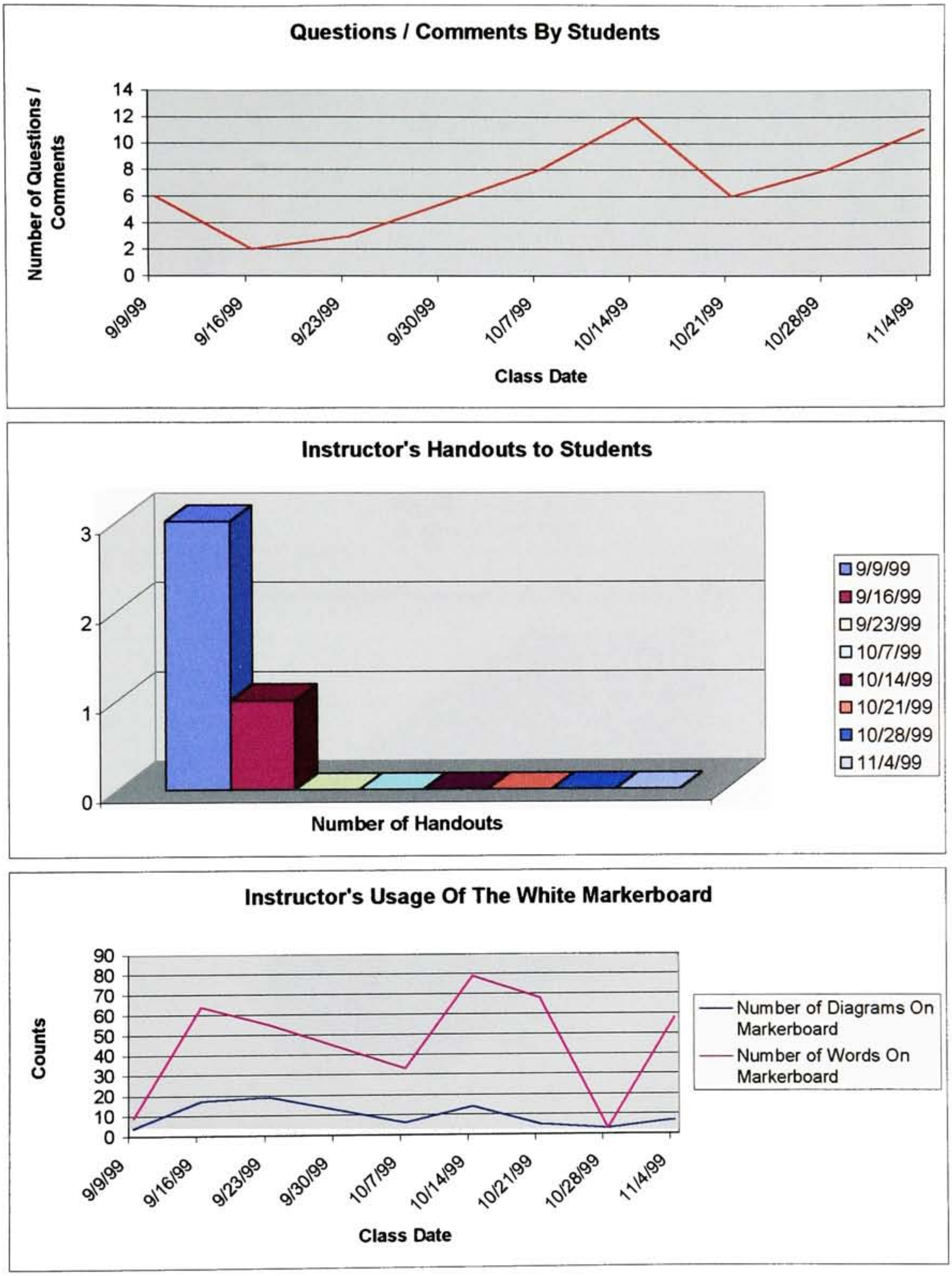
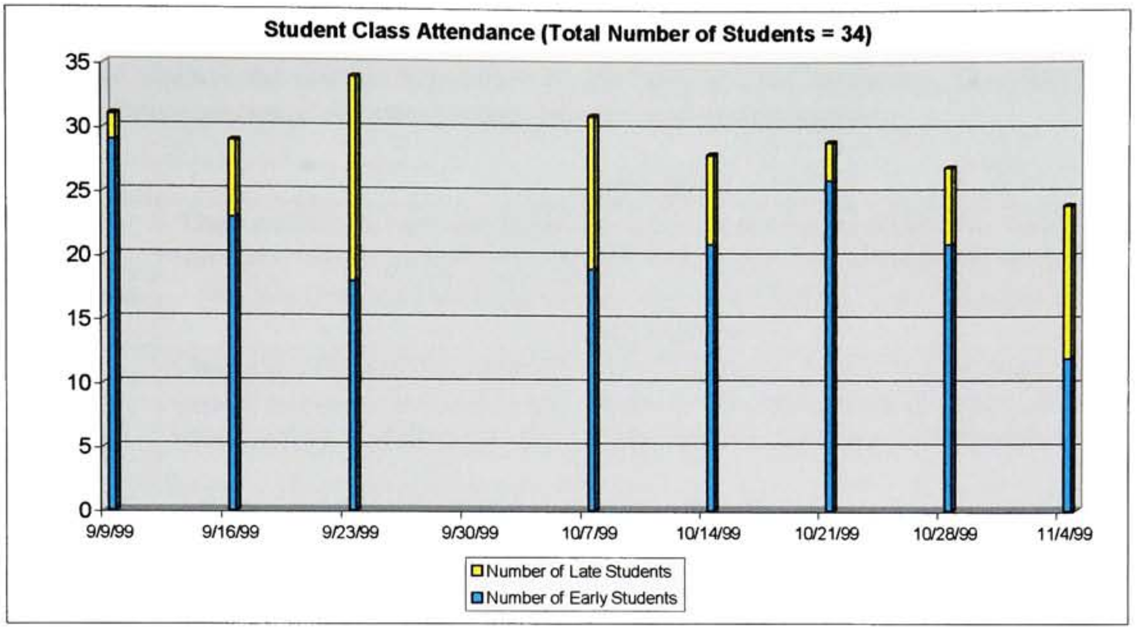


Figure 6.5 Qualities and Observations of the 12-3105 Classroom – Part II



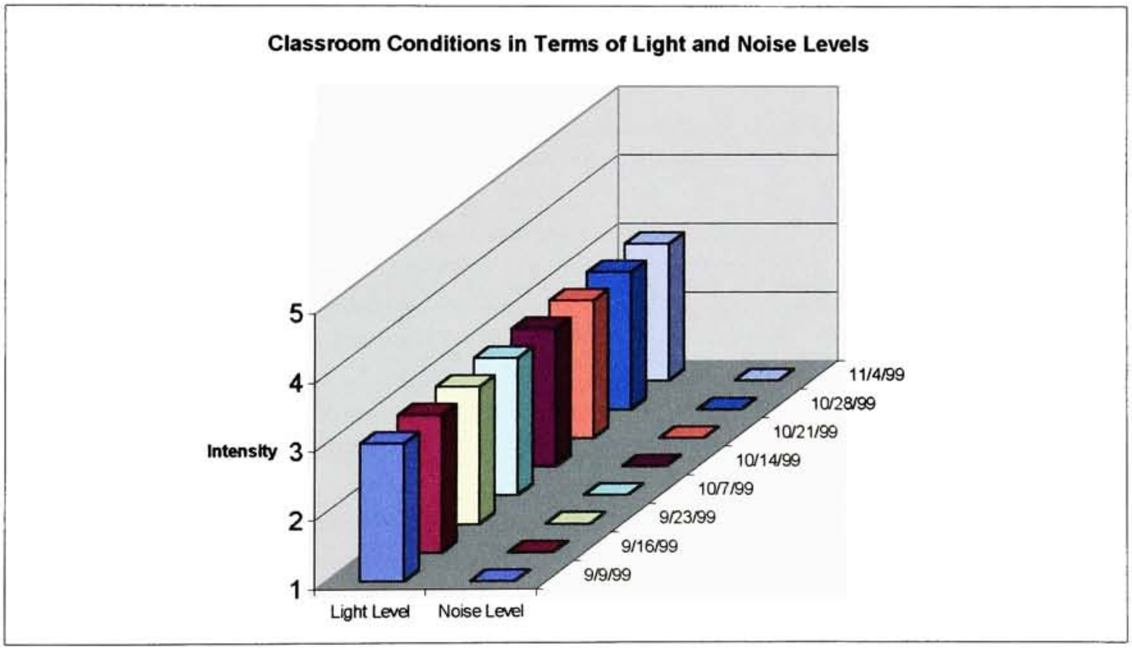


Figure 6.6 Qualities and Observations of the 12-3105 Classroom – Part III

Analysis of the Preceding Graphs

Note: I did not observe the class on September 30, 1999 due to a serious illness. Therefore, please ignore the software-generated statistics for this date in the preceding graphs.

Topic	Analysis
Indoor vs. outdoor temperatures	Daily outdoor temperatures did not affect indoor temperatures in the 12-3105 classroom to any great degree. Indoor temperatures were fairly consistent despite the fact that outdoor temperatures decreased sharply from September 9 to November 4.
Class and break durations	Classes usually lasted between 90 and 110 minutes. However, the graph shows a parallel between class and break durations. The shorter classes lasted, the longer breaks lasted. Interestingly, the last class was the longest one in the Fall Quarter.
Fatigued students	"Fatigued students" identifies students who yawn, lay on the desk or hands, or sleep. The students were fresh and anxious to learn in the beginning of the Fall Quarter. As in the 06-A205 classroom, students became more fatigued during the mid-term weeks and, then became fresh and anxious to learn again for a very short time. The number of fatigued students increased slowly while the Fall Quarter was ending.
Questions and comments by students	The graph shows inconsistent numbers of questions and comments by students. They raised six questions/comments in the first class and then became passive in class participation for a while. They suddenly asked many questions and made numerous comments on October 14 (two days after the mid-term date) and then their participation declined again. As the end of the Fall Quarter approached, they began to participate actively through many questions and comments.
Handouts	Only four hard-copy handouts were given to the students in this room during the whole Fall Quarter, all of which were distributed during the first two classes.
Usage of the white markerboard	The number of diagrams and words used by the instructor on the markerboard varied greatly from the beginning to the end of the Fall Quarter. The preceding graph on page 67 shows that as the instructor drew more diagrams, he wrote more words on the markerboard.
Student class attendance	Until October 14, there was an excellent attendance in this classroom. A gradual decline in attendance then occurred. Unlike attendance in the 06-A205 classroom, the number of "on-time" students was fairly inconsistent. Late students ranged from 2 to 17. September 23 was a very interesting day because both total attendance and the number of late students were highest for the quarter.
Classroom conditions	The intensity of noise and light levels were measured on a scale of between 1 (weakest) and 5 (strongest). Both levels were perfectly consistent. The light level was average (not too bright nor too dark), but somewhat darker than in the 06-A205 classroom. There were almost no loud noises in this classroom for the whole Fall Quarter.

Comparing two classrooms in the traditional classroom section

Criteria from Navy Research Studies for a Suitable Learning Environment	
Colors	Soft colors (white, green, blue)
Temperature	68-74 degrees F
Noise Level	Somewhat quiet (no more than 45 decibels)
Light Level	Bright (Full spectrum tubes but no traditional fluorescent lights)

Credit: Knirk & Montague, 1992, pp. 1 - 2

Comparing factors	06-A205	12-3105
Colors	Good (Bone white and gray)	Poor (Orange and brown)
Temperature	Poor (Inconsistent changes)	Good (Consistent low 70's)
Noise Level	Excellent (Almost no noise)	Excellent (Almost no noise)
Light Level	Good (Bright and some traditional fluorescent lights)	Fair (Neutral and traditional fluorescent lights)

The preceding graphs show that the 06-A205 classroom experienced slightly better class attendance than the 12-3105 classroom at the end of the Fall Quarter. The possible reasons of declining end-of-quarter class attendance in the 12-3105 classroom were fair light level and a poor combination of colors. The navy research paper written by Knirk and Montague states, "Colors seem to influence student learning, attitudes, and behaviors" (1992, p. 1).

6.2.2 Resources and Communications Methods

<table>
<tr><th>Type of Resources
And Communication Methods</th><th>Number and/or Description of Resources and Communication Methods</th></tr>
<tr><td>Textbooks (Required)</td><td>2</td></tr>
<tr><td>Videotapes (Required)</td><td>2</td></tr>
<tr><td>Handouts (Required)</td><td>6 (All hard copies)</td></tr>
<tr><td>White Markerboard and Markers (Required)</td><td>These tools were used to provide appropriate scaffolding in the traditional classroom.</td></tr>
<tr><td>Homework Assignments (Required)</td><td>
<table>
<tr><th>Number</th><th>Posted Date</th><th>Weight of Final Grade</th></tr>
<tr><td>1st</td><td>9/9/1999</td><td rowspan="5">All homework assignments combined accounted for 30 % of the final grade.</td></tr>
<tr><td>2nd</td><td>9/14/1999</td></tr>
<tr><td>3rd</td><td>9/21/1999</td></tr>
<tr><td>4th</td><td>9/28/1999</td></tr>
<tr><td>5th</td><td>10/14/1999</td></tr>
</table>
Students were required to hand in hard copies of homework assignments to the instructor, and they could be either handwritten or typed.</td></tr>
<tr><td>Final Project (Required)</td><td>(30 % of the Final Grade)
(Posted Date – 10/21/1999)
Students could choose one of four given topics for their final projects. The final project could be done by either writing a paper or building a computer hardware.</td></tr>
<tr><td>Mid-Term Exam (Required)</td><td>(20 % of the Final Grade)
Hard copy exam in class</td></tr>
<tr><td>Final Exam (Required)</td><td>(20 % of the Final Grade)
Hard copy exam in class</td></tr>
<tr><td>RIT Tutors (Optional)</td><td>Students could use RIT tutors for clarification of concepts discussed in class.</td></tr>
<tr><td>Wallace Library (Optional)</td><td>Students could use library materials to obtain further information about, or clarification of, what they learned in class.</td></tr>
<tr><td>VAX/VMS or Other E-mail Systems (Optional)</td><td>Students could communicate with each other and/or their instructor outside of class.</td></tr>
<tr><td>RIT Instructor (Optional)</td><td>Students could speak with their instructor in the office as deemed necessary.</td></tr>
</table>

6.2.3 Traditional Classroom Assignments

Week	Starting Date	Ending Date	Name of Assignment	Weight Toward Final Grade	Posted Date	Deadline Date	Time Length (In Days)
1	9/2/99	9/8/99					
2	9/9/99	9/15/99	Homework #1 Homework #2	6 6	9/9/99 9/14/99	9/16/99 9/21/99	8 8
3	9/16/99	9/22/99	Homework #3	6	9/21/99	9/28/99	8
4	9/23/99	9/29/99	Homework #4	6	9/28/99	10/5/99	8
5	9/30/99	10/6/99					
6	10/7/99	10/13/99	Mid-Term Exam	20	10/12/99	10/12/99	1
7	10/14/99	10/20/99	Homework #5	6	10/14/99	10/21/99	8
8	10/21/99	10/27/99	Final Project	30	10/21/99	11/15/99	26
9	10/28/99	11/3/99					
10	11/4/99	11/10/99					
11	11/11/99	11/17/99	Final Exam	20	11/15/99	11/15/99	1

Analysis and Interpretation

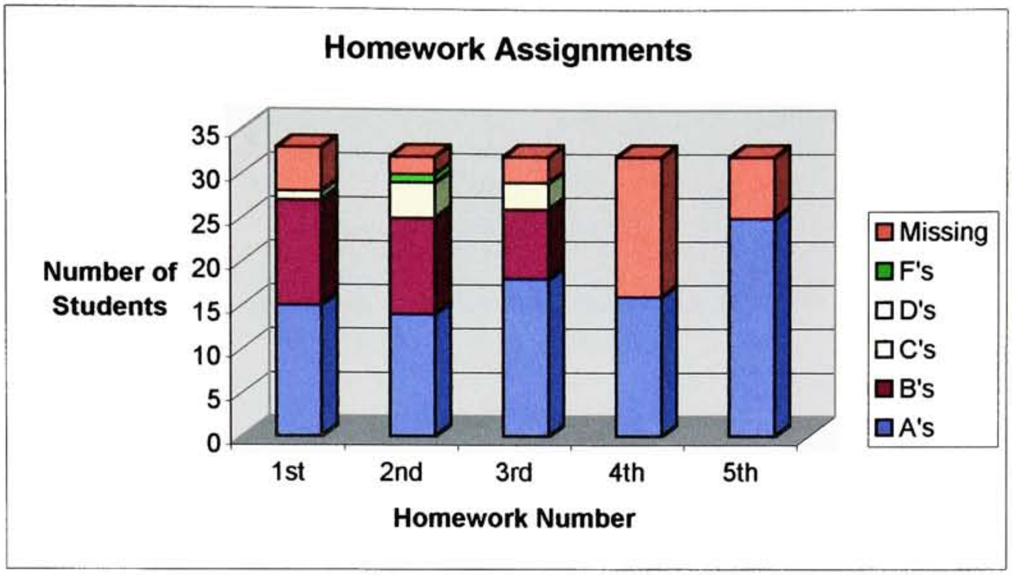
The instructor gave five homework assignments and the mid-term exam to the students before the posted date of the final project. Each homework assignment was to be completed in approximately the same length of time (about 1 week), even though the stress rate of assignments in this section appeared to be difficult in the beginning of the Fall Quarter.

The stress rate of assignments in this section later became very stable because students were given enough time to focus on the final project and study for the final exam. This indicates that the instructor knew that the students gained a lot of experience from the five homework assignments, which helped them to successfully complete the final project.

6.2.4 More Data Regarding Some Given Resources, Including Course Grades

This section focuses on grades received by the students for homework assignments, the final project, the mid-term exam, and the final exam (Credit: Traditional Classroom Instructor). The following chart summarizes the methods used to record grade frequency counts, actual class GPAs, and adjusted class GPAs.

<table>
<tr><th>Category</th><th>Definition</th><th>Fictitious Example Used to Illustrate Methods</th></tr>
<tr><td>Grade frequency counts</td><td>Number of A's, B's, C's, D's, F's, and number of missing assignments</td><td>A's – 3
B's – 2
C's –2
D's –2
F's – 2
Missing – 1</td></tr>
<tr><td>Actual class GPA</td><td>Total quality points divided by total frequency counts<table><tr><td>Letter Grade</td><td>Quality Point</td></tr><tr><td>A</td><td>4</td></tr><tr><td>B</td><td>3</td></tr><tr><td>C</td><td>2</td></tr><tr><td>D</td><td>1</td></tr><tr><td>F</td><td>0</td></tr><tr><td>Missing</td><td>0</td></tr></table></td><td>A's – 3 x 4 = 12
B's – 2 x 3 = 6
C's – 2 x 2 = 4
D – 2 x 1 = 2
F – 2 x 0 = 0
Missing 1 x 0 = 0
Total Quality Points = 24
Total Frequency Counts = 12
Actual class GPA = 2.0</td></tr>
<tr><td>Adjusted class GPA</td><td>Similar to actual class GPA, but these statistics exclude missing assignments.<table><tr><td>Letter Grade</td><td>Quality Point</td></tr><tr><td>A</td><td>4</td></tr><tr><td>B</td><td>3</td></tr><tr><td>C</td><td>2</td></tr><tr><td>D</td><td>1</td></tr><tr><td>F</td><td>0</td></tr></table></td><td>A's – 3 x 4 = 12
B's – 2 x 3 = 6
C's – 1 x 2 = 2
D – 2 x 1 = 2
F – 2 x 0 = 0
Total Quality Points = 24
Total Frequency Counts = 11
Adjusted class GPA = 2.18</td></tr>
</table>



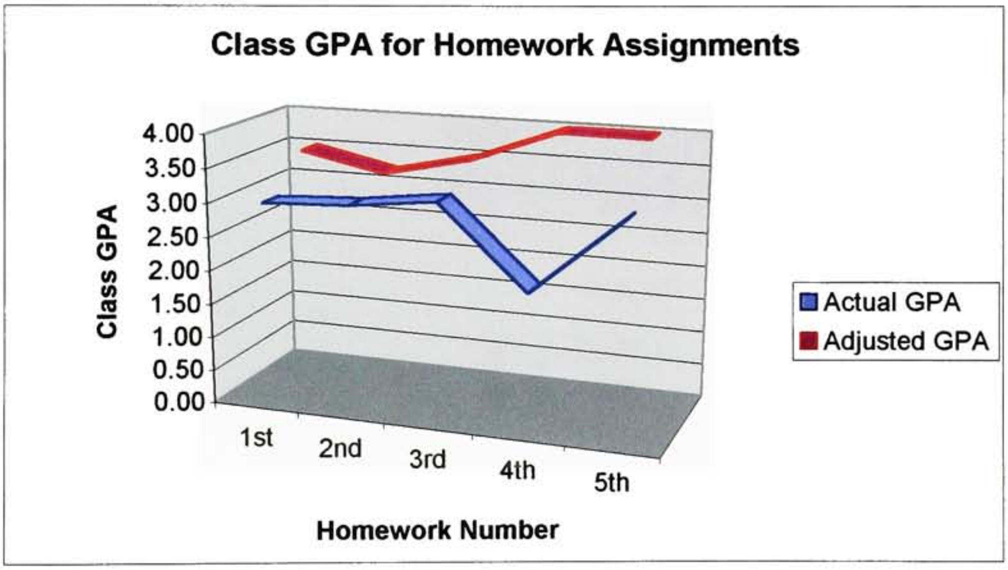
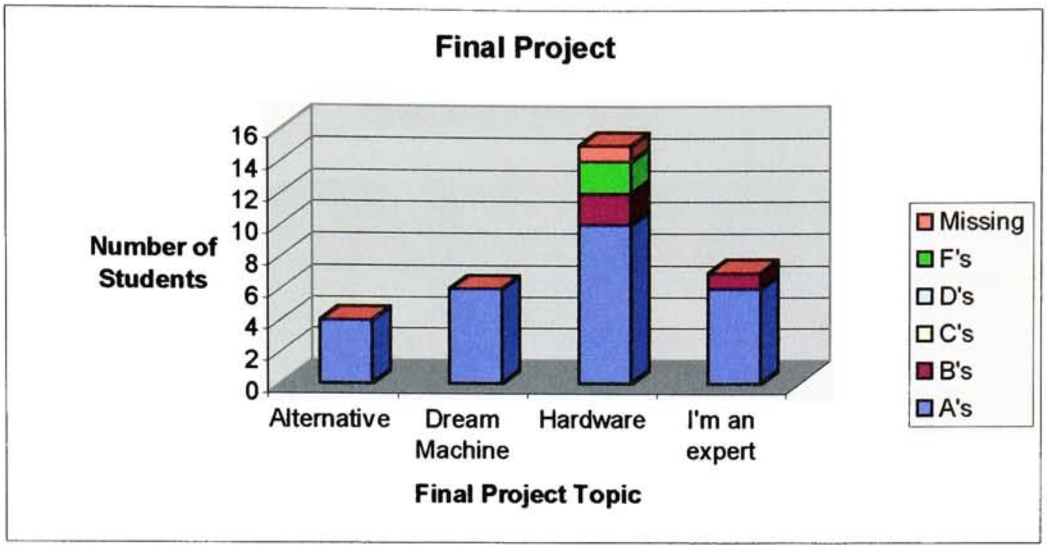


Figure 6.7 Grades for homework assignments

Analysis And Interpretation

Many students did very well on all homework assignments except for the fourth. The grades for the fourth homework assignment substantially lowered the actual class GPA because half of the students did not hand in this assignment to the instructor. The posted date of this assignment was September 28, 1999, which was also the beginning of the mid-term weeks. One might therefore conclude that many students considered doing small homework assignments as a much lower priority than studying for mid-term exams.



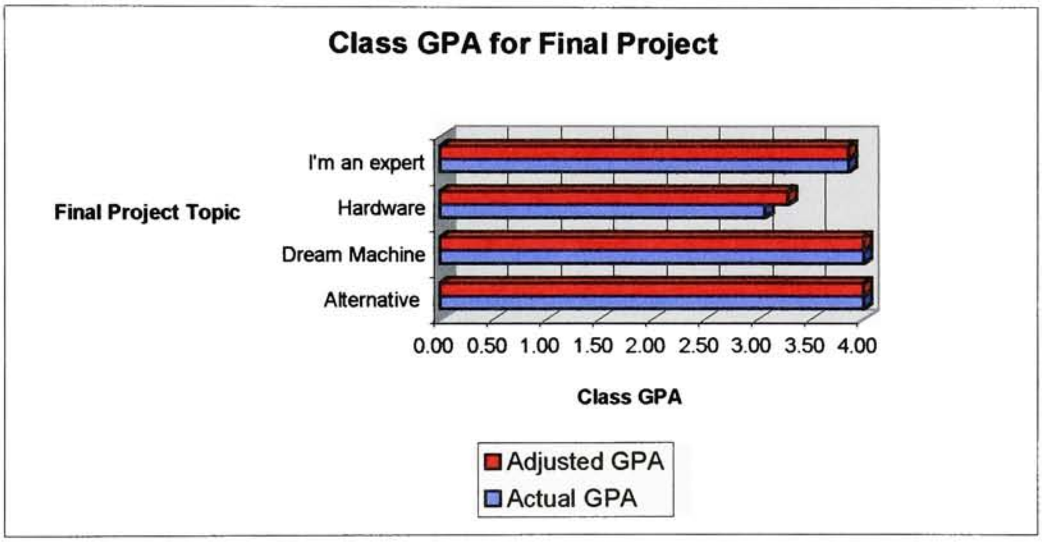
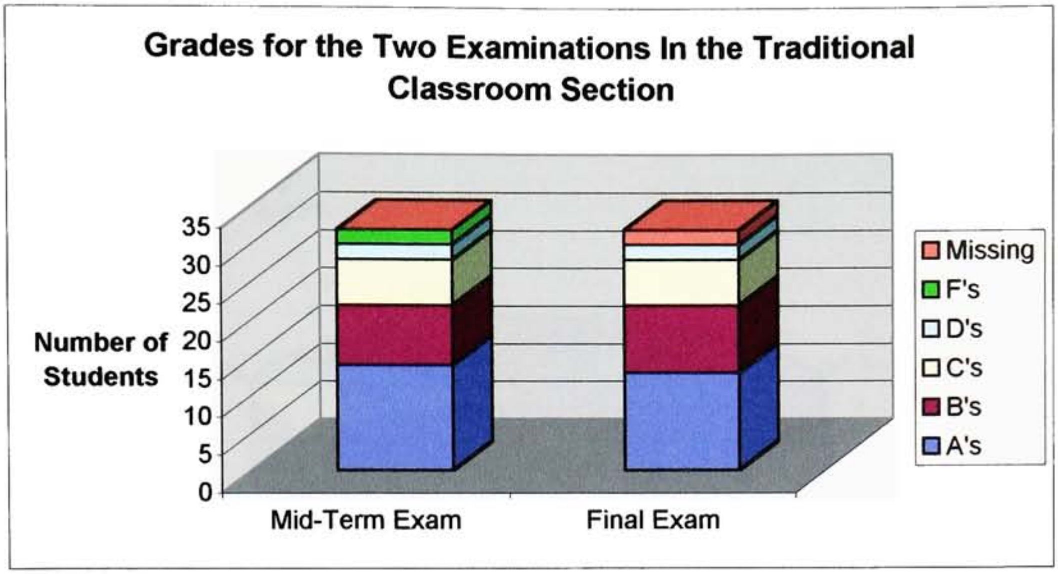


Figure 6.8 Grades for the final project

Analysis And Interpretation

Almost every student received a high grade on the final project. The "Hardware" topic appeared to be the most popular topic, even though the actual class GPA for this topic was lowest. Three students were responsible for this actual GPA being the lowest because one of them did not hand in the hardware project and the other two failed to complete it.



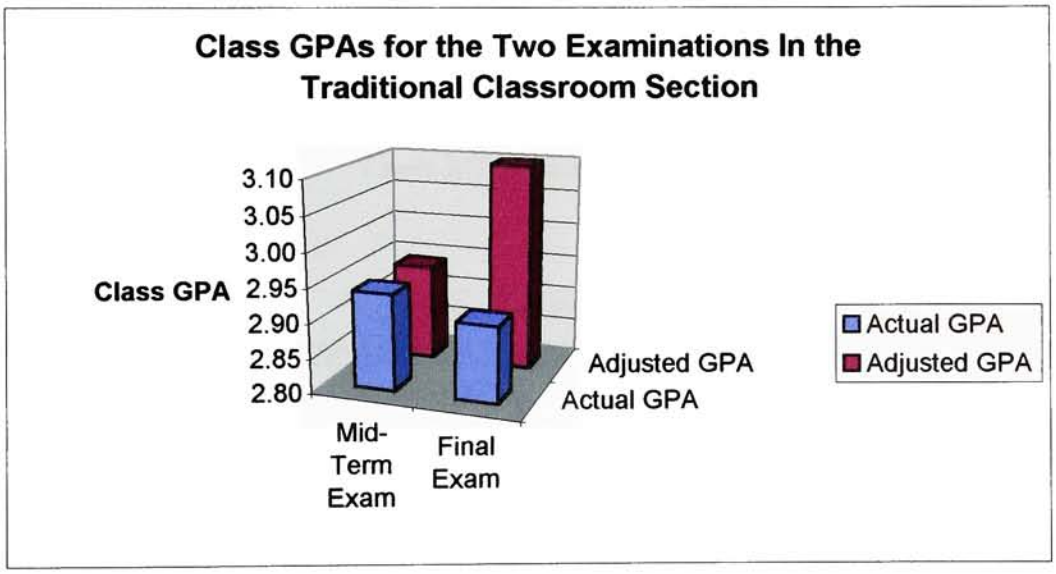


Figure 6.9 Grades for the two examinations

Analysis And Interpretation

There were no significant differences in the actual class GPAs for the mid-term exam and the final exam, but in fact the students did slightly better overall on the final exam than on the mid-term exam. Two students missing the final exam caused the actual class GPA for this exam to be lower than the actual class GPA for the mid-term exam. Excluding the two missing final exams, the adjusted class GPA for the final exam was about 3.10.

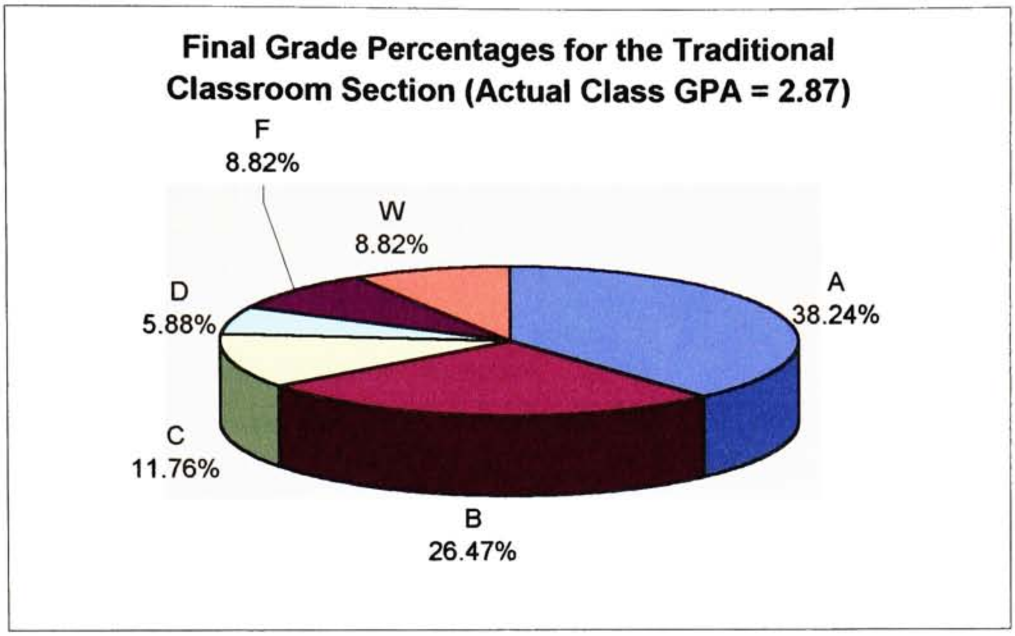


Figure 6.10 Final Grade Percentages for the Traditional Classroom Section
Credit: RIT for actual statistics

Analysis and Interpretation

RIT Student Population Average GPA's at the end of the Fall Quarter	
Year 1 students 2.72	Year 2 students 2.86
Year 3 students 2.96	Year 4 students 3.01
Year 5 students 3.02	Graduate students 3.53

Table 6.3 RIT Average GPA's at the end of the Fall Quarter 1999
Credit: Student Information System

The actual class GPA for final grades closely matches with 2nd year students' average GPA. However, it does not really tell how well students did in the traditional classroom section because it includes statistics of missing assignments, which were counted as F's. What hurt the actual class GPA for final grades? Numerous missing fourth assignments, two missing final exams, and three incomplete/missing projects strongly impacted the actual class GPA for final grades. One might conclude that the adjusted class GPA for final grades would be at least 3.0 because several students should earn much better final grades if they did all the assignments and took all the exams.

6.3 Distance Learning Section

6.3.1 Physical Locations

Students and their instructor from the distance classroom section of the selected course in my study interacted from different locations in the United States via the First Class Client Software version 5.506 on Tuesdays and Thursdays. This software was developed by the SoftArc corporation (Credit: http://www.softarc.com). The RIT distance learning server is accessed at FirstClass.rit.edu using the TCP/IP network protocol. Each user of the First Class software is required to have a communications medium (a modem, an Ethernet adapter, etc.) and a TCP/IP software driver in order to make remote communications successful.

6.3.2 Resources and Communications Methods

<table>
<tr><th>Type of Resources and Communication Methods</th><th>Number and/or Description of Resources and Communication Methods</th></tr>
<tr><td>Textbooks (Required)</td><td>2</td></tr>
<tr><td>Videotapes (Required)</td><td>2</td></tr>
<tr><td>Electronic Study Guides (Required)</td><td>11</td></tr>
<tr><td>Electronic Handouts (Required)</td><td>78</td></tr>
<tr><td>Chat Sessions (Optional but Recommended)</td><td>2 per week</td></tr>
<tr><td>First Class Dropbox (Required)</td><td>Assignments and exams had to be submitted to this electronic location by given deadline dates.</td></tr>
<tr><td>Questions & Answers Conference Folder
(Optional but Recommended)</td><td>Students could ask questions about anything related to the course. In return, their instructor would type replies and submit them to this folder.
Only 22 entries in the Fall Quarter</td></tr>
<tr><td>Discussion Entries Conference Folder
(Optional but Recommended)</td><td>Students and their instructor could discuss current course issues or concepts in depth.
100 entries in the Fall Quarter</td></tr>
<tr><td>Small Project Assignments (Required)</td><td>
<table>
<tr><th>Number</th><th>Posted Date</th><th>Weight of Final Grade</th></tr>
<tr><td>1st</td><td>9/7/1999</td><td>12.5 %</td></tr>
<tr><td>2nd</td><td>9/21/1999</td><td>8 %</td></tr>
<tr><td>3rd</td><td>10/3/1999</td><td>15 %</td></tr>
<tr><td>4th</td><td>10/12/1999</td><td>7 %</td></tr>
<tr><td>5th</td><td>10/21/1999</td><td>7.5 %</td></tr>
</table>
All these assignments were required to be submitted through the students' computers to the First Class dropbox by the given deadline dates.</td></tr>
</table>

Type of Resources and Communication Methods	Number and/or Description of Resources and Communication Methods
Final Project (Required)	(25 % of the Final Grade) (Posted Date – 10/14/1999) Students had to write papers based on the instructor's guidelines and submit them to the First Class dropbox. Project topic choices were not given to these students.
Take-Home Final Exam (Required)	(25 % of the Final Grade) (Posted Date – 11/7/99) Students were required to type their answers to 33 questions and submit them to the First Class dropbox.
RIT Tutors (Optional)	Local students could use RIT tutors for clarification of concepts discussed in class.
Wallace Library (Optional)	Local students could use library materials to obtain further information about, or clarification of, what they learned in class.
VAX/VMS or First Class or Other E-mail Systems (Optional)	Students could communicate with each other and/or their instructor outside of class.
RIT Web Pages (Optional)	Students could do research or obtain more information about course concepts.
Distance Learning Services (Optional)	• Students could find out how to register for, or withdraw from, courses from their remote environment. • Students could get proctors for their exams as requested by their instructor. • Students could buy books from RIT bookstores via online services. • Deaf students could request transcripts from audio class conferences for distance learning courses. • Students could obtain important software tools to assist them in completing assignments.

Type of Resources and Communication Methods	Number and/or Description of Resources and Communication Methods	
Distance Learning Services (continued) (Optional)	Questions & Answers Conference Folder	• General, First Class, and technical support questions • Frequently asked questions (Conference names, Uninstalling First Class software, Dialing into First Class server with a modem, Making alias of conferences, etc.) • First Class documentation • First Class Intranet Client Installer • New and old archives of questions and answers
	Student Union Folder	• Discussion about computer technology • Discussion about plans for distance learning courses in the future • Academic Success Corner (time management, personal resources, career resources) • More…
	Wallace Library Folder	• Submit questions about references • Library frequently asked questions (Accessing databases, Posting personal web pages, Guidelines for citing on-line sources [MLA & APA formats]) • Questions about library procedures • DCE/VAX account information • More…

6.3.3 Distance Learning Assignments

Week	Starting Date	Ending Date	Name of Assignment	Weight Toward Final Grade	Posted Date	Deadline Date	Time Length (In Days)
1	9/2/99	9/8/99	Small Project #1	12.5	9/7/99	9/19/99	13
2	9/9/99	9/15/99					
3	9/16/99	9/22/99	Small Project #2	8	9/21/99	9/27/99	7
4	9/23/99	9/29/99					
5	9/30/99	10/6/99	Small Project #3	15	10/3/99	10/11/99	9
6	10/7/99	10/13/99	Small Project #4	7	10/12/99	10/17/99	6
7	10/14/99	10/20/99	Final Project	25	10/14/99	11/7/99	25
8	10/21/99	10/27/99	Small Project #5	7.5	10/21/99	10/29/99	9
9	10/28/99	11/3/99					
10	11/4/99	11/10/99	Final Exam	25	11/7/99	11/14/99	8
11	11/11/99	11/17/99					

Analysis and Interpretation

The instructor gave only a few assignments to the students in the first half of the Fall Quarter, but she assigned numerous tasks in the last six weeks. The weight and time length of each assignment fluctuated greatly throughout this quarter. The stress rate of assignments in this section was fairly easy initially, but it escalated as the course progressed. For instance, the students were required to complete three assignments (small project #4, final project, and small project #5) at almost the same time.

Comparison Notes

Traditional Classroom	The stress rate of assignments was very consistent throughout the Fall Quarter except for the first three weeks. Each homework assignment's time length and weight were approximately equal. The students were required to finish all of these homework assignments before they could start the final project. They then focused on only two things (the final project and the final exam) at the end of the Fall Quarter.
Distance Learning	Unlike the traditional classroom section, the stress rate of assignments was very inconsistent throughout the Fall Quarter because of fluctuating weights and time lengths of the assignments. The students had only two small projects in the first four weeks of the Fall Quarter, but they were given many assignments in the next six weeks.

Student Submission Statistics for the Distance Learning Section

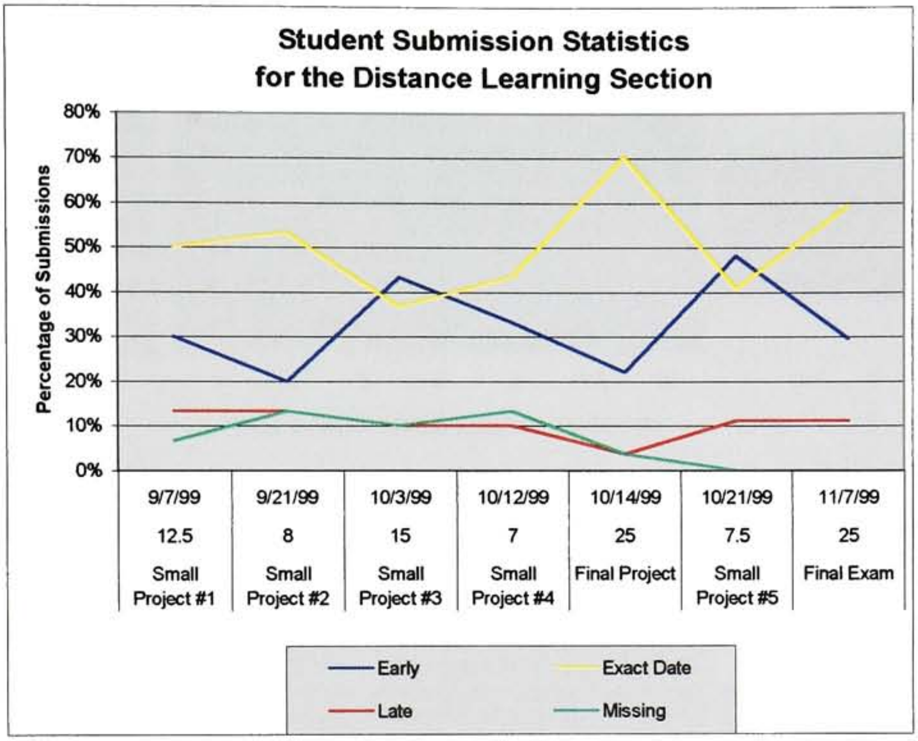
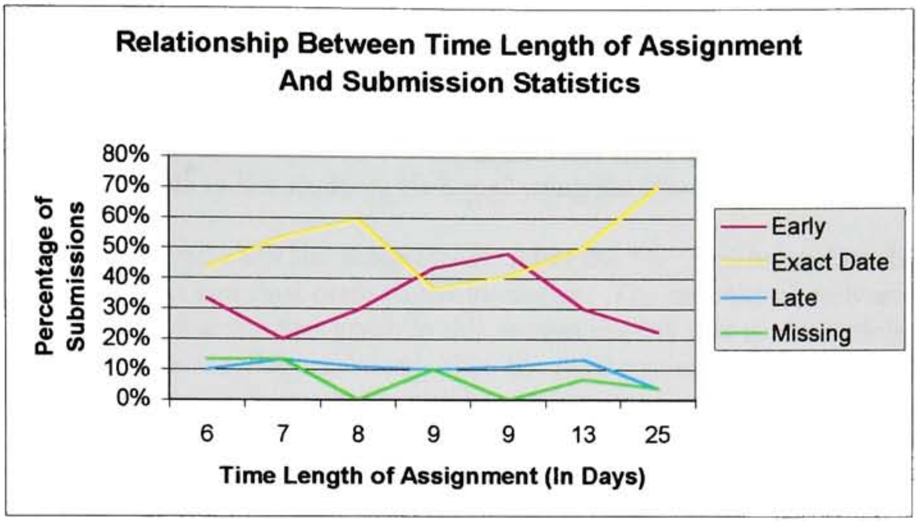


Figure 6.11 Student Submission Statistics for the Distance Learning Section – Part I
Note: Each task on the x-axis has three items (posted date, weight of assignment, and type of assignment).



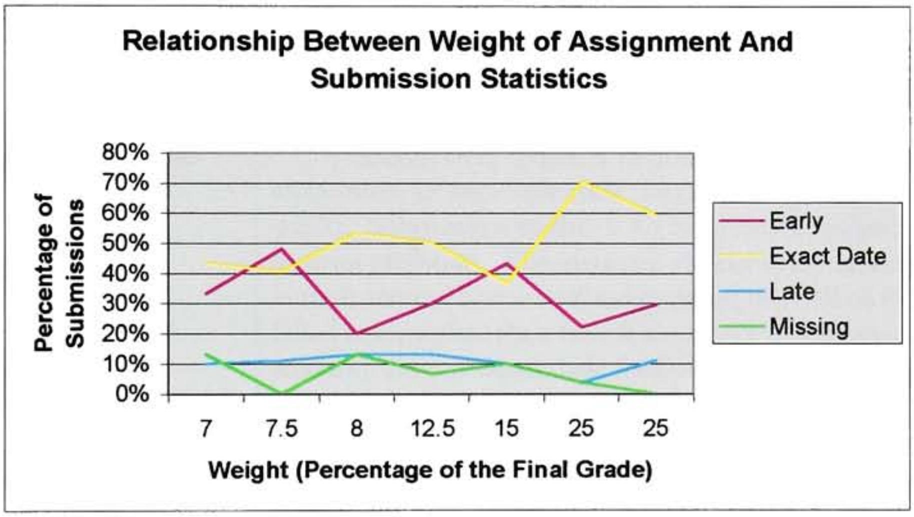


Figure 6.12 Student Submission Statistics for the Distance Learning Section – Part II

Analysis and Interpretation

All assignments, the final project, and the take-home exam were required to be completed and submitted electronically. The instructor always picked up the students' submissions, which were time-stamped by the RIT distance learning server, in the First Class dropbox. The instructor usually returned graded assignments to her students via e-mail using the First Class client software.

The instructor always received a few late assignments. After the "W" date in late October, all students submitted their fifth project and final exam to the instructor. The number of early and "on-time" submissions varied greatly, but the first graph in this section implies that students finished their final project and final exam more carefully and slowly than the small project assignments. The third graph shows a very strong relationship between the number of "on-time" submissions and the weight of assignments. Most students apparently gave priority to the "highly-weighted" assignments. The numbers of early and "on-time" submissions were nearly equal when the time length of assignments was average. On the other hand, the number of "on-time" submissions became much higher than the number of early submissions when the time length of assignments was either short or long.

Comparison Notes

Traditional Classroom	Students were required to complete each homework assignment in approximately the same length of time (about 1 week). Submission statistics for homework assignments were very inconsistent. For instance, almost every student handed in their second homework assignment, but half of the students failed to complete their fourth homework assignment! Several students did not finish their final project and final exam, which were heavily counted towards the final grade. Unlike the distance learning section, the time length and the weight of assignments seemed to have no direct relationship to submission statistics in this section. This could be due, in part, to the students' other priorities and related stress factors. For example, the fourth assignment was given to students at the beginning of the mid-term weeks.
Distance Learning	The weight of each component of the course fluctuated greatly. Submission statistics for "missing" and "late" assignments were very consistent. The first graph shows that there were always a few missing and late assignments throughout the Fall Quarter. The relationship between submission statistics, the time length of assignments, and the weight of assignments was quite evident in this class. More students meticulously completed "highly-weighted" assignments, which were most important in determining their final grade. The number of "on-time" submissions was generally high for assignments with short or long periods allowed.

6.3.4 More Data Regarding Some Given Resources, Including Course Grades

Number of Resources and Communication Methods Employed in the Distance Learning Section During the Fall Quarter

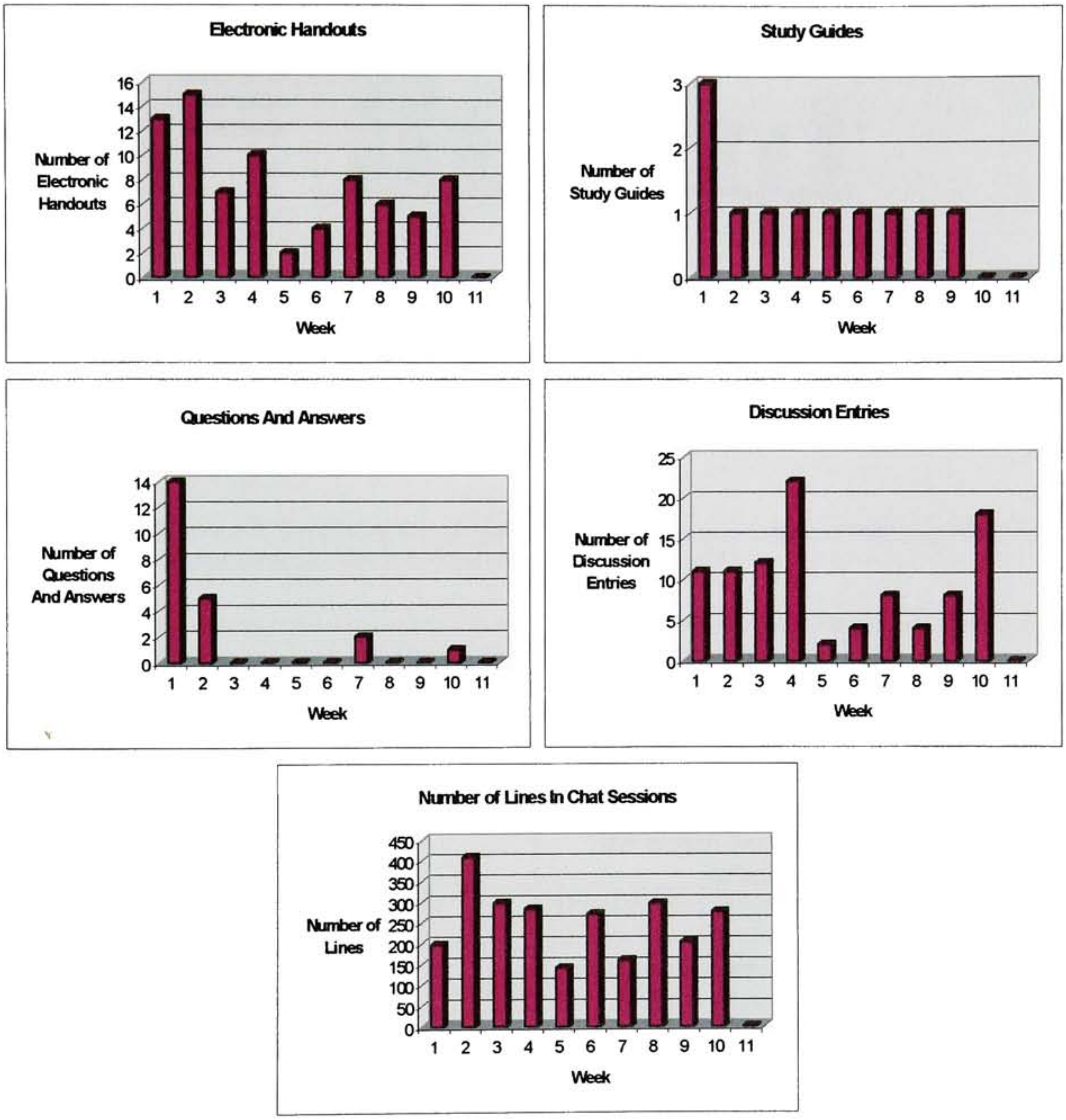


Figure 6.13 Weekly resources and communication methods

Details of Electronic Handouts

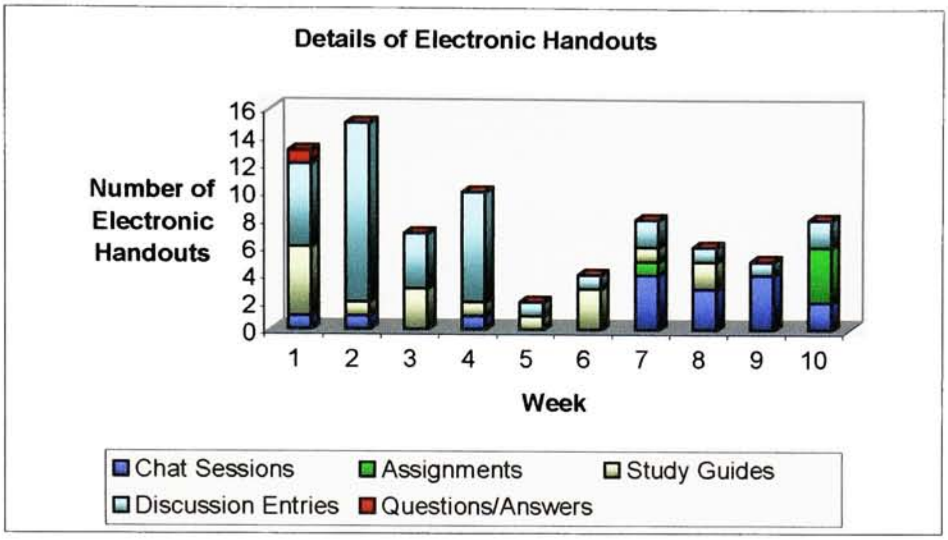


Figure 6.14 Electronic Handouts in the Distance Learning Section

Analysis and Interpretation

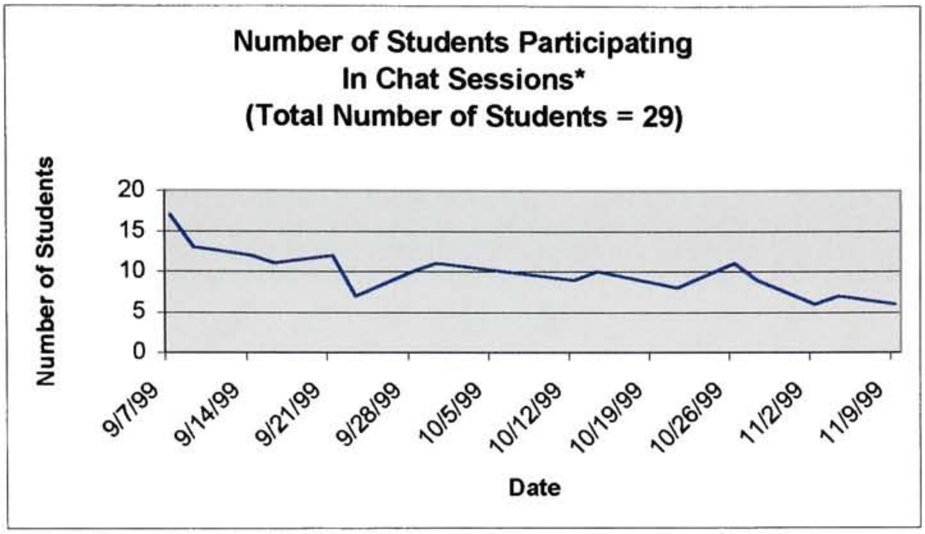
Electronic handouts could be word processing documents, computer images, or web page links. They were important supplements to what students learned in the course.

Students and their instructor were involved in an average of about ten electronic handouts per week. Most of the electronic handouts came from the discussion entries conference folder.

Comparison Notes

Traditional Classroom	There were six hard-copy handouts in the Fall Quarter 1999. The main information sources for this section were two textbooks and the instructor's lectures.
Distance Learning	The total number of electronic handouts for this quarter was 100. The main information sources for this section were two textbooks, web pages, chat sessions, and discussion entries.

Details of Chat Sessions



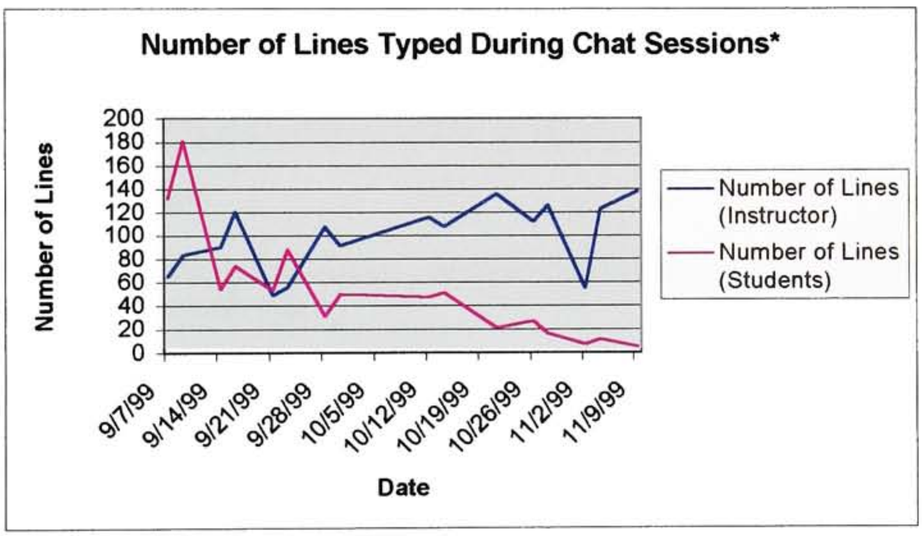


Figure 6.15 Chat Sessions in the Distance Learning Section
*Two chat sessions per week

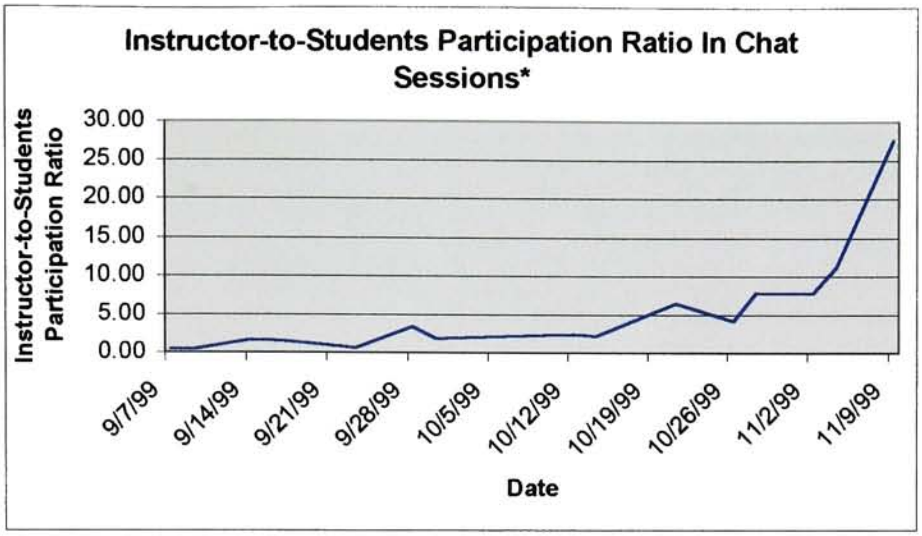


Figure 6.16 Instructor-to-Students Participation Ratio In Chat Sessions
*Two chat sessions per week

The formula used for the instructor-to-students participation ratio in chat session is:

The number of lines typed by the instructor divided by the number of lines typed by the students

Analysis and Interpretation

Chat sessions are virtual classes in cyberspace. Students and their instructor can type many lines during a chat session at the same time.

The number of students participating in chat sessions as well as the number of lines typed by students began to decline sharply after the first week. The graphs entitled "Number of Lines Typed During Chat Sessions" and " Instructor-to-Students Participation Ratio In Chat Sessions" obviously show that the instructor became more dominant in discussions during the second half of the Fall Quarter. The instructor-to-students ratio was between 0.40 and 2.00 for most of the time before October 12, 1999. However, this ratio demonstrated nearly exponential growth after October 12. The ratio for the last chat session is incredibly 27.60! The exponential growth of this ratio implies that the instructor was using the traditional classroom lecturing method much more frequently in chat sessions rather than the distance learning discussion method as the end of the quarter was approaching.

Comparison Notes

Traditional Classroom	Attendance in both the 06-A205 and 12-3105 classrooms was fairly consistent, although the number of students attending classes declined a bit at the end of the Fall Quarter. However, students became more active participants as this quarter progressed by raising more questions and comments. The instructor became more sharing and informal in class discussions.
Distance Learning	Unlike the traditional classroom section, chat session attendance declined very quickly after the first week, and students became very passive in chat session participation. This seems to have led the instructor to become more controlling in chat session discussions.

Details of Out-of-Class Participation

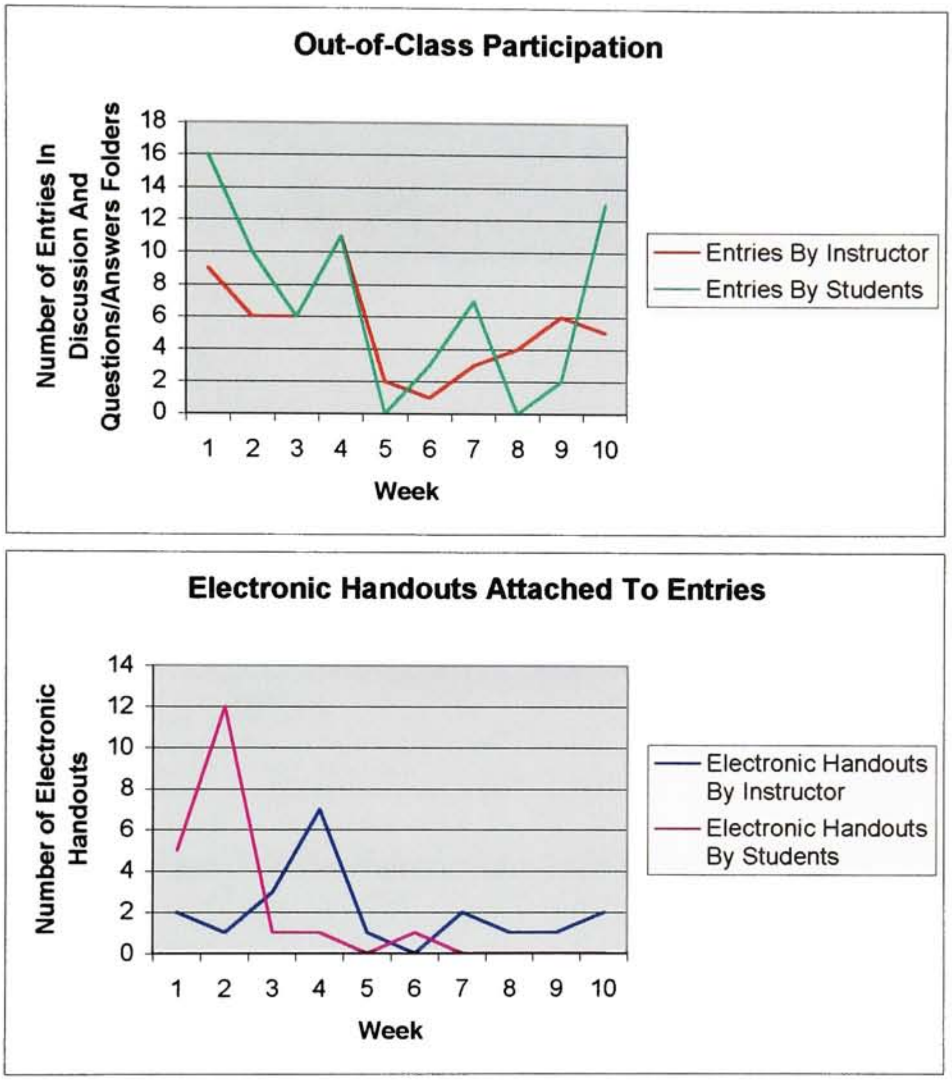
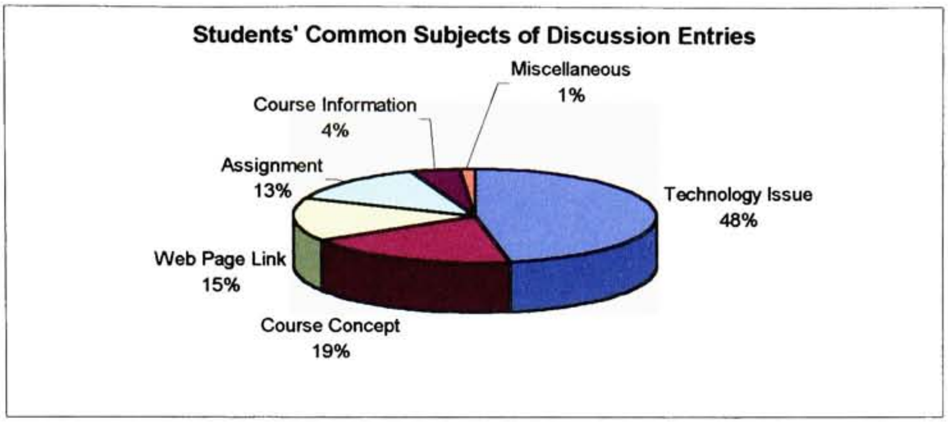


Figure 6.17 Out-of-class participation statistics – Part I

Note: Electronic handouts could be word processing documents, computer images, or web page links. Unlike the traditional classroom section, distance learning students had many opportunities to share information by finding interesting web sites, which provided further details of concepts that they learned in the course, and adding web page links to their entries.



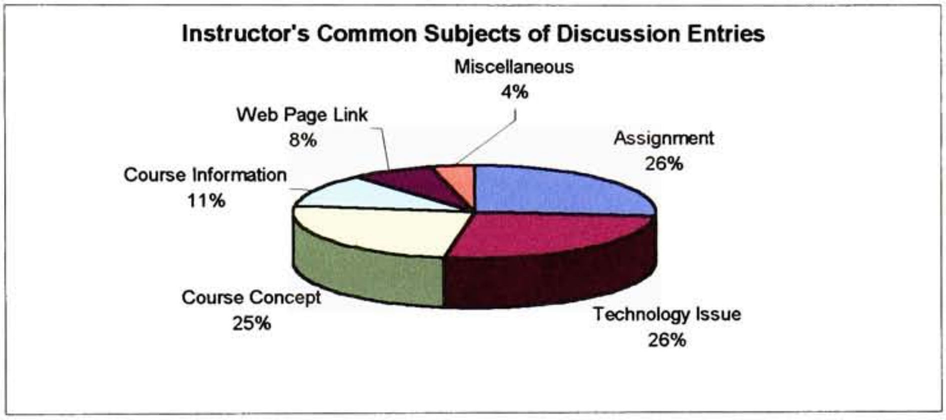
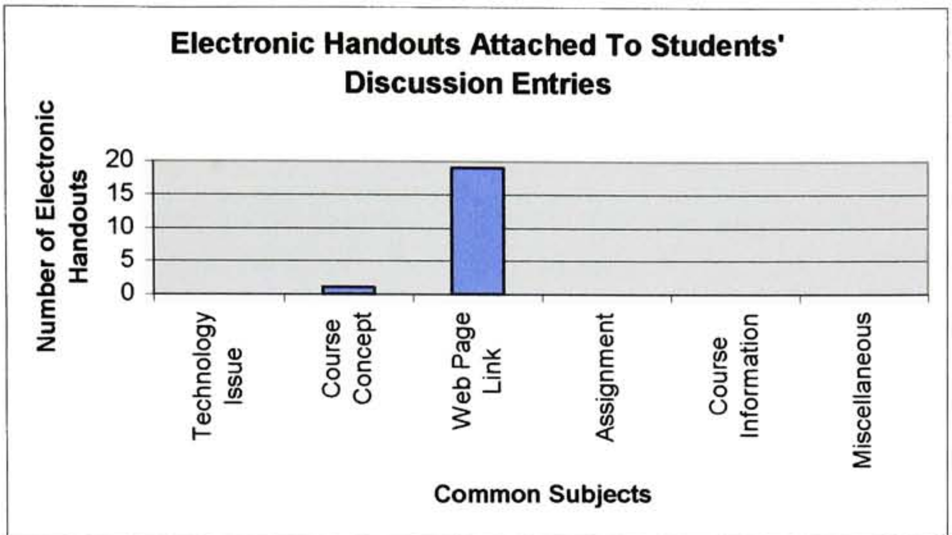


Figure 6.18 Out-of-class participation statistics – Part II



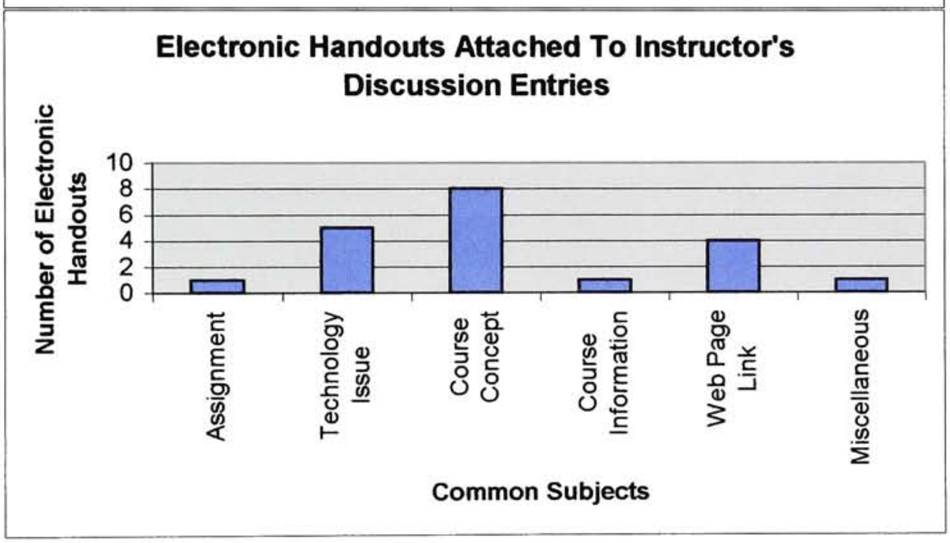


Figure 6.19 Out-of-class participation statistics – Part III

Analysis and Interpretation

Discussion entries involve course-related topics, including optional homework assignments, for which students and the instructor discuss current issues or clarify concepts. Electronic handouts are the file attachments of discussion entries or web page links in discussion entries.

Like chat session participation, out-of-class participation deteriorated rapidly after the first week. It sharply increased in the tenth week of the Fall Quarter mainly because students experienced technical difficulties in downloading the take-home final exam documents and other images from the First Class server. The instructor continued to post electronic handouts throughout the Fall Quarter, although her students' participation was minimal. The most common topics of electronic handouts were technology issues, web page links, and course concepts.

The main purpose of the discussion entries folder was to enhance the students' understanding of course concepts. Surprisingly, students and their instructor spent more time discussing technology issues (mainly technical difficulties) and assignments than course concepts.

Comparison Notes

Traditional Classroom	The total number of class hours per week was four. Students did not need additional out-of-class discussions because the instructor and students already covered a lot of course materials during classes.
Distance Learning	The total number of chat session hours per week was only two. Students, therefore, needed additional out-of-class discussions. However, these discussions did not seem to significantly help students and the instructor since out-of-class participation was fairly weak. The discussion entries also failed to satisfy the main purpose of the related folder, since almost half of the students' entries were related to technology issues/difficulties rather than course materials.

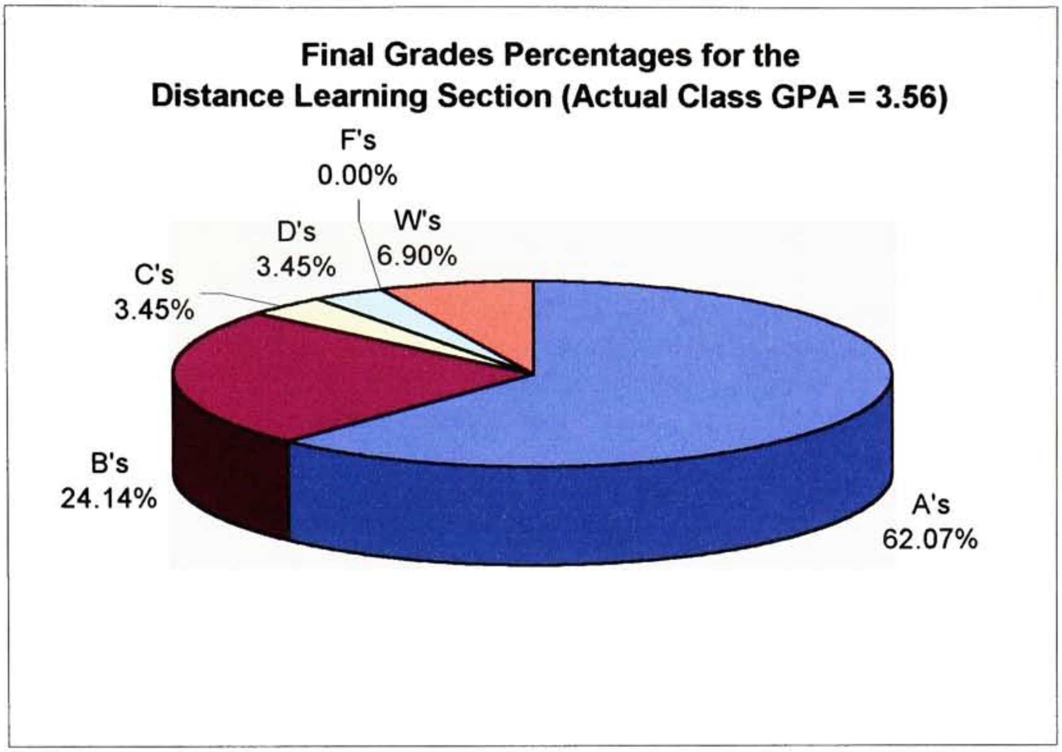


Figure 6.20 Final Grade Percentages for the Distance Learning Section
Credit: RIT for actual statistics

Analysis and Interpretation

RIT Student Population Average GPA's at the end of the Fall Quarter	
Year 1 students 2.72	Year 2 students 2.86
Year 3 students 2.96	Year 4 students 3.01
Year 5 students 3.02	Graduate students 3.53

Table 6.4 RIT Average GPA's at the end of the Fall Quarter 1999
Credit: Student Information System

The actual class GPA for final grades is above every year level's average GPA. The adjusted class GPA for final grades would be about the same as the actual class GPA because almost every student submitted all the assignments on time or early.

Comparison Notes

Traditional Classroom	The actual class GPA is 2.87 and almost exactly the same as the average GPA for all RIT 2nd year students (shown in Table 6.4). The students had good class attendance, but their poor submission statistics of homework assignments lowered the actual class GPA. If a student skipped a class, then he or she would lose all information from the lecture unless he or she contacted a classmate for notes. This could be a big problem because some exam questions were based on the lecture(s). Class attendance and work habits seemed to determine a traditional classroom student's final grade.
Distance Learning	The actual class GPA is 3.56 and very high compared to the average RIT Fall Quarter GPA's (shown in Table 6.4). It is surprising to see that the lack of out-of-class and chat session participation did not seem to affect the actual class GPA. However, the section entitled "Student Statistics Submissions for the Distance Learning Section" suggests that students already possessed excellent work habits in order to be very successful (i.e., to receive high grades) in this course (see pages 131 - 133). A student would lose nothing from missing a chat session because a chat session transcript was available in the discussion entries folder. He or she could read it anytime. The only decisive factor of a distance learning student's final grade appeared to be work habits.

Chapter 7

DATA COLLECTION – RIT INSTRUCTORS

7.1 Overview

The main focus of this chapter is to provide in-depth answers to the third principal question documented in Chapters 3 and 4.

How do traditional classroom and distance learning environments shape scaffolding and cognitive apprenticeship in RIT's distance learning and traditional classroom methods? Which education model (andragogy or pedagogy) is most closely matched with shaped scaffolding in each method?

The chapter presents data from RIT instructor interviews and questionnaires relating to scaffolding and cognitive apprenticeship in both the traditional classroom and distance learning environments (see Appendix D and E – Questionnaires For Instructors). It provides information about the instructors' general characteristics, learning viewpoint, teaching viewpoint, general tasks, and details of teaching styles.

Since this chapter only presents analyses and interpretations of results from RIT statistics and instructor surveys for both sections, the reader should refer to the section entitled "Limitations of the Study" in Chapter 11 for further details of procedures and actual happenings in my data collection.

7.2 Important Definitions and Related Data Collection/Analysis Techniques

<table>
<tr><td rowspan="6">Scaffolding</td><td>Definition</td></tr>
<tr><td>The teaching method used to help the learner to master his or her problem-solving (task) skills</td></tr>
<tr><td>Data Collection</td></tr>
<tr><td>General characteristics from questionnaire responses
Learning viewpoint from questionnaire responses
Teaching viewpoint from questionnaire responses
Details of teaching styles from interviews and observations</td></tr>
<tr><td>Final Analysis</td></tr>
<tr><td>Identification of specific teaching styles using the Staged Self-Directed Learning Model (SSDL)
Identification of each teaching environment as corresponding most closely to the andragogical or pedagogical model</td></tr>
</table>

Table 7.1 Details of Scaffolding

<table>
<tr><td rowspan="6">Cognitive Apprenticeship</td><td>Definition</td></tr>
<tr><td>The relationship between the guider and the learner in terms of developing new skills using real world experiences.</td></tr>
<tr><td>Data Collection</td></tr>
<tr><td>General characteristics from questionnaire responses
General tasks, including communication systems, from questionnaire responses
Details of teaching styles from interviews and observations</td></tr>
<tr><td>Final Analysis</td></tr>
<tr><td>Identification of specific interactions using the Staged Self-Directed Learning Model (SSDL)
Identification of each interacting environment as corresponding most closely to the andragogical or pedagogical model</td></tr>
</table>

Table 7.2 Details of Cognitive Apprenticeship

7.3 General Characteristics

7.3.1 Explanation of General Characteristics

Gender	Male or Female
Age Range (In Years)	25-40 or Over 40
Type of Instructor	Distance Learning, Traditional Classroom, or Both
Tenure Status	Part-time or Full-time
Tenure Length (In Years)	How long an instructor has been teaching at the college (0-5 or 6-10, or 11+)
Type of HS Education	Public or Private
College Education Level	B.S/B.A, M.S/M.A, or Doctorate
Type of College Education	Public or Private
Social Background	Who made decisions pertaining to education for an instructor when he or she was a student? Myself or my teachers and other people
Computer Literacy	Level of computer expertise Low, Medium, or High

Table 7.3 Explanations of General Characteristics

These general characteristics as a whole are usually significant influences in shaping an instructor's learning and teaching viewpoints.

7.3.2 Survey Results of Surveyed Class Instructors' General Characteristics

Section	Gender	Age Range	Type of Instructor	Tenure Status	Tenure Length (In Years)	Type of HS Education	College Education Level	Type of College Education	Social Background	Computer Literacy
Traditional Classroom	Male	Over 40	Both	Full-time	0-5	Public	M.S/M.A	Private	Myself	High
Distance Learning	Female	25-40	Distance Learning	Part-time	0-5	Public	M.S/M.A	Private	Myself	High

Table 7.4 Survey Results of Surveyed Class Instructors' General Characteristics

The results show that both instructors came from a very similar background. They are very independent, well-educated, computer-literate instructors, and they are among the newest RIT faculty members.

7.4 Learning Viewpoint

7.4.1 Explanation of Learning Viewpoint

The learning viewpoint is defined as the collection of different perspectives about the learning environment (self-concept, experience, readiness, time perspective, and orientation to learning).

Type	Operational definition
Self-concept	How much students depend on instructors in the range of a total dependent attitude to a total self-directed attitude.
Experience	How important students' life experiences are to the learning environment.
Readiness	Why students are ready to learn something new (biological development or social experiences).
Time perspective	Which is the best method for students to learn based on the readiness of students? Applications or facts? Both?
Orientation to learning	Which is the best classroom setting? Subject matter discussion or hands-on problem solving activities?

Table 7.5 Operational definitions of aspects of the learning viewpoint

Type	Related Question On The Questionnaire
Self-concept	Most of my students need _____ instruction and guidance from me. Constant Occasional Minimal
	"Constant" denotes a totally dependent attitude. "Occasional" denotes a mixed dependent and self-directed attitude. "Minimal" denotes an almost totally self-directed attitude.
Experience	My students' life experiences are ______ in developing their ability to learn. A very important factor Helpful, but not essential Not an important factor
	These choices dictate the importance of students' life experiences.
Readiness	I primarily consider my students' ______ in designing my teaching methods for a course. Biological development Social experiences
	Biological development means that students are expected to be ready to learn something new only because of their age and human development. Social experiences motivate students to learn something new regardless of age and human development.
Time perspective	My students learn the best by studying ____. Facts Applications Both
	"Facts" means rote learning (memorizing details). "Applications" means problem solving. "Both" is a combination of facts and related applications.
Orientation to learning	Which is more important to my students? Subject matter Problem solving
	Subject matter is information acquired primarily through topic discussions in the classroom or DL environment. Problem solving involves hands-on application activities.

Table 7.6 Related questions of aspects of the learning viewpoint

7.4.2 Survey Results of Surveyed Class Instructors' Learning Viewpoint

5th week

Section	Self-concept	Experience	Readiness	Time Perspective	Orientation to Learning
Traditional Classroom	Occasional	A very important factor	Biological development	Both	Subject matter and Problem Solving
Distance Learning	Occasional	A very important factor	Biological development	Both	Problem solving

9th week

Section	Self-concept	Experience	Readiness	Time Perspective	Orientation to Learning
Traditional Classroom	Minimal	A very important factor	Social experiences	Both	Subject matter (40%) and Problem Solving (60%)
Distance Learning	Occasional	Helpful, but not essential	Biological development	Both	Subject matter

Table 7.7 Survey Results of Surveyed Class Instructors' Learning Viewpoint
Note: Colors represent differences in the 5th and 9th week surveys.

Analysis And Interpretation

Self-concept

Matched education model

Section	5th Week	9th week
Traditional Classroom	Both pedagogy and andragogy	Andragogy
Distance Learning	Both pedagogy and andragogy	Both pedagogy and andragogy

Both instructors initially believed that their students sometimes depend on them for guidance and instructions, but the instructor from the traditional classroom section later realized that many of his students became more independent in doing assignments as the quarter progressed.

Experience

Matched education model

Section	5th Week	9th week
Traditional Classroom	Andragogy	Andragogy
Distance Learning	Andragogy	Both pedagogy and andragogy

Both instructors felt that their students' life experiences were important as tools of learning in the beginning of the Fall Quarter, but the instructor from the distance learning section decided that her students' life experiences are not as critical in the learning environment at the end of quarter. Her students' overall declining participation appeared to influence her opinion.

Readiness

Matched education model

Section	5th Week	9th week
Traditional Classroom	Pedagogy	Andragogy
Distance Learning	Pedagogy	Pedagogy

Both instructors at first believed that students' biological development is more important than social experiences in designing the educational system, but the instructor from the traditional classroom section later perceived that students' social experiences should be considered more in structuring the educational system rather than just relying on biological development.

Time Perspective

Matched education model

Section	5th Week	9th week
Traditional Classroom	Both Pedagogy and Andragogy	Both Pedagogy and Andragogy
Distance Learning	Both Pedagogy and Andragogy	Both Pedagogy and Andragogy

Both instructors agreed in both the 5th and 9th week surveys that their students should be given a combination of facts and applications in the learning environment.

Orientation to Learning

Matched education model

Section	5th Week	9th week
Traditional Classroom	Both Pedagogy and Andragogy	Both Pedagogy and Andragogy
Distance Learning	Andragogy	Pedagogy

The instructor from the traditional classroom section consistently indicated that his students appreciate both problem solving activities and subject matter discussions. However, the instructor from the distance learning section changed her opinion between the two surveys, indicating that she felt her students prefer subject matter discussions rather than problem solving activities at the end of the Fall Quarter.

7.5 Teaching Viewpoint

7.5.1 Explanation of Teaching Viewpoint

The teaching viewpoint is defined as the collection of different perspectives that influences instructors' development of a teaching environment (climate, planning, diagnosis of needs, formulation of objectives, design, activities, and evaluation).

Type	Operational definition
Climate	The intensity of the classroom setting (formal and authoritative, or informal and respectful)
Planning	Who does planning, diagnosis of needs, and formulation of objectives? Instructor, students, or both?
Diagnosis of needs	
Formulation of objectives	
Design	What will the course emphasize? Subject matter discussion, problem solving activities, or both?
Activities	How should activities be completed? Using the instructor's techniques, students' experimental techniques, or both?
Evaluation	Who completes the course evaluation(s)? Instructor, students, or both?

Table 7.8 Operational definitions of aspects of the teaching viewpoint

Type	Related Question On The Questionnaire
Climate	The learning climate for my courses is generally _______. Formal and controlled entirely by me Informal with instructor/student sharing of responsibilities
	The first choice means that an instructor is authoritative in enforcing rules and choosing teaching methods for his or her courses. The second choice indicates that students and an instructor share their responsibilities for structuring the learning environment.
Planning Diagnosis of needs Formulation of objectives Evaluation	____________ should be responsible for course... ... objectives formulation. ... structure planning. ... student needs assessment. ... effectiveness evaluations.
	The choices are the students, the instructor, or both.
Design	_____ should be emphasized in college courses. Subject matter discussions Problem solving activities Both
	The choices denote instructors' preferences for including subject matter discussions, problem solving activities, or both to provide the best learning environment for RIT students.
Activities	Course activities should use _________. Instructor's techniques Students' experimental techniques Both
	The choices indicate whether the instructors feel that instructor's techniques, students' experimental techniques, or both provide the best means of completing course activities.

Table 7.9 Related questions of aspects of the teaching viewpoint

7.5.2 Survey Results of Surveyed Class Instructors' Teaching Viewpoint

5th week

Section	Climate	Formulation of objectives	Planning	Diagnosis of needs	Evaluation	Design	Activities
Traditional Classroom	Informal with instructor/student sharing of responsibilities	The instructor	The instructor	The instructor and students	The instructor and students	Both	Instructor's techniques
Distance Learning	Informal with instructor/student sharing of responsibilities	The instructor	The instructor and students	The instructor and students	The instructor and students	Both	Both

9th week

Section	Climate	Formulation of objectives	Planning	Diagnosis of needs	Evaluation	Design	Activities
Traditional Classroom	Informal with instructor/student sharing of responsibilities	The instructor	The instructor	The instructor and students	The instructor and students	Both	Both
Distance Learning	Formal and controlled entirely by me	The instructor	The instructor	The instructor and students	The instructor and students	Both	Both

Table 7.10 Survey Results of Surveyed Class Instructors' Teaching Viewpoint
Note: Colors represent differences in the 5th and 9th week surveys.

Analysis And Interpretation

Climate

Matched education model

Section	5th Week	9th week
Traditional Classroom	Andragogy	Andragogy
Distance Learning	Andragogy	Pedagogy

Both instructors indicated preference for an informal setting with sharing of responsibilities with their students at the beginning of the Fall Quarter, but the instructor from the distance learning section later became more authoritative in her preference for developing course rules and teaching methods. Again, this change could have been precipitated at least in part by the distance learning students' declining class participation throughout the quarter.

Course responsibilities (formulation of objectives, planning, diagnosis of needs, evaluation)

Note: The weights of pedagogy and andragogy are averages of the four course responsibilities using the data from charts shown on pages 159 and 160.

Matched education model

Section	5th Week	9th week
Traditional Classroom	Pedagogy (62.5) Andragogy (37.5)	Pedagogy (62.5) Andragogy (37.5)
Distance Learning	Pedagogy (56.25) Andragogy (43.75)	Pedagogy (62.5) Andragogy (37.5)

The traditional classroom instructor consistently felt that he should have more course responsibilities than his students during the entire Fall Quarter. The distance learning instructor increased her course responsibilities somewhat as her course progressed. For instance, she let her students be involved with course planning at first, but then she assumed all planning responsibilities for her course by the end of the Fall Quarter.

Design

Matched education model

Section	5th Week	9th week
Traditional Classroom	Both Pedagogy and Andragogy	Both Pedagogy and Andragogy
Distance Learning	Both Pedagogy and Andragogy	Both Pedagogy and Andragogy

Both instructors consistently expressed their preference for including both subject matter discussions and problem solving activities into their courses.

Activities

Matched education model

Section	5th Week	9th week
Traditional Classroom	Pedagogy	Both Pedagogy and Andragogy
Distance Learning	Both Pedagogy and Andragogy	Both Pedagogy and Andragogy

The distance learning instructor felt that her students should be allowed to do their assignments using her techniques as well as their own experimental techniques. The traditional classroom instructor initially indicated that his students should follow his techniques for doing their assignments, but he later expressed a preference for allowing them to employ both his techniques and their experimental techniques.

7.6 Comprehensive Analysis and Summary of Surveyed Class Instructors' Survey Results

7.6.1 Comprehensive Calculation and Analysis of Surveyed Class Instructors' Survey Results

Basic Formula

Count (CT)	Number of responses*	Σ	Sum
Assigned Weight of Pedagogy (AWP)	Intensity of pedagogy	n	nth item
Average Weight (AW)	$\Sigma (CT_n \times AWP_n) / \Sigma (CT)$		
Pedagogy	(AW)		
Andragogy	100 - (AW)		
Overall Average	Average of All Average Weights		

Note: 75 is the highest weight for intensity of pedagogy and 25 is the lowest weight. These weights are arbitrary numbers assigned only for analytical purposes in helping to identify patterns in the survey results (i.e., the weights are not intended to be totally objective measures of the survey results, and their mathematical validity and reliability are therefore still to be determined through further study beyond the scope of this thesis). n means a sequence of responses to a question on the questionnaire. For example, n = 1, 2, 3…

*The number of responses is one because there is only one response to each question in both the traditional classroom and distance learning environments.

Lookup Teaching Style Table based on the Staged Self-Directed Learning Model (SSDL)

Teaching Style	Pedagogy Weight
Authority, Coach	62.5 or higher
Motivator, Guide	50 - 62.4
Facilitator	37.5 - 49.9
Consultant, Delegator	37.4 or lower

Interval for each teaching style = 12.4

Note: Interval is calculated as the difference between the highest weight for intensity of pedagogy and the lowest weight for intensity of pedagogy divided by the number of learning styles. As with the assigned weights, each interval is an arbitrary value used only for analytical purposes in helping to identify and classify survey result patterns. The interval values believed to be appropriate for this purpose (to aid in analyzing patterns) were determined after my research was completed, and their mathematical validity and reliability are still to be determined through further study beyond the scope of this thesis.

Analysis of Learning Viewpoint

Traditional Classroom	5th week	9th week	Assigned Weight Of Pedagogy	5th week Pedagogy	5th week Andragogy	9th week Pedagogy	9th week Andragogy
Self-concept							
Constant	0	0	75	0		0	
Occasional	1	0	50	50		0	
Minimal	0	1	25	0		25	
			Average Weight	50.0	50.0	25.0	75.0
Experience							
A very important factor	1	1	25	25		25	
Helpful, but not essential	0	0	50	0		0	
Not an important factor	0	0	75	0		0	
			Average Weight	25.0	75.0	25.0	75.0
Readiness							
Biological development	1	0	75	75		0	
Social experiences	0	1	25	0		25	
			Average Weight	75.0	25.0	25.0	75.0
Time perspective							
Facts	0	0	75	0		0	
Applications	0	0	25	0		0	
Both	1	1	50	50		50	
			Average Weight	50.0	50.0	50.0	50.0
Orientation to Learning							
Subject matter	0	0.4	75	0		30	
Problem solving	0	0.6	25	0		15	
Both	1	0	50	50		0	
			Average Weight	50.0	50.0	45.0	55.0
			Overall Average	50.0	50.0	34.0	66.0
			Learning Viewpoint	Motivator, Guide		Consultant, Delegator	

Distance Learning	5th week	9th week	Assigned Weight Of Pedagogy	5th week Pedagogy	5th week Andragogy	9th week Pedagogy	9th week Andragogy
Self-concept							
Constant	0	0	75	0		0	
Occasional	1	1	50	50		50	
Minimal	0	0	25	0		0	
			Average Weight	50.0	50.0	50.0	50.0
Experience							
A very important factor	1	0	25	25		0	
Helpful, but not essential	0	1	50	0		50	
Not an important factor	0	0	75	0		0	
			Average Weight	25.0	75.0	50.0	50.0
Readiness							
Biological development	1	1	75	75		75	
Social experiences	0	0	25	0		0	
			Average Weight	75.0	25.0	75.0	25.0
Time perspective							
Facts	0	0	75	0		0	
Applications	0	0	25	0		0	
Both	1	1	50	50		50	
			Average Weight	50.0	50.0	50.0	50.0
Orientation to Learning							
Subject matter	0	1	75	0		75	
Problem solving	1	0	25	25		0	
			Average Weight	25.0	75.0	75.0	25.0
			Overall Average	45.0	55.0	60.0	40.0
			Learning Viewpoint	Facilitator		Motivator, Guide (Almost Authority, Coach)	

Analysis of Teaching Viewpoint

Traditional Classroom	5th week	9th week	Assigned Weight Of Pedagogy	5th week Pedagogy	5th week Andragogy	9th week Pedagogy	9th week Andragogy
Climate							
Formal	0	0	75	0		0	
Informal	1	1	25	25		25	
			Average Weight	25.0	75.0	25.0	75.0
Formulation of objectives							
The instructor	1	1	75	75		75	
The students	0	0	25	0		0	
The instructor and students	0	0	50	0		0	
			Average Weight	75.0	25.0	75.0	25.0
Planning							
The instructor	1	1	75	75		75	
The students	0	0	25	0		0	
The instructor and students	0	0	50	0		0	
			Average Weight	75.0	25.0	75.0	25.0
Diagnosis of needs							
The instructor	0	0	75	0		0	
The students	0	0	25	0		0	
The instructor and students	1	1	50	50		50	
			Average Weight	50.0	50.0	50.0	50.0
Evaluation							
The instructor	0	0	75	0		0	
The students	0	0	25	0		0	
The instructor and students	1	1	50	50		50	
			Average Weight	50.0	50.0	50.0	50.0
Design							
Subject matter discussions	0	0	75	0		0	
Problem solving activities	0	0	25	0		0	
Both	1	1	50	50		50	
			Average Weight	50.0	50.0	50.0	50.0
Activities							
Instructor's techniques	1	0	75	75		0	
Students' experimental techniques	0	0	25	0		0	
Both	0	1	50	0		50	
			Average Weight	75.0	25.0	50.0	50.0
			Overall Average	57.1	42.9	53.6	46.4
			Teaching Viewpoint	Motivator, Guide		Motivator, Guide	

Distance Learning

	5th week	9th week	Assigned Weight Of Pedagogy	5th week Pedagogy	5th week Andragogy	9th week Pedagogy	9th week Andragogy
Climate							
Formal	0	1	75	0		75	
Informal	1	0	25	25		0	
			Average Weight	25.0	75.0	75.0	25.0
Formulation of objectives							
The instructor	1	1	75	75		75	
The students	0	0	25	0		0	
The instructor and students	0	0	50	0		0	
			Average Weight	75.0	25.0	75.0	25.0
Planning							
The instructor	0	1	75	0		75	
The students	0	0	25	0		0	
The instructor and students	1	0	50	50		0	
			Average Weight	50.0	50.0	75.0	25.0
Diagnosis of needs							
The instructor	0	0	75	0		0	
The students	0	0	25	0		0	
The instructor and students	1	1	50	50		50	
			Average Weight	50.0	50.0	50.0	50.0
Evaluation							
The instructor	0	0	75	0		0	
The students	0	0	25	0		0	
The instructor and students	1	1	50	50		50	
			Average Weight	50.0	50.0	50.0	50.0
Design							
Subject matter discussions	0	0	75	0		0	
Problem solving activities	0	0	25	0		0	
Both	1	1	50	50		50	
			Average Weight	50.0	50.0	50.0	50.0
Activities							
Instructor's techniques	0	0	75	0		0	
Students' experimental techniques	0	0	25	0		0	
Both	1	1	50	50		50	
			Average Weight	50.0	50.0	50.0	50.0
			Overall Average	50.0	50.0	60.7	39.3
			Teaching Viewpoint	Motivator, Guide (Almost Facilitator)		Motivator, Guide (Almost Authority, Coach)	

7.6.2 Comprehensive Summary of Surveyed Class Instructors' Survey Results

Comprehensive Summaries of Learning and Teaching Viewpoints

Type	5th week				9th week			
	Traditional Classroom		Distance Learning		Traditional Classroom		Distance Learning	
	P	A	P	A	P	A	P	A
Self-concept	50	50	50	50	25	75	50	50
Experience	25	75	25	75	25	75	50	50
Readiness	75	25	75	25	25	75	75	25
Time perspective	50	50	50	50	50	50	50	50
Orientation to learning	50	50	25	75	45	55	75	25
Overall Preference (Average)	**50**	**50**	**45**	**55**	**34**	**66**	**60**	**40**
Teaching Style	**Motivator, Guide***		**Facilitator**		**Consultant, Delegator**		**Motivator, Guide****	

Table 7.11 Comprehensive Summary of Learning Viewpoint.
Note: P = Pedagogy and A = Andragogy

Type	5th week				9th week			
	Traditional Classroom		Distance Learning		Traditional Classroom		Distance Learning	
	P	A	P	A	P	A	P	A
Climate	25	75	25	75	25	75	75	25
Formulation of objectives	75	25	75	25	75	25	75	25
Planning	75	25	50	50	75	25	75	25
Diagnosis of needs	50	50	50	50	50	50	50	50
Evaluation	50	50	50	50	50	50	50	50
Design	50	50	50	50	50	50	50	50
Activities	75	25	50	50	50	50	50	50
Overall Preference (Average)	**57.1**	**42.9**	**50**	**50**	**53.6**	**46.4**	**60.7**	**39.3**
Teaching Style	**Motivator, Guide**		**Motivator, Guide***		**Motivator, Guide**		**Motivator, Guide****	

Table 7.12 Comprehensive Summary of Teaching Viewpoint.
Note: P = Pedagogy and A = Andragogy

*It is the near the borderline of the "Facilitator" teaching style.
**It is near the borderline of the "Authority, Coach" teaching style.

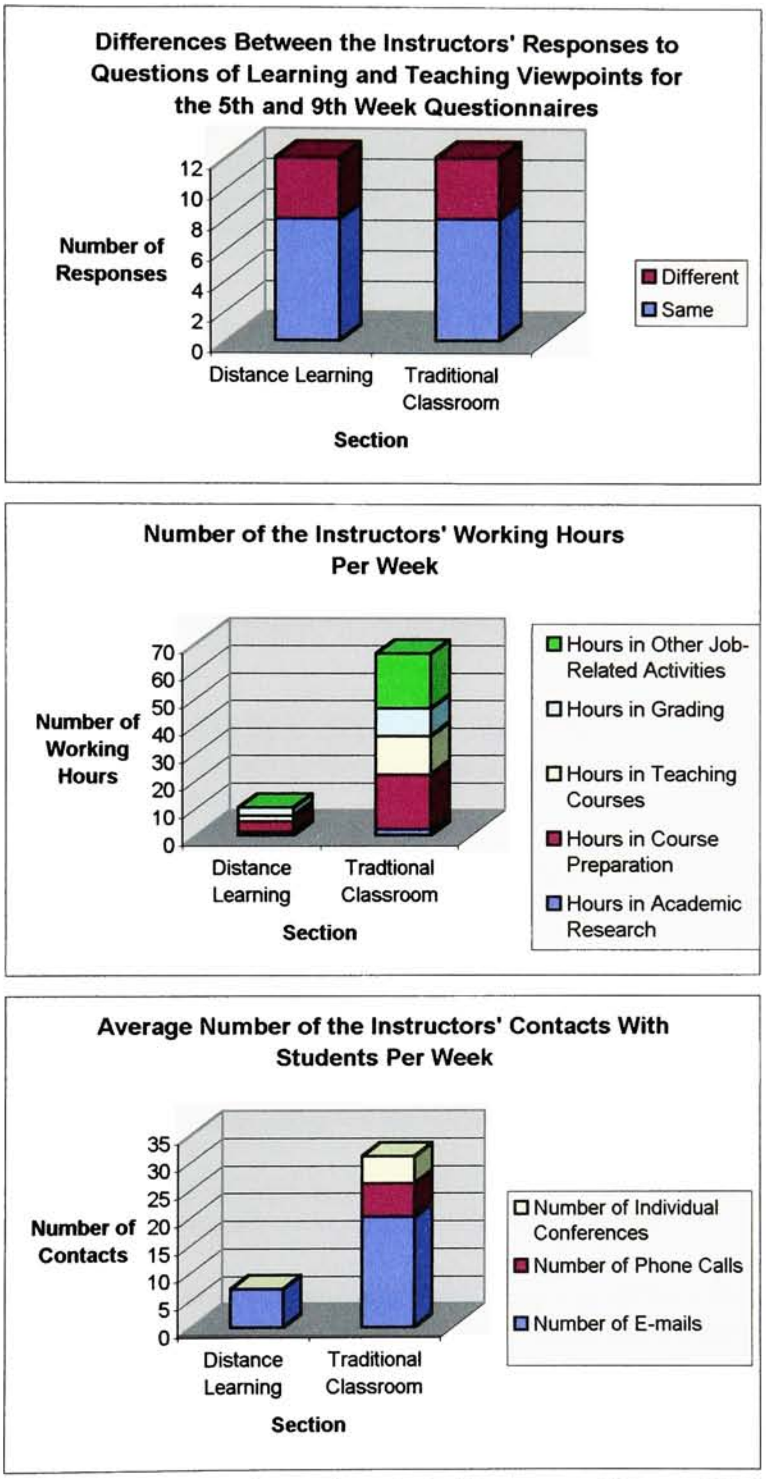


Figure 7.1 Summaries of Questionnaire Differences and General Tasks

Interview Information and Interpretation/Analysis of the Instructors' Summary Results

The instructors seemed to be impacted in similar ways, although the cultural tools (Information Technology, learning resources, and communication technologies) of both environments were different. Both of them changed four of their responses pertaining to learning and teaching viewpoints between the first and second questionnaires. Their viewpoints may have been influenced in part by RIT administrative guidelines stating that each instructor is responsible for "course content, course goals/objectives, course environment (materials selection and preparation), and course grades".

Traditional Classroom Section

The instructor used principles of the "motivator, guide" teaching style and the pedagogical model in his course throughout the Fall Quarter. The environment was strongly teacher-centered at first, as evidenced by long lectures, use of a large number of words and diagrams on the white markerboard, a fairly low number of students' questions and comments, and formal requirements for completing assignments. However, the instructor gave his students freedom to choose one of four final project topics and adopted more of a "facilitator" teaching style at the end of the Fall Quarter (see Chapter 6).

What were the main factors considered in designing the course syllabus for the traditional classroom section?

The instructor developed the course syllabus, which consisted of the standard content required by his academic department and his own content (videotapes and additional information) based on his personal experiences as well as hobbies.

Many teachers now use the PowerPoint slides for their lectures in the traditional classroom section. Why did not the instructor use the PowerPoint slides for his lectures?

"I generally do not use 'canned' lecture material. The course becomes too stale after a while. I like freeform lectures that invoke lots of discussion and questions."

The instructor wrote countless words and drew numerous diagrams on the white markerboard. What was his favorite color for the marker pen? Why?

Blue was his favorite color because it "[did not] evoke certain [negative] emotions, like using red [marker pen]. Black [marker pen] leaves a mess on the white markerboard."

The instructor tended to write or draw on the left or the center of the white markerboard. Why did he rarely write or draw anything on the right of the white markerboard?

"I start closest to the podium, which connects the material to the lecturer. Then, as I needed more space, I moved away further."

The instructor almost never brought his lecture notes or course textbooks to the classroom. How was he able to deliver information from his head in an organized, structured manner without referring to his lecture notes or course textbooks?

"This is one course where I have had <u>much</u> lifetime experience."

All of his answers in my interview appear to match with a typical "motivator, guide" instructor's perspectives. Providing sufficient and clear instructions to every student is one of the "motivator, guide" instructor's top priorities. Freeform lectures, unlike the PowerPoint slides, are an efficient way to control the flow and amount of instructions in every class. Knowledge of an appropriate marker pen, specific standing positions, and presentations based on life experiences also contribute greatly to the delivery of suitable materials to a class.

Based on his questionnaire responses, the instructor shifted from the "motivator, guide" to the "consultant, delegator" learning viewpoint, and from the "motivator, guide" toward the "facilitator" teaching principles, as the quarter progressed. This indicates that he believed his students were becoming more competent and self-directed in completing course activities.

How did he feel about class participation, students' motivation, and students' learning in this course?

"This was a great section! There seemed to be <u>lots</u> of interest in hardware. Most people in this section had minimal hardware experience."

Class participation was generally very good during the whole Fall Quarter. The students became more active in raising questions and comments in the second half of this quarter. Almost every student excelled in the final project with minimal help or guidance required from the instructor (see Chapter 6). I observed that many students also became very enthusiastic when they had the opportunity to play with computer hardware during the classes.

The last two graphs on page 162 illustrate that the "cognitive apprenticeship" relationship was quite strong in the traditional classroom section. The instructor had no significant problems communicating with his students regularly via phone calls, e-mails, and individual conferences because he is a full-time professor who works at RIT for about 70 hours per week. He spends most of his time preparing and teaching courses so he obviously has a strong interest in helping his students to develop their technical skills. This is consistent with the "motivator, guide" instructor, who is supposed to optimize cognitive apprenticeship through frequent contacts with students.

In conclusion, good class participation and strong student motivation were among the primarily factors which precipitated a change in the instructor's learning viewpoint from pedagogy to andragogy. As the quarter progressed, the instructor began to observe that many students could do their assignments using both the instructor's techniques and their experimental techniques very independently.

<u>Distance Learning Section</u>

The instructor used principles of both pedagogical and andragogical models in her course at the beginning of the Fall Quarter. However, she became more authoritative, pedagogical, and formal in her learning viewpoint and teaching methods as the course progressed. Declining chat session and out-of-class participation, an increasing instructor-to-students participation ratio in chat sessions, and a higher number of assignments were clear indications of her changing teaching style (see Chapter 6).

What were the main factors considered in designing the course syllabus for the distance learning section?

"I had a number of syllabuses from other professors who taught the course. I used those as a guide, but I did not copy any of them verbatim. [Like the instructor from the traditional classroom section, I] mixed their ideas with my own. I also relied on my experiences as an IT professional for designing the course and choosing which components were most important. Unfortunately, I did not get to pick the textbooks for the course because I was hired too late. I liked one of the textbooks but hated the other. That made it tough. I had to rely a little more on specific web sites than I originally planned."

How much time per week did the instructor spend time in finding electronic handouts from the World Wide Web? How much time per week did she spend designing her study guide, project description, and course notes?

"I probably spent 4 – 5 hours per week preparing for the upcoming week. The study guide was easy. The lengthy part was the course notes that I prepared for myself. I then cut and paste the course notes into the chats. I had a couple of standard web sites that I used to prepare the notes. I did not use the notes the first two weeks and <u>noticed that the discussions were not going the way I planned, mainly because students had not prepared before the chats. So I decided to use the chat as more of a lecture by preparing notes ahead of time. This keeps the chats flowing smoothly as well as getting to topics not covered by the texts.</u>

In addition, this is one subject that changes constantly I wanted to be as up-to-date as possible. I routinely buy server hardware so I know how important it is to keep up with changes. The only way to keep up with change is the web and the easiest way to present the new information is to organize it ahead of time in notes."

Why did not the instructor set up the Audio Bridge conferences?

"I reserved two time slots on the phone bridge before the quarter began in case I wanted to use them. Because of the time difference, I needed to make sure that I got good times. [Note: She lives in the Pacific Time Zone.] I only intended to use them if there were no hearing-impaired students. There is one hearing impaired student in the class so I never used the phone bridge. …"

Was the instructor satisfied with student participation in the "Discussion Areas" conference folder and online chat sessions? Why or why not? If not, how could she try to improve participation of distance learning students in her future courses?

"The discussion area was not used as much as I anticipated. I think the main reason for this is the 2 weekly chats [they] have. A second reason is the fact that I did not require a certain amount of participation. I think that I need to pose questions in the discussion area in order to [stimulate] conversation. However, I simply did not have the time to do that this quarter. Grading the projects and preparing the notes took most of my time. I am fairly satisfied with the participation in the chats though. I wish more students would attend (a little more than half of the class usually attends) but otherwise I think that they go well. It was obvious that most of them [students] had not read the assignments before the chats and were not able to ask more complex questions."

The instructor and her students experienced several challenges in discussing math problems in the chat sessions and the "Discussions Areas" conference folder at the beginning of the quarter. Did her students do very well on topics such as binary arithmetic and digital logic? Why or why not? If not, how could she try to improve distance learning students' performance in math for future courses?

"Since this was my first time teaching the subject, not [to] mention teaching it [in] distance learning, I was still too green when they did the binary logic units to know how to teach it more effectively. Making it even more difficult was the fact that I could not display the questions the way I wanted due to the text limitation of [the First Class software]. I have prepared better notes for next quarter and I have some .bmp samples for the students to download. Overall, most of the students did very well on the binary project."

Comparing examples of displaying math instructions in the traditional classroom and distance learning environments

Traditional Classroom Markerboard

$$6^2 = 36$$

$$\sqrt{36} = 6$$

Truth Table

TRUE AND TRUE	TRUE
TRUE AND FALSE	FALSE
FALSE AND TRUE	FALSE
FALSE AND FALSE	FALSE

Distance Learning First Class Chat Session

Instructor: 6 ^ 2 = 36
Instructor: The square root of 36 is equal to 6.
Instructor: Here's the truth table.
Instructor: TRUE AND TRUE = TRUE
Instructor: TRUE AND FALSE = FALSE
Instructor: FALSE AND TRUE = FALSE
Instructor: FALSE AND FALSE = FALSE

Unlike the traditional classroom section, the last two graphs on page 162 show weak cognitive apprenticeship in the distance learning section. The instructor only occasionally communicated with her students, with obstacles including her part-time tenure status and the remote learning environment.

Lack of contacts with her students, weak out-of-class participation, declining chat session participation, technical limits of the First Class software, and limited time for doing course-related tasks due to her part-time status led to the major shift in the instructor's teaching style from andragogy to pedagogy throughout the Fall Quarter. This change of teaching style and these difficulties hindered the accomplishment of a distance learning environment's goals. The case study in this section therefore leads to the conclusion that educators and students first need to identify and devise ways to overcome the limitations of the distance learning environment (technical difficulties, communication challenges, etc.) before they can apply self-directing principles that are so important in trying to achieve a successful transition from pedagogical to andragogical education systems.

Chapter 8

DATA COLLECTION – RIT STUDENTS

8.1 Overview

The main focus of this chapter is to provide in-depth answers to the fourth principal question documented in Chapters 3 and 4.

How do traditional classroom and distance learning environments shape RIT students' epistemological beliefs and their learning styles (dependent to self-directing) in distance learning and traditional classroom methods under the categories of cognitive apprenticeship and assisted learning? Which education model (andragogy or pedagogy) do most students prefer?

The chapter presents data from questionnaires completed by RIT students in both sections of the surveyed course (see Appendix F and G – Questionnaires For RIT Students). The first part consists of statistics related to the entire surveyed course sections, including general characteristics, success rates, summary details, and relationships. The second part describes the students' general characteristics, epistemological beliefs, learning styles, and preferred learning sites as determined from the questionnaire responses and their success rates. The students' overall learning style from the Staged Self-Directed Learning Model (SSDL) and their overall learning preference (andragogy or pedagogy) are also identified for each section of the surveyed course.

Since this chapter only presents analyses and interpretations of results from RIT statistics and student surveys for both sections, the reader should refer to the section entitled "Limitations of the Study" in Chapter 11 for further details of procedures and actual happenings in my data collection.

8.2 Important Definitions and Related Data Collection/Analysis Techniques

Cognitive Apprenticeship	**Definition**
	The relationship between the guider and the learner in terms of developing new skills using real world experiences.
	Data Collection
	• General characteristics from questionnaire responses • Epistemological beliefs from questionnaire responses • Communication methods from questionnaire responses • Learning sites from questionnaire responses • RIT statistics and other data for the entire course sections
	Final Analysis
	• Identification of specific student/instructor interactions using the Staged Self-Directed Learning Model (SSDL) • Identification of each interacting preference as corresponding most closely to the andragogical or pedagogical model

Table 8.1 Details of Cognitive Apprenticeship

Assisted Learning	**Definition**
	Any way of helping the student to learn something new.
	Data Collection
	• General characteristics from questionnaire responses • Epistemological beliefs from questionnaire responses • Work and study habits from questionnaire responses • Learning sites from questionnaire responses • RIT statistics and other data for the entire surveyed course sections
	Final Analysis
	• Identification of specific learning styles using the Staged Self-Directed Learning Model (SSDL) • Identification of each learning preference as corresponding most closely to the andragogical or pedagogical model

Table 8.2 Details of Assisted Learning

8.3 General Characteristics and Success Rates of All Students in the Surveyed Sections

The following data, which was provided by the RIT Institutional Research Center, describe the general student characteristics and success rates for both the entire traditional classroom and distance learning sections. Three data items (type of HS education, verbal SAT scores, and math SAT scores) are incomplete because CEEB (College Entrance Examination Board) codes and SAT scores are not available and/or applicable for every student.

8.3.1 Explanation of General Characteristics and Success Rates

Type	Definition
Gender	Male or Female
Age Range (In Years)	Under 21, 21 – 25, or Over 25
Majors	Information Technology or Other Majors
Origin	Original Residence (American or International)
Student Status	Part-time or Full-time
College Year Level	Freshmen, Sophomore, Junior, Senior, Graduate*
Type of HS Education	Public or Private
Verbal SAT Scores	200 – 800 (Performance Score)
Math SAT Scores	200 – 800 (Performance Score)
Cumulative GPA	Cumulative College Grade Point Average
Final Grades	A, B, C, D, F, or W

Table 8.3 Definitions related to all students' general characteristics and success rates in the surveyed sections

*Some graduate students took this undergraduate course as one of the three bridge courses for their graduate level majors.

8.3.2 Summary Graphs of All Students in the Surveyed Sections

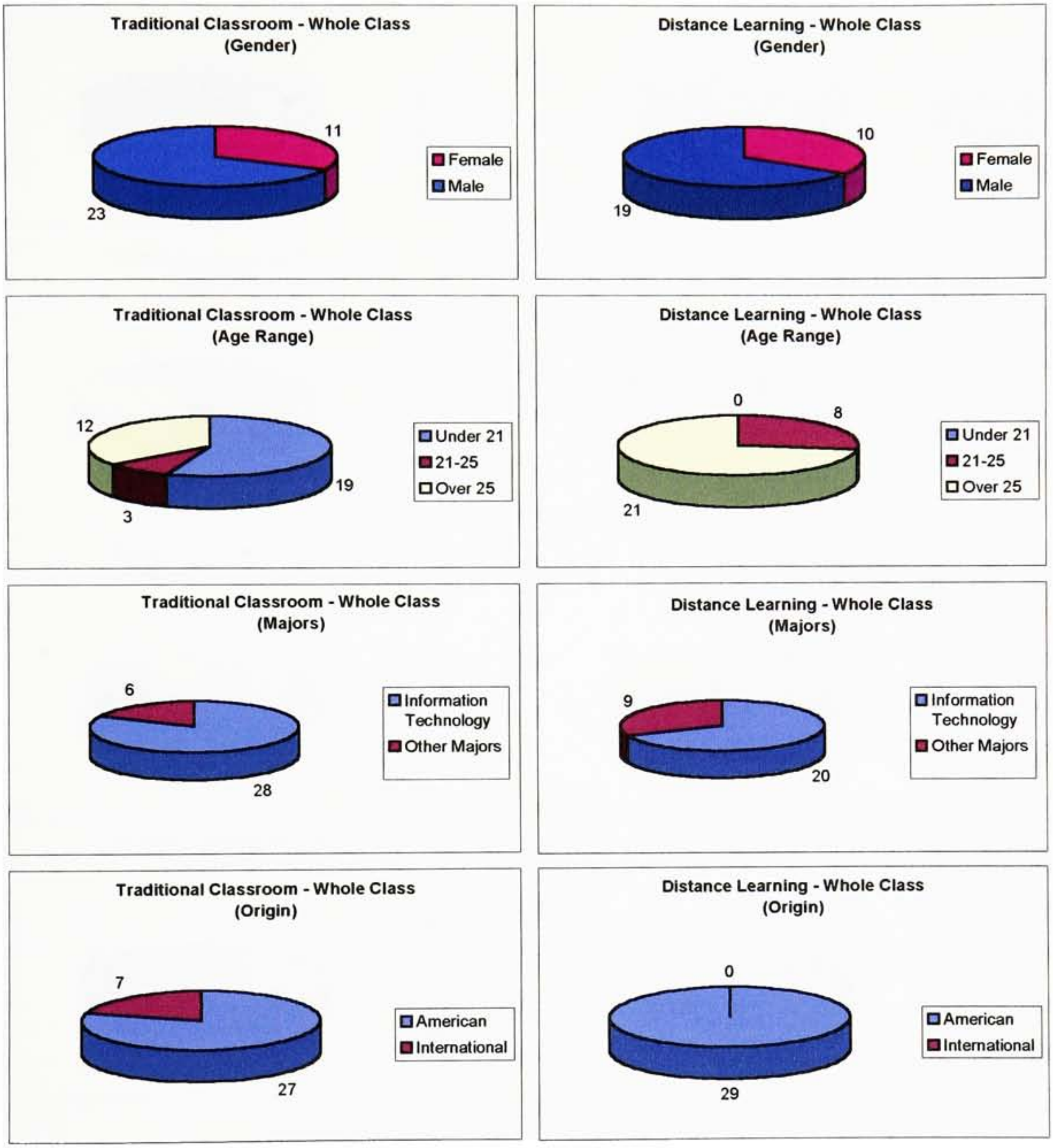


Figure 8.1 Summary Graphs of Whole Classes – Part I

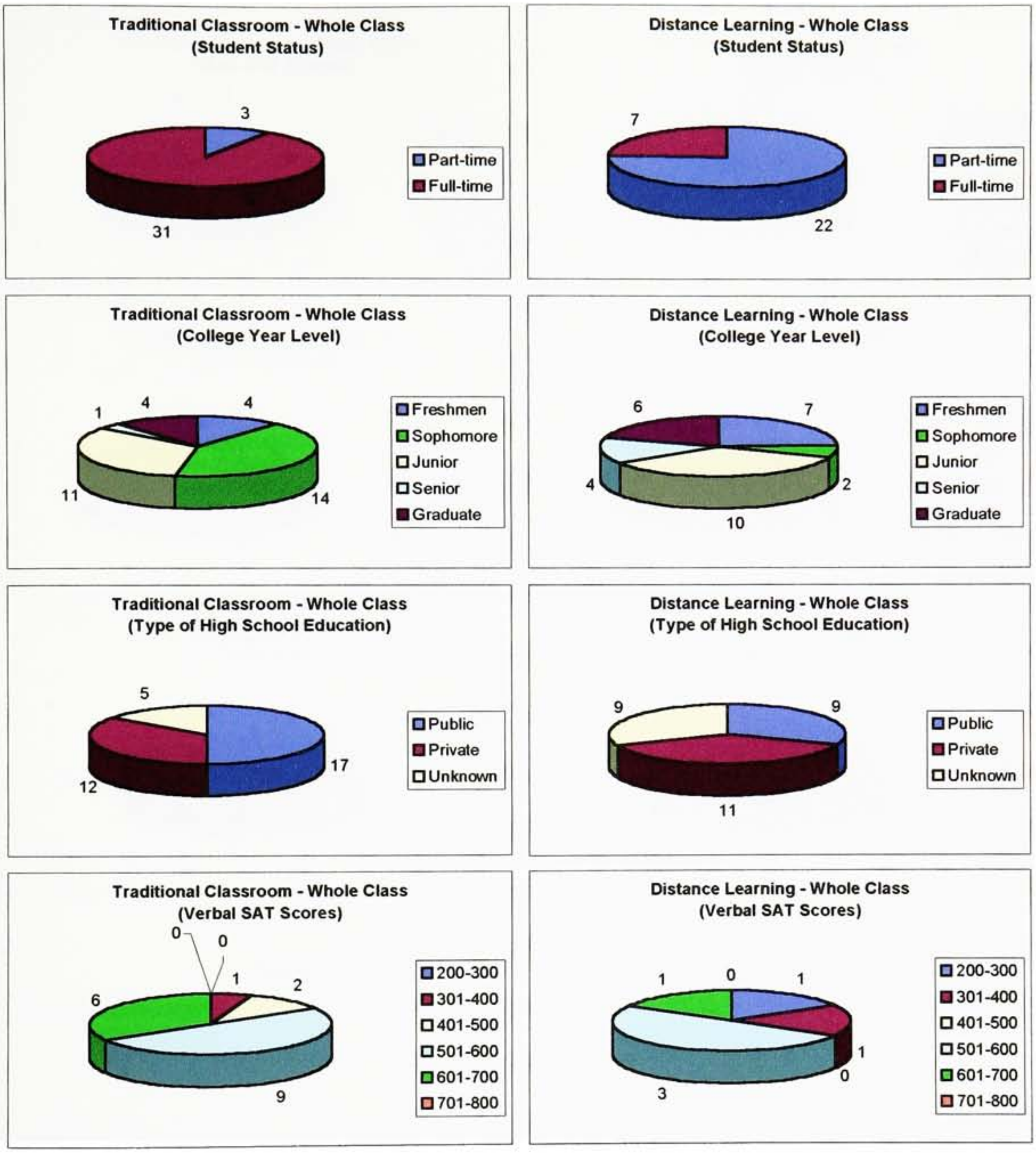


Figure 8.2 Summary Graphs of Whole Classes – Part II

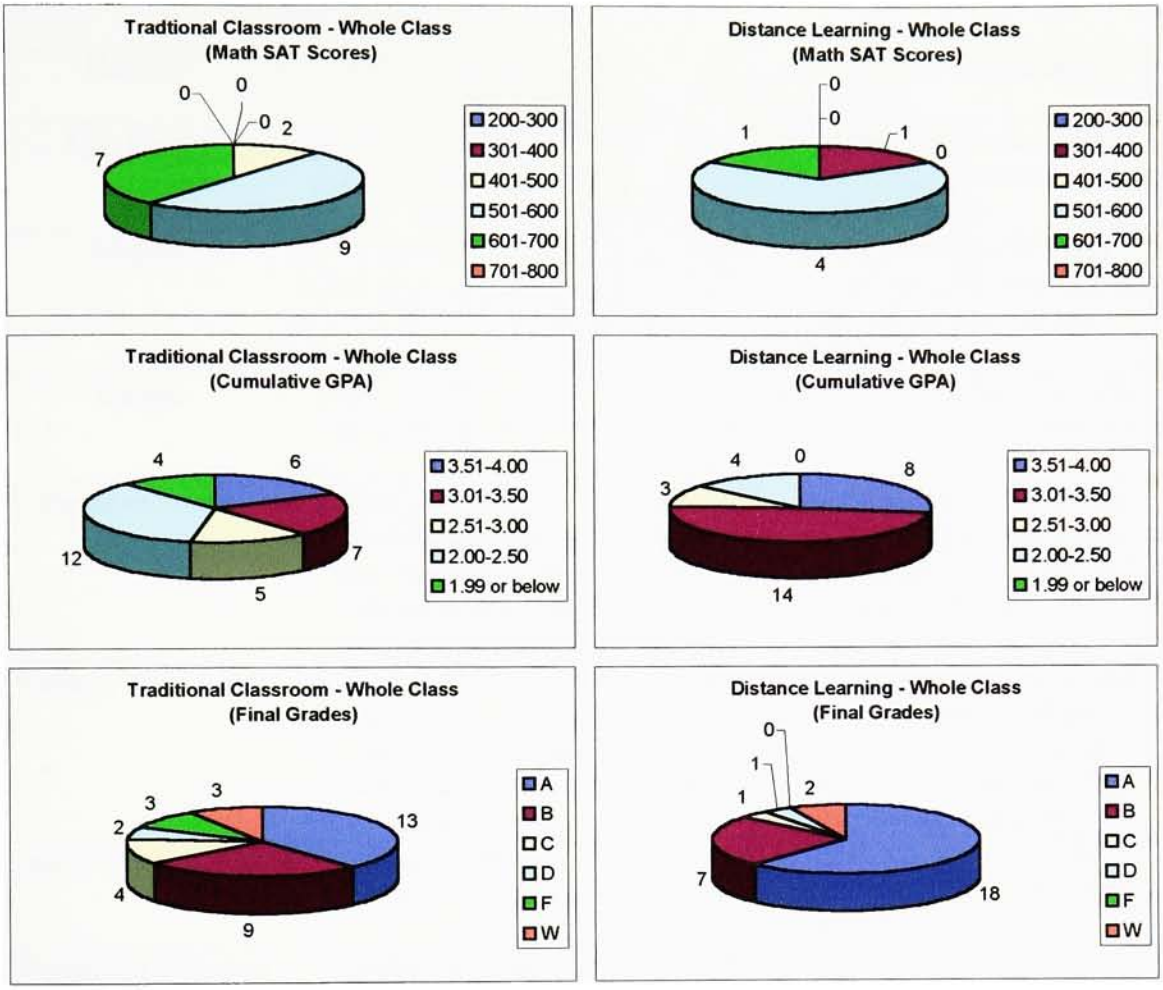


Figure 8.3 Summary Graphs of Whole Classes – Part III

Analysis and Interpretation

Gender	The number of males was much higher than the number of females in both environments.
Age Range	More than half of the students in the traditional classroom section were under age 21, but almost two-thirds of the students in the distance learning section were over age 25.
Majors	Information Technology students were predominant in both sections, but a higher percentage of students with different majors took the course in the distance learning format than in the traditional classroom format.
Origin	Most of the students from both sections were Americans. In fact, no international students took the course in the distance learning format.
Student Status	Many part-time students took the course in the distance learning format, but almost all students in the traditional classroom section were full-time. The graphs of "Age Range" and "Student Status" illustrate that older students were more likely to be part-time students and to take the course through distance learning.
College Year Level	The most common college year levels for the traditional classroom students were sophomore and junior. The distance learning section consisted mostly of junior-level students. It's interesting to note that the distance learning section had more freshmen and graduate students than the traditional classroom section.
Type of HS Education	More traditional classroom students graduated from a public rather than a private high school, whereas the opposite was true for distance learning students.
Verbal SAT Scores	Traditional classroom students had somewhat higher verbal SAT scores than distance learning students. The average verbal SAT scores for traditional classroom and distance learning students were 579 and 492.
Math SAT Scores	The students from both sections had somewhat similar performance scores on the SAT math section. The average math SAT scores for traditional classroom and distance learning students were 576 and 543.
Cumulative GPA	Despite the fact that traditional classroom students had higher average scores than distance learning students on both sections of the SAT, distance learning students' cumulative GPAs were overall much higher than those of the traditional classroom students. The average cumulative GPAs for traditional classroom and distance learning students were 2.72 and 3.25.
Final Grade	Distance learning students received higher final grades overall in the surveyed course than traditional classroom students. The class averages for traditional classroom and distance learning students were 2.87 and 3.56.

8.3.3 Summary Details of All Students in the Surveyed Sections

Note: TC = Traditional classroom and DL = Distance Learning

TC Male	Under 21	21 - 25	Over 25	Total
Year Level				
Freshmen	1	1	1	3
Sophomore	10	0	0	10
Junior	3	0	4	7
Senior	0	0	1	1
Graduate	0	1	1	2
Total	14	2	7	23

DL Male	Under 21	21 - 25	Over 25	Total
Year Level				
Freshmen	0	1	4	5
Sophomore	0	1	0	1
Junior	0	1	5	6
Senior	0	2	2	4
Graduate	0	0	3	3
Total	0	5	14	19

TC Female	Under 21	21 - 25	Over 25	Total
Year Level				
Freshmen	0	0	0	0
Sophomore	4	0	4	8
Junior	1	1	1	3
Senior	0	0	0	0
Graduate	0	0	0	0
Total	5	1	5	11

DL Female	Under 21	21 - 25	Over 25	Total
Year Level				
Freshmen	0	1	2	3
Sophomore	0	1	0	1
Junior	0	1	2	3
Senior	0	0	3	3
Graduate	0	0	0	0
Total	0	3	7	10

Analysis and Interpretation

The traditional classroom section was comprised mainly of students under age 21, whereas the distance learning section had no students under age 21. Both sections had a few students between ages 21 and 25. Most of the distance learning students were over age 25, but only about one-third of the students were over age 25 in the traditional classroom section.

The majority of both the male and female students in the traditional classroom section were sophomores. The college year levels for males in the distance learning section were widely dispersed, but the numbers of female students in this section were the same for all college year levels except for the sophomore and graduate year levels.

Explanation of the Following Charts

Sub-totals in each of the following charts indicate the number and percentage of students for each data category based on the total number of students in the major chart category for the respective course section. For example, five male students in the traditional classroom section received a course grade of A, and these students represented 21.74 % of the total number of male traditional classroom students.

Note: TC = Traditional classroom and DL = Distance Learning
Under 21, 21 – 25, Over 25 = Age categories

Under 21	HS Education		Student Status		Origin		Majors		Sub-Totals	
TC Male	**Public**	**Private**	**Full-time**	**Part-time**	**American**	**International**	**Information Technology**	**Other Majors**		
Final Grade										
A	3	2	5	0	5	0	5	0	5	21.74%
B	1	2	3	0	3	0	3	0	3	13.04%
C	2	1	3	0	3	0	3	0	3	13.04%
D	1	0	1	0	1	0	1	0	1	4.35%
F	2	0	2	0	2	0	1	1	2	8.70%
W	0	0	0	0	0	0	0	0	0	0.00%
Average	2.22	3.20	2.57	N/A	2.57	N/A	2.77	0.00	2.57	
Cumulative GPA										
3.51-4.00	0	0	0	0	0	0	0	0	0	0.00%
3.01-3.50	3	1	4	0	4	0	4	0	4	17.39%
2.51-3.00	1	2	3	0	3	0	3	0	3	13.04%
2.00-2.50	4	2	6	0	6	0	6	0	6	26.09%
1.99 or below	1	0	1	0	1	0	0	1	1	4.35%
Average	2.65	2.57	2.62	N/A	2.62	N/A	2.68	1.81	2.62	
DL Male	**Public**	**Private**	**Full-time**	**Part-time**	**American**	**International**	**Information Technology**	**Other Majors**		
Final Grade										
A	0	0	0	0	0	0	0	0	0	0.00%
B	0	0	0	0	0	0	0	0	0	0.00%
C	0	0	0	0	0	0	0	0	0	0.00%
D	0	0	0	0	0	0	0	0	0	0.00%
F	0	0	0	0	0	0	0	0	0	0.00%
W	0	0	0	0	0	0	0	0	0	0.00%
Average	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Cumulative GPA										
3.51-4.00	0	0	0	0	0	0	0	0	0	0.00%
3.01-3.50	0	0	0	0	0	0	0	0	0	0.00%
2.51-3.00	0	0	0	0	0	0	0	0	0	0.00%
2.00-2.50	0	0	0	0	0	0	0	0	0	0.00%
1.99 or below	0	0	0	0	0	0	0	0	0	0.00%
Average	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

21 - 25	HS Education		Student Status		Origin		Majors		Sub-Totals	
TC Male	**Public**	**Private**	**Full-time**	**Part-time**	**American**	**International**	**Information Technology**	**Other Majors**		
Final Grade										
A	0	0	1	0	1	0	1	0	1	4.35%
B	0	0	0	0	0	0	0	0	0	0.00%
C	0	0	0	0	0	0	0	0	0	0.00%
D	0	0	0	0	0	0	0	0	0	0.00%
F	1	0	1	0	1	0	0	1	1	4.35%
W	0	0	0	0	0	0	0	0	0	0.00%
Average	0.00	N/A	2.00	N/A	2.00	N/A	4.00	0.00	2.00	
Cumulative GPA										
3.51-4.00	0	0	1	0	1	0	1	0	1	4.35%
3.01-3.50	0	0	0	0	0	0	0	0	0	0.00%
2.51-3.00	0	0	0	0	0	0	0	0	0	0.00%
2.00-2.50	0	0	0	0	0	0	0	0	0	0.00%
1.99 or below	1	0	1	0	1	0	0	1	1	4.35%
Average	1.11	N/A	2.39	N/A	2.39	N/A	3.66	1.11	2.39	
DL Male	**Public**	**Private**	**Full-time**	**Part-time**	**American**	**International**	**Information Technology**	**Other Majors**		
Final Grade										
A	2	1	1	2	3	0	2	1	3	15.79%
B	1	0	0	1	1	0	1	0	1	5.26%
C	0	1	0	1	1	0	1	0	1	5.26%
D	0	0	0	0	0	0	0	0	0	0.00%
F	0	0	0	0	0	0	0	0	0	0.00%
W	0	0	0	0	0	0	0	0	0	0.00%
Average	3.67	3.00	4.00	3.25	3.40	N/A	3.25	4.00	3.40	
Cumulative GPA										
3.51-4.00	1	0	0	1	1	0	1	0	1	5.26%
3.01-3.50	1	1	0	2	2	0	2	0	2	10.53%
2.51-3.00	1	0	0	1	1	0	1	0	1	5.26%
2.00-2.50	0	1	1	0	1	0	0	1	1	5.26%
1.99 or below	0	0	0	0	0	0	0	0	0	0.00%
Average	3.33	2.63	2.12	3.28	3.05	N/A	3.28	2.12	3.05	

Over 25	HS Education		Student Status		Origin		Majors		Sub-Totals	
TC Male	**Public**	**Private**	**Full-time**	**Part-time**	**American**	**International**	**Information Technology**	**Other Majors**		
Final Grade										
A	2	1	3	0	2	1	2	1	3	13.04%
B	1	2	2	1	2	1	2	1	3	13.04%
C	0	0	0	0	0	0	0	0	0	0.00%
D	0	0	0	0	0	0	0	0	0	0.00%
F	0	0	0	0	0	0	0	0	0	0.00%
W	0	0	1	0	0	1	1	0	1	4.35%
Average	3.67	3.33	3.60	3.00	3.50	3.50	3.50	3.50	3.50	
Cumulative GPA										
3.51-4.00	1	0	1	0	1	0	1	0	1	4.35%
3.01-3.50	1	1	1	1	1	1	1	1	2	8.70%
2.51-3.00	1	0	1	0	1	0	1	0	1	4.35%
2.00-2.50	0	2	2	0	1	1	1	1	2	8.70%
1.99 or below	0	0	1	0	0	1	1	0	1	4.35%
Average	3.36	2.44	2.63	3.50	3.02	2.39	2.78	2.67	2.75	
DL Male	**Public**	**Private**	**Full-time**	**Part-time**	**American**	**International**	**Information Technology**	**Other Majors**		
Final Grade										
A	3	3	1	8	9	0	4	5	9	47.37%
B	0	1	0	2	2	0	2	0	2	10.53%
C	0	0	0	0	0	0	0	0	0	0.00%
D	0	1	1	0	1	0	1	0	1	5.26%
F	0	0	0	0	0	0	0	0	0	0.00%
W	0	2	1	1	2	0	2	0	2	10.53%
Average	4.00	3.20	2.50	3.80	3.58	N/A	3.29	4.00	3.58	
Cumulative GPA										
3.51-4.00	2	2	0	5	5	0	1	4	5	26.32%
3.01-3.50	1	1	0	3	3	0	2	1	3	15.79%
2.51-3.00	0	3	1	3	4	0	4	0	4	21.05%
2.00-2.50	0	1	2	0	2	0	2	0	2	10.53%
1.99 or below	0	0	0	0	0	0	0	0	0	0.00%
Average	3.78	3.15	2.38	3.52	3.28	N/A	2.99	3.81	3.28	

Entire Class	HS Education		Student Status		Origin		Majors		Sub-Totals	
TC Male	**Public**	**Private**	**Full-time**	**Part-time**	**American**	**International**	**Information Technology**	**Other Majors**		
Final Grade										
A	5	3	9	0	8	1	8	1	9	39.13%
B	2	4	5	1	5	1	5	1	6	26.09%
C	2	1	3	0	3	0	3	0	3	13.04%
D	1	0	1	0	1	0	1	0	1	4.35%
F	3	0	3	0	3	0	1	2	3	13.04%
W	0	0	1	0	0	1	1	0	1	4.35%
Average	2.38	3.25	2.76	3.00	2.70	3.50	3.00	1.75	2.77	
Cumulative GPA										
3.51-4.00	1	0	2	0	2	0	2	0	2	8.70%
3.01-3.50	4	2	5	1	5	1	5	1	6	26.09%
2.51-3.00	2	2	4	0	4	0	4	0	4	17.39%
2.00-2.50	4	4	8	0	7	1	7	1	8	34.78%
1.99 or below	2	0	3	0	2	1	1	2	3	13.04%
Average	2.70	2.52	2.60	3.50	2.68	2.39	2.76	2.06	2.64	
DL Male	**Public**	**Private**	**Full-time**	**Part-time**	**American**	**International**	**Information Technology**	**Other Majors**		
Final Grade										
A	5	4	2	10	12	0	6	6	12	63.16%
B	1	1	0	3	3	0	3	0	3	15.79%
C	0	1	0	1	1	0	1	0	1	5.26%
D	0	1	1	0	1	0	1	0	1	5.26%
F	0	0	0	0	0	0	0	0	0	0.00%
W	0	2	1	1	2	0	2	0	2	10.53%
Average	3.83	3.14	3.00	3.64	3.53	N/A	3.27	4.00	3.53	
Cumulative GPA										
3.51-4.00	3	2	0	6	6	0	2	4	6	31.58%
3.01-3.50	2	2	0	5	5	0	4	1	5	26.32%
2.51-3.00	1	3	1	4	5	0	5	0	5	26.32%
2.00-2.50	0	2	3	0	3	0	2	1	3	15.79%
1.99 or below	0	0	0	0	0	0	0	0	0	0.00%
Average	3.55	3.04	2.32	3.46	3.22	N/A	3.08	3.53	3.22	

Analysis and Interpretation

From the standpoint of grades, male students from the distance learning section generally did much better in the surveyed course as well as in their college careers than male students from the traditional classroom section. However, the success rates of course performance (as measured by final grades) for males over age 25 from both sections were almost the same. Traditional classroom male students age 25 or under tended to have final course and college career grades that were about the same as GPA's for all RIT students. By contrast, distance learning male students age 21 or over performed exceptionally well in the course and in their college careers.

As a whole, male students with a public high school education from both sections had somewhat higher cumulative GPAs than male students with a private high school education, but male students with a private high school education from the traditional classroom section performed much better in the course than male students with a public high school education. Part-time male students generally had higher cumulative GPAs and final grades than full-time male students. Unlike the traditional classroom section, male students in the distance learning section with other majors achieved higher cumulative GPAs and final grades than Information Technology students.

Overall, international male students received better final grades in the surveyed course than American male students, although the American male students' cumulative GPAs were higher on the average than international male students' cumulative GPAs.

Under 21	HS Education		Student Status		Origin		Majors		Sub-Totals	
TC Female	**Public**	**Private**	**Full-time**	**Part-time**	**American**	**International**	**Information Technology**	**Other Majors**		
Final Grade										
A	1	0	1	0	1	0	1	0	1	9.09%
B	0	1	1	0	1	0	1	0	1	9.09%
C	0	1	1	0	1	0	1	0	1	9.09%
D	0	0	0	0	0	0	0	0	0	0.00%
F	0	0	0	0	0	0	0	0	0	0.00%
W	2	0	2	0	2	0	1	1	2	18.18%
Average	4.00	2.50	3.00	N/A	3.00	N/A	3.00	N/A	3.00	
Cumulative GPA										
3.51-4.00	1	0	1	0	1	0	1	0	1	9.09%
3.01-3.50	0	0	0	0	0	0	0	0	0	0.00%
2.51-3.00	0	0	0	0	0	0	0	0	0	0.00%
2.00-2.50	1	2	3	0	3	0	3	0	3	27.27%
1.99 or below	1	0	1	0	1	0	0	1	1	9.09%
Average	2.63	2.17	2.45	N/A	2.45	N/A	2.69	1.46	2.45	
DL Female	**Public**	**Private**	**Full-time**	**Part-time**	**American**	**International**	**Information Technology**	**Other Majors**		
Final Grade										
A	0	0	0	0	0	0	0	0	0	0.00%
B	0	0	0	0	0	0	0	0	0	0.00%
C	0	0	0	0	0	0	0	0	0	0.00%
D	0	0	0	0	0	0	0	0	0	0.00%
F	0	0	0	0	0	0	0	0	0	0.00%
W	0	0	0	0	0	0	0	0	0	0.00%
Average	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Cumulative GPA										
3.51-4.00	0	0	0	0	0	0	0	0	0	0.00%
3.01-3.50	0	0	0	0	0	0	0	0	0	0.00%
2.51-3.00	0	0	0	0	0	0	0	0	0	0.00%
2.00-2.50	0	0	0	0	0	0	0	0	0	0.00%
1.99 or below	0	0	0	0	0	0	0	0	0	0.00%
Average	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

21 - 25	HS Education		Student Status		Origin		Majors		Sub-Totals	
TC Female	**Public**	**Private**	**Full-time**	**Part-time**	**American**	**International**	**Information Technology**	**Other Majors**		
Final Grade										
A	0	0	0	0	0	0	0	0	0	0.00%
B	0	0	0	0	0	0	0	0	0	0.00%
C	0	0	0	0	0	0	0	0	0	0.00%
D	1	0	1	0	1	0	1	0	1	9.09%
F	0	0	0	0	0	0	0	0	0	0.00%
W	0	0	0	0	0	0	0	0	0	0.00%
Average	1.00	N/A	1.00	N/A	1.00	N/A	1.00	N/A	1.00	
Cumulative GPA										
3.51-4.00	0	0	0	0	0	0	0	0	0	0.00%
3.01-3.50	0	0	0	0	0	0	0	0	0	0.00%
2.51-3.00	0	0	0	0	0	0	0	0	0	0.00%
2.00-2.50	1	0	1	0	1	0	1	0	1	9.09%
1.99 or below	0	0	0	0	0	0	0	0	0	0.00%
Average	2.04	N/A	2.04	N/A	2.04	N/A	2.04	N/A	2.04	
DL Female	**Public**	**Private**	**Full-time**	**Part-time**	**American**	**International**	**Information Technology**	**Other Majors**		
Final Grade										
A	1	1	2	1	3	0	2	1	3	30.00%
B	0	0	0	0	0	0	0	0	0	0.00%
C	0	0	0	0	0	0	0	0	0	0.00%
D	0	0	0	0	0	0	0	0	0	0.00%
F	0	0	0	0	0	0	0	0	0	0.00%
W	0	0	0	0	0	0	0	0	0	0.00%
Average	4.00	4.00	4.00	4.00	4.00	N/A	4.00	4.00	4.00	
Cumulative GPA										
3.51-4.00	0	0	0	0	0	0	0	0	0	0.00%
3.01-3.50	1	1	2	1	3	0	2	1	3	30.00%
2.51-3.00	0	0	0	0	0	0	0	0	0	0.00%
2.00-2.50	0	0	0	0	0	0	0	0	0	0.00%
1.99 or below	0	0	0	0	0	0	0	0	0	0.00%
Average	3.06	3.40	3.28	3.40	3.32	N/A	3.45	3.06	3.32	

Over 25	HS Education		Student Status		Origin		Majors		Sub-Totals	
TC Female	**Public**	**Private**	**Full-time**	**Part-time**	**American**	**International**	**Information Technology**	**Other Majors**		
Final Grade										
A	0	2	3	0	0	3	3	0	3	27.27%
B	0	0	0	2	1	1	1	1	2	18.18%
C	0	0	0	0	0	0	0	0	0	0.00%
D	0	0	0	0	0	0	0	0	0	0.00%
F	0	0	0	0	0	0	0	0	0	0.00%
W	0	0	0	0	0	0	0	0	0	0.00%
Average	N/A	4.00	4.00	3.00	3.00	3.75	3.75	3.00	3.60	
Cumulative GPA										
3.51-4.00	0	2	3	0	0	3	3	0	3	27.27%
3.01-3.50	0	0	0	1	0	1	0	1	1	9.09%
2.51-3.00	0	0	0	1	1	0	1	0	1	9.09%
2.00-2.50	0	0	0	0	0	0	0	0	0	0.00%
1.99 or below	0	0	0	0	0	0	0	0	0	0.00%
Average	N/A	3.71	3.72	3.17	3.00	3.62	3.54	3.33	3.50	
DL Female	**Public**	**Private**	**Full-time**	**Part-time**	**American**	**International**	**Information Technology**	**Other Majors**		
Final Grade										
A	0	1	1	2	3	0	2	1	3	30.00%
B	2	0	0	4	4	0	3	1	4	40.00%
C	0	0	0	0	0	0	0	0	0	0.00%
D	0	0	0	0	0	0	0	0	0	0.00%
F	0	0	0	0	0	0	0	0	0	0.00%
W	0	0	0	0	0	0	0	0	0	0.00%
Average	3.00	4.00	4.00	3.33	3.43	N/A	3.40	3.50	3.43	
Cumulative GPA										
3.51-4.00	0	0	1	1	2	0	1	1	2	20.00%
3.01-3.50	1	1	0	3	3	0	2	1	3	30.00%
2.51-3.00	0	0	0	1	1	0	1	0	1	10.00%
2.00-2.50	1	0	0	1	1	0	1	0	1	10.00%
1.99 or below	0	0	0	0	0	0	0	0	0	0.00%
Average	2.77	3.33	3.92	3.21	3.31	N/A	3.17	3.67	3.31	

Entire Class	HS Education		Student Status		Origin		Majors		Sub-Totals	
TC Female	**Public**	**Private**	**Full-time**	**Part-time**	**American**	**International**	**Information Technology**	**Other Majors**		
Final Grade										
A	1	2	4	0	1	3	4	0	4	36.36%
B	0	1	1	2	2	1	2	1	3	27.27%
C	0	1	1	0	1	0	1	0	1	9.09%
D	1	0	1	0	1	0	1	0	1	9.09%
F	0	0	0	0	0	0	0	0	0	0.00%
W	2	0	2	0	2	0	1	1	2	18.18%
Average	2.50	3.25	3.14	3.00	2.60	3.75	3.13	3.00	3.11	
Cumulative GPA										
3.51-4.00	1	2	4	0	1	3	4	0	4	36.36%
3.01-3.50	0	0	0	1	0	1	0	1	1	9.09%
2.51-3.00	0	0	0	1	1	0	1	0	1	9.09%
2.00-2.50	2	2	4	0	4	0	4	0	4	36.36%
1.99 or below	1	0	1	0	1	0	0	1	1	9.09%
Average	2.49	2.94	2.82	3.17	2.47	3.62	3.00	2.40	2.89	
DL Female	**Public**	**Private**	**Full-time**	**Part-time**	**American**	**International**	**Information Technology**	**Other Majors**		
Final Grade										
A	1	2	3	3	6	0	4	2	6	60.00%
B	2	0	0	4	4	0	3	1	4	40.00%
C	0	0	0	0	0	0	0	0	0	0.00%
D	0	0	0	0	0	0	0	0	0	0.00%
F	0	0	0	0	0	0	0	0	0	0.00%
W	0	0	0	0	0	0	0	0	0	0.00%
Average	3.33	4.00	4.00	3.43	3.60	N/A	3.57	3.67	3.60	
Cumulative GPA										
3.51-4.00	0	0	1	1	2	0	1	1	2	20.00%
3.01-3.50	2	2	2	4	6	0	4	2	6	60.00%
2.51-3.00	0	0	0	1	1	0	1	0	1	10.00%
2.00-2.50	1	0	0	1	1	0	1	0	1	10.00%
1.99 or below	0	0	0	0	0	0	0	0	0	0.00%
Average	2.87	3.37	3.49	3.24	3.32	N/A	3.25	3.46	3.32	

Analysis and Interpretation

Similar to male students, female students as a whole from the distance learning section generally achieved higher final grades and cumulative GPAs than female students from the traditional classroom section. Female students over age 25 from the traditional classroom section had slightly higher cumulative GPAs and final grades than female students over age 25 from the distance learning section. Traditional classroom female students age 25 or under had lower average final grades and a higher number of withdrawals than their male counterparts.

Female students with a private high school education from both sections achieved higher cumulative GPAs and final grades than female students with a public high school education. Full-time female students also generally had somewhat higher course grades and college career GPAs than part-time female students. Unlike the traditional classroom section, female students with other majors attained slightly higher cumulative GPAs and final grades than Information Technology students in the distance learning section.

International female students in the traditional classroom section achieved much higher final grades and cumulative GPAs than the American female students. There were no international female students in the distance learning section, but the American female students' final grades in this section were only slightly lower than those for the traditional classroom section's international female students.

8.3.4 Additional Data and Relationships

Traditional Classroom Section

Cumulative GPA	1.99 or below	2.00 - 2.50	2.51 - 3.00	3.01 - 3.50	3.51 - 4.00
A	0	2	2	4	5
B	0	4	2	3	0
C	0	4	0	0	0
D	0	2	0	0	0
F	2	0	1	0	0
W	2	0	0	0	1
Grade Average In Class	**0.00**	**2.50**	**2.80**	**3.57**	**4.00**

College Year Level	Freshmen	Sophomore	Junior	Senior	Graduate
A	1	4	5	1	2
B	1	4	3	0	1
C	1	2	1	0	0
D	0	1	1	0	0
F	1	2	0	0	0
W	0	1	1	0	1
Grade Average In Class	**2.25**	**2.54**	**3.20**	**4.00**	**3.67**

Verbal SAT Scores	200-300	301-400	401-500	501-600	601-700	701-800
A	0	0	1	1	2	0
B	0	0	0	3	1	0
C	0	0	1	2	0	0
D	0	1	0	1	0	0
F	0	0	0	1	2	0
W	0	0	0	1	1	0
Grade Average In Class	**N/A**	**1.00**	**3.00**	**2.00**	**1.83**	**N/A**

Math SAT Scores	200-300	301-400	401-500	501-600	601-700	701-800
A	0	0	0	1	3	0
B	0	0	0	3	1	0
C	0	0	0	2	1	0
D	0	0	1	1	0	0
F	0	0	1	2	1	0
W	0	0	0	1	0	0
Grade Average In Class	**N/A**	**N/A**	**0.50**	**1.80**	**2.83**	**N/A**

Distance Learning Section

Cumulative GPA	1.99 or below	2.00 - 2.50	2.51 - 3.00	3.01 - 3.50	3.51 - 4.00
A	0	2	0	8	3
B	0	1	4	2	0
C	0	0	0	1	0
D	0	1	0	0	0
F	0	0	0	0	0
W	0	0	2	0	0
Grade Average In Class	**N/A**	**3.00**	**3.00**	**3.64**	**4.00**

College Year Level	Freshmen	Sophomore	Junior	Senior	Graduate
A	4	1	7	1	5
B	2	1	2	1	1
C	0	0	0	1	0
D	0	0	0	1	0
F	0	0	0	0	0
W	1	0	1	0	0
Grade Average In Class	**3.67**	**3.50**	**3.78**	**2.50**	**3.83**

Verbal SAT Scores	200-300	301-400	401-500	501-600	601-700	701-800
A	0	1	0	2	1	0
B	1	0	0	0	0	0
C	0	0	0	1	0	0
D	0	0	0	0	0	0
F	0	0	0	0	0	0
W	0	0	0	0	0	0
Grade Average In Class	**3.00**	**4.00**	**N/A**	**3.33**	**4.00**	**N/A**

Math SAT Scores	200-300	301-400	401-500	501-600	601-700	701-800
A	0	0	0	3	1	0
B	0	1	0	0	0	0
C	0	0	0	1	0	0
D	0	0	0	0	0	0
F	0	0	0	0	0	0
W	0	0	0	0	0	0
Grade Average In Class	**N/A**	**3.00**	**N/A**	**3.50**	**4.00**	**N/A**

The following charts show the strength of relationship between each general student characteristic and success rate (final grade) from Table 8.3 for all students in each surveyed section. Since the relationship categories (very strong, strong, etc.) were developed arbitrarily only for informal comparison purposes, the indicated relationships were based on my subjective analysis of the aggregate data, not on statistical correlations. Therefore, they should only be viewed as logical and analytical estimates of the actual relationships rather than as statistically valid correlations.

Strength of Relationship to All Traditional Classroom Students' Final Grades

General Characteristics of All Students	Very Strong	Strong	Intermediate	Weak	Very Weak	N/A*
Gender				X		
Age		X				
Major				X		
Origin		X				
Student Status					X	
College Year Level		X				
Type of HS Education			X			
SAT Scores						
Verbal					X	
Math	X					
Cumulative GPA	X					

*Not applicable, or insufficient data to determine relationships

Strength of Relationship to All Distance Learning Students' Final Grades

General Characteristics of All Students	Very Strong	Strong	Intermediate	Weak	Very Weak	N/A*
Gender					X	
Age				X		
Major			X			
Origin						X
Student Status					X	
College Year Level					X	
Type of HS Education					X	
SAT Scores						
Verbal						X
Math						X
Cumulative GPA	X					

*Not applicable, or insufficient data to determine relationships

Analysis and Interpretation

For the traditional classroom section, the strongest relationships between final grades and general student characteristics were for cumulative GPAs and SAT math scores. As discussed in chapters 6 and 7, both sections of the course required students to have strong math and logic skills to solve binary arithmetic and digital logic problems. Consistent with this requirement, students with high SAT math scores as well as high cumulative GPAs that indicated success in other college courses (some of which probably helped strengthen student math and logic skills) were, as a whole, much more likely to receive high grades in the surveyed course. Strong relationships in general were also identified between a student's final grade and the student's age, origin, and college year level. That is, the older, international, and higher level students achieved course grades that were rather significantly higher on average than the grades received by other students as a whole. Relationships between final grades and all other general characteristics shown in the charts were found to be, by comparison, much less significant.

For the distance learning section, the only general student characteristic which had a strong relationship to final grades was cumulative GPA. Relationships for all other characteristics were much weaker, not applicable (e.g., there were no international students in this section), or could not be reasonably determined due to sufficient student data not being available from RIT sources.

8.4 General Characteristics and Success Rates of Students Participating in the Surveys

The data from the students' questionnaires and the RIT Institutional Research Center provide information about the general characteristics and success rates of participating students in both the traditional classroom and distance learning environments. These data explain or help to define the students' epistemological beliefs, learning habits, communicating habits, and preferences of learning sites.

8.4.1 Explanation of General Characteristics and Success Rates

Type	Definition
Gender*	Male or Female
Age Range (In Years)*	Under 21, 21 – 25, or Over 25
Majors*	Information Technology or Other Majors
Origin*	Original Residence (American or International)
Student Status*	Part-time or Full-time
College Year Level*	Freshmen, Sophomore, Junior, Senior, Graduate
Type of HS Education*	Public or Private
Social Background*	Who made decisions pertaining to education for a student? Myself or my teachers and other people
Computer Literacy*	Level of computer expertise Low, Medium, or High
Future Goal*	What are students' future goals? Become an employee, an executive, a professor, or other profession
Cumulative GPA**	Cumulative College Grade Point Average
Final Grades**	A, B, C, D, F, or W

Table 8.4 Definitions related to participating students' general characteristics and success rates in the surveyed sections

*The data items came from the questionnaires in the 5th and 9th weeks of the Fall Quarter 1999.
**The data items came from the RIT Institutional Research Center.

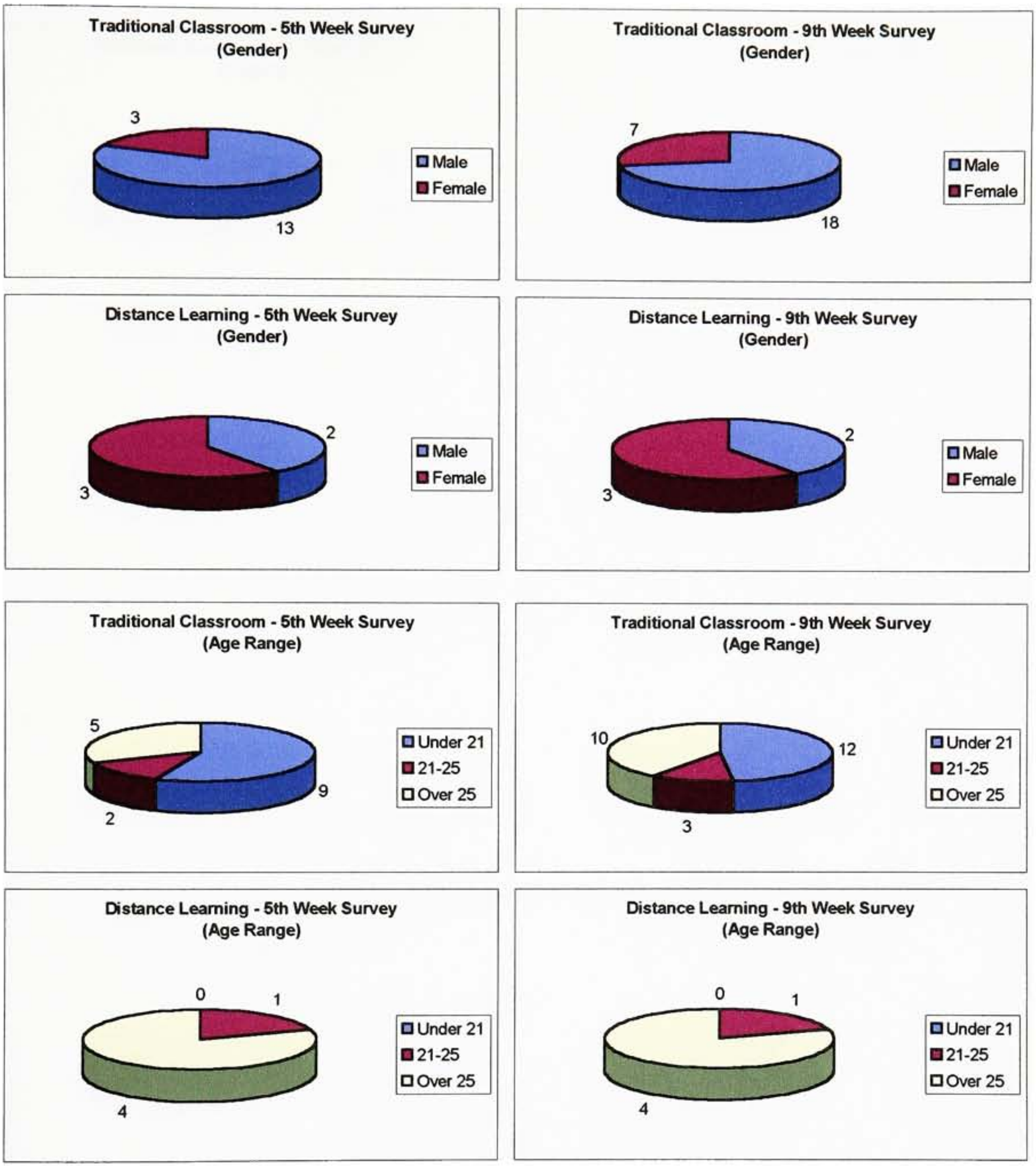


Figure 8.4 Graphs of Participating Students' General Characteristics – Part I

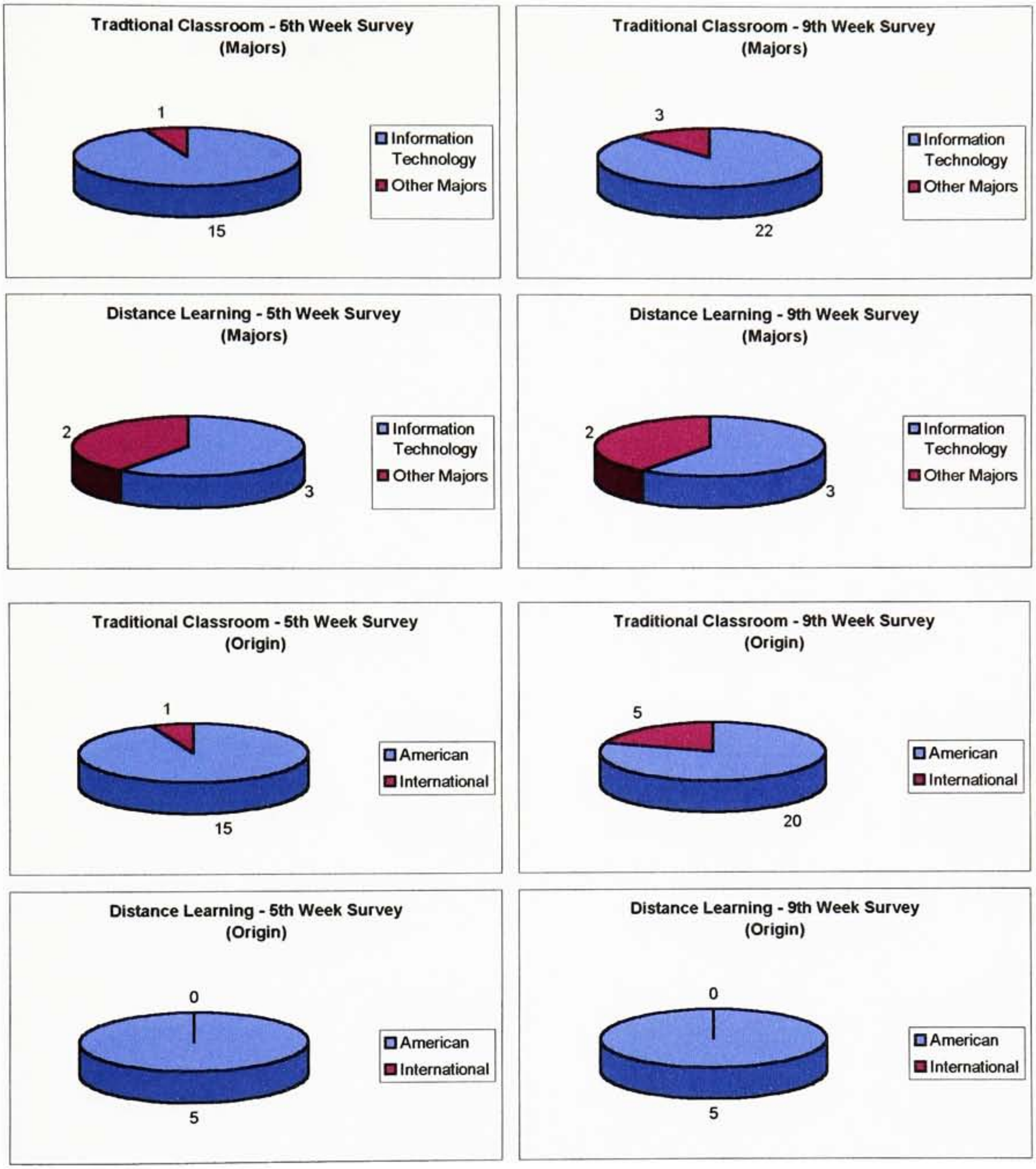


Figure 8.5 Graphs of Participating Students' General Characteristics – Part II

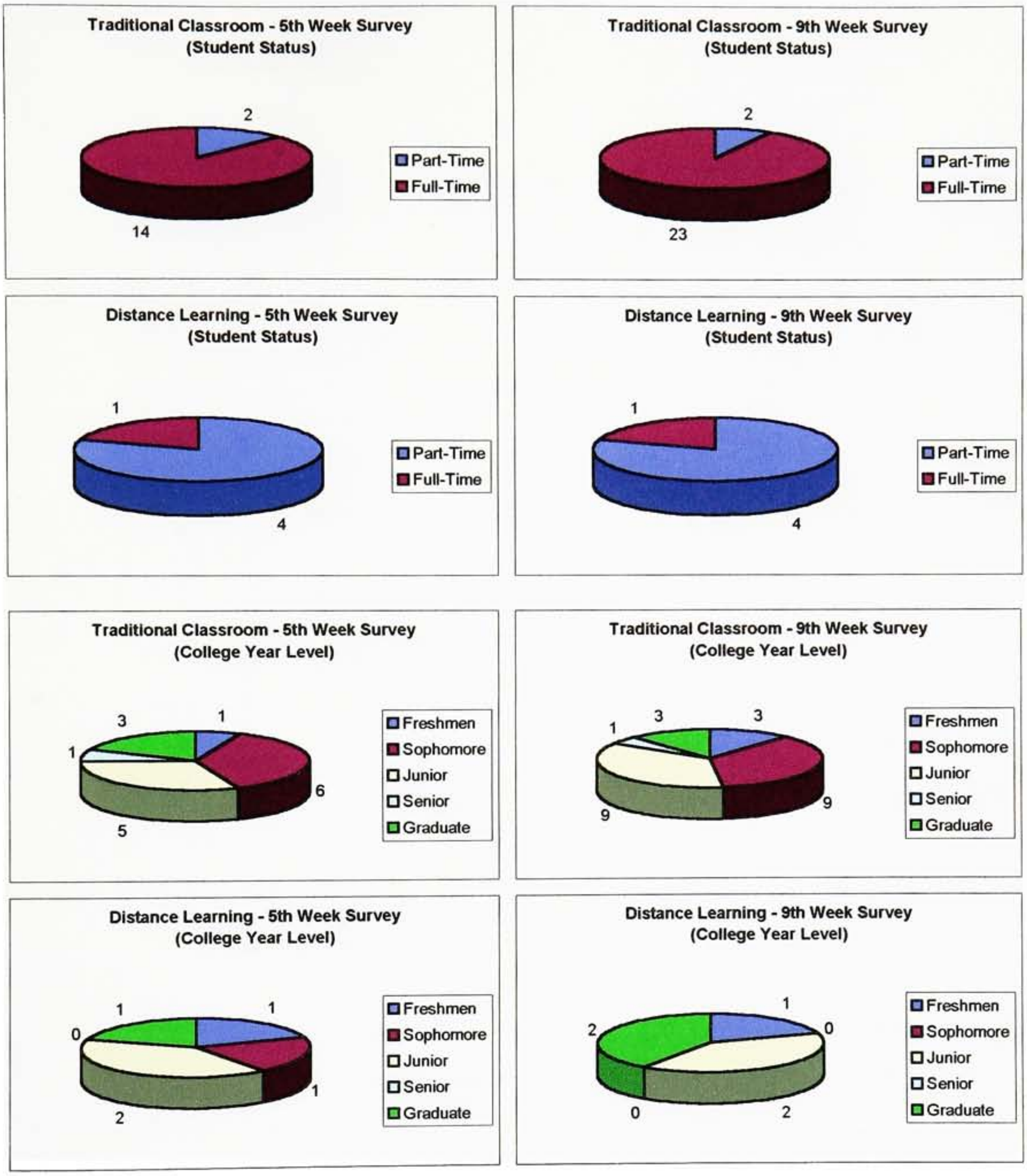


Figure 8.6 Graphs of Participating Students' General Characteristics – Part III

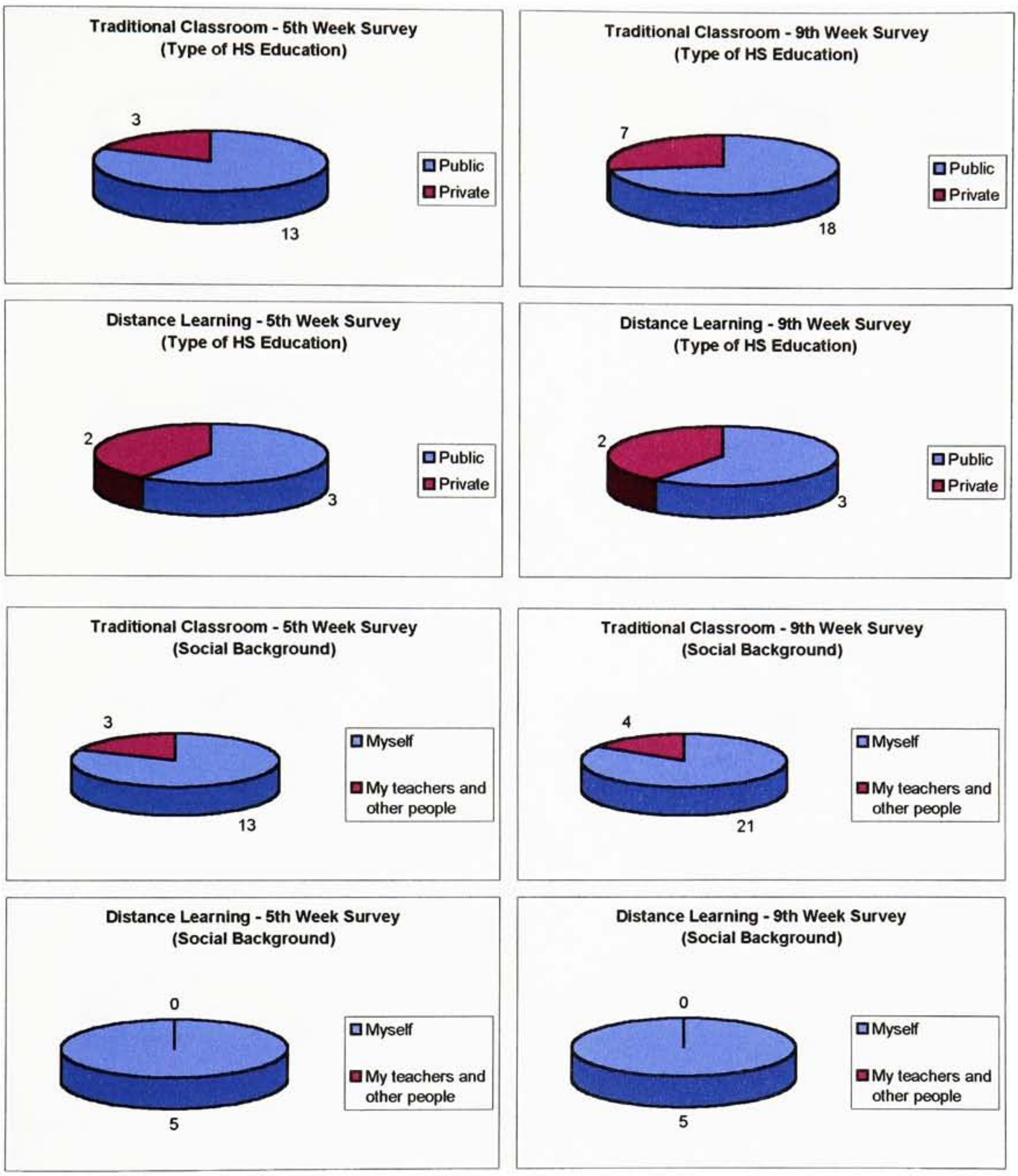


Figure 8.7 Graphs of Participating Students' General Characteristics – Part IIII

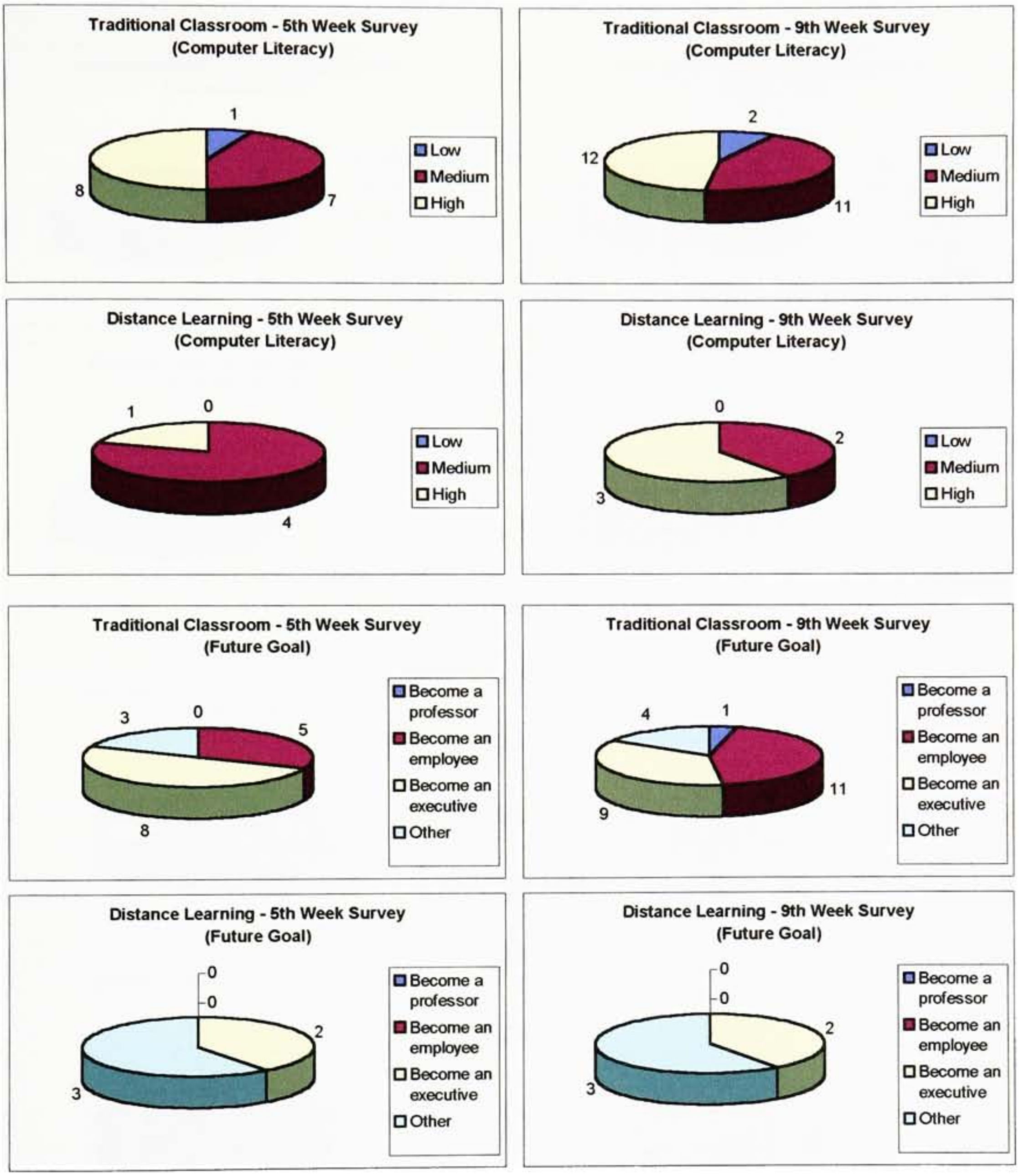


Figure 8.8 Graphs of Participating Students' General Characteristics – Part V

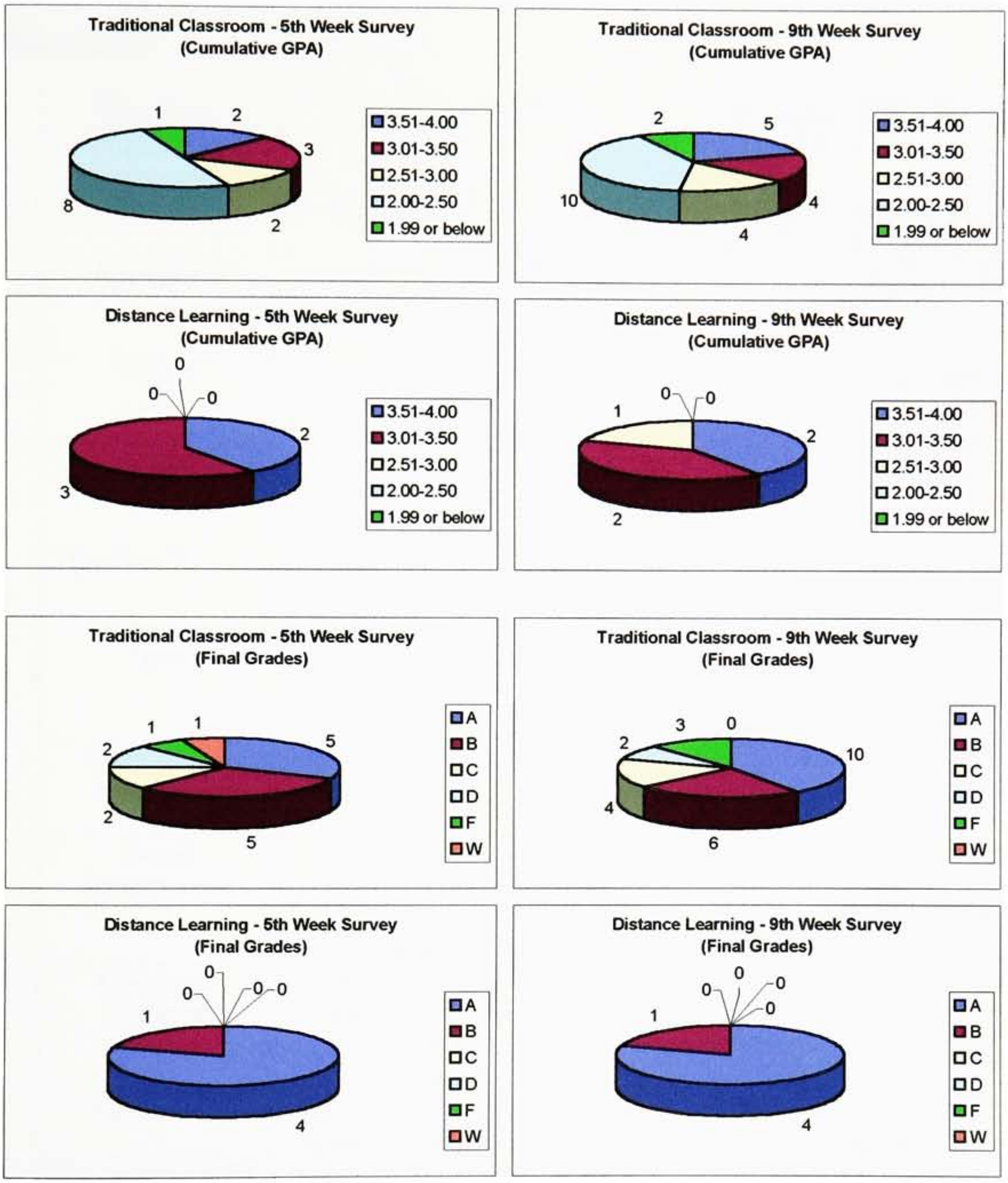


Figure 8.9 Graphs of Participating Students' Success Rates

Analysis and Interpretation

5th Week Survey

Data Item	Traditional Classroom	Distance Learning
Number of Responses	16	5
Gender	Mostly male students completed the questionnaires.	Only three females and two males filled out the questionnaires.
Age Range	More than half of the participating students were under age 21.	Almost all participating students were over age 25.
Majors	Almost all participating students were majoring in Information Technology.	Three of the five participating students were majoring in Information Technology.
Origin	More than 95 % of the participating students originally came from the United States.	Every participating student was an American.
Student Status	The majority of the participating students were full-time students.	The majority of the participating students were part-time students.
College Year Level	Mostly sophomore and junior students participated in the survey.	Like the traditional classroom section, the majority of the participating students were sophomores and juniors.
Type of HS Education	Almost all participating students graduated from public high schools.	Three of the five participating students graduated from public high schools.
Social Background	Most of the participating students indicated that they made their own decisions pertaining to education.	All participating students were identified themselves as independent decision-makers about their educational programs.
Computer Literacy	Most of the participating students believed that they have intermediate or advanced computer skills.	Most of the participating students perceived that they have average (not advanced) computer skills.
Future Goal	Half of the participating students wanted to become executives.	Participating students' future goals varied widely.
Cumulative GPA	Half of the participating students maintained a cumulative GPA (2.00 – 2.50).	All participating students' cumulative GPAs were exceptionally good.
Final Grade	Participating students' final grades fluctuated, but ten students received a grade of B or better.	All but one of the participating students earned a grade of A.

9th Week Survey

Data Item	Traditional Classroom	Distance Learning
Number of Responses	25	5
Gender	Mostly male students completed the questionnaires.	Only three females and two males filled out the questionnaires.
Age Range	Most of the participating students were under age 21 and over age 25	Almost all participating students were over age 25.
Majors	Almost all participating students were majoring in Information Technology.	Three of the five participating students were majoring in Information Technology.
Origin	80 % of the participating students originally came from the United States.	Every participating student was an American.
Student Status	The majority of the participating students were full-time students.	The majority of the participating students were part-time students.
College Year Level	Mostly sophomore and junior students participated in the survey.	Unlike the traditional classroom section, the majority of the participating students were juniors and graduates.
Type of HS Education	Almost all participating students graduated from public high schools.	Three of the five participating students graduated from public high schools.
Social Background	Most of the participating students indicated that they made their own decisions pertaining to education.	All participating students were identified themselves as independent decision-makers about their educational programs.
Computer Literacy	Most of the participating students believed that they have intermediate or advanced computer skills.	Most of the participating students considered themselves as advanced computer users.
Future Goal	Most of the participating students wanted to become employees or executives.	Participating students' future goals varied widely.
Cumulative GPA	More than half of the participating students maintained a cumulative GPA (2.00 – 3.00).	All participating students' cumulative GPAs were exceptionally good except for one student.
Final Grade	Participating students' final grades fluctuated, but sixteen students received a grade of B or better.	Almost every participating student earned a grade of A.

Interesting Changes (5th week vs. 9th week surveys)

Data Item	Changes
Computer Literacy	Participating distance learning students considered themselves to have average computer literacy skills at first, but their confidence in using computers increased from the 5th week to 9th week, probably due to greater exposure to computer technologies (the First Class software, the Internet, etc.) during the course.
Future Goal	A greater percentage of the participating traditional classroom students wanted to become executives at the 5th week than at the 9th week. The instructor from the traditional classroom section discussed his job experiences in his lectures quite often, which may have led his students to reflect more deeply about their future options.

8.5 Participating Students' Epistemological Beliefs

8.5.1 Explanation of Epistemological Beliefs

Epistemological beliefs are defined as students' beliefs pertaining to knowledge and learning (see Chapter 2 – Literature Review). Participating students expressed their beliefs in the questionnaires completed during the 5th and 9th weeks of the Fall Quarter, 1999.

Type of belief	Operational definition
Source of knowledge	Where does knowledge come from? Teachers, life experiences, or both?
Organization of knowledge	How can knowledge be learned and organized? Separated parts of a topic, the whole topic at once, or both, depending on the subject matter?
Stability of knowledge	How often does knowledge change? Never, rarely, sometimes, or often?
Method of learning*	Which is the best type of learning for a student? Memorizing facts, applying facts to a given situation, or both?
Speed of learning	How quickly can learning occur? The answer can be in a range from very slow to very fast.
Control of learning	Is the ability to learn fixed (innate) or changing? How often can learning change? Never, rarely, sometimes, or often?

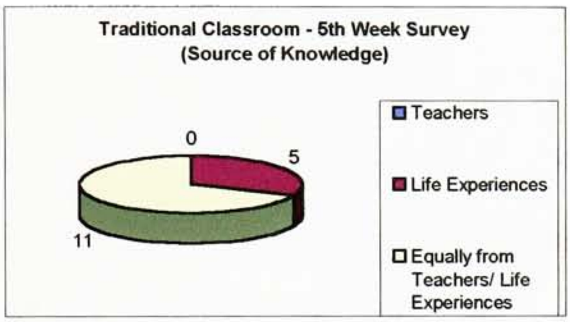
Table 8.5 Operational definitions of aspects of the epistemological beliefs

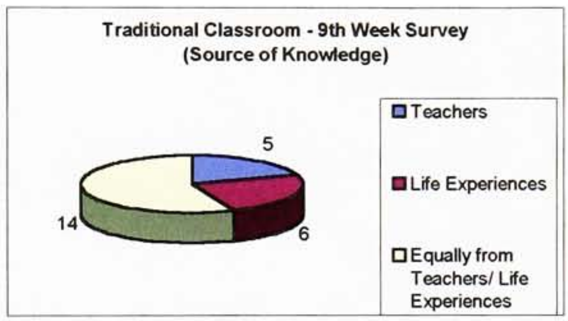
*The aspect was added to aspects of the epistemological beliefs theory because in the context of this thesis, it is important to know if students prefer rote learning (memorizing facts) or conceptual learning (problem solving applications).

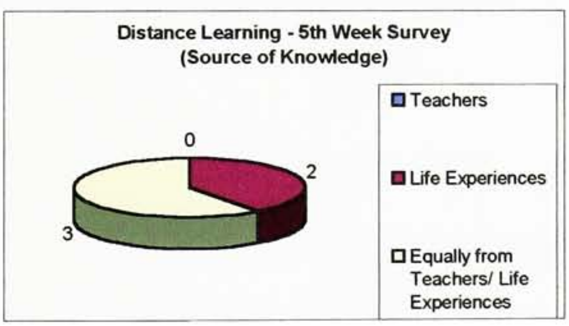
Source of knowledge

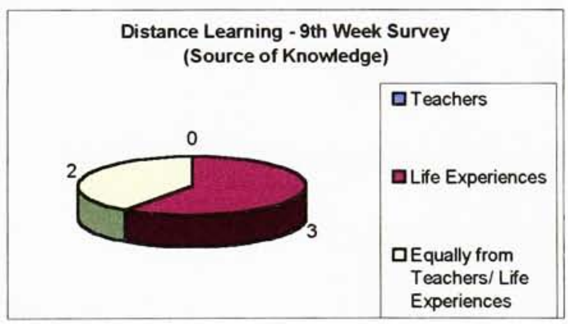
Related question on the questionnaire
Most of my knowledge has been acquired from _______. Teachers Life Experiences Equally from Teachers/Life Experiences
Explanation of the question
The choices indicate whether an individual's knowledge has come from teachers as guiders, life experiences, or both.

Result:









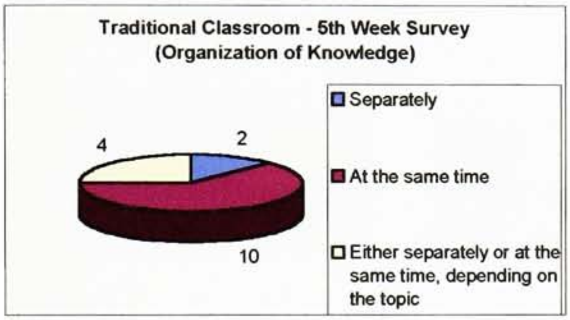
Matched Education Model:
Traditional Classroom – Both Pedagogy and Andragogy (5th and 9th weeks)
Distance Learning – Both Pedagogy and Andragogy (5th week) and Andragogy (9th week)

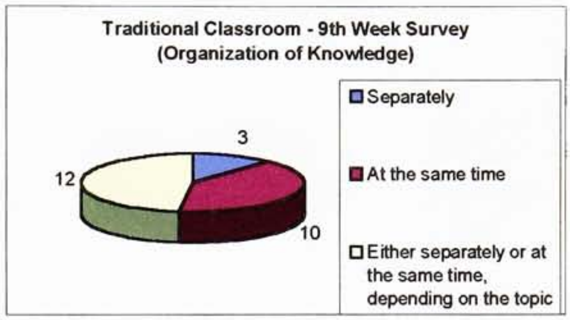
Interpretation:
Most of the participating students from the traditional classroom section indicated that their knowledge came from both life experiences and their teachers. However, more participating students from the distance learning section indicated life experiences as their primary source of knowledge in the 9th versus 5th week surveys. Their inclinations toward life experiences might have accounted in part for distance learning students' declining out-of-class and chat session participation (see Chapter 6).

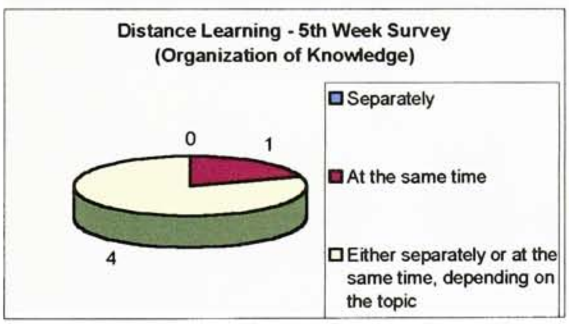
Organization of knowledge

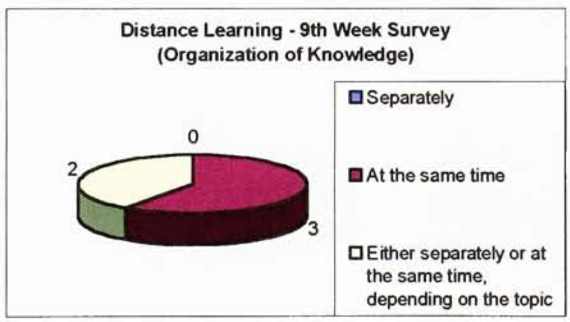
Related question on the questionnaire
I acquire knowledge best by learning about interrelated parts of a topic ________. Separately At the same time Either separately or at the same time, depending on the topic
Explanation of the question
The choices denote how a student organizes interrelated parts of a topic for his or her optimum learning.

Result:









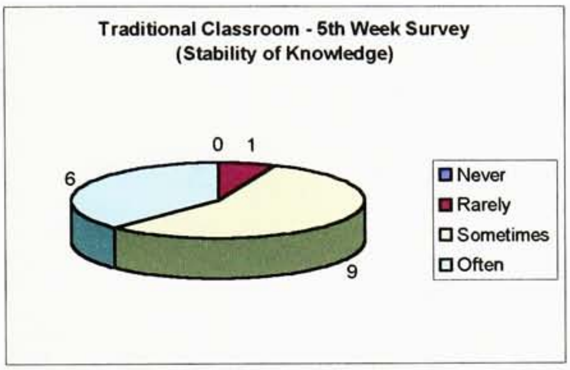
Matched Education Model:
Traditional Classroom – Pedagogy (5th week) and Both Pedagogy and Andragogy (9th week)
Distance Learning – Both Pedagogy and Andragogy (5th week) and Pedagogy (9th week)

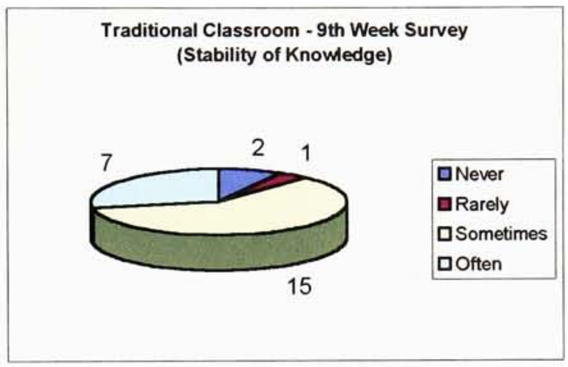
Interpretation:
Most participating traditional classroom students initially believed that they could learn best by studying all the interrelated parts of a topic at the same time. However, they later agreed that they needed to be more flexible in their organization of knowledge. More participating distance learning students leaned toward always learning about interrelated parts of a topic at the same time. The stress of completing assignments at specific times in both sections might have influenced the students' perspective about organizing knowledge (see Chapter 6). Most of the traditional classroom assignments were fairly balanced at equal intervals throughout the Fall Quarter, but the distance learning instructor assigned tasks more rapidly in the second half of this quarter.

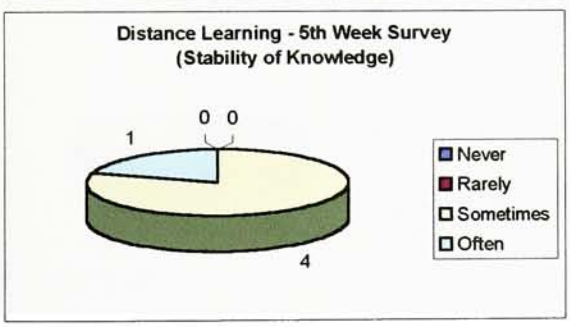
Stability of knowledge

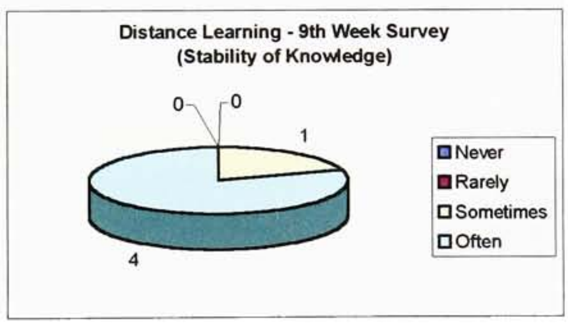
Related question on the questionnaire
After learning about a topic, I believe my knowledge of the subject will _____ change in the future. Never, Rarely, Sometimes, or Often
Explanation of the question
The choices indicate if and how often the student feels his or her knowledge of a subject can be changed after first learning about it.

Result:









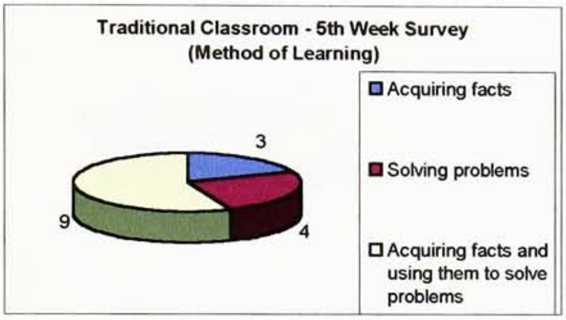
Matched Education Model:
Traditional Classroom – Andragogy (5th and 9th weeks)
Distance Learning – Andragogy (5th and 9th weeks)

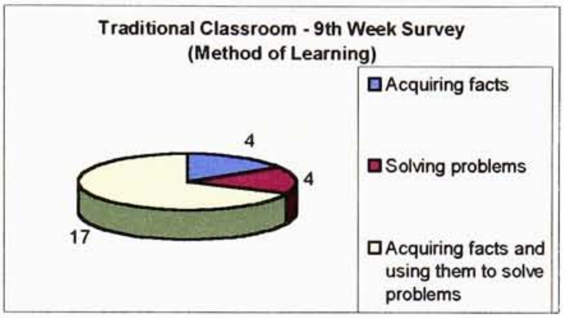
Interpretation:
Most of the participating students from both sections indicated that their knowledge of a subject could change sometimes or often. This type of general response is encouraging, since the concepts of Information Technology change rapidly due to new and updated technologies in computer software, computer hardware, the Internet, networking, etc.

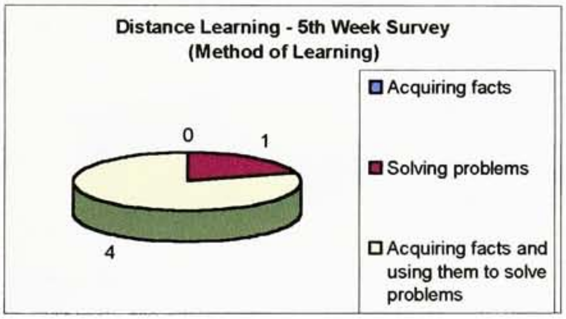
Method of learning

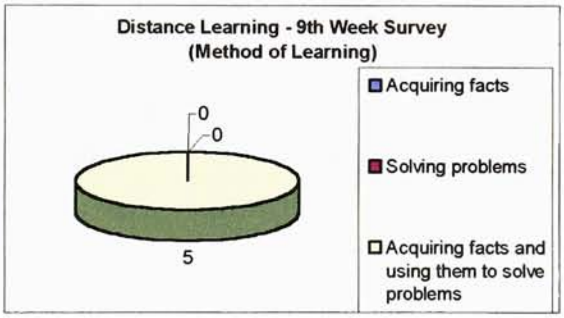
Related question on the questionnaire
I prefer to expand my knowledge by ___________.   Acquiring facts   Solving problems   Acquiring facts and using them to solve problems
Explanation of the question
The choices denote how students can best expand their knowledge.

Result:









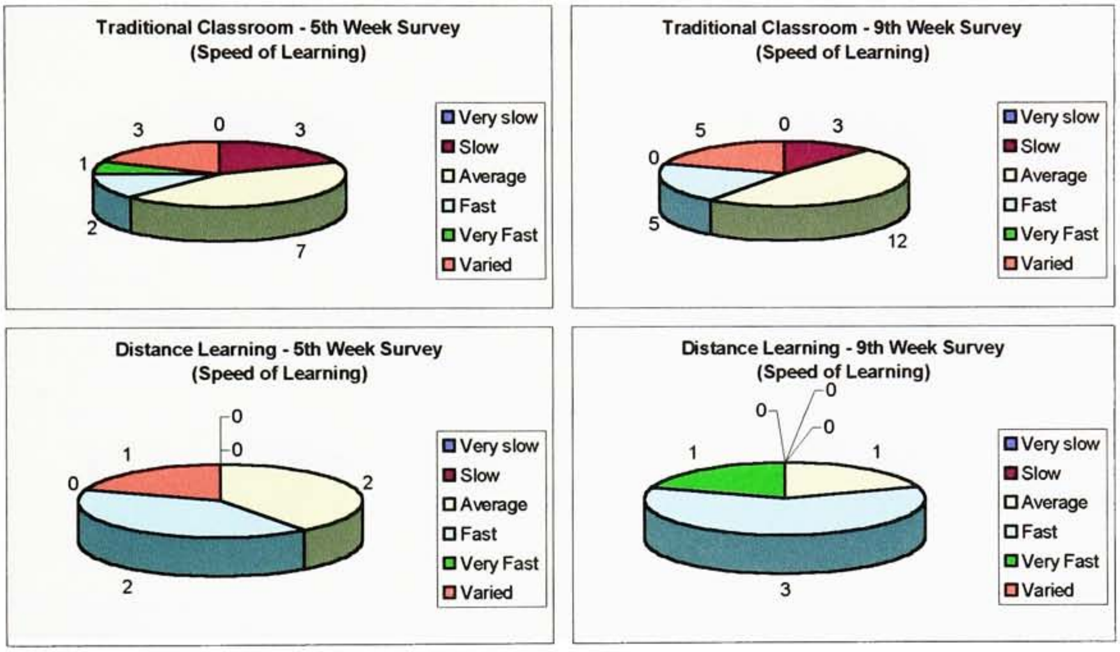
Matched Education Model:
Traditional Classroom – Both Pedagogy and Andragogy (5th and 9th weeks)
Distance Learning – Both Pedagogy and Andragogy (5th and 9th weeks)

Interpretation:
Most of the participating students from both sections concluded that it was important for them to use a combination of learning methods (acquiring facts and solving problems). The instructors from both sections required their students to be familiar with facts and to be able to solve logic and math problems using these facts at the same time.

Speed of learning

Related question on the questionnaire
I have a ____ learning speed. Very slow, Slow, Average, Fast, Very Fast, or Varied (Depending on topic)
Explanation of the question
The choices indicate how a student feels about her or his learning speed.

Result:



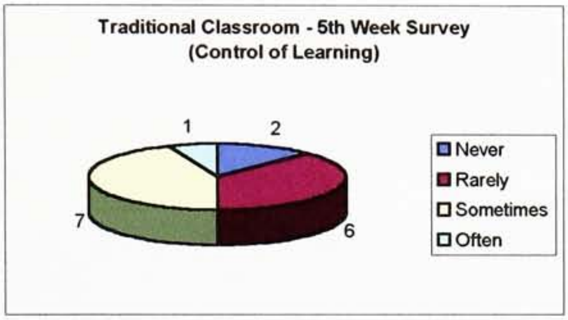
Matched Education Model:
Traditional Classroom – Both Pedagogy and Andragogy (5th and 9th weeks)
Distance Learning – Andragogy (5th and 9th weeks)

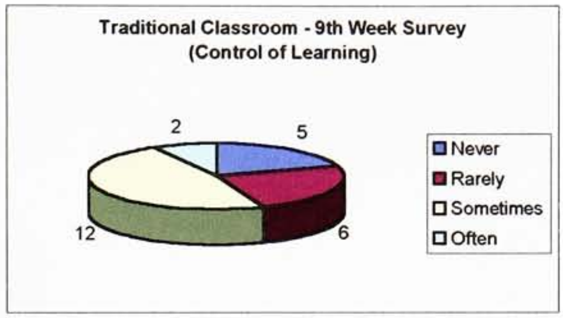
Interpretation:
Most of the participating traditional classroom students indicated in both surveys that they have an average learning speed. On the other hand, all but one of the distance learning students believed that they could learn topics fast or very fast. Average or slow learners must depend more often on teachers for guidance and instructions than fast learners who like to be self-paced in learning new things. The distance learning students' responses to this question might help further explain their declining out-of-class and chat session participation (see Chapter 6).

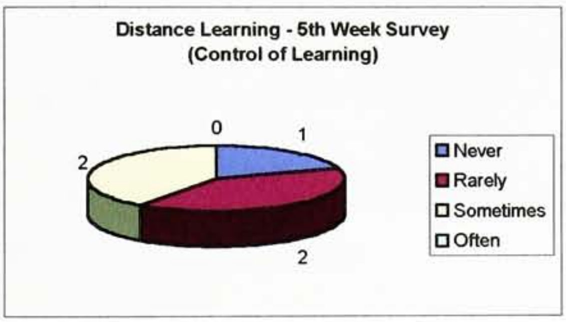
Control of learning

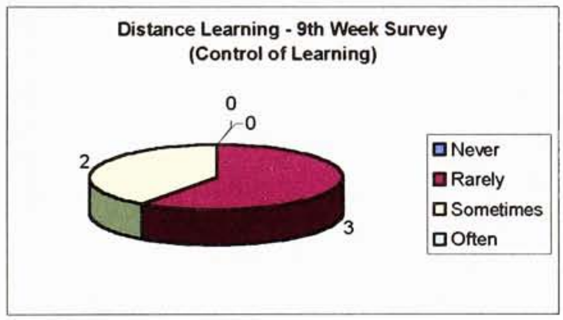
Related question on the questionnaire
My ability to learn new things ______ changes. Never, Rarely, Sometimes, or Often
Explanation of the question
The choices mean how often students feel their learning ability can be changed.

Result:









Matched Education Model:
Traditional Classroom – Both Pedagogy and Andragogy (5^{th} and 9^{th} weeks)
Distance Learning – Both Pedagogy and Andragogy (5^{th} week) and Pedagogy (9^{th} week)

Interpretation:
Participating traditional classroom students appeared to have greater flexibility in changing their learning abilities than participating distance learning students. Self-directed students are supposed to believe that their learning abilities can change sometimes or often. Since the distance learning students were much older on the average than the traditional classroom students, the distance learning students' responses may indicate that they are more "set in their ways" because of their life experiences, and thus tend to resist changes. Also, the distance learning instructor became more authoritative as the Fall Quarter progressed (see Chapter 6), which may have influenced the students into believing that their learning ability should not be changed often (at least in the distance learning environment).

8.5.2 Comprehensive Calculation and Analysis of Participating Students' Survey Results

Basic Formula

Count (CT)	Number of responses	Σ	Sum
Assigned Weight of Pedagogy (AWP)	Intensity of pedagogy	n	nth item
Average Weight (AW)	$\Sigma (CT_n \times AWP_n) / \Sigma (CT)$		
Pedagogy	(AW)		
Andragogy	100 - (AW)		
Overall Average	Average of All Average Weights		

Note: 75 is the highest weight for intensity of pedagogy and 25 is the lowest weight. These weights are arbitrary numbers assigned only for analytical purposes in helping to identify patterns in the survey results (i.e., the weights are not intended to be totally objective measures of the survey results, and their mathematical validity and reliability are therefore still to be determined through further study beyond the scope of this thesis). n means a sequence of responses to a question on the questionnaire. For example, n = 1, 2, 3...

Lookup Learning Style Table For Epistemological Beliefs based on the Staged Self-Directed Learning Model (SSDL)

Student Style	Pedagogy Weight
Dependent	62.5 or higher
Interested	50 - 62.4
Involved	37.5 - 49.9
Self-directed	37.4 or lower

Interval for each student style = 12.4

Note: Interval is calculated as the difference between the highest weight for intensity of pedagogy and the lowest weight for intensity of pedagogy divided by the number of learning styles. As with the assigned weights, each interval is an arbitrary value used only for analytical purposes in helping to identify and classify survey result patterns. The interval values believed to be appropriate for this purpose (to aid in analyzing patterns) were determined after my research was completed, and their mathematical validity and reliability are still to be determined through further study beyond the scope of this thesis.

Analysis of Participating Students' Epistemological Beliefs

Traditional Classroom

	5th week	9th week	Assigned Weight Of Pedagogy	5th week Pedagogy	5th week Andragogy	9th week Pedagogy	9th week Andragogy
Source of knowledge							
Teachers	0	5	75	0		375	
Both	11	14	50	550		700	
Life Experiences	5	6	25	125		150	
			Average Weight	42.2	57.8	49.0	51.0
Organization of knowledge							
Separately	2	3	25	50		75	
Both	4	12	50	200		600	
At the same time	10	10	75	750		750	
			Average Weight	62.5	37.5	57.0	43.0
Stability of knowledge							
Never	0	2	75	0		150	
Rarely	1	1	56	56		56	
Sometimes	9	15	44	396		660	
Often	6	7	25	150		175	
			Average Weight	37.6	62.4	41.6	58.4
Method of learning							
Acquiring facts	3	4	75	225		300	
Solving problems	4	4	25	100		100	
Both	9	17	50	450		850	
			Average Weight	48.4	51.6	50.0	50.0
Speed of learning							
Very slow	0	0	75	0		0	
Slow	3	3	65	195		195	
Average	7	12	50	350		600	
Fast	2	5	35	70		175	
Very fast	1	0	25	25		0	
Varied	3	5	50	150		250	
			Average Weight	49.4	50.6	48.8	51.2
Control of learning							
Never	2	5	75	150		375	
Rarely	6	6	56	336		336	
Sometimes	7	12	44	308		528	
Often	1	2	25	25		50	
			Average Weight	51.2	48.8	51.6	48.4
			Overall Average	48.6	51.4	49.7	50.3
			Student Style	Involved (Almost Interested)		Involved (Almost Interested)	

Distance Learning

	5th week	9th week	Assigned Weight Of Pedagogy	5th week Pedagogy	5th week Andragogy	9th week Pedagogy	9th week Andragogy
Source of knowledge							
Teachers	0	0	75	0		0	
Both	3	2	50	150		100	
Life Experiences	2	3	25	50		75	
			Average Weight	40.0	60.0	35.0	65.0
Organization of knowledge							
Separately	0	0	25	0		0	
Both	4	2	50	200		100	
At the same time	1	3	75	75		225	
			Average Weight	55.0	45.0	65.0	35.0
Stability of knowledge							
Never	0	0	75	0		0	
Rarely	0	0	56	0		0	
Sometimes	4	1	44	176		44	
Often	1	4	25	25		100	
			Average Weight	40.2	59.8	28.8	71.2
Method of learning							
Acquiring facts	0	0	75	0		0	
Solving problems	1	0	25	25		0	
Both	4	5	50	200		250	
			Average Weight	45.0	55.0	50.0	50.0
Speed of learning							
Very slow	0	0	75	0		0	
Slow	0	0	65	0		0	
Average	2	1	50	100		50	
Fast	2	3	35	70		105	
Very fast	0	1	25	0		25	
Varied	1	0	50	50		0	
			Average Weight	44.0	56.0	36.0	64.0
Control of learning							
Never	1	0	75	75		0	
Rarely	2	3	56	112		168	
Sometimes	2	2	44	88		88	
Often	0	0	25	0		0	
			Average Weight	55.0	45.0	51.2	48.8
			Overall Average	46.5	53.5	44.3	55.7
			Student Style	Involved		Involved	

8.5.3 Comprehensive Summary of Participating Students' Survey Results

Comprehensive Summary of Participating Students' Epistemological Beliefs

Type	5th week				9th week			
	Traditional Classroom		Distance Learning		Traditional Classroom		Distance Learning	
	P	A	P	A	P	A	P	A
Source of knowledge	42.2	57.8	40.0	60.0	49.0	51.0	35.0	65.0
Organization of knowledge	62.5	37.5	55.0	45.0	57.0	43.0	65.0	35.0
Stability of knowledge	37.6	62.4	40.2	59.8	41.6	58.4	28.8	71.2
Method of learning	48.4	51.6	45.0	55.0	50.0	50.0	50.0	50.0
Speed of learning	49.4	50.6	44.0	56.0	48.8	51.2	36.0	64.0
Control of learning	51.2	48.8	55.0	45.0	51.6	48.4	51.2	48.8
Overall Preference (Average)	**48.6**	**51.4**	**46.5**	**53.5**	**49.7**	**50.3**	**44.3**	**55.7**
Student Style	**Involved***		**Involved**		**Involved***		**Involved**	

Table 8.6 Comprehensive Summary of Participating Students' Epistemological Beliefs
Note: P = Pedagogy and A = Andragogy

*It is near the borderline of the "Interested" student style.

Analysis and Interpretation

Throughout the Fall Quarter, the participating students from both the traditional classroom and distance learning sections generally indicated through their questionnaire responses that they are "involved" students who like to use their basic knowledge from courses and past life experiences in order to master new skills. They expected to be more self-paced and self-directed in their learning. This means that they became more flexible with the usage of various learning resources such as classmates, books, web pages, teachers, and/or other guiders. The preceding table indicates that participating distance learning students appeared to become slightly more self-directed in some ways than traditional classroom students as the course progressed. However, the general tendencies toward the andragogical or pedagogical models for both sections were nearly the same and did not change substantially overall between the 5th and 9th week surveys.

Malcolm Knowles stated that many American college students are accustomed to the pedagogical K-12 education system, but that they gradually become adult learners between the ages of 20 and 30 (see Chapter 1). Responses to the questionnaires indicate that participating students in both sections are, as a whole, attempting to become self-directed by embracing slightly more andragogical than pedagogical characteristics. However, even the participating distance learning students did not exhibit overwhelming self-directed/adult-learning epistemological beliefs, as Mr. Knowles and others might have expected based on the students' average age of 33 and (presumably) greater life experiences than the traditional classroom students with the average age of 24. In fact, the distance learning students actually seemed to revert in some ways to pedagogical (i.e., childlike) tendencies in response to the same reversion by the distance learning instructor.

8.6 Participating Students' Learning Styles

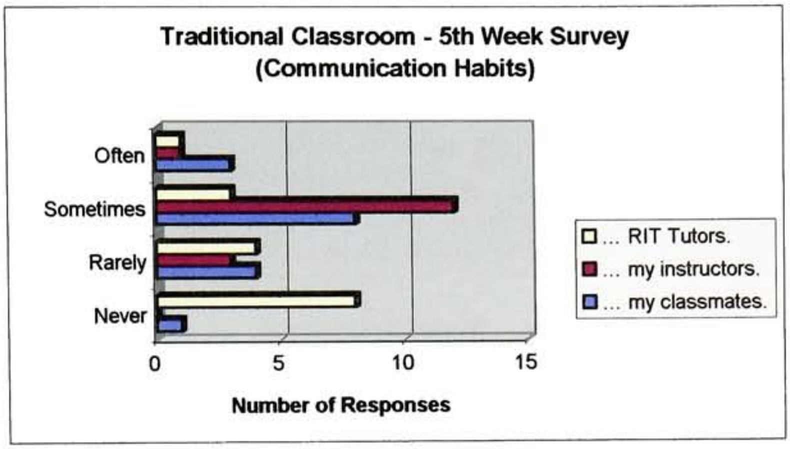
8.6.1 Explanation of Learning Styles

The learning style is defined as how a student customizes his or her communication, work, and study habits to establish an effective learning environment.

Aspect of learning style	Operational definition
Communication habits	How often do students communicate with each other, their instructor, and RIT tutors? What are their common communication technologies? E-mail, phone, fax, or face-to-face contact?
Doing assignments	How do students complete their assignments? Do they work on them a little each day, do them at the last minute, or never do them?
Studying for exams	How do students study for their exams? Do they study a little each day, cram the night before, or rely on their memory?

Table 8.7 Operational definitions of aspects of the learning style

8.6.2 Survey Results of Participating Students' Communication Habits



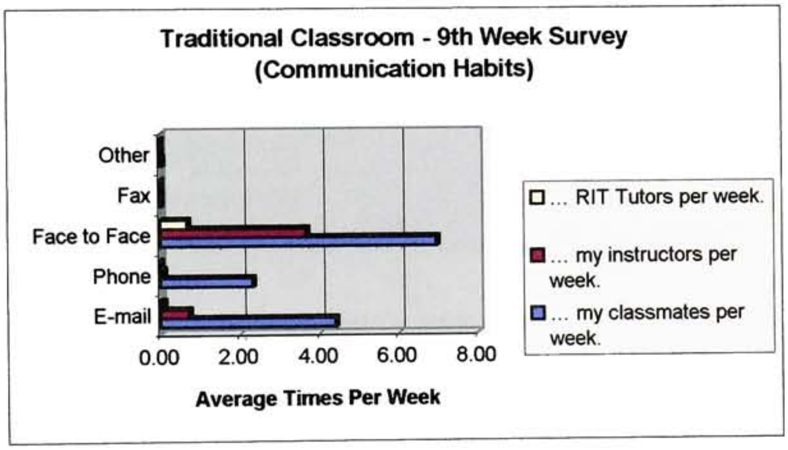


Figure 8.10 Graphs of Participating Students' Communication Habits – Traditional Classroom Section

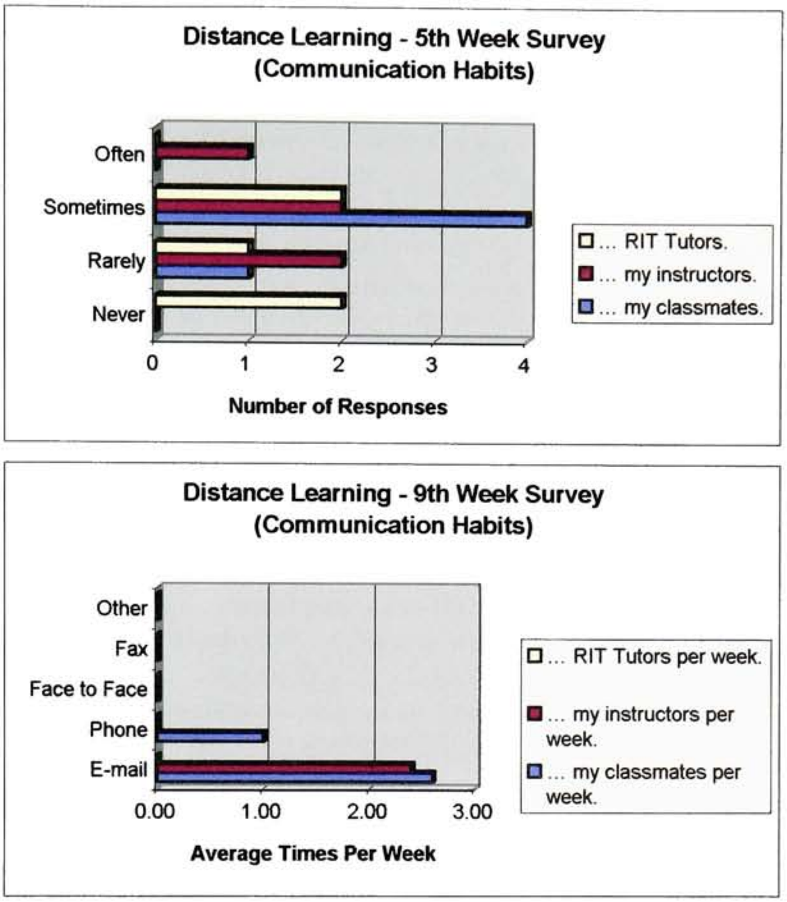


Figure 8.11 Graphs of Participating Students' Communication Habits – Distance Learning Section

Analysis and Interpretation

Section	5^{th} week	9^{th} week
Traditional Classroom	Most of the participating students only communicated occasionally with their classmates and instructors. Most also sought help from RIT tutors only rarely or not at all.	The most common communication method was a face-to-face contact. Most of the participating students communicated with their classmates and instructors in various ways (face-to-face contacts, e-mails, and/or phone calls). Few contacts were made with RIT tutors.
Distance Learning	Most of the participating students only communicated with their classmates occasionally, but they contacted their instructors in varying degrees. Like the traditional classroom section, they did not visit with RIT tutors often.	The most common communication method by far was an e-mail technology. The participating students rarely communicated with their classmates and instructors. They did not contact RIT tutors at all for guidance.

The choices and frequencies of communication methods and communication partners appeared to reflect the participating students' source of knowledge. Most of the participating traditional classroom students felt that they obtained their knowledge from both life experiences and their teachers, and thus contacted their instructors and tutors for the surveyed course more often than the distance learning students did. On the other hand, participating students from the distance learning section emphasized their life experiences most often as the primary source of their knowledge at the end of the Fall Quarter. This is consistent with the theory that andragogical learners typically prefer to rely on life experiences rather than instructors as their principal learning tools.

8.6.3 Survey Results of Participating Students' Work and Study Habits

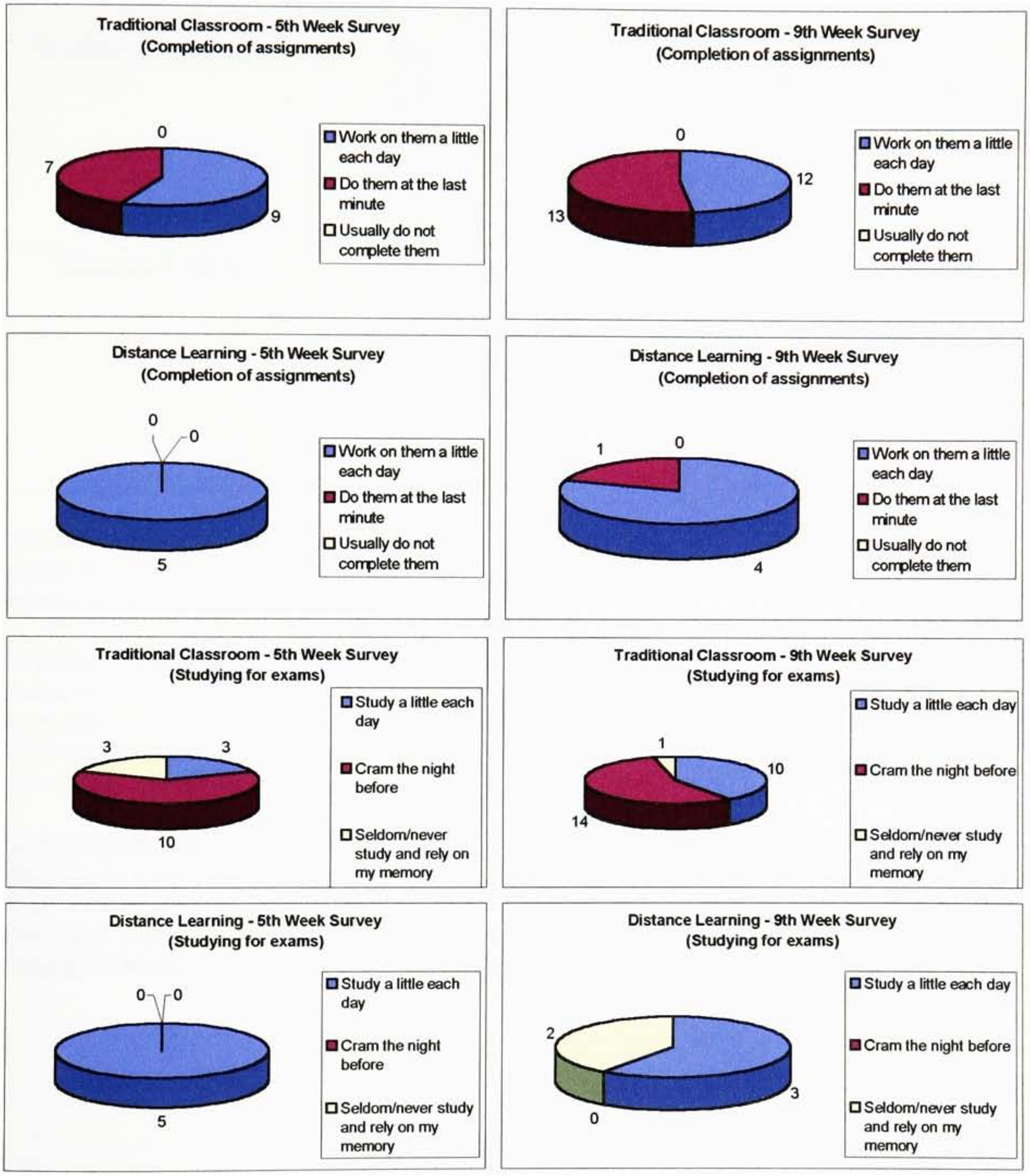


Figure 8.12 Graphs of Participating Students' Work and Study Habits

Analysis and Interpretation

Section	5th week	9th week
Traditional Classroom	More than half of the participating students preferred to work on their assignments a little each day, but almost two-thirds indicated that they cram the night before for an exam.	More than half of the participating students indicated that they not only complete their assignments at the last minute but also cram the night before for an exam.
Distance Learning	All participating students expressed a preference for working on their assignments and studying for exams a little each day.	All but one of the participating students preferred to work on their assignments a little each day. However, three of them believed that they should study a little each day for exams and two others indicated that they seldom or never study.

Student questionnaire responses pertaining to the organization of knowledge and the speed of learning, two aspects of epistemological beliefs, appeared to be consistent with the participating students' work and study habits.

The participating traditional classroom students generally considered themselves to be average learners and believed that it is necessary to vary their organization of knowledge, depending on circumstances. These perceptions may, in part, have led many of the traditional classroom students to indicate that they were cramming for exams and completing assignments at the last minute more at the 9th than the 5th week due to other end-of-quarter pressures.

The participating students from the distance learning section gradually began to feel that they should learn a whole topic by studying all the interrelated parts simultaneously, and most ranked themselves as fast or extremely fast learners who do not need to study very hard in order to pass their exams. Based on all responses, the participating distance learning students generally fit the model of an andragogical learner more closely than the traditional classroom students did.

8.7 Participating Students' Learning Sites

8.7.1 Explanation of Learning Sites

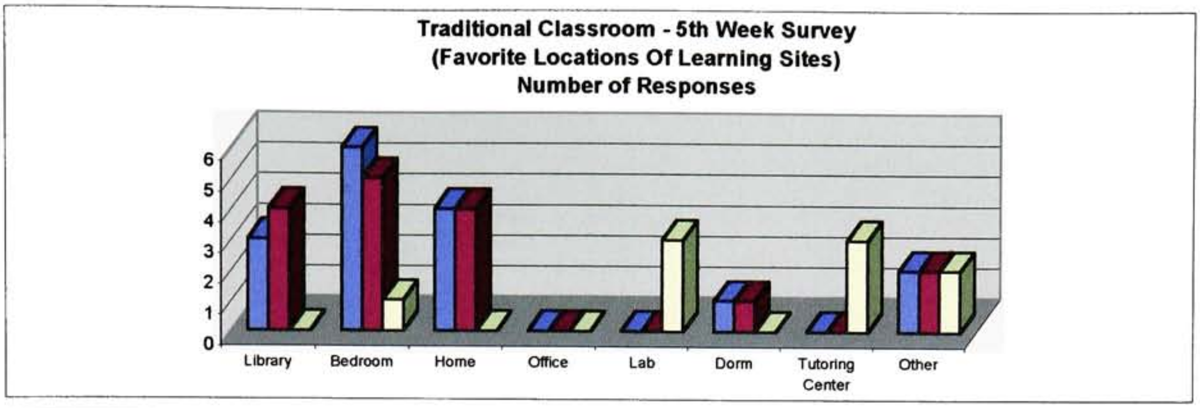
Learning sites are defined as the locations where students complete assignments, study for exams, and obtain assistance. Previous navy studies about learning sites have indicated that dominant colors, average temperature, noise level, light level, and the number of people in the location are major factors that affect how well students learn (Knirk & Montague, 1992, pp. 1 – 2).

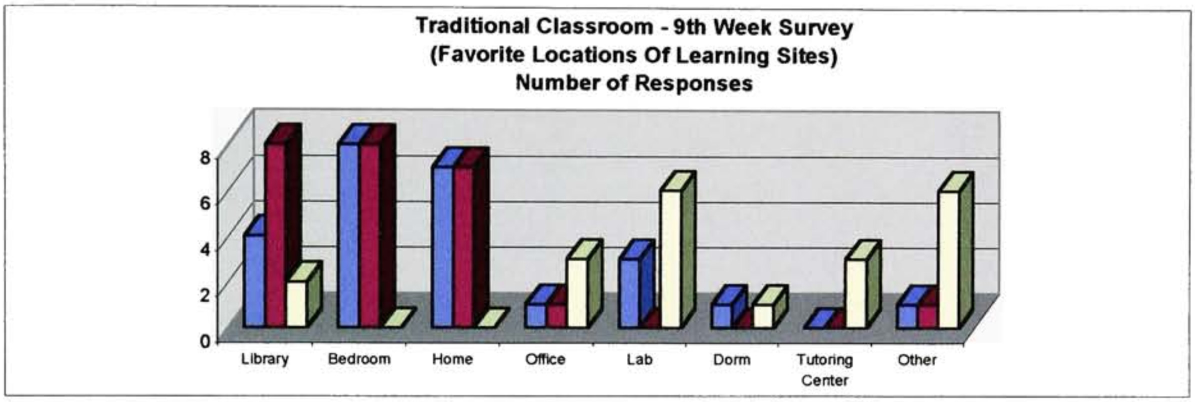
Aspect of learning site	Operational definition
Favorite location	The student's most common physical location for completing assignments, studying for exams, and obtaining assistance. Examples could be libraries, bedrooms, and offices.
Dominant colors	The most common colors in the student's favorite location for each task shown above.
Average temperature	The most common temperature in the student's favorite location for each task shown above.
Noise level	The most common noise level in the student's favorite location for each task shown above.
Light level	The most common light level in the student's favorite location for each task shown above.
Number of people in the location	The number of people generally present in the student's favorite location for each task shown above.

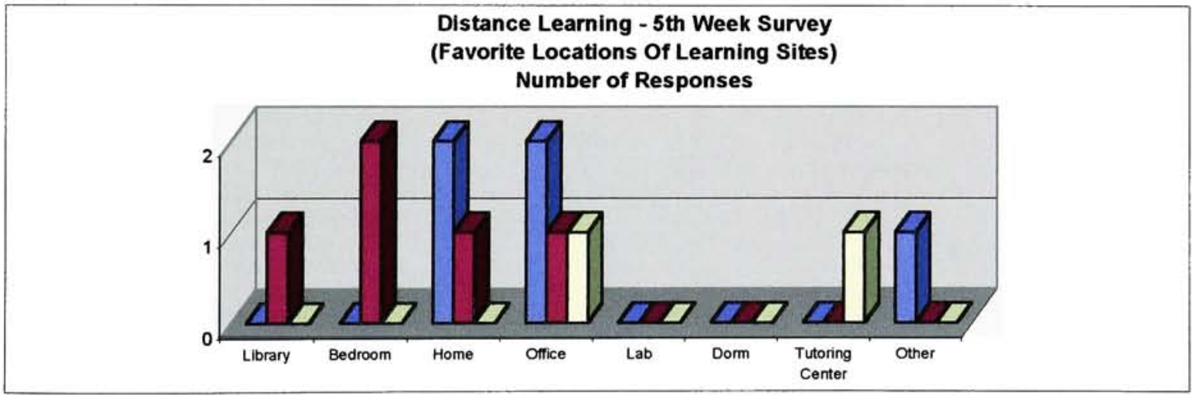
Table 8.8 Operational definitions of aspects of the learning sites

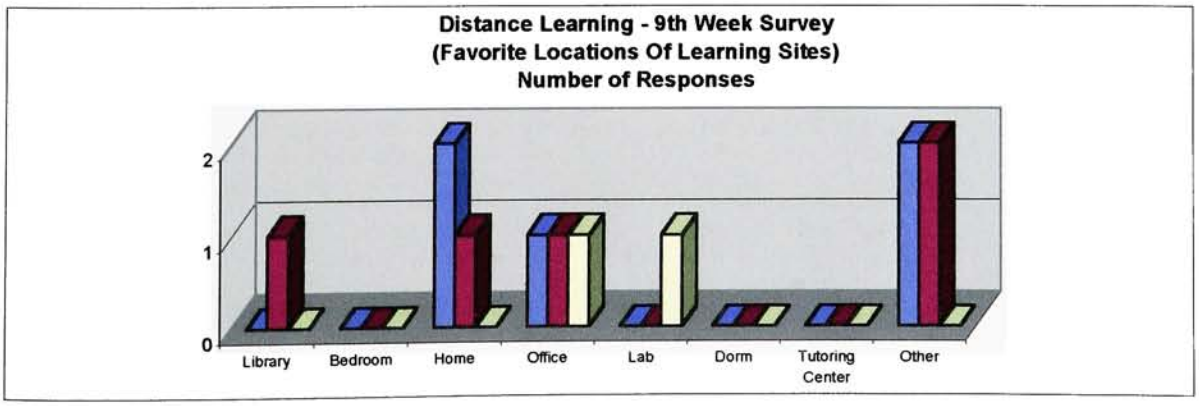
8.7.2 Survey Results of Participating Students' Learning Sites

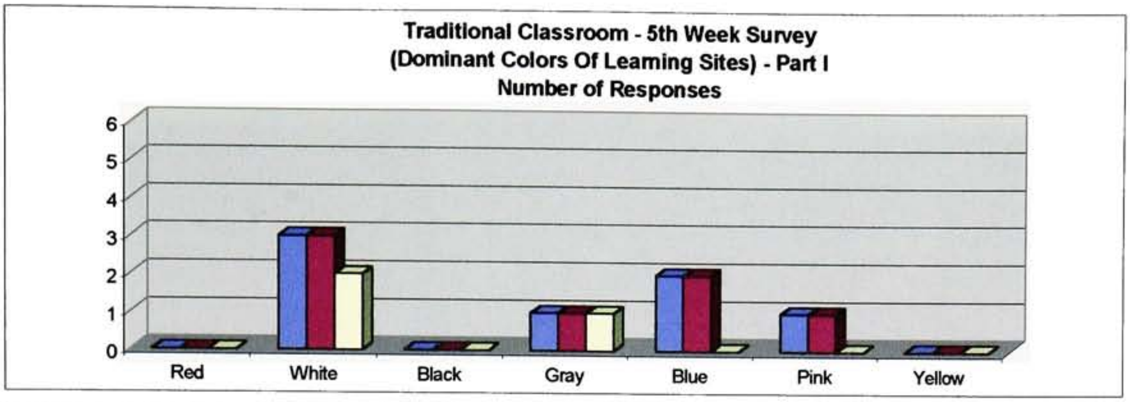
Legend Color	Legend Explanation
Blue	Completing assignments
Red	Studying for exams
Yellow	Obtaining assistance

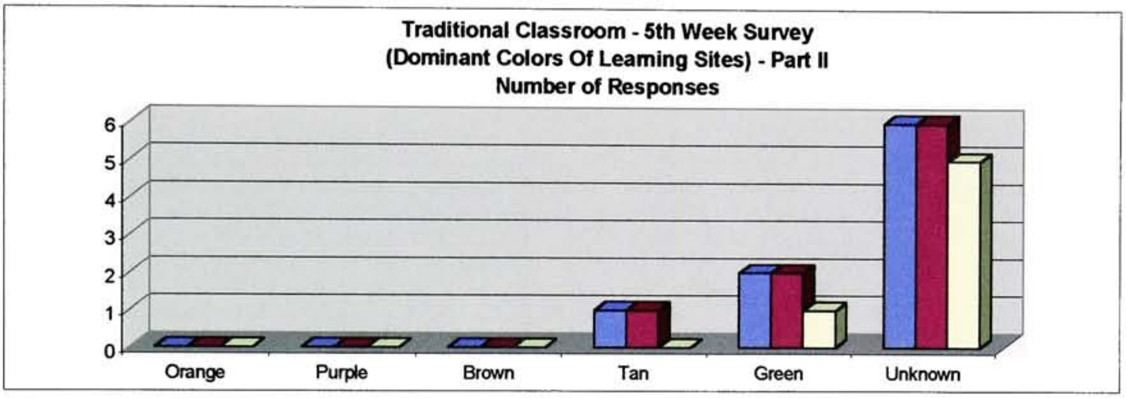

Traditional Classroom - 5th Week Survey
(Favorite Locations Of Learning Sites)
Number of Responses
0
1
2
3
4
5
6
Library
Bedroom
Home
Office
Lab
Dorm
Tutoring Center
Other

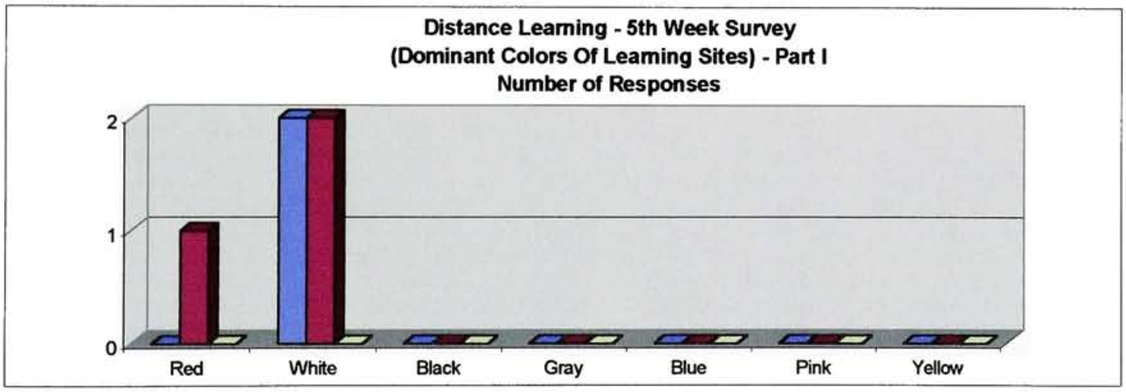

Traditional Classroom - 9th Week Survey
(Favorite Locations Of Learning Sites)
Number of Responses
0
2
4
6
8
Library
Bedroom
Home
Office
Lab
Dorm
Tutoring Center
Other

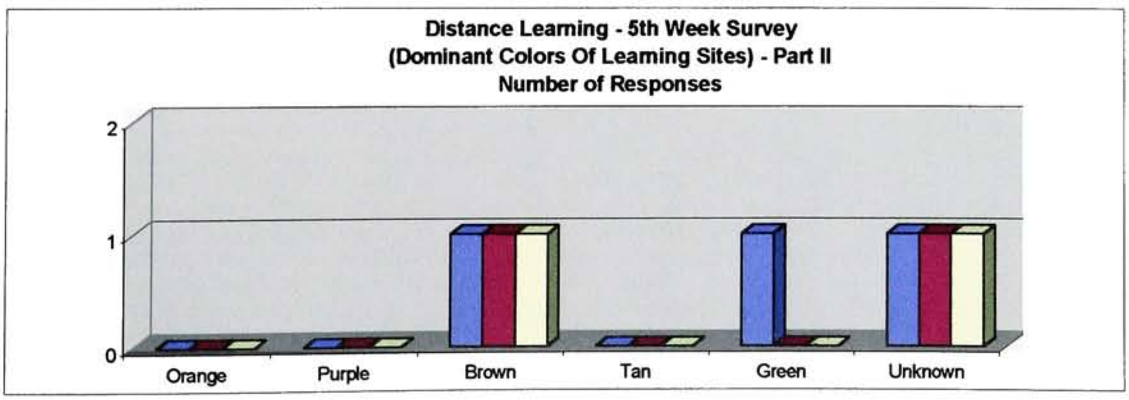

Distance Learning - 5th Week Survey
(Favorite Locations Of Learning Sites)
Number of Responses
0
1
2
Library
Bedroom
Home
Office
Lab
Dorm
Tutoring Center
Other

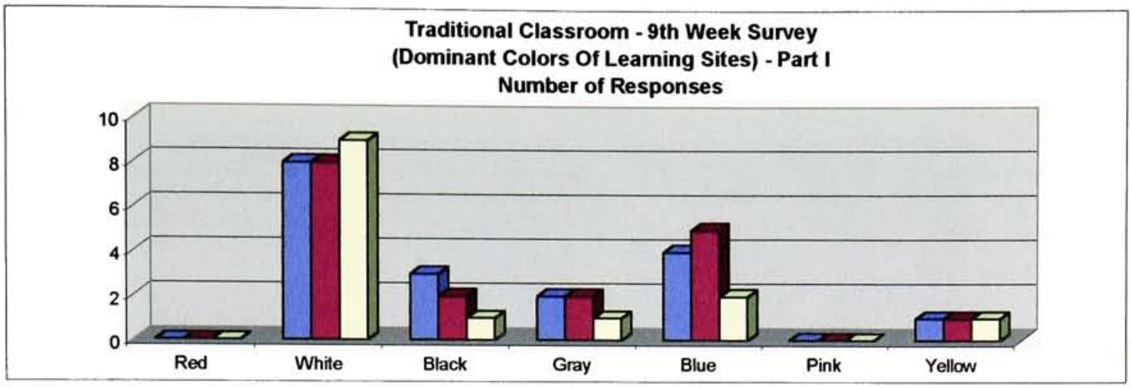

Distance Learning - 9th Week Survey
(Favorite Locations Of Learning Sites)
Number of Responses
0
1
2
Library
Bedroom
Home
Office
Lab
Dorm
Tutoring Center
Other

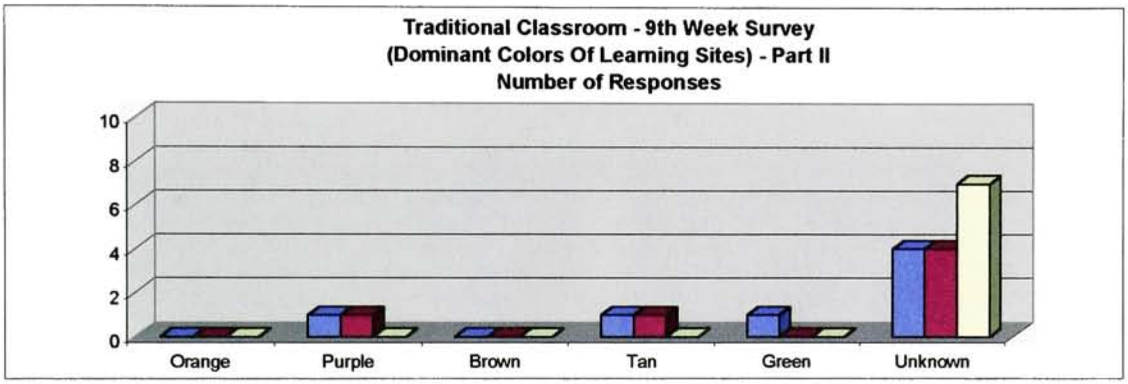

Traditional Classroom - 5th Week Survey
(Dominant Colors Of Learning Sites) - Part I
Number of Responses
0
1
2
3
4
5
6
Red
White
Black
Gray
Blue
Pink
Yellow

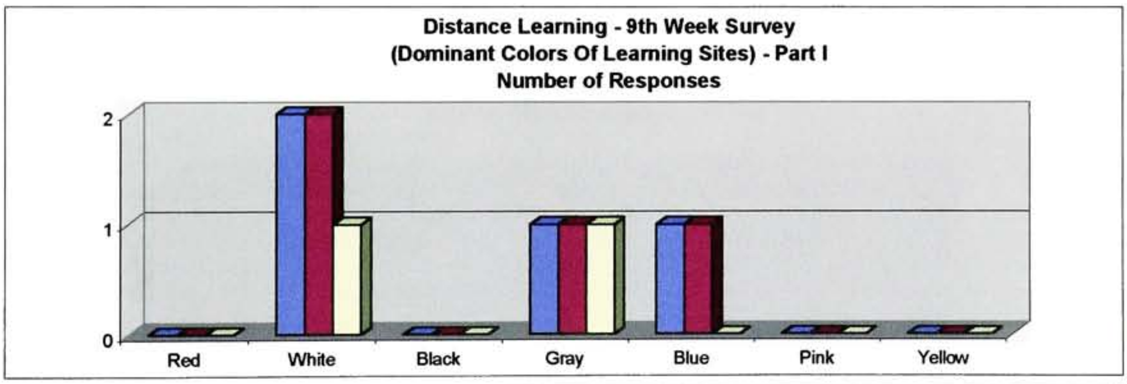

Traditional Classroom - 5th Week Survey
(Dominant Colors Of Learning Sites) - Part II
Number of Responses
0
1
2
3
4
5
6
Orange
Purple
Brown
Tan
Green
Unknown

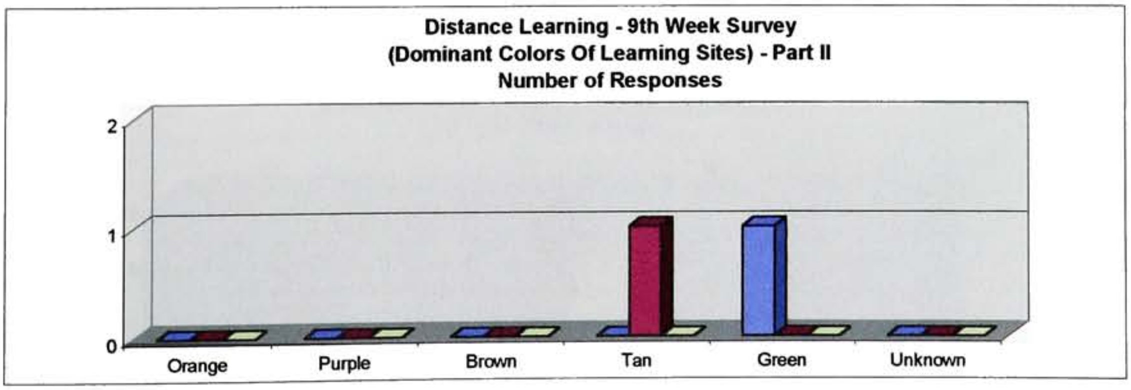

Distance Learning - 5th Week Survey
(Dominant Colors Of Learning Sites) - Part I
Number of Responses
0
1
2
Red
White
Black
Gray
Blue
Pink
Yellow

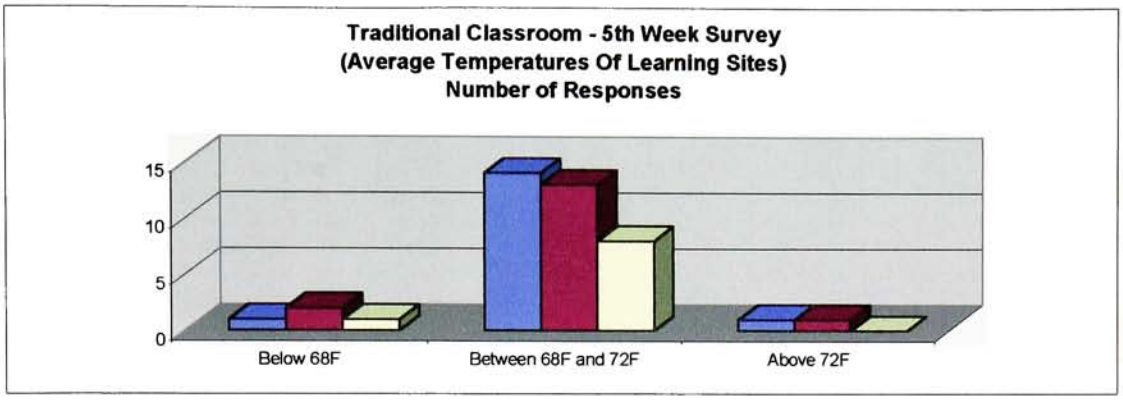

Distance Learning - 5th Week Survey
(Dominant Colors Of Learning Sites) - Part II
Number of Responses
0
1
2
Orange
Purple
Brown
Tan
Green
Unknown

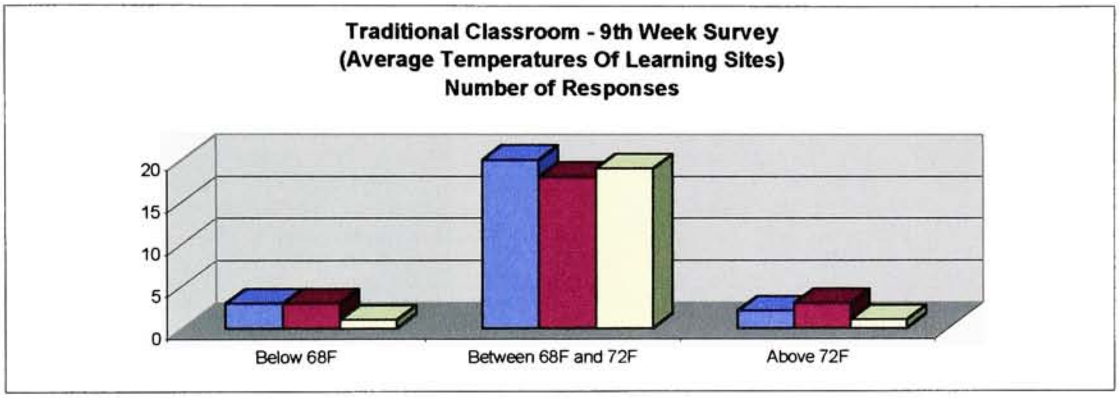

Traditional Classroom - 9th Week Survey
(Dominant Colors Of Learning Sites) - Part I
Number of Responses
10
8
6
4
2
0
Red
White
Black
Gray
Blue
Pink
Yellow

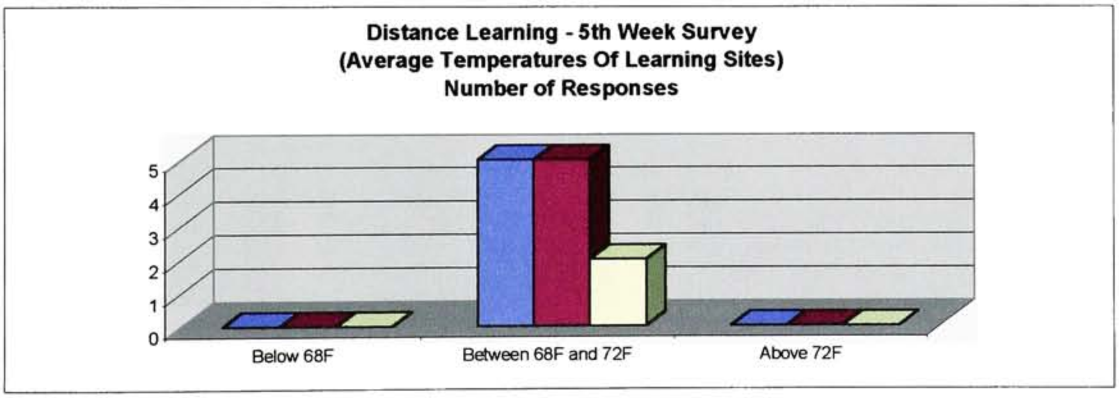

Traditional Classroom - 9th Week Survey
(Dominant Colors Of Learning Sites) - Part II
Number of Responses
10
8
6
4
2
0
Orange
Purple
Brown
Tan
Green
Unknown

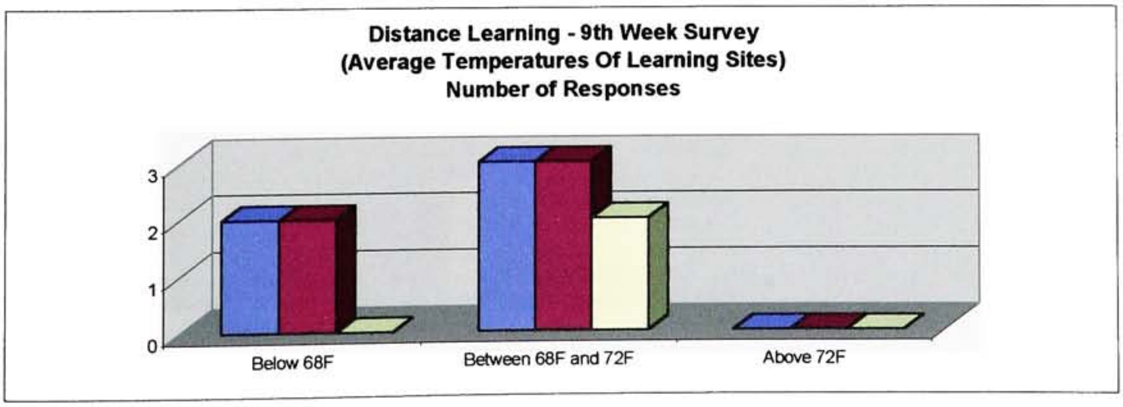

Distance Learning - 9th Week Survey
(Dominant Colors Of Learning Sites) - Part I
Number of Responses
2
1
0
Red
White
Black
Gray
Blue
Pink
Yellow

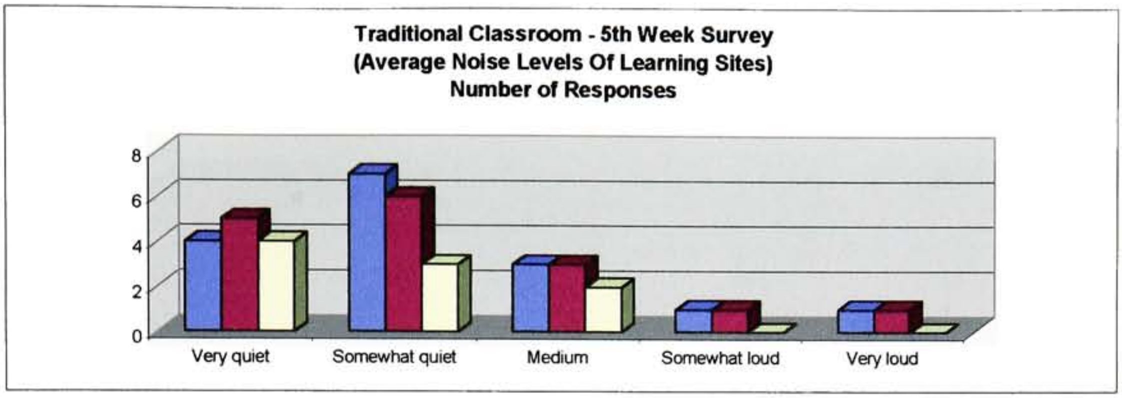

Distance Learning - 9th Week Survey
(Dominant Colors Of Learning Sites) - Part II
Number of Responses
2
1
0
Orange
Purple
Brown
Tan
Green
Unknown

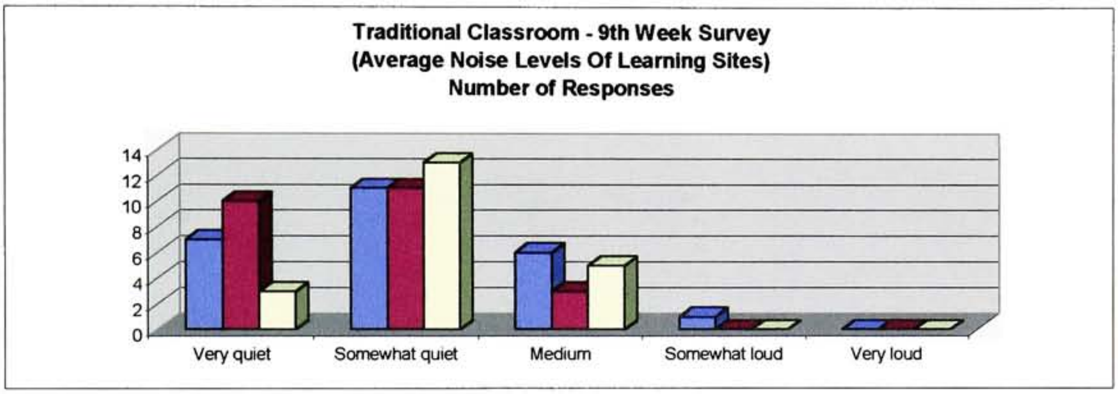

Traditional Classroom - 5th Week Survey
(Average Temperatures Of Learning Sites)
Number of Responses
15
10
5
0
Below 68F
Between 68F and 72F
Above 72F

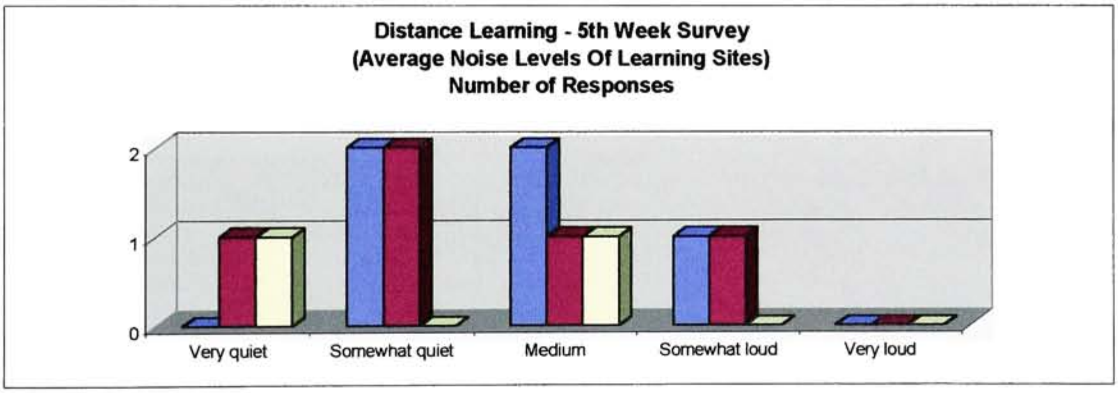

Traditional Classroom - 9th Week Survey
(Average Temperatures Of Learning Sites)
Number of Responses
20
15
10
5
0
Below 68F
Between 68F and 72F
Above 72F

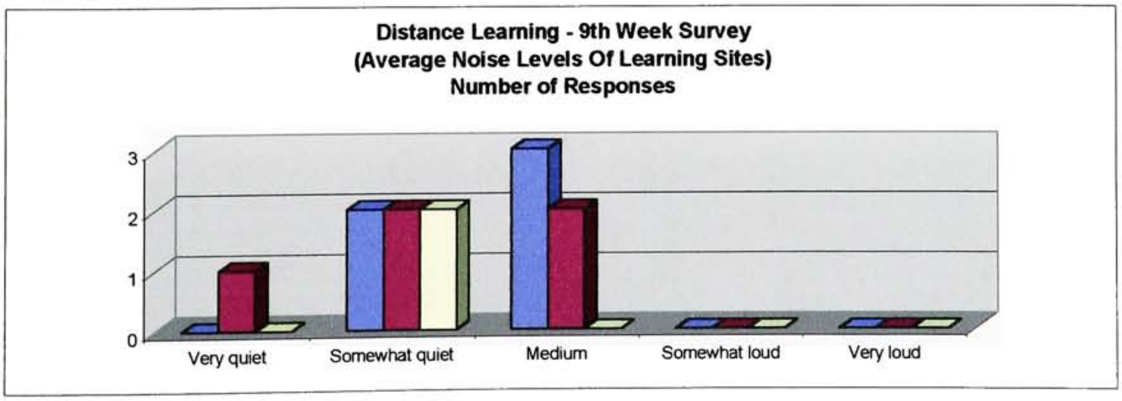

Distance Learning - 5th Week Survey
(Average Temperatures Of Learning Sites)
Number of Responses
5
4
3
2
1
0
Below 68F
Between 68F and 72F
Above 72F

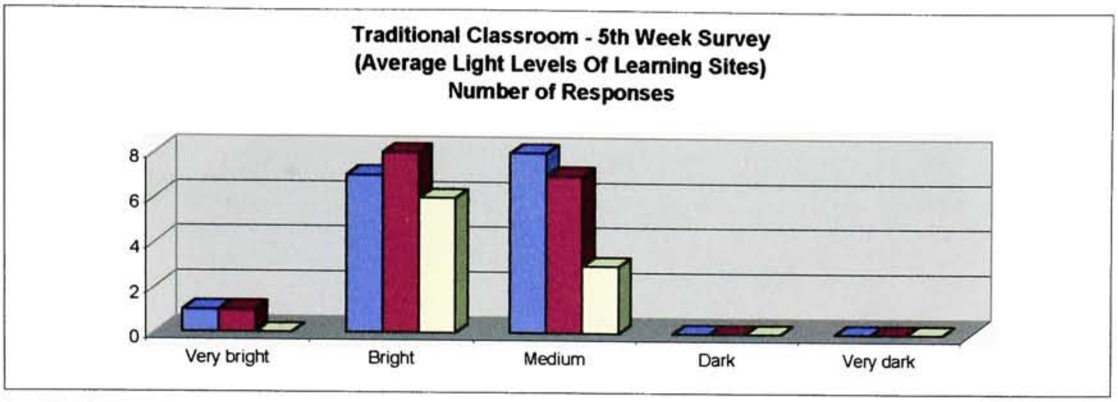

Distance Learning - 9th Week Survey
(Average Temperatures Of Learning Sites)
Number of Responses
3
2
1
0
Below 68F
Between 68F and 72F
Above 72F

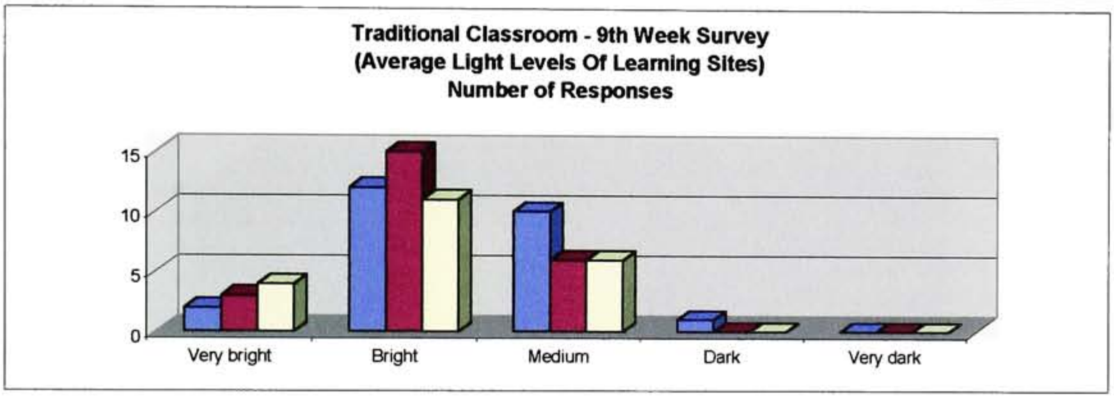

Traditional Classroom - 5th Week Survey
(Average Noise Levels Of Learning Sites)
Number of Responses
8
6
4
2
0
Very quiet
Somewhat quiet
Medium
Somewhat loud
Very loud

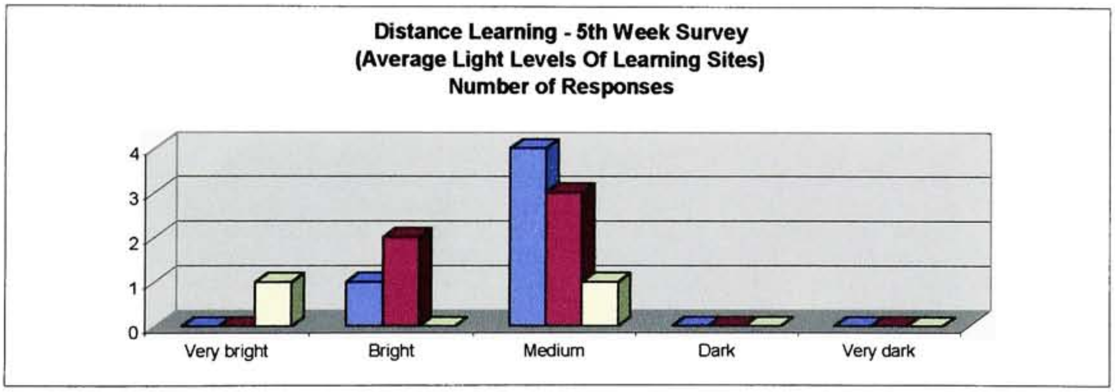

Traditional Classroom - 9th Week Survey
(Average Noise Levels Of Learning Sites)
Number of Responses
14
12
10
8
6
4
2
0
Very quiet
Somewhat quiet
Medium
Somewhat loud
Very loud

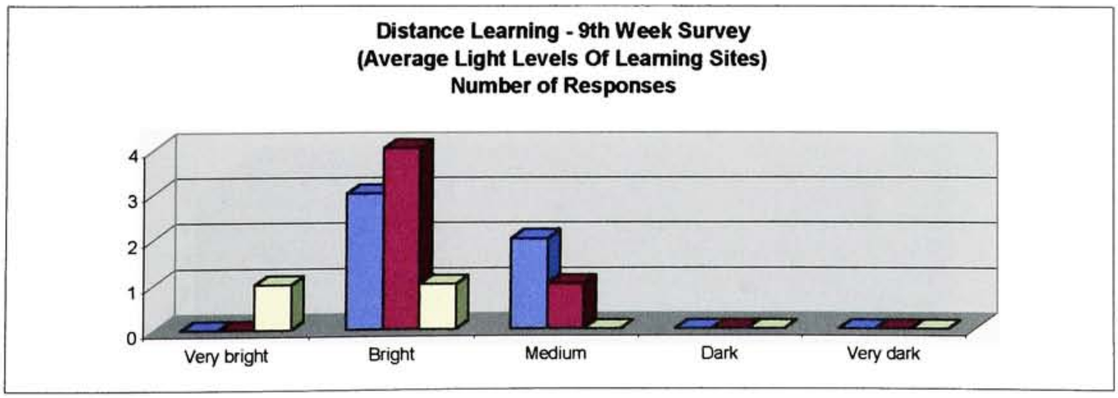

Distance Learning - 5th Week Survey
(Average Noise Levels Of Learning Sites)
Number of Responses
2
1
0
Very quiet
Somewhat quiet
Medium
Somewhat loud
Very loud


Distance Learning - 9th Week Survey
(Average Noise Levels Of Learning Sites)
Number of Responses
3
2
1
0
Very quiet
Somewhat quiet
Medium
Somewhat loud
Very loud

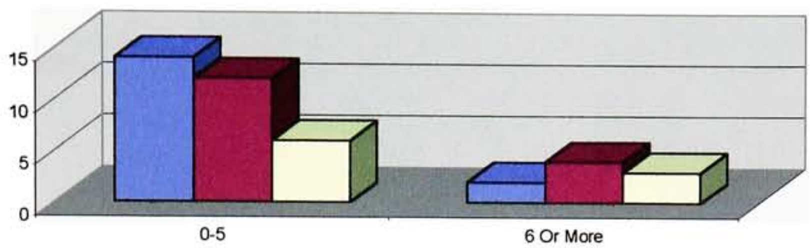

Traditional Classroom - 5th Week Survey
(Average Light Levels Of Learning Sites)
Number of Responses
8
6
4
2
0
Very bright
Bright
Medium
Dark
Very dark


Traditional Classroom - 9th Week Survey
(Average Light Levels Of Learning Sites)
Number of Responses
15
10
5
0
Very bright
Bright
Medium
Dark
Very dark

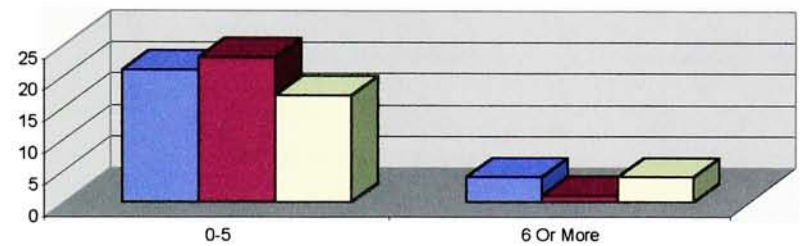

Distance Learning - 5th Week Survey
(Average Light Levels Of Learning Sites)
Number of Responses
4
3
2
1
0
Very bright
Bright
Medium
Dark
Very dark


Distance Learning - 9th Week Survey
(Average Light Levels Of Learning Sites)
Number of Responses
4
3
2
1
0
Very bright
Bright
Medium
Dark
Very dark

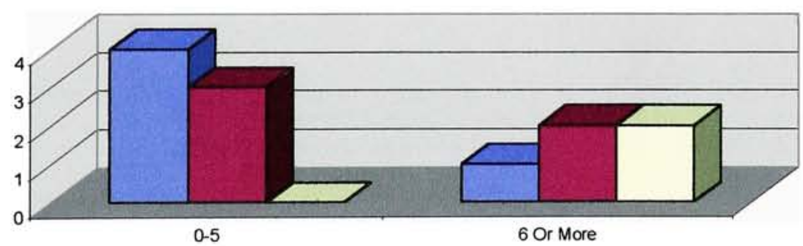
Traditional Classroom - 5th Week Survey
(Number of People In Learning Sites)
Number of Responses



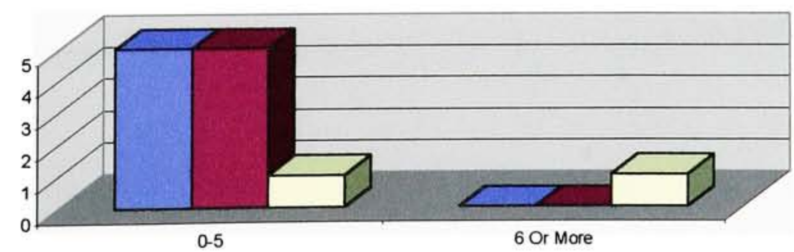
Traditional Classroom - 9th Week Survey
(Number of People In Learning Sites)
Number of Responses



Distance Learning - 5th Week Survey
(Number of People In Learning Sites)
Number of Responses



Distance Learning - 9th Week Survey
(Number of People In Learning Sites)
Number of Responses



Analysis and Interpretation

5th week

Type	Traditional Classroom	Distance Learning
Favorite location	The most popular locations for doing assignments and studying for exams were bedrooms, libraries, and homes. Assistance was obtained at tutoring centers and labs most often.	The most popular locations for doing assignments were homes and offices. Most of the participating students studied for exams in their bedrooms. They went to either offices or tutoring centers in order to obtain assistance.
Dominant colors	<u>Doing assignments</u> 1st – White 2nd – Blue or Green <u>Studying for exams</u> 1st – White 2nd – Blue or Green <u>Obtaining assistance</u> 1st – White 2nd – Green or Gray	<u>Doing assignments</u> 1st – White 2nd – Green or Brown <u>Studying for exams</u> 1st – White 2nd – Red or Brown <u>Obtaining assistance</u> 1st – Brown
Average temperature	Almost all locations were between 68° F and 72° F.	All locations were between 68° F and 72° F.
Noise level	Most of the learning sites were either very quiet or somewhat quiet.	The noise levels in the learning sites ranged from very quiet to somewhat loud, with most being a medium or somewhat quiet learning environment.
Light level	Most of the learning sites were either bright or at a medium level.	Most of the learning sites were either bright or at a medium level.
Number of people in the location	Most of the participating students worked, studied, or got help in learning sites with 5 or fewer other people present.	Most of the participating students worked and studied alone or with few people in their learning sites. However, there were 6 or more people in the learning sites where they were getting help.

9th week

Type	Traditional Classroom	Distance Learning
Favorite location	The most popular locations for doing assignments and studying for exams were bedrooms, libraries, and homes. The participating students visited labs most often for help.	The most popular locations for doing assignments were homes. Most of the participating students studied for exams either in libraries, offices, or at their homes. They went most often either to offices or labs for help.
Dominant colors	<u>Doing assignments</u> 1st – White 2nd – Blue <u>Studying for exams</u> 1st – White 2nd – Blue <u>Obtaining assistance</u> 1st – White 2nd – Blue	<u>Doing assignments</u> 1st – White 2nd – Gray, Green, or Blue <u>Studying for exams</u> 1st – White 2nd – Gray, Blue, or Tan <u>Obtaining assistance</u> 1st – White or Gray
Average temperature	Almost all locations were between 68° F and 72° F.	Locations for doing assignments and studying for exams were generally between 68° F and 72° F, with only a few being below 68° F. All but one of the locations for getting help were between 68° F and 72° F.
Noise level	Most of the learning sites were either very quiet or somewhat quiet.	Most of the participating students had medium or somewhat quiet learning environments.
Light level	Most of the learning sites were either bright or at a medium level.	Most of the learning sites were either bright or at a medium level.
Number of people in the location	Most of the participating students worked, studied, or got help in learning sites with 5 or fewer other people present.	Most of the participating students worked, studied, or got help in learning sites with 5 or fewer other people present.

Analysis and Interpretation Continued…

Favorite learning sites for both traditional classroom and distance learning students were generally excellent based on previous navy research studies which indicated that soft colors (white, green, blue), temperatures of 68° F to 74° F, low noise levels (i.e., less than 45 decibels), and bright light levels are ideal for a learning environment (Knirk & Montague, 1992, pp. 1 – 2). Favorite learning sites for the participating students from both sections also had a few people present, which presumably helped to minimize distractions in completing educational tasks and thus to optimize their learning process.

Chapter 9

CONCLUSION – ANALYSIS OF GAPS BETWEEN INSTRUCTORS' TEACHING STYLES AND STUDENTS' LEARNING STYLES/ EPISTEMOLOGICAL BELIEFS

9.1 Overview

The main focus of this chapter is to provide in-depth answers to the fifth principal question documented in Chapters 3 and 4.

Which are the methods that produce the largest and smallest gaps between instructors' teaching styles (scaffolding and cognitive apprenticeship) and students' learning styles/ epistemological beliefs (cognitive apprenticeship and assisted learning) at RIT?

The chapter presents gap analysis tables, additional data about differences in pedagogy tendencies between the 5th and 9th week questionnaire survey results, analyses of differences in pedagogy, and the final gap analysis conclusion. The overall pedagogy preference figures from Tables 7.11, 7.12, and 8.6, as well as several educational theories (including the Staged Self-Directed Learning Model, andragogy vs. pedagogy, Mezirow's Concept of Perspective Transformation, and all six aspects of the sociocultural theory from the second chapter) are utilized in analyzing the gaps between instructors' teaching styles and students' learning styles.

9.2 Gap Analysis Tables

The following gap analysis tables identify matches and mismatches for the two surveyed sections between instructors' teaching styles and students' learning styles/epistemological beliefs, based on the Staged Self-Directed Learning Model (see Section 2.4.3). Comprehensive summaries of the participating instructors' learning and teaching viewpoints provide the information used in these analyses about teaching styles (see Tables 7.11 and 7.12), whereas details of the participating students' learning styles can be found in the comprehensive summary of their epistemological beliefs (see Table 8.6).

Explanations of Colors Used in the Tables

Color	Explanation
Bold blue	Actual students' learning style as shown in Table 8.6
Light blue	"Near borderline" students' learning style as shown in Table 8.6
Bold yellow	Actual teaching style as shown in Table 7.11 or 7.12
Light yellow	"Near borderline" teaching style as shown in Table 7.11 or 7.12
Bold green	Actual match or mismatch between instructor's teaching and students' learning styles
Light green	"Near borderline" match or mismatch between instructor's teaching and students' learning styles

5th Week Traditional Classroom Survey

Instructor's Learning Viewpoint vs. Students' Learning Style

	Instructor's Learning Viewpoint			
Students' Learning Style	Authority, Coach	Motivator, Guide	Facilitator	Consultant, Delegator
Self-directed	Severe Mismatch	Mismatch	Near Match	Match
Involved	Mismatch	Near Match	Match	Near Match
Interested	Near Match	Match	Near Match	Mismatch
Dependent	Match	Near Match	Mismatch	Severe Mismatch

	Pedagogy	Andragogy
Instructor's Learning Viewpoint	50.0	50.0
Students' Learning Style	48.6	51.4
Difference	1.4	1.4

Instructor's Teaching Viewpoint vs. Students' Learning Style

	Instructor's Teaching Viewpoint			
Students' Learning Style	Authority, Coach	Motivator, Guide	Facilitator	Consultant, Delegator
Self-directed	Severe Mismatch	Mismatch	Near Match	Match
Involved	Mismatch	Near Match	Match	Near Match
Interested	Near Match	Match	Near Match	Mismatch
Dependent	Match	Near Match	Mismatch	Severe Mismatch

	Pedagogy	Andragogy
Instructor's Teaching Viewpoint	57.1	42.9
Students' Learning Style	48.6	51.4
Difference	8.5	8.5

Analysis and Interpretation

The instructor's overall perspectives about his students' learning style closely matched with the students' actual learning style. This "near match" indicated, among other things, that the instructor and his students generally agreed that both applications (problem solving) and subject matter (facts) were necessary aspects of their learning environment (see Chapters 7 and 8). However, the instructor's teaching viewpoint was much more pedagogical than his students' actual learning style. For example, he preferred that the students follow his techniques for doing assignments, whereas most of the participating students indicated that both knowledge from teachers and life experiences were equally important to them in mastering new skills in the classroom (see Chapters 7 and 8).

9th Week Traditional Classroom Survey

Instructor's Learning Viewpoint vs. Students' Learning Style

	Instructor's Learning Viewpoint			
Students' Learning Style	**Authority, Coach**	**Motivator, Guide**	**Facilitator**	**Consultant, Delegator**
Self-directed	Severe Mismatch	Mismatch	Near Match	Match
Involved	Mismatch	Near Match	Match	Near Match
Interested	Near Match	Match	Near Match	Mismatch
Dependent	Match	Near Match	Mismatch	Severe Mismatch

	Pedagogy	**Andragogy**
Instructor's Learning Viewpoint	34.0	66.0
Students' Learning Style	49.7	50.3
Difference	15.7	15.7

Instructor's Teaching Viewpoint vs. Students' Learning Style

	Instructor's Teaching Viewpoint			
Students' Learning Style	**Authority, Coach**	**Motivator, Guide**	**Facilitator**	**Consultant, Delegator**
Self-directed	Severe Mismatch	Mismatch	Near Match	Match
Involved	Mismatch	Near Match	Match	Near Match
Interested	Near Match	Match	Near Match	Mismatch
Dependent	Match	Near Match	Mismatch	Severe Mismatch

	Pedagogy	**Andragogy**
Instructor's Teaching Viewpoint	53.6	46.4
Students' Learning Style	49.7	50.3
Difference	3.9	3.9

Analysis and Interpretation

Differences between the instructor's general viewpoint about his students' learning style and the students' actual learning style were more significant at the 9th week than at the 5th week of the Fall Quarter. The instructor perceived that his students were becoming much more self-directed, independent, and experienced learners as the quarter progressed. His questionnaire responses indicate that he believed his students needed minimal guidance, emphasized social experiences more in their learning process, and preferred problem solving activities rather than subject matter discussions (see Chapter 7). On the other hand, most of his students still ranked themselves at the 9th week as average (not fast nor slow) learners who need guidance from their instructors. As mentioned in Chapter 8, the students' overall tendencies toward the andragogical model of self-direction changed very slightly between the 5th and 9th weeks.

Despite this difference between the instructor's learning viewpoint and his students' actual learning style, his teaching viewpoint did not change significantly between the 5th and 9th weeks of this quarter. The instructor decided to allow his students to use both his methods and their experimental techniques (see Chapter 7) as well as to choose one of four final project topics and to complete this project on their own (see Chapter 6).

The changes in the instructor's learning viewpoint imply that he was very satisfied with the progress, high motivation, and strong interests shown by his students. Good class attendance and improving class participation might also have influenced the changes in his learning viewpoint (see Chapters 6 and 7). However, his decision to maintain relative consistency in his teaching viewpoint throughout the Fall Quarter, with only moderate steps taken toward self-directed activities, appears to have been the correct course of action due to the minimal changes perceived by the students as a whole in their learning style between the 5th and 9th weeks. This consistent teaching approach probably enabled the students to progress smoothly through the course without encountering the type of significant difficulties that a radical change in the teaching environment may have caused.

5th Week Distance Learning Survey

Instructor's Learning Viewpoint vs. Students' Learning Style

	Instructor's Learning Viewpoint			
Students' Learning Style	**Authority, Coach**	**Motivator, Guide**	**Facilitator**	**Consultant, Delegator**
Self-directed	Severe Mismatch	Mismatch	Near Match	Match
Involved	Mismatch	Near Match	Match	Near Match
Interested	Near Match	Match	Near Match	Mismatch
Dependent	Match	Near Match	Mismatch	Severe Mismatch

	Pedagogy	**Andragogy**
Instructor's Learning Viewpoint	45.0	55.0
Students' Learning Style	46.5	53.5
Difference	1.5	1.5

Instructor's Teaching Viewpoint vs. Students' Learning Style

	Instructor's Teaching Viewpoint			
Students' Learning Style	**Authority, Coach**	**Motivator, Guide**	**Facilitator**	**Consultant, Delegator**
Self-directed	Severe Mismatch	Mismatch	Near Match	Match
Involved	Mismatch	Near Match	Match	Near Match
Interested	Near Match	Match	Near Match	Mismatch
Dependent	Match	Near Match	Mismatch	Severe Mismatch

	Pedagogy	**Andragogy**
Instructor's Teaching Viewpoint	50.0	50.0
Students' Learning Style	46.5	53.5
Difference	3.5	3.5

Analysis and Interpretation

The instructor's and her students' perceptions of their learning/teaching viewpoints and the students' overall learning style matched almost perfectly in the 5th week of the Fall Quarter. The instructor believed that her students should share most of the course responsibilities (planning, diagnosis of needs, and evaluation) with her except for the formulation of objectives, and that her students learned best by using life experiences and completing problem-solving activities (see Chapter 7). Most of her students were part-time, already had various job experiences, and obtained guidance from various resources (their instructor, classmates, web pages, textbooks, videotapes, etc). Many of their questionnaire responses were consistent with the instructor's viewpoints (e.g., as a whole, they preferred to obtain knowledge from both life experiences and instructors, and embraced a combination of acquiring facts and solving problems in their courses) (see Chapter 8).

9th Week Distance Learning Survey

Instructor's Learning Viewpoint vs. Students' Learning Style

	Instructor's Learning Viewpoint			
Students' Learning Style	Authority, Coach	Motivator, Guide	Facilitator	Consultant, Delegator
Self-directed	Severe Mismatch	Mismatch	Near Match	Match
Involved	Mismatch	Near Match	Match	Near Match
Interested	Near Match	Match	Near Match	Mismatch
Dependent	Match	Near Match	Mismatch	Severe Mismatch

	Pedagogy	Andragogy
Instructor's Learning Viewpoint	60.0	40.0
Students' Learning Style	44.3	55.7
Difference	15.7	15.7

Instructor's Teaching Viewpoint vs. Students' Learning Style

	Instructor's Teaching Viewpoint			
Students' Learning Style	Authority, Coach	Motivator, Guide	Facilitator	Consultant, Delegator
Self-directed	Severe Mismatch	Mismatch	Near Match	Match
Involved	Mismatch	Near Match	Match	Near Match
Interested	Near Match	Match	Near Match	Mismatch
Dependent	Match	Near Match	Mismatch	Severe Mismatch

	Pedagogy	Andragogy
Instructor's Teaching Viewpoint	60.7	39.3
Students' Learning Style	44.3	55.7
Difference	16.4	16.4

Analysis and Interpretation

The gap between the instructor's and the participating students' education preferences became wider from the 5th to the 9th week of the Fall Quarter. The students were slightly more inclined toward the "self-directing" learning style as a whole, but the instructor became more pedagogical in her teaching methods. Most of the students, who generally ranked themselves as fast or very fast learners, emphasized life experiences rather than instructors as their primary source of knowledge and expressed an overwhelming preference for using a combination of acquiring facts and solving problems to expand their knowledge (see Chapter 8). The instructor took over complete planning of her "chat room" lectures and assignments, did not see life experiences as necessary learning tools, and felt that her students preferred subject matter discussions to problem solving activities (see Chapter 7). Declining out-of-class participation, poor chat session attendance, growing instructor-to-students participation ratio in chat sessions, and increasing number of assignments appeared to result from this widening gap (see Chapter 6).

9.3 Additional Gap Analysis Data

The following tables use figures for overall preferences from Tables 7.11, 7.12, and 8.6 to illustrate changes in pedagogical tendencies (Table 9.1) and differences between the instructors' and students' pedagogical preferences (Table 9.2) for the 5th and 9th week surveys.

9.3.1 Differences in Pedagogy

For Table 9.1, the following formula was used to calculate each change in pedagogy, based on the comparative analysis between the 5th and 9th week surveys.

Overall Preference (Average) of Pedagogy from the 9th week survey <u>minus</u>
Overall Preference (Average) of Pedagogy from the 5th week survey

A positive difference indicates a general shift toward pedagogical tendencies, while a negative figure denotes an overall change in the direction of more andragogical preferences.

Differences in Pedagogy (5th vs. 9th week surveys)

	Learning Viewpoint			Teaching Viewpoint		
Instructors	**5th week**	**9th week**	**Difference**	**5th week**	**9th week**	**Difference**
Traditional Classroom	50.0	34.0	-16.0	57.1	53.6	-3.5
Distance Learning	45.0	60.0	15.0	50.0	60.7	10.7

	Epistemological Beliefs		
Students	**5th week**	**9th week**	**Difference**
Traditional Classroom	48.6	49.7	1.1
Distance Learning	46.5	44.3	-2.2

Table 9.1 Differences in Pedagogy (5th vs. 9th week surveys)

9.3.2 Differences in Pedagogical Preferences

For Table 9.2, the following formula was used to calculate each difference between pedagogical preferences for students and instructors, based on the comparative analysis between the 5th and 9th week surveys.

Students' Overall Preference (Average) of Pedagogy from the nth week survey <u>minus</u>
Instructor's Overall Preference (Average) of Pedagogy from the nth week survey

n can be 5 or 9. Each difference is an absolute (or only positive) value.

The absolute value indicates the amount of difference in pedagogical preferences between students and instructors. The larger the absolute value, the greater the difference in pedagogical preferences.

Differences in Pedagogical Preferences Between Students and Instructors (5th vs. 9th week surveys)

5th week						
Section	Instructor's Learning Viewpoint	Students' Epistemological Beliefs	Difference	Instructor's Teaching Viewpoint	Students' Epistemological Beliefs	Difference
Traditional Classroom	50.0	48.6	1.4	57.1	48.6	8.5
Distance Learning	45.0	46.5	1.5	50.0	46.5	3.5

9th week						
Section	Instructor's Learning Viewpoint	Students' Epistemological Beliefs	Difference	Instructor's Teaching Viewpoint	Students' Epistemological Beliefs	Difference
Traditional Classroom	34.0	49.7	15.7	53.6	49.7	3.9
Distance Learning	60.0	44.3	15.7	60.7	44.3	16.4

Table 9.2 Differences in Pedagogical Preferences Between Students and Instructors (5th vs. 9th week surveys)

9.3.3 Analysis of the Preceding Tables

The following expectations are based on Mezirow's Concept of Perspective Transformation and the zone of proximal development (ZPD), and are used in this section for analyzing changes and differences in pedagogy (see Chapter 2 and Table 2.6).

Expectations

Table 2.6 indicates that the degree of success for cognitive apprenticeship and assisted learning is weak when teachers' scaffolding methods change dramatically and college students' perspectives remain almost the same, and vice versa. The degree of difference in students' ZPD (i.e., between potential and actual development levels) is supposed to be large in the same situations. A noticeable reduction in the students' ZPD gap is expected to occur only when a teacher's scaffolding methods and students' epistemological beliefs do not change significantly, or when they both change dramatically in the same direction (i.e., toward development of students' self-directed skills).

Additional Expectation

A solid match between an instructor's scaffolding methods and college students' perspectives should produce the most successful performance results (i.e., final grades).

Traditional Classroom Section

Analysis	Instructor's scaffolding methods*	Students' epistemological beliefs
Changes between the 5th and 9th weeks	Moderately Small	Small
Degree of success in cognitive apprenticeship and assisted learning throughout the Fall Quarter	Table 2.6 indicates that the success of cognitive apprenticeship and assisted learning should be strong. Data provided in the sixth, seventh, and eighth chapters of the thesis verify the existence of a relatively strong cognitive apprenticeship relationship between the instructor and his students. However, assisted learning was not as successful as cognitive apprenticeship due to such factors as students' mediocre work and study habits.	
ZPD gap	Table 2.6 indicates that the students' ZPD gap should be small. The gap did become much smaller due to the students being given greater independence in completing the final project. Their overall success in this project work demonstrated that the students' internalization grew stronger because they were able to apply the course concepts. The instructor and his students were also enthusiastic in discussing current issues from the real world, which illustrated good intersubjectivity.	
Degree of match/mismatch	5th week – Near match 9th week – Near match	
Success rate	Actual Class GPA - 2.87 This figure indicates average success for the students as a whole because it is almost the same as Year 2 RIT students' average GPA (see Chapter 6).	

*Based on the instructor's teaching viewpoint.

Distance Learning Section

Analysis	Instructor's scaffolding methods*	Students' epistemological beliefs
Changes between the 5^{th} and 9^{th} weeks	Large	Small
Degree of success in cognitive apprenticeship and assisted learning throughout the Fall Quarter	Table 2.6 indicates that the degree of success in both cognitive apprenticeship and assisted learning should be weak. However, data provided in Chapters 6, 7, and 8 indicate that although the cognitive apprenticeship relationship between the instructor and her students was generally weak throughout the quarter, most of the students were able to find other ways to successfully complete the course without participating in chat sessions or out-of-class discussions. Therefore, self-directed assisted learning was extremely strong.	
ZPD gap	Table 2.6 indicates that the students' ZPD gap should be large. However, the relatively large changes in the instructor's viewpoints seemed to have very little effect on most of the students' ability to successfully complete the course (i.e., most students did not depend on their instructor for guidance). Although course intersubjectivity was generally weak because most students did not participate extensively in either chat sessions or out-of-class discussions, their overall high class GPA indicates that they demonstrated internalization in doing their assignments based on their life experiences and various other sources of knowledge. Therefore, the ZPD gap was consistently small throughout the quarter in spite of the instructor's changing viewpoints.	
Degree of match/mismatch	5^{th} week – Match 9^{th} week – Near mismatch	
Success rate	Actual Class GPA – 3.56 This figure indicates very high success for the students as a whole because it is significantly higher than the average GPA for all RIT students (see Chapter 6).	

*Based on the instructor's teaching viewpoint.

Analysis and Interpretation

Data from the preceding tables strongly suggest that the expectations on page 240 do not universally occur in RIT's current environment. The survey results indicate that the arrival of new methods for educating students (e.g., distance learning) and information technologies (e.g., the World Wide Web) have made it possible for students to succeed in their college courses even if significant differences exist between an instructor's scaffolding methods and students' learning perspectives, or if the instructor's scaffolding methods change dramatically over a period of time while the students' perspectives do not.

Flaws in the assumptions on page 240 were clearly illustrated in the surveyed distance learning section, where between the 5th and 9th week surveys, (1) there was a change from "near match" to "near mismatch" between both the instructor's learning and teaching viewpoints and her students' learning style, and (2) the difference in the instructor's scaffolding methods was large but the students' perspectives remained about the same. According to the expectations, these situations should have resulted in lower student success ratios (i.e., final grades) for the distance learning students than for the traditional classroom students, whose perspectives were generally more consistent with their instructor's teaching viewpoint and scaffolding methods for the quarter as a whole. The opposite was true, however, since the average course GPAs were 3.56 for the distance learning students and 2.87 for the traditional classroom students.

The primary reason that using expectations does not always produce valid conclusions in modern times is that they assume a direct relationship between the degree of success in cognitive apprenticeship and assisted learning (i.e., that both have to be either "weak" or "strong" in a given educational environment). For the distance learning section, however, data from the surveys indicate that the students were successful as a whole (i.e., they achieved a high average course GPA), despite a weak cognitive apprenticeship relationship with the instructor, because of strong self-directed assisted learning traits (e.g., excellent independent work/study habits, reliance on life experiences to master new skills, and use of educational resources other than the instructor). One can therefore surmise that many of the traditional classroom students may have been able to achieve higher final grades in the course if they had exhibited similar assisted learning traits and had used sources of information other than the instructor to supplement their knowledge. This analysis leads to the conclusion that:

> **<u>Assisted learning</u>** can be a stronger determinant of students' success in their college courses than cognitive apprenticeship or gaps between instructors' scaffolding methods and students' learning styles whenever the students are able and willing to take advantage of new educational opportunities through Information Technology and other relevant sources of knowledge as they become available.

Chapter 10

CONCLUSION – COMPARISONS OF BOTH SURVEYED LEARNING ENVIRONMENTS WITH RIT'S UNIVERSITY LEARNING GOALS

10.1 Overview

The main focus of this chapter is to provide in-depth answers to the sixth principal question documented in Chapters 3 and 4.

Which is the method that matches with RIT's university learning goals the least? The best? How should RIT's educational techniques be modified to eliminate performance discrepancies?

The chapter presents comparisons of RIT's university goals with relevant data documented in previous chapters for both sections of the surveyed course. Conclusions about these comparisons have also been formulated and presented by means of a performance report card, performance discrepancies analyses, recommendations, and final thoughts.

10.2 RIT's University Learning Goals vs. Both Sections of the Surveyed Course

The following tables use figures of overall preferences from Tables 5.9, 5.10, 7.11, 7.12, and 8.6 to illustrate differences between the administrators' and the instructors' pedagogical preferences (Table 10.1) and differences between the administrators' and students' pedagogical preferences (Table 10.2) for the 5th and 9th week surveys.

Note that each participating administrator was surveyed one time during the study (i.e., rather than at both the 5th and 9th weeks), and that the administrators' questionnaire responses were based on the RIT educational environment as a whole rather than on separate traditional classroom and distance learning categories.

10.2.1 Differences in Pedagogical Preferences (Administrators vs. Instructors)

For Table 10.1, the following formula was used to calculate each difference between pedagogical preferences for administrators and instructors, based on the comparative analysis between the 5th and 9th week surveys.

Administrators' Overall Preference (Average) of Pedagogy <u>minus</u>
Instructor's Overall Preference (Average) of Pedagogy from the n^{th} week survey

n can be 5 or 9. Each difference is an absolute (or only positive) value.

The absolute value indicates the amount of difference in pedagogical preferences between administrators and instructors. The larger the absolute value, the greater the difference in pedagogical preferences.

Differences Between RIT Administrators and Instructors in Pedagogy (5th vs. 9th week surveys)

5th week	Learning Viewpoint			Teaching Viewpoint		
Section	Instructor	Administrators	Difference	Instructor	Administrators	Difference
Traditional Classroom	50.0	45.8	4.2	57.1	51.8	5.3
Distance Learning	45.0	45.8	0.8	50.0	51.8	1.8

9th week	Learning Viewpoint			Teaching Viewpoint		
Section	Instructor	Administrators	Difference	Instructor	Administrators	Difference
Traditional Classroom	34.0	45.8	11.8	53.6	51.8	1.8
Distance Learning	60.0	45.8	14.2	60.7	51.8	8.9

Table 10.1 Differences in Pedagogical Preferences Between RIT Administrators and Instructors (5th vs. 9th week surveys)

10.2.2 Differences in Pedagogical Preferences (Administrators vs. Students)

For Table 10.2, the following formula was used to calculate each difference between pedagogical preferences for administrators and students, based on the comparative analysis between the 5th and 9th week surveys.

Administrators' Overall Preference (Average) of Pedagogy minus
Students' Overall Preference (Average) of Pedagogy from the nth week survey

n can be 5 or 9. Each difference is an absolute (or only positive) value.

The absolute value indicates the amount of difference in pedagogical preferences between administrators and students. The larger the absolute value, the greater the difference in pedagogical preferences.

Differences Between RIT Administrators and Students in Pedagogy (5th vs. 9th week surveys)

5th week

Section	Administrators' Learning Viewpoint	Students' Epistemological Beliefs	Difference	Administrators' Teaching Viewpoint	Students' Epistemological Beliefs	Difference
Traditional Classroom	45.8	48.6	2.8	51.8	48.6	3.2
Distance Learning	45.8	46.5	0.7	51.8	46.5	5.3

9th week

Section	Administrators' Learning Viewpoint	Students' Epistemological Beliefs	Difference	Administrators' Teaching Viewpoint	Students' Epistemological Beliefs	Difference
Traditional Classroom	45.8	49.7	3.9	51.8	49.7	2.1
Distance Learning	45.8	44.3	1.5	51.8	44.3	7.5

Table 10.2 Differences in Pedagogical Preferences Between RIT Administrators and Students (5th vs. 9th week surveys)

Analysis and Interpretation

The magnitude of RIT performance discrepancies for both 5th and 9th week surveys are presented below, based on conditions shown in Table 4.1.

5th week

Traditional Classroom Section	Instructor's teaching viewpoint	Students' learning style	Performance Discrepancy
RIT university learning goals*	Near Match	Near Match	Small

Distance Learning Section	Instructor's teaching viewpoint	Students' learning style	Performance Discrepancy
RIT university learning goals*	Match	Match	No

9th week

Traditional Classroom Section	Instructor's teaching viewpoint	Students' learning style	Performance Discrepancy
RIT university learning goals*	Match	Near Match	Small

Distance Learning Section	Instructor's teaching viewpoint	Students' learning style	Performance Discrepancy
RIT university learning goals*	Near Mismatch	Match	Yes

*Based on the participating administrators' teaching viewpoint for instructors and their learning viewpoint for students

The preceding chart indicates that instructor and student viewpoints for the distance learning section of the surveyed course matched almost perfectly with RIT's university learning goals at the 5^{th} week, but performance discrepancies existed at the 9^{th} week because of dramatic changes in the distance learning instructor's teaching style. Figures for the traditional classroom section imply that only small performance discrepancies were present throughout the quarter. The reader should refer to Chapter 5 (especially to the interpretations and analyses of Table 5.9 and Table 5.10) for detailed information about the participating administrators' survey results, and to section 5.2 for specific data about RIT goals obtained through interviews and research.

The next section discusses specific performance discrepancies and suggestions for alleviating these discrepancies using a performance report card.

10.3 Performance Report Card and Performance Discrepancies Analyses

The performance report card presented in this section is a method of evaluating both learning environments against RIT's university learning goals and suggested guidelines from the literature review. The main topics addressed are available resources, scaffolding, cognitive apprenticeship, and assisted learning. The learning environments are evaluated for each sub-topic category based on data analyses documented in the fifth, sixth, seventh, and eighth chapters.

10.3.1 Performance Report Card

Evaluating scheme for each sub-topic category

Traditional Classroom	Distance Learning	Definition
√		The traditional classroom section was more consistent with RIT goals than the distance learning section.
	√	The distance learning section was more consistent with RIT goals than the traditional classroom section.
√	√	Both sections were equally consistent or inconsistent with RIT goals.

Available Resources

Category	Traditional Classroom	Distance Learning
Student-Faculty Ratio	√	√

RIT Information

The average student-faculty ratio outside of NTID was 11:1.

RIT Goal

"Distance learning classes need to [have] a reasonable class size to maximize student/instructor interactions. There is no magic number, but a fallacy [takes place when distance learning courses have the same or more students than the same traditional classroom courses.]"

Evaluation Rationale

Both sections had very high student-faculty ratios compared to the RIT average. These ratios for the traditional classroom and distance learning sections were 34:1 and 29:1, with the distance learning section having almost same number of students as the traditional classroom section.

Category	Traditional Classroom	Distance Learning
Classes	√	

RIT Information

A typical 4-credit course usually has 4 hours a week of classroom lecture and discussion.

RIT Goal

"Many classes can use a combination of classroom discussion with distance learning instruction outside of class – e.g. rather than 4 hours a week of classroom lecture, the class could be two hours of distance learning and two hours in class each week."

Evaluation Rationale

The traditional classroom students had the opportunity to learn course materials through mostly 3 hours a week of classroom lecture/discussion and 1 hour a week of evaluating computer hardware. By contrast, there were only two hours a week reserved for chat sessions and optional out-of-class discussion in the distance learning section, in which many students did not regularly participate.

<table>
<tr><th>Category</th><th>Traditional Classroom</th><th>Distance Learning</th></tr>
<tr><td>Course materials</td><td>√</td><td>√</td></tr>
<tr><td colspan="3">Evaluation Rationale
Both instructors required their students to read the same textbooks and watch the same videotapes. They taught very similar topics throughout the Fall Quarter.</td></tr>
</table>

<table>
<tr><th>Category</th><th>Traditional Classroom</th><th>Distance Learning</th></tr>
<tr><td>Handouts</td><td></td><td>√</td></tr>
<tr><td colspan="3">Evaluation Rationale
The traditional classroom instructor only provided 6 hard-copy handouts to his students, but the distance learning instructor and her students shared information through 78 electronic handouts.</td></tr>
</table>

<table>
<tr><th>Category</th><th>Traditional Classroom</th><th>Distance Learning</th></tr>
<tr><td>Assignments/ Exams</td><td>√</td><td>√</td></tr>
<tr><td colspan="3">RIT Goal
RIT needs to work on “inconsistent guidelines for evaluating faculty’s [teaching]”.

Evaluation Rationale
Both sections had different number of assignments/exams. The traditional classroom instructor required his students to complete two in-class exams, five small assignments, and the final project. The distance learning students were asked to complete one take-home final exam, five small projects, and the final project. The assignments and exams from both sections did not have the same content (i.e., different questions).</td></tr>
</table>

Category	Traditional Classroom	Distance Learning
Information and Communications Technology		√

RIT Goal RIT must keep up with competing universities in terms of technology because "advanced technology, [including Information Technology], and sophisticated knowledge will continue to grow as driving economic factors." **Evaluation Rationale** The distance learning section instructor and students used many Information Technology tools (First Class Client software version 5.506, several free software tools on a CD-ROM and on-line help services provided by the RIT distance learning service, electronic study guides, electronic handouts, chat sessions, First Class Dropbox, Questions & Answers Conference Folder, Discussion Entries Conference Folder, e-mail systems, RIT web pages, chat session transcripts, etc.) Only e-mail systems, phones, and word processing documents were utilized by the traditional classroom instructor and students.

Scaffolding

RIT Goal

"Individual faculty and their departments are responsible for the quality of education in the classroom and through distance learning" as well as "strong teaching".

Category	Traditional Classroom	Distance Learning
Course Execution by Instructor	√	
Evaluation Rationale Both instructors prepared solid course syllabi and materials. In the traditional classroom section, each homework assignment was planned by the instructor to take approximately the same length of time to complete and given the same weight of the final grade before his students started the final project. His students were given enough time to complete the final project after gaining experience from homework assignments and the mid-term exam. The instructor also followed the sequence of topics (from general to complicated) in a very organized manner. The weight and time length of assignments, and out-of-class participation in the distance learning section were inconsistent throughout the Fall Quarter. For example, the students were required to complete three small projects, the final project, and the final exam almost simultaneously. The distance learning instructor also occasionally changed course topics during the quarter, and available time for course-related activities was reduced by the need to resolve technical difficulties produced by Information Technology.		

Category	Traditional Classroom	Distance Learning
Class Execution by Instructor	√	

Evaluation Rationale

The traditional classroom instructor seldom brought his lecture notes or course textbooks to the classroom. He preferred freeform lectures that stimulate discussions and questions raised by students in the class. He knew how to deliver his good lectures using appropriate marker pens, specific standing positions, and life experiences. He sometimes gave his students the opportunity to evaluate computer hardware during classes. His class execution appeared to encourage good class participation and strong student motivation.

The distance learning instructor did not use course notes during the first two weeks of the Fall Quarter, and she did not raise questions in the out-of-class discussion area before chat sessions. When she discovered that her students were not prepared for chat sessions, she decided to deliver long lectures in the chat sessions for the rest of the Fall Quarter. Declining chat session and out-of-class participation, and increasing instructor-to-students participation ratio appeared to be the results of her chat session execution. Students could also read chat session transcripts without participating in the chat sessions.

Cognitive Apprenticeship

RIT Goal

Instructors should use more "extensive participation and interactive techniques" in both learning environments. Student/faculty interaction should be emphasized.

Category	Traditional Classroom	Distance Learning
Class Attendance	√	
Evaluation Rationale Between 24 and 34 students attended each traditional classroom session throughout the Fall Quarter, but the number of distance learning students participating in chat sessions decreased from 17 for the first session to only 6 for the last session.		

Category	Traditional Classroom	Distance Learning
Class Participation	√	
Evaluation Rationale Unlike the distance learning students, the traditional classroom students were relatively passive in classes at the beginning of the Fall Quarter. They became much more active in classes as the quarter progressed by raising many more questions and comments (see Figures 6.2 and 6.5), whereas the trend of chat session participation by the distance learning students was almost completely the opposite (see Figures 6.15 and 6.16).		

Category	Traditional Classroom	Distance Learning
Communicating With Classmates	√	
Communicating With Instructors	√	
Communicating With RIT Tutors	√	√

Evaluation Rationale

The traditional classroom instructor stated that he had about thirty contacts with individual students via e-mails, phone calls, and conferences per week. Most of his students indicated that they communicated with their classmates and instructors sometimes, but that they almost never sought help from RIT tutors.

The distance learning instructor indicated that she had only five individual contacts with her students via e-mails in an average week. Her students also indicated that they rarely communicated with their classmates and instructors. Like the traditional classroom students, they did not depend on RIT tutors at all.

Assisted Learning

RIT Goal

RIT should encourage all undergraduate students to become "strong self-motivated learners" to increase their chances of success.

Category	Traditional Classroom	Distance Learning
Work Habits		√

Evaluation Rationale

More than half of the participating traditional classroom students ended the quarter by preferring to complete their assignments at the last minute, but almost all distance learning students believed that they should work on their assignments a little each day.

Category	Traditional Classroom	Distance Learning
Study Habits		√

Evaluation Rationale

Most of the participating traditional classroom students stated that they crammed for exams the night before, but most of the participating distance learning students generally emphasized studying for exams a little each day.

Category	Traditional Classroom	Distance Learning
Submission of Assignments and Exams		√

Evaluation Rationale

Submission of homework assignments by the traditional classroom students was inconsistent. A few students from this section also failed to complete the final project and/or the final exam. However, the submission of all assignments, including the final exam, in the distance learning section was outstanding throughout the Fall Quarter.

Category	Traditional Classroom	Distance Learning
Usage of Learning Resources		√
Evaluation Rationale Most of the traditional classroom students used lecture notes, textbooks, and/or videotapes for learning. Most of the distance learning students used all of the same materials plus web sites related to the course.		

Category	Traditional Classroom	Distance Learning
Choice of Learning Sites	√	√
Evaluation Rationale Most of the traditional classroom and distance learning students made excellent choices of their favorite learning sites, as confirmed by data from previous navy research studies.		

10.3.2 Summary of the Performance Report Card

Main Topic	**Number of Sub-Topics Checked**	
	Traditional Classroom	**Distance Learning**
Available Resources	4	5
Scaffolding	3	0
Cognitive Apprenticeship	5	1
Assisted Learning	1	5
Final Results	**Traditional Classroom**	**Distance Learning**
Retention Rate	√	√
Average Class GPA		√

Table 10.3 Summary of the Performance Report Card

Analysis and Interpretation

RIT Information

The RIT student retention rate for the school year 1998-99 was only 62% (see section 5.2.2).

RIT Student Population Average GPA's at the end of the Fall Quarter	
Year 1 students 2.72	Year 2 students 2.86
Year 3 students 2.96	Year 4 students 3.01
Year 5 students 3.02	Graduate students 3.53

Table 10.4 RIT Average GPA's at the end of the Fall Quarter 1999
Credit: Student Information System

RIT Goal

RIT must improve its student retention rate.

Performance in the distance learning section of the surveyed course was more consistent with RIT university learning goals than in the traditional classroom section for the available resources and assisted learning categories, but the traditional classroom section performed more consistently with the RIT goals in scaffolding and cognitive apprenticeship. The retention rates for both sections were nearly equal because a few students withdrew from each section. The distance learning section's average class GPA was significantly higher than the average class GPA for traditional classroom students in the surveyed course.

Data presented in this section provides additional verification of the conclusion at the end of Chapter 9 that assisted learning traits can be a stronger determinant of students' success (i.e., high grades) than other factors if they take advantage of sources of knowledge (i.e., available resources) outside of the classroom or chat sessions. For example, the distance learning students excelled in many sub-topics under assisted learning and achieved a higher average class GPA than their traditional classroom peers. One of surveyed RIT administrators stated that "... In The Distance Learners' Guide, ed. by George Connick (1999) the characteristics of a successful distance learner are: high motivation, independent, active learners, have good organizational and time management skills, have the discipline to study without external reminders, and can adapt to new learning environments." This analysis therefore leads to the conclusion that as the number of available resources increases, students in both the distance learning and traditional classroom environments will be more successful in their college careers if they maximize utilization of these resources through development of self-directed assisted learning traits.

10.3.3 Recommendations

As mentioned in section 4.3, instructional technologists suggest that performance discrepancies (e.g., for scaffolding, cognitive apprenticeship, and assisted learning) can be reduced by changes in at least one of four areas – communication, instruction, motivation/attitude, and environment. The recommendations presented below for these educational factors are conceptually supported by previous data and analyses in this thesis, but it should be remembered that they are not necessarily applicable to the entire CAST or RIT populations because the surveyed participants were not randomly selected (see Section 4.3.1). Rather, they are presented to address issues that, in my opinion, are likely to be important to other RIT courses and areas. I therefore consider the recommendations to be valuable and worthy of further study and consideration even though they are not statistically supportable at this time.

<u>**Scaffolding**</u>

- [Instruction] Based on suggestions by RIT administrators (see section 5.2.4), every instructor and administrators responsible for general course development in their departments should attend special programs, such as those offered by the Faculty Institute for Teaching and Technology during the summer, to "increase faculty expertise and comfortableness with technology". All available technologies should then be considered by appropriate administrators and especially by each instructor before courses begin each quarter to determine if any of the current technologies should be included in course curricula and/or be made known and available to students. Information Systems Center and Educational Technology Center personnel should assist in these efforts as deemed necessary by the administrators, instructors, and students.

- [Environment, Instruction, and Motivation/Attitude] All sections of the same RIT course should have standardized grading systems, exams, assignments, and projects as approved by the department. This type of environment would help ensure the fair and consistent evaluation of instructors, and give all students an equal opportunity to acquire the same knowledge and to achieve grades consistent with their efforts in meeting course requirements. However, RIT instructors should have the freedom (1) to discuss topics beyond the "standardized course content" if they feel this would strengthen their students' understanding of the material, (2) to allow students to select assignments and projects from a department-approved list if possible, and (3) even to permit students to volunteer to complete additional assignments and projects (perhaps for extra credit). This instructor flexibility should encourage student transitions from pedagogical to andragogical attributes.

- [Environment and Motivation/Attitude] In general, the distance learning section(s) of a course should have three hours a week of chat sessions and discuss course-related theories, and one hour a week of interactive courseware and similar events that simulate "hands-on" activities being completed in the traditional classroom section(s) of the same course. For example, the surveyed distance learning section could include three hours of theory-based chat sessions followed by one hour of interactive simulation software that explores computer hardware. This type of weekly transition from theoretical lectures to related reality-based activities would motivate more distance learning students to participate in the chat sessions by their understanding that the theories would later be linked to simulated practical applications. The results of this process should be similar to the higher student motivation observed when "hands-on" activities were introduced into the surveyed traditional classroom section.

- [Instruction, Environment, and Communication] The distance learning environment provides students with the opportunity to browse web sites and share their findings in the First Class conference. Traditional classroom instructors should also encourage their students to explore further course-related information through the World Wide Web outside of the classroom as a means of increasing their knowledge, technological expertise, and advancement toward self-directed learning. Two or three volunteering students could briefly share their findings each week with the other students during one of the scheduled classes for each course. At the end of each quarter, instructors who taught the same section (both distance learning and traditional classroom) should discuss the relevance of the information presented by the students for possible inclusion in future sections.

- [Environment and Communication] All traditional classroom and distance learning instructors should set up their own personal web sites and First Class conferences to encourage their students to continue learning outside of the classroom and chat session environments. Each personal web site should contain such learning tools as animated lectures, electronic study guides, electronic handouts, and web page links related to each particular course they are teaching. The First Class conference would enable students and their instructor to ask and answer course-related questions electronically.

__Cognitive Apprenticeship__

- [Environment] All sections of the same course should have as low a student-faculty ratio as possible, consistent with general RIT guidelines and budgets, in order to enhance student/instructor interactions in the classroom and chat sessions. Fewer students should be allowed to enroll in each distance learning session than in traditional classroom sessions of the same course for reasons such as the following: (1) For the same dialogue, typing in a chat session consumes more time than speaking in a classroom; (2) Chat sessions are usually shorter than traditional classes; and (3) Many distance learning students use relatively slow modem-based Internet communications.

- [Environment and Motivation/Attitude] Students who have the type of andragogical traits and sufficient technological skills to succeed in distance learning sessions should be encouraged by their faculty advisors to enroll in them. This would enable instructors to spend more time in the traditional classroom environment providing guidance to students whose self-directed attributes are not as well-developed. More distance learning sessions could also be scheduled to further encourage prepared students to consider the distance learning alternative.

- [Environment, Communication, and Motivation/Attitude] Class attendance and participation were much better in the surveyed traditional classroom section than in the surveyed distance learning section because many people are more highly motivated to communicate face-to-face than through remote (i.e., more impersonal) sessions. Patricia Kitchen, the author of the article entitled "Let the Internet Be Your Classroom", states, "Although it is not likely to completely replace face-to-face sessions, virtual face-to-face is just around the corner" (2000, p. F11). Adding virtual face-to-face sessions to the First Class client software should therefore be seriously considered to encourage class attendance and participation by distance learning students.

- [Environment, Communication, and Motivation/Attitude] RIT students have different communication preferences and capabilities. The First Class software used in the distance learning environment should therefore have audio, virtual face-to-face (with or without audio and/or text), and text-only options so that all students will have an equal opportunity to participate in chat sessions. For example, "normal" and sight-impaired students could use the audio or virtual face-to-face setting to meet with their classmates and instructor, while hearing-impaired students could select either the virtual face-to-face or text-only setting with voices being electronically translated into text.

- [Communication and Motivation/Attitude] Each instructor should post some questions and/or topics for discussion to the First Class conference folder the day before each class or chat session in order to stimulate student participation. Interactive tutor software should also be included in the instructors' personal web sites for those students who either don't have access to RIT tutors or would prefer to use this option.

<u>Assisted Learning</u>

- [Instruction and Motivation/Attitude] A summer "pre-RIT" seminar (i.e., the Summer Vestibule Program) should be instituted for all incoming freshmen and transfer students which would enable them to identify their current epistemological beliefs and learning styles. The types of questionnaires presented in this thesis could be used for this purpose, which should be automated so that students will receive immediate summaries and analyses of their beliefs and styles. With the assistance of trained faculty and student counselors (i.e., mentors), the students would be able to (1) identify the types of courses, activities, and learning environment (i.e., traditional classroom or distance learning) best suited to their profiles, and (2) explore ways to increase their chances of completing a successful college career by modifying and/or maximizing the use of their assisted learning traits (e.g., appropriate work and study habits as well as usage of learning resources).

  The seminar should be available in an interactive mode on-line through an RIT web site for distance learning students and others who are unable to personally attend the summer seminar. This would also enable all students to review the seminar material and produce a new "profile" periodically to determine if their beliefs and styles have changed as they progress in their college careers.

- [Environment, Instruction, and Motivation/Attitude] A summer seminar similar to the one recommended above for students should be optional for RIT instructors (and appropriate administrators) to enable them to identify their current teaching and student learning viewpoints as well as to identify any modifications to these viewpoints which may be appropriate based on the courses they are assigned to teach.

- [Environment and Instruction] Some students in the distance learning section of the surveyed course complained that the First Class software has serious technical limitations in displaying math and logic concepts. As suggested by one of the participating students, the First Class software should therefore be modified to include a virtual blackboard, thereby helping all distance learning students and instructors to overcome the limitations by allowing these concepts to be displayed in an "old-fashioned" but more successful way.

<u>Final Thoughts</u>

- The First Class software limitations mentioned above are hindering the scaffolding, cognitive apprenticeship, and assisted learning processes at RIT. Therefore, the SoftArc Corporation, RIT, and perhaps other universities should work together as soon as possible to revamp the First Class software technologies as previously recommended (i.e., to include the virtual face-to-face option, customized chat session options, and the virtual blackboard).

- RIT instructors, administrators, and students should work together wherever possible to enhance their technical communication skills, since the business world is starting to emphasize "online collaboration" while "telecommuting and virtual teaming increase" (Kitchen, 2000, p. F11).

- Information documented in both Chapters 9 and 10 affirm that <u>assisted learning</u> can be one of the strongest determinants of each student's overall college performance. RIT faculty and administrators should therefore help students to master assisted learning skills. Analyses and conclusions presented in this thesis indicate that such actions will lead to a higher retention rate at RIT and better prepare students to successfully perform in their chosen professions after graduation.

- Follow-up research projects should be conducted at time intervals selected by RIT personnel (e.g., no less than every two years) to determine the success of each recommendation presented in this thesis that is approved and implemented.

Chapter 11

CONCLUSION – SERENDIPITOUS FINDINGS AND LIMITATIONS OF THE STUDY

11.1 Overview

The main focus of this chapter is to present serendipitous information obtained during the research stage and limitations of the study.

11.2 Serendipitous Findings

- More freshmen and graduate students were enrolled in the distance learning section of the surveyed course than in the traditional classroom section.

- Based on questionnaire responses, both instructors' learning and teaching viewpoints changed much more dramatically between the 5^{th} and 9^{th} weeks than their students' epistemological beliefs.

- No international students were enrolled in the distance learning section of the surveyed course, and the average course GPA for international students enrolled in the traditional classroom section was much higher than for the American students.

- Two of the participating distance learning students indicated that they rarely studied for exams and relied primarily on their memory instead.

- The most common topic of discussion entries in the distance learning section was technology issues (technical difficulties).

- The distance learning students' out-of-class and chat session participation declined sharply after the first week of the Fall Quarter.

- The distance learning instructor became much more authoritative in her teaching methods as the Fall Quarter progressed.

- The average course GPA for the distance learning section was higher than the average cumulative GPAs for all RIT student levels, including the graduate school level.

11.3 Limitations of the Study

This section discusses the three possible challenges to successful completion of the case study identified in Chapter 4 (see Section 4.4) and unexpected challenges/limitations which arose as the study progressed.

11.3.1 First Challenge

Potential Challenge From Chapter 4
Finding the same instructor for both sections of the same undergraduate course. If the case study included two different instructors from both sections of the same undergraduate course, they were very likely to have different teaching philosophies and styles. This situation would skew data for some variables in the case study because different teaching styles would affect how RIT students responded in the questionnaires/surveys at the end of the quarter.
Actual Result
Two different instructors taught the traditional classroom and distance learning sections of the surveyed course. However, this presented interesting opportunities to expand the scope of the research to include comparisons of the instructors' viewpoints and performance, thus writing more meaningful analyses and conclusions. Also, there were no indications that the participating students' questionnaire responses would have been significantly different despite differences in their instructors' questionnaire responses and teaching styles.

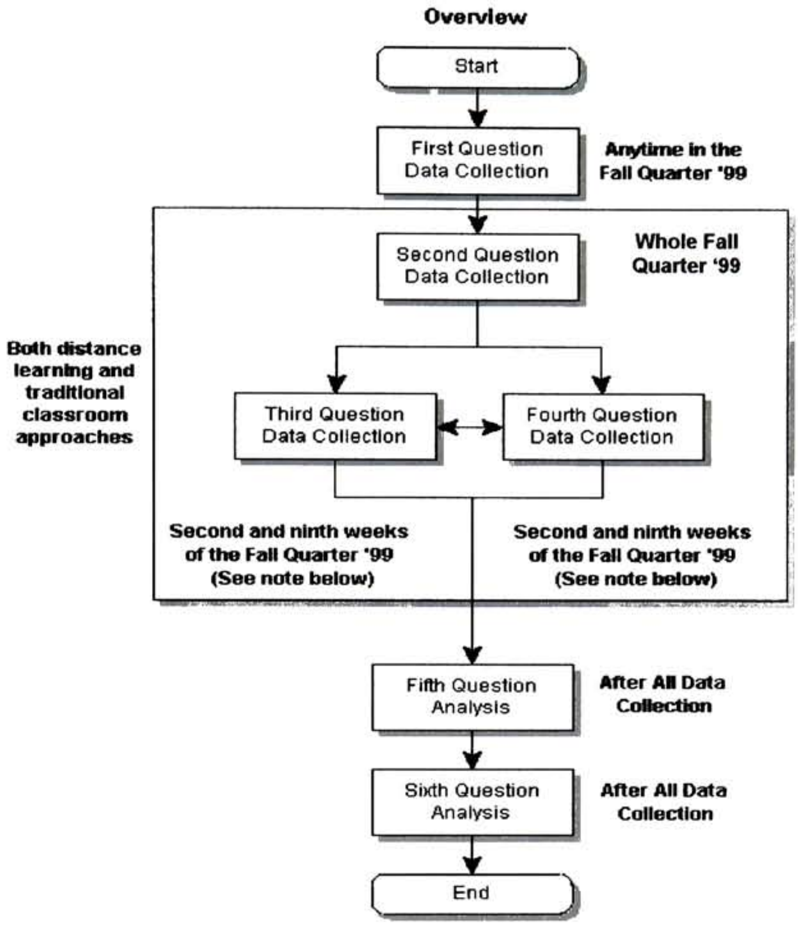
11.3.2 Second Challenge

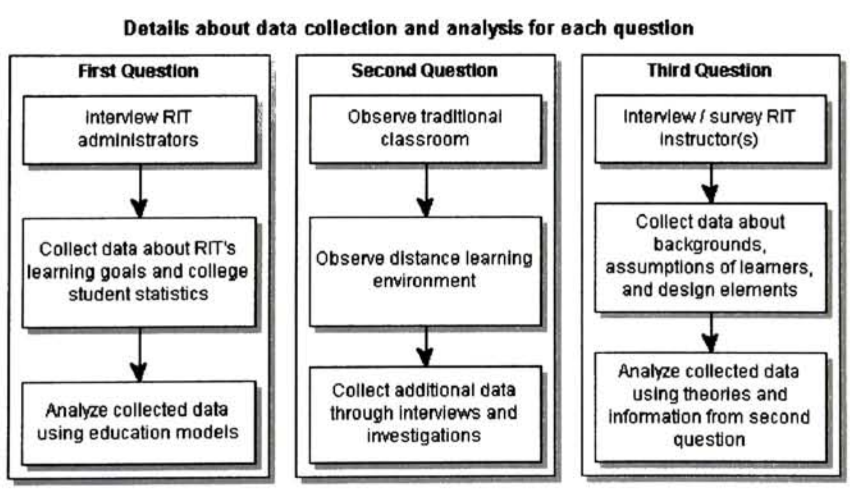
Potential Challenge From Chapter 4
Obtaining permission to access all data needed to reach accurate and valid conclusions. The thesis committee members might have been able to assist in obtaining the required permissions.
Actual Result
The timelines in Sections 11.3.4 and 11.3.5 illustrate that this was the most difficult and frustrating challenge to be addressed in completing the case study because of numerous and sometimes unexpected approvals required to be obtained from the Institutional Review Board, administrators, instructors, students, and researchers. Delays and/or difficulties in communications often occurred while data requests were reviewed and processed.

11.3.3 Third Challenge

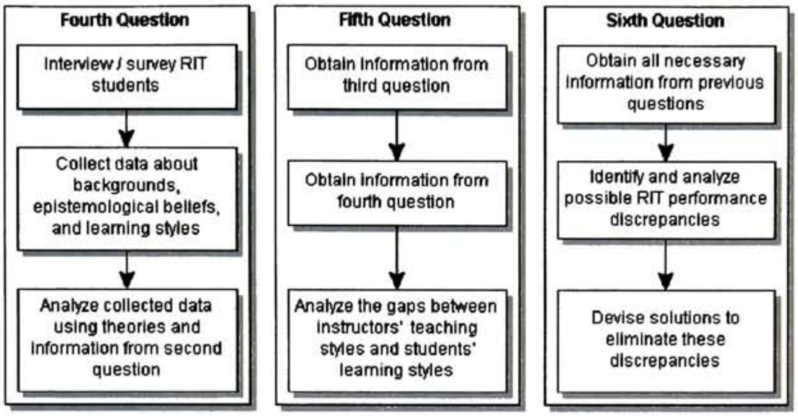
Potential Challenge From Chapter 4
Preventing, or at least detecting, indirect and invisible factors that influenced the RIT learning environment. Examples are weather conditions and personal situations.
Actual Result
Weather conditions did not appear to significantly hinder course attendance for the traditional classroom students, and, of course, this is usually not a factor for distance learning students unless the weather affects internet access services (no such problems occurred during the quarter). No unusual personal situations nor other "indirect" factors which may have influenced questionnaire responses or the learning environment were detected for the surveyed instructors or students during observations of both sections of the surveyed course.

11.3.4 Intended Timeline (Reproduced From Chapter 4)



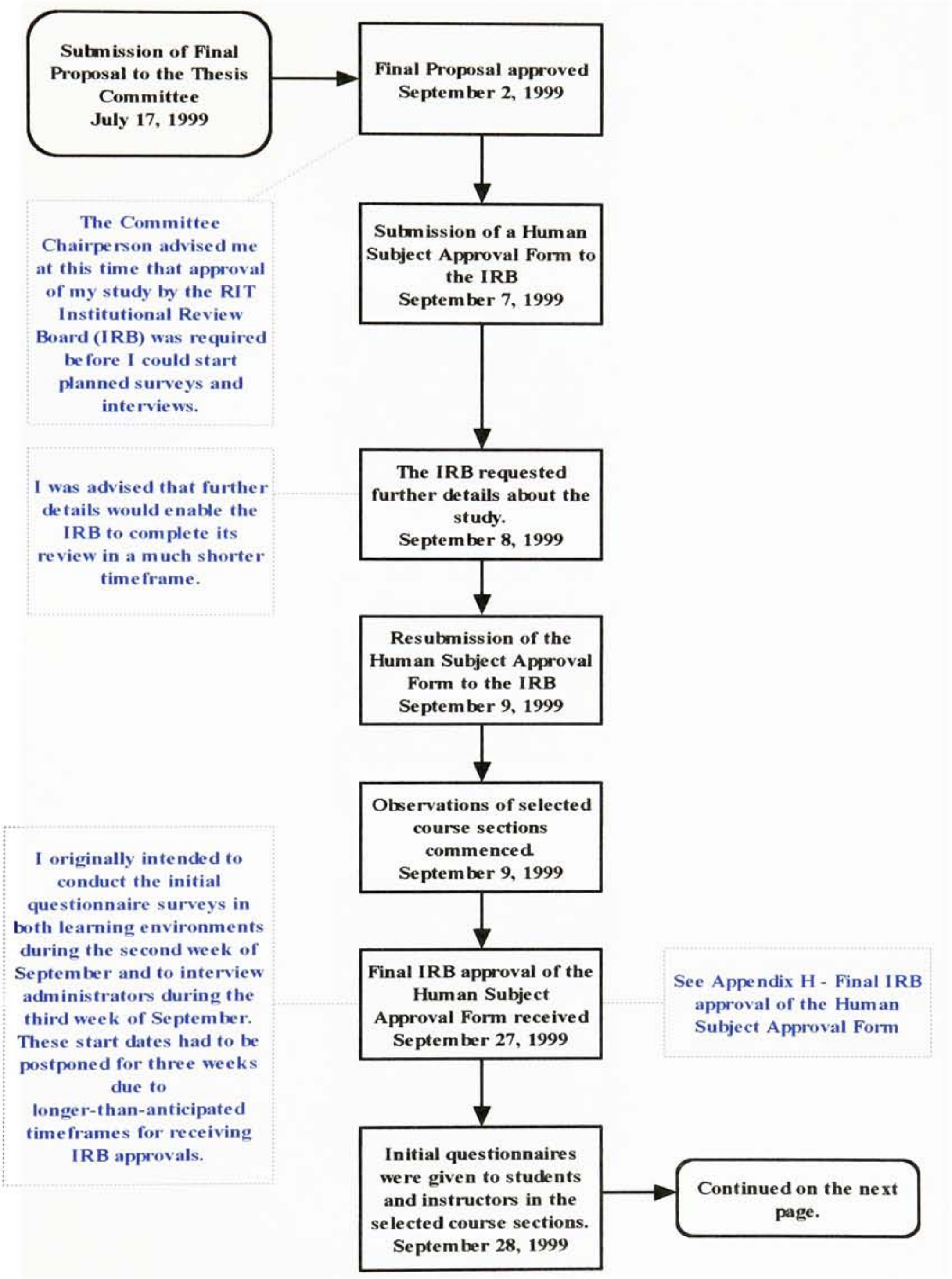


Intended Timeline Continued...

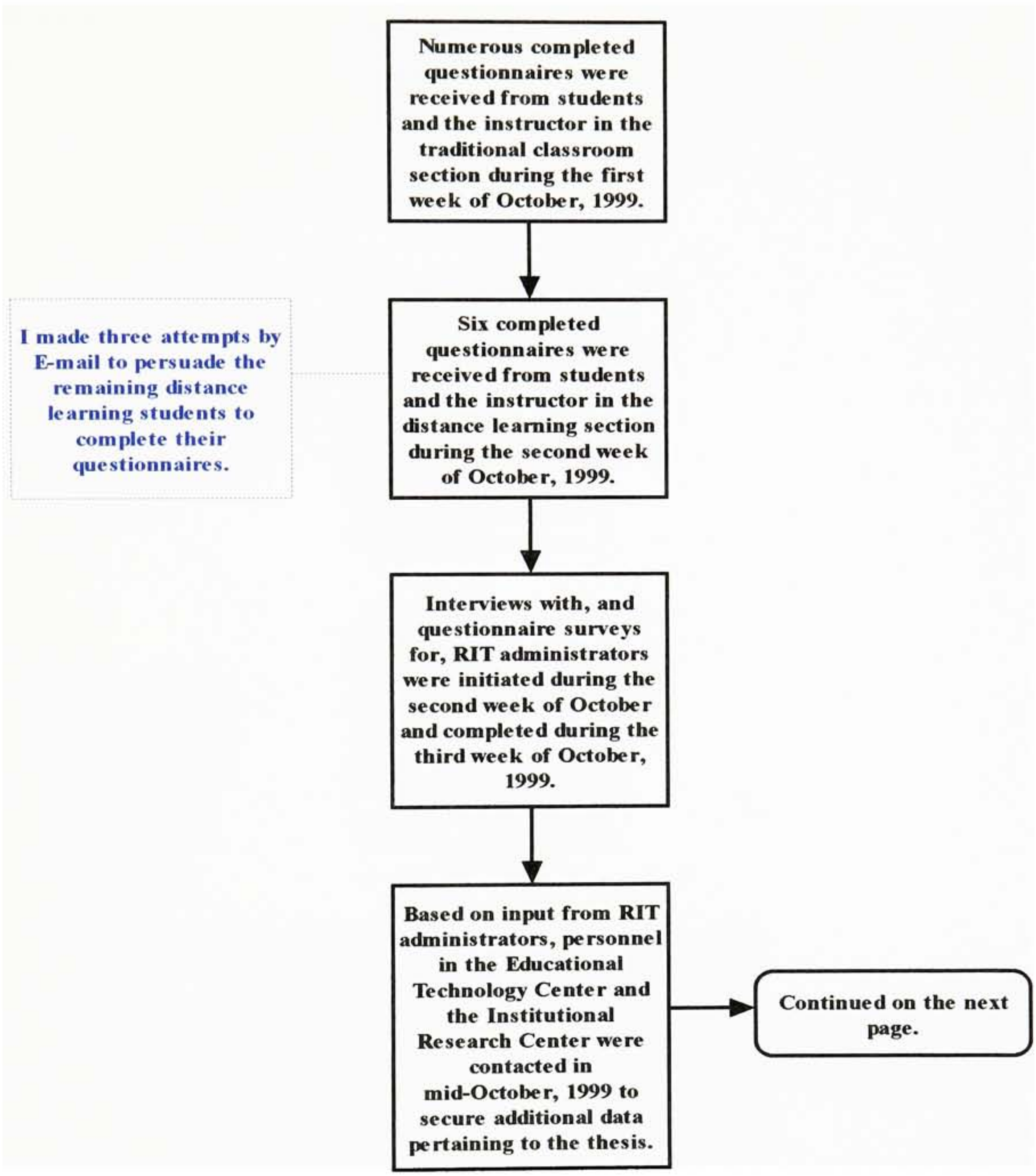


Note: The second and ninth weeks of the Fall Quarter '99 should have produced the most effective data collection from students and instructors. Students and instructors were ready to start working together after the drop/add period. The ninth week was between the last day of 'W' and the final exam week. During the ninth week, students and instructors should have been able to describe their complete learning experiences in their courses because they did not feel too pressured about the 'W' date or final exams at that time.

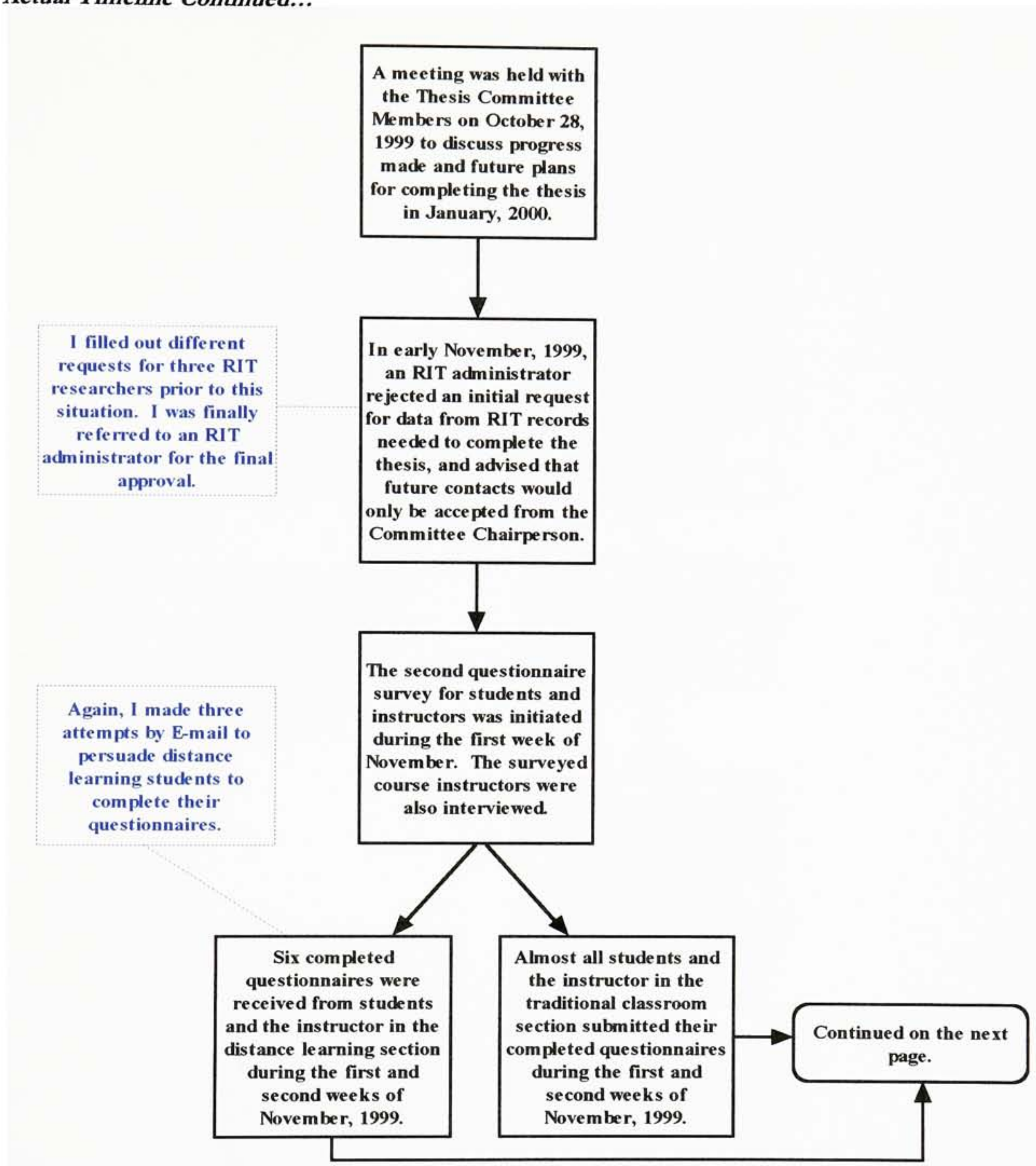
11.3.5 Actual Timeline



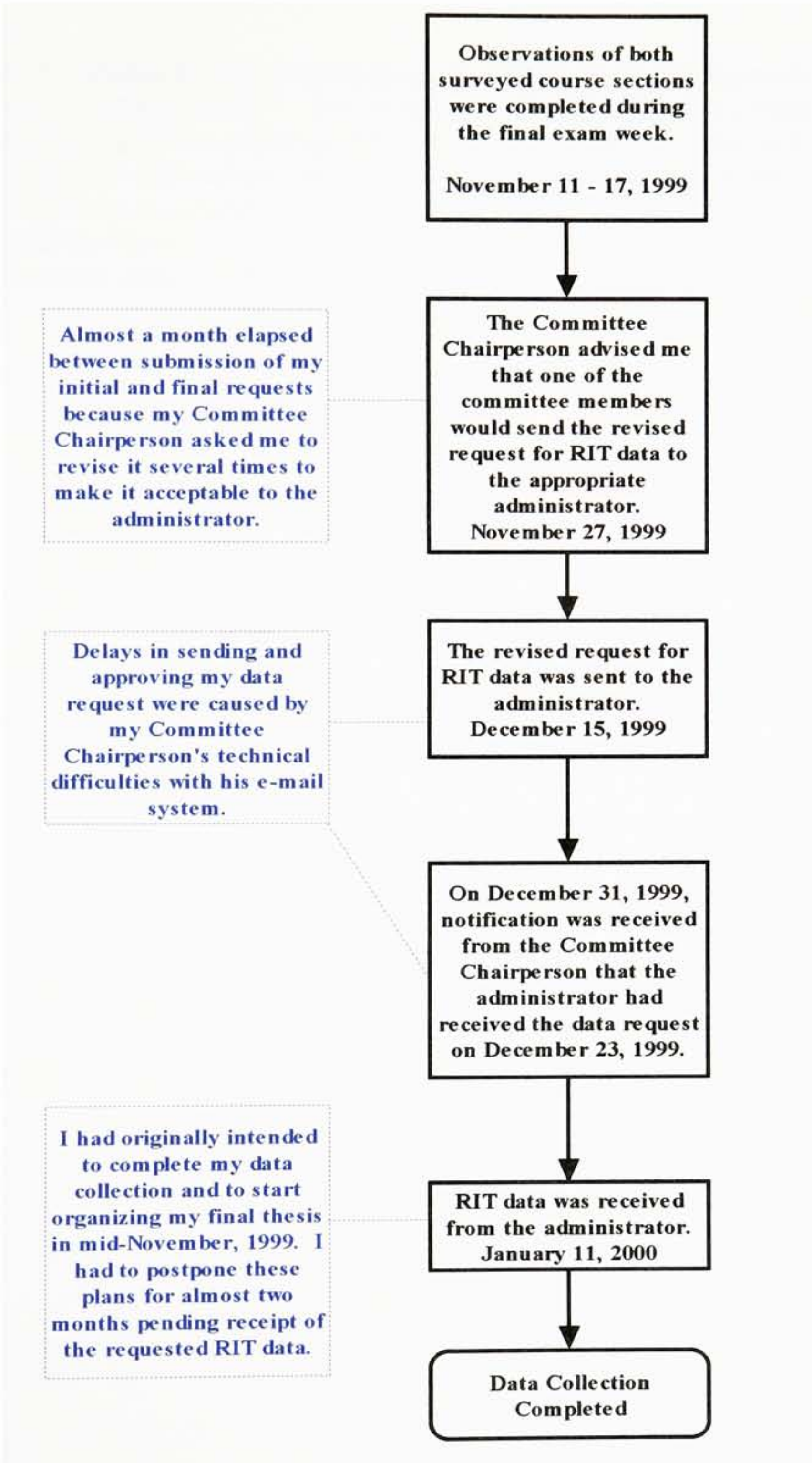
Actual Timeline Continued…



Actual Timeline Continued…



Actual Timeline Continued…



11.3.6 Final Thought About Data Collection Challenges/Limitations

In several ways, the electronic communication system proved to be a hindrance in obtaining permissions and data during the study. First, it was more difficult to receive completed questionnaires from human subjects in the remote distance learning environment than in the face-to-face traditional classroom environment. Second, problems with e-mail systems caused a number of delays in getting approvals and data from committee members, administrators, and researchers. Therefore, future researchers should attempt to identify and resolve all potential electronic communication problems before beginning their studies to alleviate these types of limitations.

ANNOTATED BIBLIOGRAPHY

Applications of Vygotsky's Theory to Education [Online]. (1999). Available: http://209.36.93.3/jholford/applications_of_vygotsky.htm [1999, July 14].

Highlights: The article describes the importance of Vygotsky's concept of a zone of proximal development and cultural tools in educational applications. It also gives an example of how the sociocultural theory was used in the field of education as well as *Information Technology*.

Keywords: zone of proximal development, sociocultural theory, learning, interaction, cultural tools

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Benson, A. (1995). *Review and Analysis of Vygotsky's Thought and Language* [Online]. Available: http://129.7.160.115/inst5931/Vygotsky.html [1999, July 14].

Highlights: Alexis Benson clarifies Vygotsky's theories in terms of thought, language, speech, and instructional technology needs for child and adult learning.

Keywords: Vygotsky, zone of proximal development, instructional technology, learning, development, culture, society, experience

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Benson, A. (1995). *Vygotsky Analyzes Piaget's Developmental Theory* [Online]. Available: http://129.7.160.115/INST5931/Vygotsky_Analyzes_Piaget.html [1999, July 14].

Highlights: The article discusses how Vygotsky analyzed Piaget's Developmental Theory and explained that cultural and biological development are closely related in social contexts.

Keywords: development, social, cultural, experience

Bonk, C. J., & Kim, K. A. (1998). Extending Sociocultural Theory to Adult Learning. In M. C. Smith & T. Pourchot (Ed.), *Adult Learning and Development: Perspectives From Educational Psychology* (pp. 67-88). Mahwah, New Jersey: Lawrence Erlbaum Associates.

Highlights: The article implies that sociocultural theory can be applied to adult learning because Information Technology, as a cultural artifact, influences human development and learning in childhood and adulthood. It also describes the needs to research adult learning using a sociocultural approach.

Keywords: sociocultural theory, Vygotsky, distance education, technology, self-directed, adult learning

Burwell, D. (No date). *EDU 449 Secondary Student Teaching : The Action Research Plan* [Online]. Available: http://hecate.acofi.edu/education/action.html [1999, July 14].

Highlights: The article defines action research, and describes purposes and steps of the process.

Keywords: action research, methodology, classroom, data gathering, problem formulation

Cross, K. P. (1981). *Adults As Learners.* Washington: Jossey-Bass Publishers.

Highlights: Kathryn Patricia Cross describes how she devised the "Characteristics of Adults as Learners" (CAL) model to emphasize the importance of research in adult learning. Her model pays special attention to three areas (physical characteristics, sociocultural characteristics, and psychological characteristics) of adult learning.

Keywords: adult learning, sociocultural, andragogy, pedagogy, adult development

Davey, K. B. (Winter 1999). Distance Learning Demystified. *National Forum: The Phi Kappa Phi Journal, 79,* (1), 44-46.

Highlights: Kathleen B. Davey defines distance learning and criticizes common misconceptions of distance learning.

Keywords: distance learning, education, colleges and universities, technology

Distance Learning Services. (1998). *Roles and Responsibilities for the Development and Delivery of Distance Learning Courses* [Online]. Available: http://www.rit.edu/~609www/ch/faculty/orient7.htm [1999, November 15].

Highlights: The web page contains a table of roles and responsibilities for the development and delivery of distance learning courses.

Keywords: department, faculty, students, course

Educational Technology Center. (Producer). (1999). *President Simone's Community Address 1999.* [Film]. Rochester, NY: Rochester Institute of Technology.

Highlights: RIT administrators addressed RIT's 1998-99 highlights, strengths, weaknesses, and recommendations.

Keywords: technology, students, faculty, retention rate

Educational Technology Center and Registrar. (No date available). *Classroom Feature Databases* [Online]. Available: http://disted.rit.edu/classrooms/ [1999, November 15].

Highlights: The web page provides information about the physical properties of many classrooms.

Keyword: classroom

Gabel, D. (1995). *An Introduction to Action Research* [Online]. Available: http://www.phy.nau.edu/~danmac/actionrsch.html [2000, February 26].

Highlights: The article presents formal definitions and details of the action research methodology.

Keywords: action research, plan, action, reflect, cycle, educational

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Greenwood, D. J. & Levin, M. (1998). *Introduction to Action Research.* London: SAGE Publications.

Highlights: The book presents in-depth details about the history and philosophy of the action research methodology.

Keyword: action research

Grow, G. (1991). The Model. In *Teaching Learners to be Self-Directed* [Online]. Available: http://www.famu.edu/sjmga/ggrow/SSDL/Model.html#TheModel [1999, July 2].

Highlights: Dr. Gerald Grow proposes the Staged Self-Directed Learning Model, a matrix of four teaching styles and four learning styles. Each style is described and illustrated through examples.

Keywords: readiness, situation, teaching, learning, self-directed, Staged Self-Directed Learning Model

Grow, G. (1991). Implications for Teaching. In *Teaching Learners to be Self-Directed* [Online]. Available: http://168.223.2.3/sjmga/ggrow/SSDL/ImpTeach.html#ImplicationsforTeaching [1999, July 2].

Highlights: This important article provides a table for identifying matches and mismatches in the Staged Self-Directed Learning Model. It also explains the causes of some mismatches.

Keywords: teaching styles, learning stages, Staged Self-Directed Learning Model, self-directed, learning, adult education

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Guerra, C., & Schutz, R. (No date). *Vygotsky* [Online]. Available: http://www.viavale.com.br/english/sk-vygot.html [1999, July 14].

Highlights: The article contains a summary of Vygotsky's life, the analysis of Thought and Language, and the analysis of zone of proximal development.

Keywords: Vygotsky, zone of proximal development, language, culture, interaction, internal development processes

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Hsiao, J. (No date). *CSCL Theories* [Online]. Available: http://www.edb.utexas.edu/csclstudent/Dhsiao/theories.html [1999, July 14].

Highlights: Hsiao explains how educational theories can be applied in computer-supported collaborative learning and raises some important research questions pertaining to this matter.

Keywords: computer-supported collaborative learning, sociocultural theory, self-regulated learning, education

---

Kitchen, P. (2000, February 13). Let the Internet Be Your Classroom. *Newsday,* p. F11.

Highlights: The article discusses recommendations for the distance learning environment.

Keywords: traditional classroom, distance learning, learning technologies, online collaboration

Knirk, F., & Montague, W. (1992). Physical Classroom Environment. In *What Works in Adult Instruction: The Management, Design and Delivery of Instruction* [Online]. Available: http://www.nprdc.navy.mil/wworks/find45.htm [1999, July 14].

Highlights: The article gives an example of how a physical classroom should be constructed in order to enhance learning.

Keywords: colors, light level, noise factors, temperature, classroom

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Knowles, M. (1990). *The Adult Learner: A Neglected Species.* (4th Edition). Houston: Gulf Publishing Company.

Highlights: Malcolm Knowles defines and describes andragogy based on the findings and viewpoints of education researchers. His book also discusses important educational problems in adults' early, middle, and older years.

Keywords: andragogy, pedagogy, development, education, psychology

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Learning Theories: Social Constructivism: Conceptualising information technologies in the ZPD In *Learning Theories in Information Technology: Social Constructivism* [Online]. (No date). Available: http://www.jcu.edu.au/dept/Education/subjects/ed1441/topics/topic2/topic2j.htm [1999, July 14].

Highlights: The web page describes Information Technology as "the more capable other" or "pedagogical mediator" in the zone of proximal development and states that it can behave like a human teacher in some ways.

Keywords: zone of proximal development, Information Technology, interactive multimedia, cultural tools, social constructivism

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Learning Theories: Social Constructivism: Introduction In *Learning Theories in Information Technology: Social Constructivism* [Online]. (No date). Available: http://www.jcu.edu.au/dept/Education/subjects/ed1441/topics/topic2/topic2b.htm [1999, July 14].

Highlights: The online text affirms that Information Technology influences human development and learning in the viewpoints of socioculturists.

Keywords: Information Technology, cognitive tools, social constructivism, culture, social context, sociocultural theory, Vygotsky

Learning Theories: Social Constructivism: Other Information and Activities In *Learning Theories in Information Technology: Social Constructivism* [Online]. (No date). Available: http://www.jcu.edu.au/dept/Education/subjects/ed1441/topics/topic2/topic2l.htm [1999, July 14].

Highlights: The source describes cultural tools, scaffolding, the concept of interpsychological vs. intrapsychological, and assisted performance in the zone of proximal development.

Keywords: scaffolding, cultural tools, interpsychological, intrapsychological, zone of proximal development, Information Technology

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Learning Theories: Social Constructivism: Zone of Proximal Development and Learning In *Learning Theories in Information Technology: Social Constructivism* [Online]. (No date). Available: http://www.jcu.edu.au/dept/Education/subjects/ed1441/topics/topic2/topic2c.htm [1999, July 14].

Highlights: The web page shows a simple and clear illustration of what the zone of proximal development learning means.

Keywords: zone of proximal development, social constructivism

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Lev Vygotsky (1896 - 1934) [Online]. (No date). Available: http://www.bestpraceduc.org/people/LevVygotsky.html [1999, July 14].

Highlights: The article provides important highlights of Lev Vygotsky's life.

Keywords: developmental psychology, education

Merriam-Webster Collegiate Dictionary (1st Edition), [CD-ROM]. (1994). Available: Merriam-Webster, Inc. [1999, July 2].

Highlights: The on-line collegiate dictionary contains complete definitions of some important term(s) in the thesis.

Keywords: N/A

Neal, E. (Winter 1999). Distance Education. *National Forum: The Phi Kappa Phi Journal, 79,* (1), 40-43.

Highlights: Ed Neal compares and contrasts traditional classroom and distance learning approaches in terms of economics and educational psychology.

Keywords: traditional classroom, virtual learning, self-directed, adult learning, adolescent learning

Overdorff, J. & Young, S. (1998). *Who is L.S. Vygotsky?* [Online]. Available: http://westyjr.jtwn.k12.pa.us/2000/sxy100/psychology5.html [1999, July 14].

Highlights: The article presents a summary of Lev Vygotsky's life and applications of his theories.

Keywords: Signs, tools, Vygotsky, methodology, society, development, culture

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Padak, G. & Padak, N. (2000). *Research to Practice: Guidelines for Planning Action Research Projects* [Online]. Available: http://archon.educ.kent.edu/Oasis/Pubs/0200-08.htm [2000, February 26].

Highlights: The article explains the steps of the action research methodology.

Keywords: action research, questions, data, collect, analyze

Pathways. (No date). *Action Research* [Online]. Available: http://www.ncrel.org/sdrs/areas/issues/envrnmnt/drugfree/sa3act.htm [1999, July 14].

Highlights: The short article presents a complete definition and purpose of action research.

Keywords: action research, organization, schools

Ratner, C. (1998). *Historical and Contemporary Significance of Vygotsky's Sociohistorical Psychology* [Online]. Available: http://www.humboldt1.com/~cr2/sociohis.htm [1999, July 14].

Highlights: The article discusses contrasts between Vygotsky's works and other psychologists' works, psychological phenomena in sociocultural perspectives, and values in social settings.

Keywords: sociocultural theory, cultural artifacts, higher psychological processes, psychological phenomena, social experience

---

Rochester Institute of Technology. (1994, August). *Learning and Careers 2004: The Strategic Plan for the Rochester Institute of Technology.* Paper presented at the meeting of the Strategic Planning Steering Committee, Rochester, NY.

Highlights: The document describes RIT's internal and external assumptions, and its long-term educational goals.

Keywords: teaching, learning, technology, Information technology, faculty, students

Schommer, M. (1998). The Role of Adults' Beliefs About Knowledge In School, Work, and Everyday Life. In M. C. Smith & T. Pourchot (Ed.), *Adult Learning and Development: Perspectives From Educational Psychology* (pp. 127-143). Mahwah, New Jersey: Lawrence Erlbaum Associates.

Highlights: Dr. Marlene Schommer points out how important it is for adult educators to know what adult learners believe about education. The epistemological beliefs theory is covered in full detail in her article.

Keywords: adult learning, epistemological beliefs theory, knowledge

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The Nature of Learning For the Self Directed Learner - The Advantages of Fostering Self-Directed Learning [Online]. (No date). Available: http://www.rcc.ryerson.ca/learnontario/idnm/idnmf/mod2/lesson1/mod2-1113.htm [1999, July 3].

Highlights: The article provides a list of self-directed learning benefits and describes each benefit in detail.

Keywords: ability, subject matter, transference capability, learning, self-directed, process awareness, self-understanding

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The Nature of Learning For the Self Directed Learner - Fostering Self-Directed Learning [Online]. (No date). Available: http://www.rcc.ryerson.ca/learnontario/idnm/idnmf/mod2/lesson1/mod2-111.htm [1999, July 3].

Highlights: Dr. Gerald Grow proposes goals for our current educators and makes suggestions about how teachers should design self-directed learning experiences.

Keywords: universities, self-direction, dependency, learning, learners, instructors

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The Nature of Learning For the Self Directed Learner - Learning How to Learn [Online]. (No date). Available: http://www.rcc.ryerson.ca/learnontario/idnm/idnmf/mod2/lesson1/mod2-17.htm [1999, July 3].

Highlights: The article defines "learning how to learn" as it relates to self-directed education.

Keywords: learning, situation, technology, self-directed

The Nature of Learning For the Self Directed Learner - Optimum Conditions For Adult Learners [Online]. (No date). Available: http://www.rcc.ryerson.ca/learnontario/idnm/idnmf/mod2/lesson1/mod2-18.htm [1999, July 3].

Highlights: The article suggests six conditions for optimum adult learning.

Keywords: adult learning, process, self-directed, distant study

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The Nature of Learning For the Self Directed Learner - The Self-Directed Learner [Online]. (No date). Available: http://www.rcc.ryerson.ca/learnontario/idnm/idnmf/mod2/lesson1/mod2-110.htm [1999, July 3].

Highlights: The article describes characteristics of the self-directed learner.

Keywords: learning, control, self-directed, skills

Vygotsky, L., & Kozulin, A. (1986). *Thought and Language.* Cambridge, Massachusetts: The MIT Press.

Highlights: The book provides complete details of Vygotsky's analyses of Piaget's Theory and Stern's Theory, the relationship between thought and speech, and some empirical studies of this relationship. It briefly discusses the zone of proximal development, too.

Keywords: learning, development, children, thought, speech, zone of proximal development

---

Vygotsky, L. (1978). *Mind in Society: The Development of Higher Psychological Processes.* Cambridge, Massachusetts: Harvard University Press.

Highlights: Vygotsky developed important and original concepts of the zone of proximal development, cultural artifacts, interpersonal vs. intrapersonal, and social experience.

Keywords: interpersonal, intrapersonal, zone of proximal development, culture, tools, signs, social

---

Wadsworth, Y. (November 1998). *What is Participatory Action Research?* [Online]. Available: http://elmo.scu.edu.au/schools/sawd/ari/ari-wadsworth.html [2000, February 26].

Highlights: The web page describes the participatory action research methodology.

Keyword: action research, participatory research, conventional research process

APPENDIX A

RIT Education

Informed Consent Form

I agree to participate in a research study being conducted by Ryan M. Griske, an RIT graduate student, during the fall quarter, 1999, with the understanding that:

1. The major objective of this study is to provide the RIT population with a better understanding of the factors contributing to successful traditional classroom and distance learning environments so that potential improvements can be identified and considered for the benefit of all interested parties.

2. Input for the study will be secured from interviews with RIT administrators and faculty members, existing information pertaining to the RIT faculty and student populations, and questionnaires to be completed by instructors and students in two Information Technology courses. Mr. Griske will answer any inquiries from study participants regarding these and other procedures related to the study.

3. All data secured during the study (including, but not limited to, questionnaire and interview answers, as well as statistics and other existing information regarding the RIT faculty and student populations) will be kept confidential and therefore will not affect students' course grades nor expose participants to any other risk. The names of participants will not be used in any reports prepared as part of the study. A participant may elect to withdraw from participation in this study at any time without prejudice.

____________________ ____________ ____________

Signature Date Birthdate

APPENDIX B

RIT Education

Interview Questions For Administrators

1. What are RIT's short-term and long-term educational strategies for assuring the best possible undergraduate traditional classroom and distance learning environments? Are you aware of any studies or publications about this topic? If so, how can I obtain copies of these documents?

2. Can you provide me with any statistics and other information for RIT undergraduate students that might relate to their success in completing traditional classroom and distance learning courses? Examples might include: (a) high school and non-RIT college grades, honors, and activities; (b) SAT, ACT, and other college or class level entrance scores, (c) RIT honors, activities, organizations, jobs held while attending RIT, and grades for specific classes taken; and (d) previous employment information.

3. What are your most important contributions to the success you and your students have achieved in the RIT traditional classroom and distance learning environments? Please be specific.

APPENDIX C

RIT Education Questionnaire

For Administrators

Learning Viewpoint

Most of RIT students need ______ instruction and guidance.

- Constant ☐
- Occasional ☐
- Minimal ☐

Students' life experiences are ______ in developing their ability to learn.

- A very important factor ☐
- Helpful, but not essential ☐
- Not an important factor ☐

Instructors should primarily consider students' ______ in designing teaching methods for a course.

- Biological development (age, intelligence) ☐
- Social experiences ☐

RIT students learn the best by studying ____.

- Facts ☐
- Applications ☐
- Both ☐

Which is more important to RIT students?

- Subject matter ☐
- Problem solving ☐

Teaching Viewpoint

The learning climate for RIT courses is generally _______.

- Formal and controlled entirely by instructors ☐
- Informal with instructor/student sharing of responsibilities ☐

___________ should be responsible for course...

... objectives formulation.

- The instructor ☐
- The students ☐
- The instructor and students ☐

... structure planning.

- The instructor ☐
- The students ☐
- The instructor and students ☐

... student needs assessment.

- The instructor ☐
- The students ☐
- The instructor and students ☐

... effectiveness evaluations.

- The instructor ☐
- The students ☐
- The instructor and students ☐

_____ should be emphasized in college courses.

- Subject matter discussions ☐
- Problem solving activities ☐
- Both ☐

Course activities should use ________.

- Instructor's techniques ☐
- Students' experimental techniques ☐
- Both ☐

General Comments

Please write anything about the success of RIT teaching/learning environment on the back of this paper.

Thanks so much for filling out the questionnaire!

APPENDIX D

5th Week

RIT Education Questionnaire

For Instructors

Learning Viewpoint

Most of my students need ______ instruction and guidance from me.

Constant ☐
Occasional ☐
Minimal ☐

My students' life experiences are ______ in developing their ability to learn.

A very important factor ☐
Helpful, but not essential ☐
Not an important factor ☐

I primarily consider my students' ______ in designing my teaching methods for a course.

Biological development (age, intelligence) ☐
Social experiences ☐

My students learn the best by studying ____.

Facts ☐
Applications ☐
Both ☐

Which is more important to my students?

Subject matter ☐
Problem solving ☐

Teaching Viewpoint

The learning climate for my courses is generally _______.

Formal and controlled entirely by me ☐
Informal with instructor/student sharing of responsibilities ☐

__________ should be responsible for course...

... objectives formulation.
The instructor ☐
The students ☐
The instructor and students ☐

... structure planning.
The instructor ☐
The students ☐
The instructor and students ☐

... student needs assessment.
The instructor ☐
The students ☐
The instructor and students ☐

... effectiveness evaluations.
The instructor ☐
The students ☐
The instructor and students ☐

______ should be emphasized in college courses.

Subject matter discussions ☐
Problem solving activities ☐
Both ☐

Course activities should use __________.

Instructor's techniques ☐
Students' experimental techniques ☐
Both ☐

General Information

Gender Male ☐ Female ☐

Age Range 25—40 ☐ Over 40 ☐

Type of Instructor

Traditional Classroom ☐
Distance Learning ☐
Both ☐

Tenure Status

Full-time ☐ Part-time ☐

Tenure Length (in years)

0—5 ☐ 6—10 ☐ 11+ ☐

Type of H.S. Education

Public ☐ Private ☐

College Education Level

B.S./B.A. ☐
M.S./M.A. ☐
Doctorate ☐

Type of College Education

Public ☐ Private ☐

Social Background

Decisions about my education have usually been made by _________.

Myself ☐
My teachers and other people ☐

Computer Literacy

Low ☐ Medium ☐ High ☐

General Comments

Please write anything about the plan of your teaching/learning environment on the back of this paper.

Thanks so much for filling out the questionnaire!

APPENDIX E

9th Week

RIT Education Questionnaire

For Instructors

Learning Viewpoint

Most of my students need ______ instruction and guidance from me.

Constant ☐
Occasional ☐
Minimal ☐

My students' life experiences are ______ in developing their ability to learn.

A very important factor ☐
Helpful, but not essential ☐
Not an important factor ☐

I primarily consider my students' ______ in designing my teaching methods for a course.

Biological development (age, intelligence) ☐
Social experiences ☐

My students learn the best by studying ____.

Facts ☐
Applications ☐
Both ☐

Which is more important to my students?

Subject matter ☐
Problem solving ☐

Teaching Viewpoint

The learning climate for my courses is generally ______.

Formal and controlled entirely by me ☐
Informal with instructor/student sharing of responsibilities ☐

__________ should be responsible for course...

... objectives formulation.
The instructor ☐
The students ☐
The instructor and students ☐

... structure planning.
The instructor ☐
The students ☐
The instructor and students ☐

... student needs assessment.
The instructor ☐
The students ☐
The instructor and students ☐

... effectiveness evaluations.
The instructor ☐
The students ☐
The instructor and students ☐

_____ should be emphasized in college courses.

Subject matter discussions ☐
Problem solving activities ☐
Both ☐

Course activities should use ________.

Instructor's techniques ☐
Students' experimental techniques ☐
Both ☐

General Information

Gender Male ☐ Female ☐

Age Range 25—40 ☐ Over 40 ☐

Type of Instructor

Traditional Classroom ☐
Distance Learning ☐
Both ☐

Tenure Status

Full-time ☐ Part-time ☐

Tenure Length (in years)

0—5 ☐ 6—10 ☐ 11+ ☐

Type of H.S. Education

Public ☐ Private ☐

College Education Level

B.S./B.A. ☐
M.S./M.A. ☐
Doctorate ☐

Type of College Education

Public ☐ Private ☐

Social Background

Decisions about my education have usually been made by ________.

Myself ☐
My teachers and other people ☐

Computer Literacy

Low ☐ Medium ☐ High ☐

Please complete the next page —>

RIT Education Questionnaire

For Instructors

General Tasks

How many E-mails ______ and phone calls ______ do you receive in an average week from your students?

How many individual conferences do you have in an average week with your students? ______

What are the three or four most common subjects of the student: . . .

a. E-mails? ____

b. Phone calls? ____

c. Conferences? ____

How many hours do you spend in an average week on Academic Research? ____
Course Preparation? ____ Teaching Courses? ____ Grading? ____
Other Job-Related Activities (specify: ________________________________)? _____

General Comments

Please write anything about the success of your teaching/learning environment below.

Thanks so much for filling out the questionnaire!

APPENDIX F

5th Week

RIT Education Questionnaire

For Students

Learning Viewpoint

Most of my knowledge has been acquired from _______.

- Teachers ☐
- Life Experiences ☐
- Equally from Teachers/ Life Experiences ☐

I acquire knowledge best by learning about interrelated parts of a topic __________.

- Separately ☐
- At the same time ☐
- Either separately or at the same time, depending on the topic ☐

After learning about a topic, I believe my knowledge of the subject will _____ change in the future.

- Never ☐
- Rarely ☐
- Sometimes ☐
- Often ☐

I prefer to expand my knowledge by ___________.

- Acquiring facts ☐
- Solving problems ☐
- Acquiring facts and using them to solve problems ☐

I have a ____ learning speed.

- Very slow ☐
- Slow ☐
- Average ☐
- Fast ☐
- Very Fast ☐
- Varied (Depending on topic) ☐

My ability to learn new things ______ changes.

- Never ☐
- Rarely ☐
- Sometimes ☐
- Often ☐

Learning Habits

I __________ communicate with ....

... my classmates.

- Never ☐
- Rarely ☐
- Sometimes ☐
- Often ☐

... my instructors.

- Never ☐
- Rarely ☐
- Sometimes ☐
- Often ☐

... RIT Tutors.

- Never ☐
- Rarely ☐
- Sometimes ☐
- Often ☐

In completing my assignments, I usually _______.

- Work on them a little each day ☐
- Do them at the last minute ☐
- Usually do not complete them ☐

To prepare for my exams, I usually ____________.

- Study a little each day ☐
- Cram the night before ☐
- Seldom/never study and rely on my memory ☐

General Information

Gender Male ☐ Female ☐

Age Range

Under 21 ☐ 21—25 ☐ Over 25 ☐

Student Status

Full-time ☐ Part-time ☐

College Year Level

1 ☐ 2 ☐ 3 ☐ 4 ☐

College Major

____

Type of H.S. Education

Public ☐ Private ☐

Social Background

Decisions about my education have usually been made by ________.

- Myself ☐
- My teachers and other people ☐

Computer Literacy

Low ☐ Medium ☐ High ☐

Future Goal

- Become a professor ☐
- Become an employee ☐
- Become an executive ☐
- Other: ☐

____

Please complete the other side of this page —>

RIT Education Questionnaire

For Students

Learning Sites

Doing assignments

My favorite location: ______________

Dominant color: ______________

Average temperature:

- Below 68F ☐
- Between 68F and 72F ☐
- Above 72F ☐

Average noise level:

- Very quiet ☐
- Somewhat quiet ☐
- Medium ☐
- Somewhat loud ☐
- Very loud ☐

Average light level:

- Very bright ☐
- Bright ☐
- Medium ☐
- Dark ☐
- Very dark ☐

Number of people in this location:

0—5 ☐ 6 Or More ☐

Studying for exams

My favorite location: ______________

Dominant color: ______________

Average temperature:

- Below 68F ☐
- Between 68F and 72F ☐
- Above 72F ☐

Average noise level:

- Very quiet ☐
- Somewhat quiet ☐
- Medium ☐
- Somewhat loud ☐
- Very loud ☐

Average light level:

- Very bright ☐
- Bright ☐
- Medium ☐
- Dark ☐
- Very dark ☐

Number of people in this location:

0—5 ☐ 6 Or More ☐

Obtaining assistance (Example: tutoring)

My favorite location: ______________

Dominant color: ______________

Average temperature:

- Below 68F ☐
- Between 68F and 72F ☐
- Above 72F ☐

Average noise level:

- Very quiet ☐
- Somewhat quiet ☐
- Medium ☐
- Somewhat loud ☐
- Very loud ☐

Average light level:

- Very bright ☐
- Bright ☐
- Medium ☐
- Dark ☐
- Very dark ☐

Number of people in this location:

0—5 ☐ 6 Or More ☐

General Comments

Use this space to write any comments about learning experiences in this course or in your life.

Thanks so much for filling out the questionnaire!

APPENDIX G

9th Week

RIT Education Questionnaire

For Students

Learning Viewpoint

Most of my knowledge has been acquired from _______.

Teachers ☐
Life Experiences ☐
Equally from Teachers/ Life Experiences ☐

I acquire knowledge best by learning about interrelated parts of a topic __________.

Separately ☐
At the same time ☐
Either separately or at the same time, depending on the topic ☐

After learning about a topic, I believe my knowledge of the subject will _____ change in the future.

Never ☐
Rarely ☐
Sometimes ☐
Often ☐

I prefer to expand my knowledge by ___________.

Acquiring facts ☐
Solving problems ☐
Acquiring facts and using them to solve problems ☐

I have a ____ learning speed.

Very slow ☐
Slow ☐
Average ☐
Fast ☐
Very Fast ☐
Varied (Depending on topic) ☐

My ability to learn new things ______ changes.

Never ☐
Rarely ☐
Sometimes ☐
Often ☐

Learning Habits

How many times in an average week do I communicate with my classmates by
E-mail? ____ Phone? ____
Face-to-face contact? ____
Fax? ____
Other (specify: _____________)? _____

How many times in an average week do I communicate with my instructor by
E-mail? ____ Phone? ____
Face-to-face contact? ____
Fax? ____
Other (specify: _____________)? _____

How many times in an average week do I communicate with RIT tutors by
E-mail? ____ Phone? ____
Face-to-face contact? ____
Fax? ____
Other (specify: _____________)? _____

In completing my assignments, I usually _______.

Work on them a little each day ☐
Do them at the last minute ☐
Usually do not complete them ☐

To prepare for my exams, I usually _____________.

Study a little each day ☐
Cram the night before ☐
Seldom/never study and rely on my memory ☐

General Information

Gender Male ☐ Female ☐

Age Range

Under 21 ☐ 21—25 ☐ Over 25 ☐

Student Status

Full-time ☐ Part-time ☐

College Year Level

1 ☐ 2 ☐ 3 ☐ 4 ☐

College Major

____

Type of H.S. Education

Public ☐ Private ☐

Social Background

Decisions about my education have usually been made by ________.

Myself ☐
My teachers and other people ☐

Computer Literacy

Low ☐ Medium ☐ High ☐

Future Goal

Become a professor ☐
Become an employee ☐
Become an executive ☐
Other: ☐
____

Please complete the next page —>

RIT Education Questionnaire

For Students

Learning Sites

Doing assignments	**Studying for exams**	**Obtaining assistance (Example: tutoring)**
My favorite location: ________	My favorite location: ________	My favorite location: ________
Dominant color: ________	Dominant color: ________	Dominant color: ________
Average temperature:	Average temperature:	Average temperature:
Below 68F ☐	Below 68F ☐	Below 68F ☐
Between 68F and 72F ☐	Between 68F and 72F ☐	Between 68F and 72F ☐
Above 72F ☐	Above 72F ☐	Above 72F ☐
Average noise level:	Average noise level:	Average noise level:
Very quiet ☐	Very quiet ☐	Very quiet ☐
Somewhat quiet ☐	Somewhat quiet ☐	Somewhat quiet ☐
Medium ☐	Medium ☐	Medium ☐
Somewhat loud ☐	Somewhat loud ☐	Somewhat loud ☐
Very loud ☐	Very loud ☐	Very loud ☐
Average light level:	Average light level:	Average light level:
Very bright ☐	Very bright ☐	Very bright ☐
Bright ☐	Bright ☐	Bright ☐
Medium ☐	Medium ☐	Medium ☐
Dark ☐	Dark ☐	Dark ☐
Very dark ☐	Very dark ☐	Very dark ☐
Number of people in this location:	Number of people in this location:	Number of people in this location:
0—5 ☐ 6 Or More ☐	0—5 ☐ 6 Or More ☐	0—5 ☐ 6 Or More ☐

General Comments

Use this space to write any comments about learning experiences in this course or in your life.

Thanks so much for filling out the questionnaire!

APPENDIX H

(Form C)

(716) 475-2182

TO: (Principal Investigator) Ryan Griske

FROM: RIT Institutional Review Board

DATE: September 27, 1999

Subject: Traditional Classroom Versus Distance Learning Approaches in Providing
(Project Title) Education for Students at the College of Applied Science and Technology at RIT

The Board has taken the following action on the above project request:

________ Exempt

__x__ Approved as Type _II_. Informed consent required for Types II, III, IV.

________ Deferred. Please submit following additional information or assurances promptly so Board can act on your request. Do not seek informed consent or involve human subjects until approved by Board.

________ Disapproved or suspended. You are free to resubmit with revisions, and to request a hearing with the Board.

Supporting Statement or Additional Requirements

If project is approved, you may proceed as described with the understanding that you will promptly report to the Board proposed modifications, unanticipated risks, or actual injury to human subjects. If the project extends more than 12 months and continues to involve the active participation of human subjects, it must be resubmitted to the Board within 12 months of the above date. If the approved project is RIT-initiated and involves the cooperation of subjects in other institutions, a statement from those institutions indicating appropriate review and approval relative to risk to human subjects must be received by the RIT Institutional Review Board prior to the participation of subjects in those institutions.

Inquiries about DHHS regulations or the RIT policy and procedures may be directed to any member of the Board.

John M Waud (st)
John M. Waud, Ph.D., Chairman
Institutional Review Board

cc: IRB Members