ON-LINE TEACHING AND LEARNING: A DESCRIPTION OF THE DEVELOPMENT OF THE MEDIA TECHNOLOGY AND DIVERSITY ONLINE COURSE AND ITS ELECTRONIC DISCOURSE ANALYSIS

By

Yolanda Nokuri Hegngi

Dissertation submitted to the Faculty of the
Virginia Polytechnic Institute & State University
in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

In

Curriculum and Instruction

Susan G. Magliaro (Chair)
John K. Burton
Norman R. Dodl
James W. Garrison
C. David Taylor

April 15, 1997
Blacksburg, Virginia

Keywords: On-line teaching, On-line learning, Discourse analysis, Electronic discourse, On-line course development

Copyright 1997, Yolanda Hegngi

ON-LINE TEACHING AND LEARNING: A DESCRIPTION OF THE DEVELOPMENT OF THE MEDIA TECHNOLOGY AND DIVERSITY ONLINE COURSE AND ITS ELECTRONIC DISCOURSE ANALYSIS

By

Yolanda Nokuri Hegngi

(ABSTRACT)

The purpose of this study was to examine and describe the events of the first iteration of the Media Technology and Diversity course with an in-depth analysis of its electronic discourse. In conceptualizing the viable alternatives for delivering college-level distance education via on-line technologies, Harasim (1990) cautions that the mere introduction of computer mediated communication"does not in itself improve learning; design (or method) is crucial' (p. xx). The role of instructional design as the cornerstone of all effective instruction is relevant as new technologies are used in teaching and learning. The MTD distance education course content was delivered via the World Wide Web, where the course homepage was the on-line classroom and e-mail and Webchat communication supported participants' interaction. The participants of the study were the instructors and teaching assistants, as well as the undergraduate and graduate students who took the course.

The electronic archive data, student assignments, and follow-up interviews with participants provided multiple data points for analysis. The Webchat archive data was analyzed using the NUD.DIST qualitative research software to sort and produce descriptive statistics. The analysis of e-mail and Webchat discourse revealed that participant interaction differed between media types and between asynchronous and scheduled the Webchat discussions. The differences were temporal, topical, and structural. Student initiated thought-provoking Webchat dialogue yet on-line content delivery, course structure, and reliability of computer systems reduced student participation in on-line discourse and course activities.

Significantly, lessons learned from the design of the MTD experience indicate that on-line course development requires advance technical skill and accessible instructional technologies. Instructional designers should develop course materials with the end-users' lowest common denominator technologies to increase participation and learning opportunities. The lessons learned from the electronic discourse analysis indicate that the WWW is a very complex instructional environment that requires carefully designed pedagogical activities and interaction. Research results indicate that where as asynchronous Webchat discussions encourage students to initiate conversation topics, the overall participation in on-line discourse is low. On the other hand, scheduled Webchat discussions promote lengthy and more thought-provoking discussions, but students generally respond to instructor-posted questions or topics.

Dedication
To my

TEACHER

Acknowledgements

I would like to express my sincerest appreciation to Dr. Susan Magliaro who patiently and skillfully guided me through the research experience. I will never forget sitting on the third floor of Neuman library with one of your students on the eve of his prospectus exam, when he said,"I could never face this exam without her!....How old is she?' And I gave a very vague guess, to which the student responded,"How did she get smart so quickly?' Your dedication and excellence in teaching and has been an educational experience, all on its own. Working with you is a great adventure in learning. Dr. Norman Dodl, Dr. John Burton, Dr. James Garrison, and Dr. David Taylor, your wisdom, humor, and support have helped launch my career in this field.

Lucinda Roy, the opportunity for me to be a part of the Cyberschool experience has been pivotal in my career. Thanks for all the advice and support. Drs. Glen Holmes and Joyce Williams-Green, thank you for cooperating with the inquiry process. Juone Brown, girl, I appreciate your help.

Thank you Fidelis for your support and love that have propelled me forward in life and in this learning venture. Parnell and Topher, your love and prayers are very precious to me. My sisters and friends, Anike, Linda, Mbongo, and Nganga, I love you and look forward to lots of years of growth in our lives. John, Danillo, and Sam, my brothers, thanks for your love. Thank you auntie Bern and Ranni for strength and love. Lastly, Mom and Dad, your persistence and sacrifice have contributed to this successful project and I thank you.

To my colleagues, Tome Barrett and Carmel Vaccare, your humor and help have made a difference in this journey. To the Cellar gang and the ETL peers, thanks for your encouragement. Drs. Scales thank you!! Gloria Noll, I thank you.

Table of Contents

Title Page i

Abstract ii

Dedication iv

Acknowledgements v

Table of Contents vii

List of Tables xii

List of Figures xiii

CHAPTER 1 1

Introduction 1

Purpose of the Study 6

CHAPTER 2 9

Review of Literature 9

Distance Education 10

Definition 10

Rationale for distance education 11

A Brief Historical Account 12

Role of technology in distance education 13

Computer-Related Instructional Materials 14

Computer assisted instruction 14

Computer mediated communication 15

The World Wide Web: An emerging instructional environment 15

Interaction in Distance Education 16

Research on interaction 17

Electronic Discourse Analysis 20

Summary 24

Questions 25

Chapter 3

Methodology 27

Overview 27

Field Site Information 27

General Setting 27

Participants 29

Human subjects protection 32

Course Delivery Details 33

Face-to-face orientation sessions 33

Instructional components 36

Student biography pages 38

Webchats 38

E-mail communication 40

Course assignments and activities 41

Data Sources and Collection/Recording Procedures 42

Data Sources 43

Documents 43

Electronic archives. 44

Student records 44

Interviews 45

Field notes/Investigator's journal 45

Data Management and Analysis Procedures 47

Data management 47

Data analysis 48

Data reduction 48

Deductive and inductive analysis 48

Conclusions drawing and verification 52

Planning For Trustworthiness 52

Credibility 53
Transferability 54
Dependability 54
Confirmability 55
Researcher's Stance 55
Limitations of Study 56
Chapter 4
A Description of the MTD Course: From Design and Implementation to Discourse Analysis 58
Course Design History 58
Course Production 60
Initial research and development activities 61
Equipment and facility 64
Production time 65
Electronic Discourse Analysis 65
Temporal Characteristic 66
Topical 68
Structural sequence 72
Discourse Characteristics 78
Course Outcome 83
Understanding the design process 84
Role of culture in media development 85
Summary of course outcome 91
Summary 93
Chapter 5
Interpretations, Implications, and Future Considerations 95
Thematic Interpretation of Findings 95
Implications and Next Steps for MTD Course 100

Implications and Next Steps for Furthering Research and Development of On-line Course 102
References 104
Appendix AOperational Definitions 111
Appendix B
Consent Forms 113
Appendix C
Course Production, Implementation Timeline 114
Appendix D
MTD Required Software and Plugins 122
Appendix E
Student Homepage Paper Sketch Design 123
Appendix F
Syllabus 124
Appendix G
Course Assignment Schedule and Description 125
Appendix H
Interview with Instructors 126
Interview with students 127
Appendix I
Coding Categories 129
Appendix J
Sequence of Classroom Lesson 130
Appendix K
Webchat Topics 132
Appendix L
Evaluation Responses 134
Appendix M

Pittsburgh E-mail Posting 136

Appendix N

Vita 139

List of Tables

Table

1 Rationale for Data Collection Procedures and Tools 46

2 Temporal Factors--Electronic Discourse Lag Time 49

3 Electronic Discourse Topical Factors 50

4 Webchat IRE Breakdown 72

5 Webchat Tally 76

6 Grand Totals of Webchat Postings 81

List of Figures

Figure

1 Biography Page 32

2 Course Assignment Schedule 34

3 On-line Syllabus 36

4 Webchat 37

5 E-mail Communication 39

6 Who Will I Hire 40

CHAPTER 1

Introduction

Institutions of higher education are offering increasing numbers of courses and even degree programs on the Internet. Educational curricula now include The Virtual Classroom (University of Connecticut), The Cyber Classroom (Florida State University), Cyberschool (Virginia Tech), World Lecture Hall (University of Texas), and innumerable on-line courses. Regent University in Virginia is offering a Doctoral Program of Studies in its College of Communication and Arts. Educational application of the Internet ranges from electronic mailing for personal and/or administrative matters, to using listservs, Webchats, Newsgroups, and bulletin boards to supplementing classroom instruction and communicating entire course content, as some universities have implemented. These networked telecommunication technologies have dramatically changed many classroom practices and distance education practice (Dede, 1996).

The claims for using the World Wide Web (WWW) in distance education are varied. Advances in computer-supported collaborative learning, multimedia/hypermedia, and experiential simulation offer the potential to create shared "learning-through-doing environments" available any place and any time (Dede, 1996). The WWW is appealing for teachers given the current characterization of the nature of learning as active, social, and dialogic (Jonassen, Davidson, Collins, Campbell, & Haag, 1995). Jonassen and colleagues (1995) suggest that such technologies could "facilitate the construction of knowledge" (p. 17). They argue that "Retrieved information can be used to support positions in computer conferencing discussions, for elaboration on a particular topic....[thus] knowledge construction is fostered through the intentional searching process and through linking information to the learner's own schema" (p. 17). A medium with the potential to support such interaction might facilitate knowledge construction.

Interactivity and emerging on-line technologies are two recurring themes in distance education. Research on distance education investigates ways to establish on-line technologies as a viable alternative for delivering college-level education (Harasim, 1989, 1994, 1995; Hiltz, 1994; Wagner, 1994). These studies allege that interaction opportunities among students and teachers in distance education using on-line technologies are one reason for this viability. Some recent research has shown that the WWW learning environment increases participation (Mackenzie, 1996; Ruberg, 1994), and provides convenient access to instructor and peers (Ruberg, 1994).

In addition to convenience, the emerging innovations in telecommunications offer many other teaching and learning enhancements: on-line databases, graphical representation, synchronous and asynchronous communication, and de-massification. The WWW provides access to numerous information sources in such as on-line databases such as Ask ERIC and First Search. It also displays graphical representations in the forms of pictures and video clips. The WWW facilitates synchronous (real-time) and asynchronous (delayed) group communication. Such communication allows for flexibility and convenience among participants and has led some to claim that learning in this new environment should also improve (Hiltz, 1994; Holden & Wedman, 1993; Jonassen, et al., 1995). Another quality of these new media is de-massification (Williams, et. al., 1988). De-massification refers to the control an individual has over the medium, such as selective characteristics that allow individual to tailor messages to their needs. For example, looking at an electronic archive of a Hyper News interchange, one can choose a single discourse thread and read only the responses relating to a specific subject. Previously, one would have to read through the entire archive. Taken together, the qualities of on-line databases, graphical representation, interactivity, synchronicity and asynchronicity in group communication, and de-massification offer great potential for improved learning (for more information about these terms, see the Operational Definitions Appendix A).

The potential for improved teaching and learning are accompanied by some challenges. One of the challenges that on-line communication participants encounter is

'information overload' (Dede, 1996; Hiltz, 1994; Ruberg 1994). Participants report that they feel inundated by the volume of information as they read and respond to on-line postings synchronously and asynchronously. In other instances, students are reluctant to use these new technologies, impeding student participation in course activities. The instructor is also faced with challenges in on-line courses. One major concern is credibility. It is virtually impossible to conclusively ascertain students' identity (Dede, 1996). Another concern is that, while increased interaction is beneficial, the time commitment necessary to develop and direct such interaction can be problematic (Dede, 1996). These managerial challenges can be further compounded by some pedagogical issues.

While the use of these telecommunications technologies is growing, very little is known about this complex and fast changing social environment. Thus far, instructional efforts in the on-line environment have generally been exploratory. A brief review of distance education and educational technology research indicate that on-line education is convenient, promotes collaborative learning, facilitates access to instructional opportunities, supports increased participation, and improves interaction. These findings emanate primarily from anecdotal records and general course evaluations. The absence of in-depth research studies to support the integration of these technologies into educational arenas increases the likelihood of technology misuse: for example, Dede (1996) reports that on-line teaching is frequently the delivery of traditional classroom class content. That is, it is the same "talking head' format, but using a different delivery technology. The technology is available and seductive but the pedagogy is just emerging, uncertain, and not without problems. Hence teachers, technical experts, and instructional designers are faced with the challenges of understanding and harnessing the potential opportunities presented by the WWW environment. These practitioners and experts seek empirical guidance in using these innovations in traditional classrooms and in distance education situations.

In conceptualizing the viable alternatives for delivering college-level distance education via on-line technologies, Harasim (1990) cautions that "the mere introduction of CMC does not in itself improve learning: design (or method) is crucial' (p. xx). The role of instructional design as the cornerstone of all effective instruction is relevant in face-to-face instruction, as in distance education. Over a decade ago, Clark (1983) argued that most reported academic gains were directly attributable to the increased attention imparted to the instructional design when new technology were considered and adopted for educational purposes. Although addressing television and videotapes as the emerging technologies, Clark's (1983) argument nonetheless applies to Internet technologies. Successful uses of the Internet, specifically the WWW as an instructional and learning environment, are incumbent on the purposeful execution of sound instructional design principles. Flouris (1989) notes that by some estimates "only three to four percent of the software for education can be considered excellent... (p. 15). Since the capability and overall quality of CAI programs--as well as of any other learning systems--depends on their design, it is of paramount importance that instructional procedures are systematically designed and delivered to the learner(s)' (p. 17).

The enthusiasm about the promise of the WWW environment and curiosity about its instructional uses led to this investigation of the Virginia Tech Media Technology and Diversity (MTD) course. This course was offered by the Virginia Tech Cyberschool Initiative in an attempt to address students' learning needs and explore the instructional uses of the WWW. The MTD course was taught using the WWW as the primary learning environment. This study maintains the commitment of the Virginia Tech Instructional Technology program to question, understand and report the wealth of opportunities that new technologies bear for instructional purposes and to see that they are able to sustain maximum instructional impact. Sharing the experiences in developing instructional materials for the on-line environment provided important information for creating such products.

The product, in this study, was an on-line course where electronic discourse was the mode of communication among participants at different geographical locations. The MTD course participants communicated primarily by typing and reading texts. Although

the WWW environment supports other forms of representations, such as graphics, audio, and video, most on-line communications are textual because of the prevalence of low bandwidth technologies. The role of language as text in today's literary forms is another contributing factor in its prevalence in the on-line environment. Hence an investigations of on-line instruction have focused on discourse analysis (Levin, Kim, & Riel, 1990).

Purpose of the Study

The purpose of this study was to examine and describe the events of the first iteration of the Media Technology and Diversity course. Using a research and development model to frame the investigation, the central focus of this study is the examination of the MTD on-line discourse. This specific focus on electronic discourse is essential due to the role of language as text in the on-line environment.

Using the research and development stance in framing this study offers two advantages. First, the reader is afforded the entire context from conceptualization through implementation in which the discourse was enacted. Second, this stance inherently represents the position that a cycle of design, implementation, and reflection is key to the development of quality instructional experiences. Given that this course was in its first design and implementation cycle, this examination can inform the ongoing re-design of a specific course and other similar instructional ventures. So far, many on-line courses are simply a delivery of traditional classroom materials (Dede, 1996). There is a need to first of all understand this complex on-line environment, then explore some effective pedagogical strategies and instructional designs. There is a need to investigate the roles that members of design teams assume in developing on-line courses and the roles that participants play during the implementation phase. The issue of roles is always relevant, yet more so amidst all the other changes in this new social milieu.

However, just to reiterate, although the research and development model prefaces and frames the researcher's approach to this literature review and study, the research itself focused on examining and describing the interaction in this new WWW environment. For it is from the teacher-student, student-student interactions that we can build a better sense of the ways we can ensure these virtual environments can offer personal connections. These personal connections are an important part of learning and meaning making. As Dewey suggests, meaning, as understood through language, derives its potency from functional use within a social setting (Dewey, 1916/1917). The process of discourse analysis provides "a means of evoking different activities performed by different persons so as to produce consequences that are shared by all participants in the conjoint undertaking" (Dewey, 1916/1917).

An in-depth examination of the MTD on-line interaction using discourse analysis is also premised on repeated research findings (Cazden, 1972; Mehan, 1978; Moll & Diaz, 1987; Cazden, 1988) which indicate that (1) discourse illustrates what people learn and (2) that factors affecting performance and participation in the immediate interactional context include careful management of the learning environment and the organization of lessons. Student learning was specifically explored by examining the nature of the electronic discourse, in terms of what participants said, and how they said it.

In summary, results of this in-depth analysis informs the ongoing development of instructional strategies and materials in other on-line courses and contributes to the conversation about the effectiveness of the WWW towards learning. Moreover, the study should inform practitioners and other educational stakeholders about the changing participant roles and changing paradigms inherent in on-line instructional design, development, and learning. The MTD instructors can use the results of this study as they redesign the second iteration of the course.

CHAPTER 2

Review of Literature

The literature review provides a theoretical framework for examining and describing the discourse of the MTD on-line course within the research and development model. The theme of changing roles and changing paradigms, which guides this investigation will be threaded through out this review of the history of distance education, the development of on-line instructional materials, and the analysis of on-line discourse.

On-line teaching and learning presents some challenges into which practitioners can no longer afford to stumble blindly. Historically, simpler media forms such as print and radio mediated distance education. However, advances in computer and telecommunication technologies now enable new types of communication and experiences, precipitating multifold development considerations for its uses in instructional arenas. This in-depth examination of the MTD on-line course is therefore informed by the literature on distance education, research and development principles, and discourse analysis studies.

The review begins with a survey of the central background literature on distance education, then describes ways in which instructional materials have been developed using computer technologies, followed by an examination of the research on interaction in education, and lastly, outlining research on discourse analysis. This review concludes the research questions.

Distance Education

The purpose of this first component of the review is to trace the advances in distance education from delivering instruction on ink parchments to delivering instruction via complex multimedia technologies. This section begins with a definition of distance education, followed by a rationale for it in pragmatic and in problem-solving terms. A brief history of distance education is presented. Next, a discussion relating distance teaching and learning to educational technology will ensue. Finally, an overview of Computer Mediated Communication (CMC) will be presented with an emphasis on the Internet and one of its networks, the World Wide Web (WWW) as an emerging learning environment.

Definition

There are many definitions of distant education. They reflect a range from the textual practices of traditional correspondence courses, to the recent uses of telecommunication innovations. Simms' (1977) definition reflects the early days of distance education,"The unique and distinguishing feature of correspondence education is that the learner is at a distance from the teacher for much, most or even all of the time during the teaching -learning process" (p. 6). Another definition is the separation of teacher and learner in space and/or time (Perraton, 1988). Some definitions reflect a functional perspective, such as Peeters' (1983) characterization of distance education as"a form of study complementary to our industrial and technological age" (p. 8). Some of central concepts underlying all these definitions include: distinguishing between face-to-face classroom activity and the physical separation of teacher and student, instruction offered by an institution for higher learning as opposed to training or personal lifelong learning pursuits, and the use of some technical media as the context for the teaching and learning event (Keegan, 1980).

Rationale for distance education

The practice of distance education can be seen primarily as a response to perceived needs and demands for access to education (Neufeld, 1985), however, economic

factors have also played an important role in the decision to use a distance format (Neufeld, 1985). Much has been made public about the unequal access to education for people in rural areas. Harasim and Johnson (1986) suggested that distance education alleviates some of the significant obstacles students often face related to, "geographic isolation, family responsibilities, scheduling conflicts, and lack of appropriate educational programs or facilities" (p. ix). Technology such as CMC, videos and audios (individually or integrated) provide convenient and flexible access to instructional opportunities.

An increasingly diverse student population in higher education which includes more "non-traditional students" create a demand for novel ways to offer instruction. These students encounter time constraints due to full-time employment or other social obligations. In an attempt to address these needs, institutions are exploring the use of the WWW to provide convenient and accessible instruction to students.

Distance education not only provides access to education but it is regarded as increasingly essential because of economic factors. The recent budget cuts that many institutions of higher learning are facing, in addition to the decreasing number of traditional students enrolling in university and college relative to the number of nontraditional students (Wagner, 1990), have led some institutions or programs to opt for distance education. Kaye (1995) argues that distance education can be economically advantageous because of the potential of high enrollment. He describes the student to faculty potential ratio as 200 to 1, and contends that there are "economies of scale associated with mass distance education provision" (p. 12). A second reason for the economic advantage is the reduction in the need for student-based campus facilities such as buildings for classrooms and computer labs, dorms, etc. (Kaye, 1995). By requiring students to own computer resources, institutions save on purchasing, as well as maintenance expenditure. If these non-traditional students access the course materials from home, the institutions save on utility, janitorial, infrastructure and renovation costs.

A Brief Historical Account

The history of distance education, in the broadest sense, could be traced back to medieval Europe, when letters and manuscripts--laboriously handwritten in ink on parchment--were disseminated to monastic scholars in geographically distant locations (Burke, 1978). Messengers bearing these missives in saddlebags made such modes of informal distance education more economical (Burke, 1978). Another milestone invention in communications technology was the invention of the printing press in mid-fifteenth century, which revolutionized the world (Cauthen & Roth, 1994). The printing press dramatically reduced the labor and economic production costs of recording and duplicating books. It also hastened the dissemination of information and served to democratize access to new ideas (Burke, 1978). This print revolution, together with the development in later centuries of increasingly efficient and reliable postal delivery methods such as rail, motor, and airline transportation systems delivered much of the formal distance education: the "correspondence course." Correspondence courses were an alternative to regular matriculation in schools and institutions of higher learning. Subsequent distance education practices evolved to the use of radio, television, satellite, and computer technologies to deliver course content.

Role of technology in distance education

The nature of distance education--the time and place separation of students and teachers--requires technology to accomplish its instructional goals. Garrison (1987) suggests that:

> Distance education is inexorably linked to the technology of delivery. It can be seen as a set of instructional methods based largely on mediated communication capable of extending the influence of the educator beyond the formal institutional setting for the purpose of benefiting the learner through appropriate guidance and support. Without the use of technology, distance education would not exist (p. 45).

The early predominant practice in distance education was text-based correspondence courses. Recent uses of communications technologies such as the telegraph, telephone, radio and even recently, television (abetted by communications satellites), teleconferencing systems, the VCR, and computer have altered distance educational practice. The availability of these technologies instigated a change to supplement correspondence courses with audio and video cassette materials (Neufeld, 1985). This evolution continued with each successive technology; radio broadcasts, satellite and television broadcasts, audio-conferencing, and video-conferencing. The distance education practice became an integration of these systems, for instance, a satellite broadcast was augmented by audio-conferencing for all the participants. The use of innovations such as the telegraph, telephone, radio and, recently television (abetted by communications satellites), teleconferencing systems, the VCR, and computers have for the most part served primarily as delivery systems.

Computer-Related Instructional Materials

This section traces the introduction of the computer into distance education as Computer Assisted Instruction, and how it evolved to the use of Computer Mediated Communication technologies, specifically, the WWW environment.

Computer assisted instruction

The computer was used as an instructional aid in distance education, a practice frequently referred to as Computer-Assisted Instruction (CAI). Students using CAI would communicate with a program in the computer which may provide "tutorial, drill and practice, or simulation and modeling exercises" (Hiltz, 1994, p. 21). More specifically, the term "intelligent tutoring systems" (Larkin & Chabay, 1992) was used to describe CAI. Learning with CAI was active in that, students were forced to interact with the computer to move from one screen to another. Hiltz sees a limitation with CAI programs which "only process simple input and provide preprogrammed responses to expected inputs (p. 21). However, a comprehensive review was conducted by Chambers and Sprecher (1980), which suggests many advantages of using CAI as an adjunct or supplementary mode within a regular classroom where CAI sessions include small or large group discussions.

CAI was also used in distance education as a form of correspondence instruction. It took the form of electronically delivered presentation-type computer-assisted instruction with limited interactive capability (Jonassen, et al., 1995, p. 19). Santoro (1995) characterizes the traditional CAI used in distance education as oversimplified and reductionistic because they were largely designed for drill and practice skills. Chronologically, the CAI was a precursor to computer mediated communication.

Computer mediated communication

A widely used name for computer network conferencing is computer-mediated communication (CMC). CMC refers to the use of networks of computers to facilitate interaction between spatially separated users (Jonassen, et al., 1995). CMC tools include electronic mail, Gopher servers, World Wide Web servers, bulletin boards (usenet), electronic conferences (mailing lists, listservs), virtual terminal access, and switched video (webmaker@bev.net, 1994), shared graphics spaces, Webchats, etc. CMCs afford synchronous (real-time) and asynchronous (delayed) group communication that support group (peer and expert) interaction, collaboration and construction knowledge.

The World Wide Web: An emerging instructional environment

An embraced CMC feature is the WWW. It is a software program that provides hypertext and hypermedia links to other Internet resources. To say that the Internet infrastructure is a giant computer network would be an understatement. There is no agreed-upon definition that sums up the Internet. Any definition would have to include

these components; "(a) a network of networks based on the Transmission Control Protocol over Internet Protocol (TCP/IP), (b) a community of people who use and develop those networks, and (c) a collection of resources that can be reached from those networks" (Krol, 1993, p. 1). One of such networks that is an information organizer and a tool to retrieve information anywhere on the Internet, is the World Wide Web (for more information about these terms, see Operational Definitions Appendix A). The WWW uses hypertext (text that, when clicked on, allows the reader to move from one document to another for more information on that subject) and graphics together to display information, allowing users to search entire networks with a single click of the mouse. Its graphical interface and easy to use point and click capabilities make the WWW user-friendly and popular.

The WWW is an easy-to-use computer-mediated communications tool and its ability to access remote library resources, on-line databases proposes interesting instructional opportunities. Current thinking suggests that because of its enabled exchange of audio, Hypertext (a system in which documents contain links that allow all readers to move between areas of the document, following subjects of interests in a variety of different paths) and regular text, graphics, video, greater interaction among students and between students and instructors is likely to ensue (Harasim, 1994; Hiltz, 1995; Holden & Wedman, 1993; Wagner, 1994).

Interaction in Distance Education

The importance of interaction in distance education is a much-discussed topic. This theme of interaction is particularly relevant in distance education because of its origins in correspondence study. Correspondence study had a tendency to limit dialogue among students and between students and instructors. Kaye (1989) notes, a "problem common to traditional distance education is the lack of opportunity for dialogue, debate, conversational learning and collaborative work" (p. 1). Innovations in communications technology offer the potential to dramatically improve dialogue in distance education. Moore (1973) states that the nature of distance education requires any educational interaction to be mediated by the use of print or electronic, mechanical, or other communication devices. The need for mediation in distance education is what differentiates it from conventional education (Barker, Frisbie, and Patrick, 1989),. Here is where the WWW plays a critical role. According to Barker, Frisbie, and Patrick (1989), "the use of new technologies permits live interaction and allows for immediate feedback and interaction between teacher and student(s)" (p. 22).

Given the increasingly frequent appeals made to dialogue and interaction in distance education, it is disheartening to find so few theories that can inform dialogical practice.

Research on interaction

The existing research on interaction in on-line courses is sparse and fragmented, ranging from enthusiastic observational or self-report data to case studies to quasi-experimental studies. Ruberg (1994) notes that self-report and case studies "are helpful in motivating others to consider using CMC for instructional purposes, and provide descriptive information regarding all dependent and independent variables" (p. 25). Overall, these preliminary studies indicate an increase in student-student and student-instructor interaction in distance education using computer mediated communication systems. The ensuing research findings are: observations, self-reports, case studies, and quasi-experiments.

Tucker (1995) observations of twelve on-line courses found a "high degree of interactivity" among students and between students and instructors as compared to other classes. Harasim's (1987, 1995) research on on-line graduate courses in education reports these students' testimonials: (1) increased interaction--quantity and intensity; (2) better access to group knowledge and support; (3) more democratic environment; (4) convenience of access; and (5) increased motivation. Faigley (1992) found student-initiated comments occurring 70 to 80 percent of the time in an on-line classroom

environment. Winkelmans' (1988) research on on-line computer conferencing indicated that the instructor's contribution was 10-15% of the message postings. All studies, including Faigleys used computer mediated communication tools that include: electronic mail, gopher servers, bulletin boards (Usenet), electronic conferences (mailing lists), virtual terminal access, and switched video. Albrekston's (1995) case study of an on-line graduate mentored-seminar used "credentialed' mentors to guide small groups of students to discuss course material, as a distance education module of a traditional course. He found that the content of the verbal communication was "in general, far superior to the general run of live-seminar discussion" (p. 105). He attributed the superior quality to "the fact that each student had access to the whole discussion thread which gave them the broad context in which to make significant new contribution"[1] (p. 105).

Hiltz's (1994) quasi-experiment study provides detailed descriptions, analyses, and interpretations of students' interaction in a distance education on-line environment. Hiltz compared students' reports in a Virtual Classroom and the same courses taught in a traditional classroom. The matched courses included introductory sociology, freshman computer science, and an upper-level statistics course. She found that, majority of students felt that they had better access to their professor in the Virtual Classroom. The students found this interaction more friendly and egalitarian than in a typical traditional classroom. She also reported that, students found it easier to communicate and cooperate with other students in the Virtual Classroom.

Although the findings offer evidence of some increase in on-line interaction, these studies present some limitations. Perhaps most noticeable is the limited number of studies and many snapshots over a few years. There is a shortage of consistent and verified research findings on the instructional impact of on-line technologies (Dede, 1996). There also appears to be missing research that focuses on actual classroom processes. Given the shortage of empirical research findings, there is a preponderance of position and opinion papers, speculating on the impact of these emerging technologies on social interaction in distance education.

These research findings are also limited to earlier media forms of on-line communication: electronic mail (i.e., e-mail). New media forms, such as the WWW enable new types of messages, synchronous, asynchronous, and de-massification and new experiences such as video conferencing, shared graphic spaces, and virtual reality. Consequently, it is exigent to examine the uses of these emerging media, messages and experiences in distance education.

In-depth investigation of this new social milieu requires electronic discourse analysis to examine the impact of the WWW course content on learning. Prior research on the impact of on-line technologies has focused on electronic discourse analysis (Mehan, Moll, & Riel, 1985; Riel & Levin, 1985; Levin, Kim, & Riel, 1990). Reasons for such inquiry include the textual nature of the on-line environment, the self-transcription of electronic discussion, and most importantly,electronic discourse analysis premise that discourse illustrates what students learns.

Electronic Discourse Analysis

The term discourse refers to talk; communication that is socially situated. Discourse implies both "oral and written texts that is examined after the fact and socially situated practices that are constructed in moment-to-moment interaction" (Hicks, 1995, p. 51). Research into processes of classroom discourse explores the links between language and learning in social contexts. The findings indicate that the language illustrates what people learn and reveal factors such as access and organization of lessons that affect performance and participation in classrooms.

In analyzing general, live classroom discourse, Cazden (1988), Mehan (1979), Cazden and colleagues (1974) found the most common sequence in teacher-led speech

[1] It is significant to note that the author did not present any data for the above study.

events is“Initiation-Reply-Evaluation" (IRE). Later studies have indicated some variations of the sequential structure of classroom discourse that reflect differences in educational purposes for the discourse. Cazden (1988) explains that these variations are based on: the number of participants (teacher and one student instead of a group); the medium of interaction (electronic mail instead of oral); and the cultural differences among students.

One constitutive ethnographic study offers some interesting results of in-depth analysis of electronic discourse. Constitutive ethnography is a research strategy which describes the social organization of routine, everyday events (Mehan, 1979). Quinn, Mehan, Levin, and Black (1983) examined instructional interaction among people using a computer (based electronic message system or e-mail), contrasting it with conventional face-to-face discussion in a college level class. They found that the electronic discourse differed from face-to-face classroom discussions in three ways:

1. A temporal difference between initiations and responses
2. A topical difference
3. A structural difference

Mehan and others (1984) found that the temporal nature of the electronic discourse had a different effect on the interaction between students and the course instructor. Mehan's earlier studies (1979) had indicated that large gaps are disruptive in everyday conversations. However, in an electronic environment, the lag time of hours or even days between initiations and responses did not seem to disrupt the flow of the conversation (Quinn, et al., 1983). These findings were replicated in later years (Levin, et al., 1990; Mehan, et al., 1985; Ruberg, 1994).

More interesting, Mehan and his colleagues (1984) also found significant differences in the discourse itself. Topically, in contrast to the regular classroom, discussions via electronic mail consisted of half as many teacher-directed questions to the students. The electronic discourse also pursued“multiple threads” rather than only one at a time. In other words, the discussions were course-content driven, not teacher or process.

Here is a typical I-R-E sequence from Mehan and his colleagues' study in live classrooms:

> Initiation. Teacher:...so where would you put that in this categorization scheme? Is that a comment on the teacher, student, learning, knowledge, maybe all four? Go ahead.
>
> Response. Student: She's reinforcing speed.
>
> Evaluation. Teacher: Okay, okay. So the process of learning is concerned with repetition recall and definitely speed, that is, very quick learning.

The live classroom sequences consisted of initiations by the teacher, a reply by a student, and then an evaluation by the teacher. The structural sequence of the electronic discourse varied. Electronic message systems make use of a computer's extended storage capabilities, hence a participant in an asynchronous discussion can respond to several preceding initiations or replies. Here, Mehan and colleagues (1984) categorized the discourse as:

Initiation (I)-Response(R)-Response(R)

> Initiation. Teacher...I still need to know in more fundamental terms, what “ethnography“means?...
>
> Response. Student 1...ethnography is the task of describing a particular culture. it involves the cultural experience, entering the field, doing field work, and describing a culture. It involves really getting in there and experiencing it...
>
> Response. Student 2...In response to and in addition to Laurie, I would add that characteristics of ethnography would include the cultural scenes, informants,

> categories, and meanings in relation to participants in a cultural situation. These things would also be important in describing a particular culture...

This sequence becomes complex when several topics are pursued at once.

Lastly, the structural sequence of IRE also changed. Students gave longer and more thoughtful answers to the questions. Teachers offered very few evaluations after the students' responses. In contrast to classroom discussion, electronic discourse consisted of half as many teacher-directed questions to students. Mehan and colleagues (1984) found that students received more comments from their peers (see example above).

Other recent studies of on-line structural sequences have generated more mixed results. Levin, Kim and Riel's (1990) study of classes offered via e-mail found the IRE sequence varied by the temporal nature of the electronic discourse. They concluded that the time-lag contributed to two common patterns, (1) one initiation eliciting several consequent replies, and (2) several topics being pursued at once (multiple threads). In the few cases where the IRE was intact, the roles varied: a student may initiate, the teacher responds, and another student evaluates. They attributed the simultaneous occurrence of multiple threads of discussions to "the unpredictable time bands" (p. 210). Ruberg's (1994) study of the Daedalus environment generated different findings from Levin and his colleagues. She found that increased student participation in the on-line environment led to multiple threads of discussions but the structural sequence was; initiation-response-evaluation-response/initiation (IRER/I). Here structural sequences indicated that "students did not evaluate each others comments" (p. 113). They responded to their peers' replies by requesting for clarification, to further explain a point of view. The participants' roles in Ruberg's (1994) study were also varied, yet she documented increased student-to-student interaction in the on-line units.

A recent analysis of an undergraduate biology laboratory that used computer-mediated-communications (Webchats) discussions indicated that high quality on-line discussions were rich in scientific thought, engaging discussants by offering information, questioning, and actively hypothesizing (McKenzie, 1996). McKenzie, characterized the Webchat dialogue into three categories; social responses, Webchat mechanics responses, and course-related responses. He further divided the "course-related responses" into three categories: "those dealing with course logistics (i.e., When is that paper due?), those offering information (i.e. Gammarus is in the class Crustacea.), and engaging or thought-provoking responses (i.e., just because all three populations have the same DNA banding pattern doesn't mean they are identical)" (p. 75). Such ethnographic forms of research on instructional electronic discourse are enlightening and provide glimpses of what may become "a more common medium of instruction" (Cazden, 1988, p. 67).

Summary

Research on distance education investigates ways to establish CMC in distance education as a viable alternative for delivering college-level education (Harasim, 1989, 1994, 1995; Hiltz, 1994; Wagner, 1994). These studies propagate the view that interaction opportunities among students and teachers in distance education using CMC are one reason for this viability. Research findings on electronic discourse illustrate that there is increased student participation and interaction. One study has explored the analysis of such interaction, yet there is need for further investigation. These findings are enlightening, yet limited to an electronic mail medium. What happens in the complex, WWW multimedia environment?

The WWW presents itself as a particularly suitable context for in-depth inquiry because it begs for additional understanding as a learning environment. Such inquiry is particularly significant considering the enthusiastic predictions and assertions (Hiltz, 1994; Holden & Wedman, 1993; Jonassen, et al., 1995) have made concerning the instructional applications of the Internet (a network of networks, of which the WWW is a part). As a research problem, this study is timely and practical due to the WWW's increasing use as the primary medium for class activity and interaction as was the case in the Media, Technology, and Diversity (MTD) class. The MTD course was designed to include

interactive features that can facilitate interchange, and reciprocity among participants who were geographically separated. Furthermore, the WWW provides an ideal milieu for in-depth examination because of its complexity, its support of texts, audio, video, graphics, and electronic dialogue.

The general and specific questions relating to this study are:

Questions

1. What was the nature of the design, development, and implementation of the Media Technology and Diversity on-line course?

1a. What were the participants' roles during the three phases?

2. What is the nature of the electronic discourse in the Media Technology & Diversity on-line course?

2a. What is the temporal or lag time between the initiation and response?

2b. What is the content of the discourse in each setting?

2c. What is the structural sequence in each setting?

Chapter 3

Methodology

Overview

The specific focus of this study was to examine the patterns of discussion within the context of an on-line course. However, in order to understand the nature of the discourse, the broader examination of the design, development and implementation of the MTD course must be examined. More specifically, such examination was accomplished through completion of the following efforts; 1) reporting the design tasks involved in the MTD on-line course, 2) analyzing the development of instructional strategies, including the participants' roles, and 3) describing and interpreting the nature of the electronic discourse that occurred during the implementation phase. The outcome of this examination is to create inductively, a set of thematics for practitioners and researchers who wish to pursue the design and development of instruction for the WWW.

Field Site Information

General Setting

The setting for this study is an undergraduate(senior-level) and graduate course: Black Studies 4984/EDCI 5774 Media, Technology, and Diversity (MTD) course offered for the first time during Summer, 1996. The MTD course was designed to examine the influence of stereotypes and the values and beliefs of the designers on media products. The students as media technology designers would assess their own stereotypes, values and beliefs. The course on-line activities included such things as chat discussions, posting completed off-line assignments, and completing formative course evaluations. The final project was a multimedia presentation on some topic related to diversity, based on the principles of instructional design they had learned in the class. The documentation from the orientation sessions and on-line interaction was archived and analyzed for this study.

This course was a part of the Virginia Tech Cyberschool program. The mission statement for Cyberschool is:

> Cyberschool is an experiment to determine how best CMC (computer-mediated communication) technologies can be utilized at Virginia Tech in a range of courses in the College of Arts and Sciences. As a partnership between Arts and Sciences and the division of Information Systems, Cyberschool has an overarching mission: to redesign course offerings that take full advantage not only of what we are learning about instructional technologies, but also what we have discovered about the way students learn (Roy, 1995).

As the principal investigator for Virginia Tech's Cyberschool project, Lucinda Roy (the instructor for the investigator's on-line pilot study) describes the model she developed for Cyberschool courses:

> Learning is equal to a combination of delivery and response, where response is always far greater that delivery. It is a very simple approach to solving what I call the Delivery/Response Conundrum. All it means is that we devote far too much time and energy as educators in fine-tuning delivery mechanisms, and far too little time focused on student response. The new information technology gives us the potential to explore the response dynamic in ways we have never before; it gives us a way to listen to what our students are saying and educate them according to the responses they give us (Roy, 1995, p. 2).

Participants

The participants of the study included the two instructors, the two teaching assistants, and six consenting students.

The instructors are Virginia Tech faculty members, Dr. Glen Holmes and Dr. Joyce Williams-Green. The MTD course was the first collaborative teaching venture of these two. Dr. Glen Holmes is an Instructional Technologist with the Virginia Tech Department of Teaching and Learning, who has five years of college teaching experience. His experiences, prior to teaching at Virginia Tech included computer programming in the industrial sector and teaching in the public school setting. Holmes believes that when used correctly, technology can enhance and even improve learning. His approach to the use of technology for instructional purposes emphasize two factors: (a) assessing students' needs, and (b) being responsible enough to acknowledge when an endeavor does not work. He traces the collaboration for the MTD course content to the Fall of 1995, when the plan was to offer a traditional course. In the Spring of 1996 however, Dr. Joyce Williams-Green and he decided to offer the course on-line. The reasons for offering the course on-line included "practicality, timeliness, convenience, standardization, and economy of use" (G. A. Holmes, personal communication, November 14, 1996).

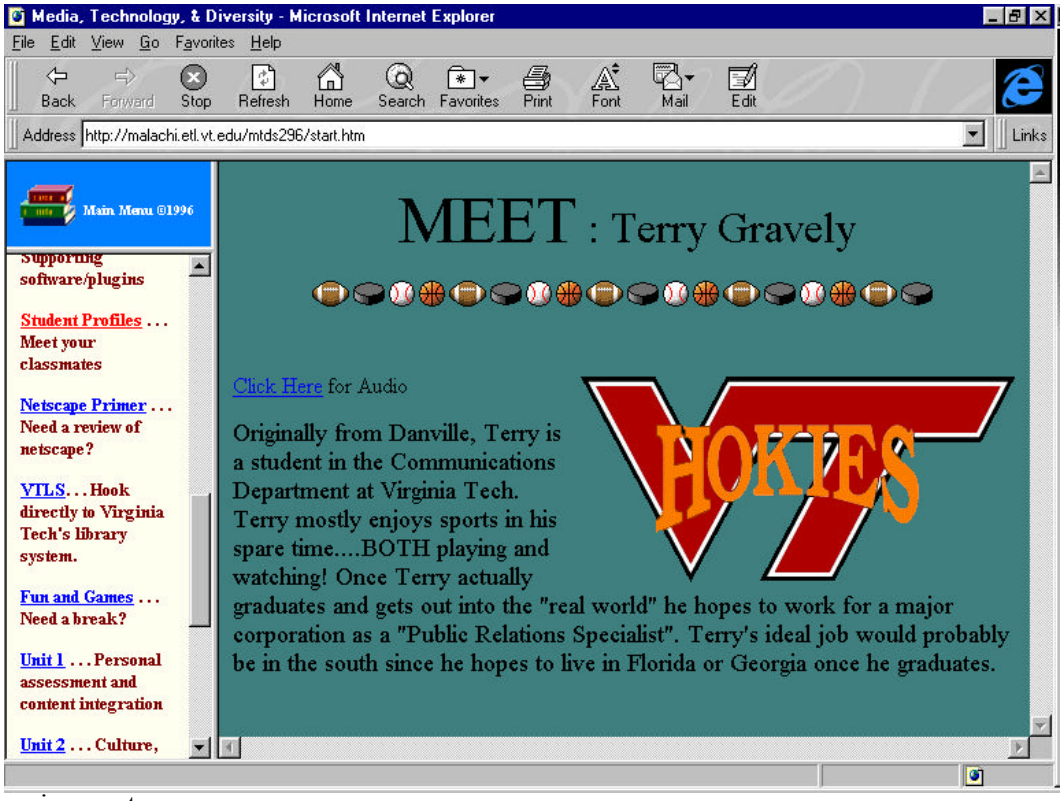
Dr. Joyce Williams-Green is a graduate of the Virginia Tech Educational Research, Evaluation, and Policy Studies program and is the director of the Black Studies program. She is interested in the relationship between multicultural/ diversity issues and student academic achievement. She traces her involvement in the MTD on-line course to the aforementioned scholarly interests, and a collaborative project with Tom Sherman (Professor in Department of Teaching and Learning at Virginia Tech) and Glen Holmes in developing a cultural assessment tool for evaluating computer software. Williams-Green was interested in incorporating cognitive/learning styles and cultural differences in the MTD course exercises and learning activities. Her goal for the course was to encourage full communication by "breaking down walls to deal with sensitive issues" (J. F. Williams-Green, personal communication, November 14, 1996). Williams-Green was concerned about the paradoxical characteristic of the on-line communication medium; the anonymity of the on-line environment could encourage more honest interaction, yet impede dialogue because of the lack of non-verbal cues. She believes that observable emotional expressions are vital in discussing such sensitive diversity issues.

Another participant was Juone Brown, the Teaching Assistant for this course and a doctoral student in Instructional Technology. She furnished the investigator with copies of all the planning meetings, recorded during the course design phase. Ms. Brown was also a student in this course but did not wish to remain anonymous. She had assisted Dr. Williams-Green in the Black Studies program and been enrolled Dr. Holmes' Instructional Technology courses. She reported that her experiences in the Instructional Technology courses motivated her to select Dr. Holmes as her advisor.

The MTD class included 11 students; 8 graduate and 3 undergraduates at Virginia Tech. All students were invited to participate in this study. Six of those students responded and four of the respondents were interviewed for this study. The other two had time conflicts and e-mail interviews were also unsuccessful. All four of the interviewed students were in graduate school and were competent at using computer technologies. Two of the student interviewees majored in Instructional Technologies, and the other two majored in Educational Counseling and Family and Child Development. All four students owned personal computers and had at least three years experience with computers. They all indicated that the prevailing reasons for taking this course were the diversity content and the convenience of taking a WWW-based distance education course. All the students in this study signed consent forms prior to the interviews (see Appendix B for examples).

At the commencement of this study, two of the students, who declined to be interviewed, had yet to complete the course. These students were undergraduates. According to Ms. Brown, students were overwhelmed by the adjustment to learning on an on-line environment. Dr. Holmes and Dr. Williams-Green attributed the "incompletes" to procrastination and poor time management skills on the part of the students.

Four of the eleven students posted a homepage for the MTD course Biography page (see Figure 1). Three of those four students consented to participate in this study. When asked to explain the reasons for withholding the biography pages, one student responded that she was graded for completing the assignment, not for posting it. Another student responded that she was late in enrolling for the MTD course and missed that



assignment.

Figure 1

Human subjects protection

Based on the"Protection of Human Subjects" (Part 46 of Code of Federal Regulations, Title 45, revised 1983) as quoted by Morse (1994), this study qualifies as an Exempt Review--"research that is conducted in established or commonly accepted educational settings, involving normal educational practices" (Morse, 1994, p. 232). The students who chose to participate signed consent forms according to the Virginia Tech Human subject policy. The instructors also consented to this study and agreed to provide access to student assignments and class projects. The Virginia Tech Institutional Review Board approved the entire application (see copies of informed consent, students' consent, and approval as Appendix B).

Course Delivery Details

The MTD course was enacted over a 5-week time period in a university summer session. The instructors began the course with three face-to-face sessions with their students. The remainder of the course instruction and discussions were offered on-line (at times convenient to the students). The three face-to-face sessions served to orient the participants to each other, the course materials and course format (see Appendix C for a description of these sessions in timeline). All subsequent on-line interaction focused on the content of the course.

Face-to-face orientation sessions

The original MTD course design called for a mandatory two-day orientation session. However, the instructors found it necessary to add a third session to familiarize students to the software and programs (see Appendix D for software and plugins listing). The tentative schedule for these live sessions included five activities: Content and Technology,"Who Am I Activity", Bios and Pictures, Development of Journals, and"What is Culture and Ethnicity?" (see Figure 2).

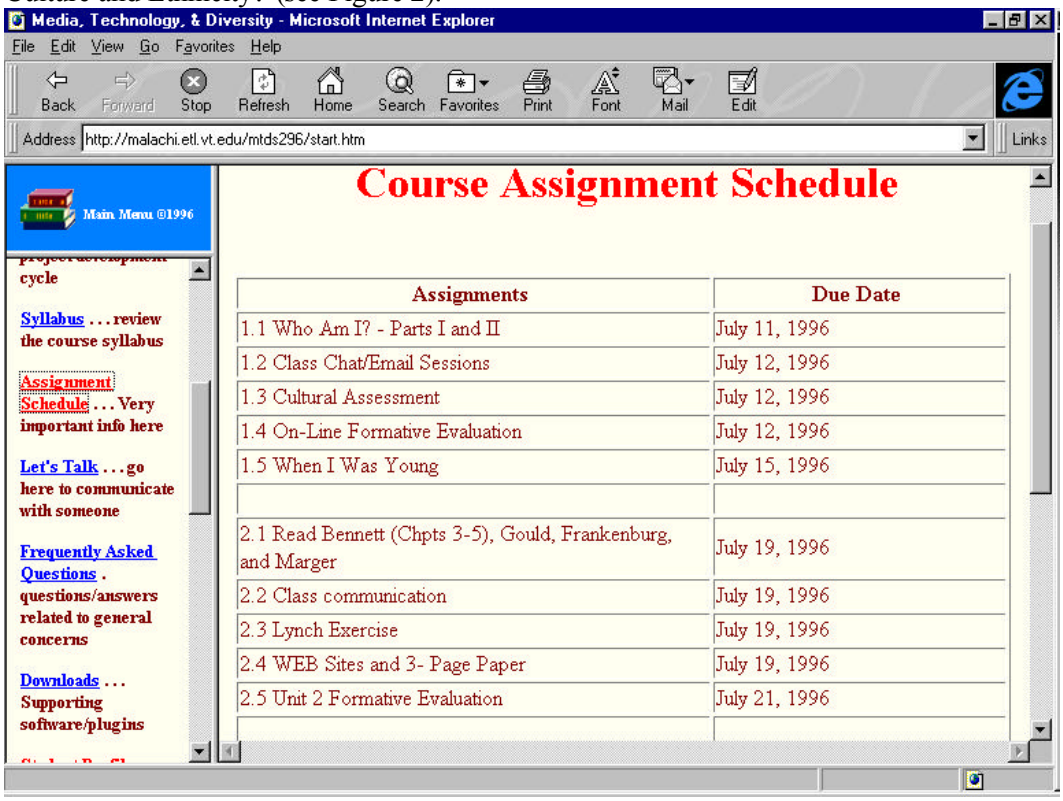


Figure 2

On the first day, the class met at the Educational Technology Lab (ETL) at Virginia Tech. The instructors introduced the course syllabus, directing attention to the goals, required texts, and course requirements. The students were introduced to: Netscape and viewed the course homepage, Webchat, and E-mail. Students were also exposed to audio software and Acrobat reader for PDF lectures.

Two orientation activities used to introduce the course content were the"Bios and Picture activity", and the e-mail assignment. The purpose of the Bios and Pictures activities was to introduce students to the media design component of the course and some diversity issues. Students were given sheets of paper representing pixels of the Biopage design space. They were instructed to locate an image to represent themselves. The students conducted interviews with peers to learn about hobbies and obtain biographical data. Using the sketch paper, students designed a peer's Webpage, with images that depicted that peer's background and interests (see Appendix E). The Webpage design activity introduced students to media design considerations, as well as illustrated people's inherent biases and stereotypes.

The second assignment was an e-mail message, asking students to reply via e-mail to two questions. This assignment was meant to help assess student telecommunication and computer experience and appraise student technology needs. The first question simply asked students what computer facility they planned to use for the course. Secondly,

students were asked to describe their hardware and software capabilities. This assignment was due prior to the second orientation session.

On the second day, the instructors informed the students of their hardware and software needs. Students were taught how to scan images and create Webpages, using HTML editors. They were also introduced to sound medium for creating audio files. Students were informed that a third day would be added to provide "a make-up and/or follow-up, one-to-one session" (J. Brown, personal communication, November 12, 1996).

On the third day, Ms. Brown, the Teaching Assistant was available at the computer lab to assist students as they designed their biography Webpages and tutor other students on the on-line technologies. Students were not required to keep journals.

Instructional components

The on-line instruction was comprised of on-line and video (on reserve at the Virginia Tech library) resources, assignments, and activities. The instruction was divided into four units. Each unit had its own lecture notes (as Webdocuments or as Portable document Format [PDF] slides), resources, assignments, and activities. Each unit and its corresponding materials were placed on-line, one unit at time. Students were strongly advised to complete the Units sequentially and promptly (see Syllabus Appendix F). All instructional materials including the on-line syllabus could be accessed from the course homepage (see Figure 3).

Course home pages.

The MTD course homepage is a World Wide Webpage where the Hypertext information is set in "frames" (Figure 4). The frames serve a dual purpose: providing an aesthetically pleasing view of documents, as well as avoiding information overcrowding by using the window scroll features. Access to the information on these Webpages required supportive software/plugins provided at the "Downloads" link, which included Acrobat reader, Cu-SeeMe, Netscape Navigator Gold, QuickTime™ (Windows/Macversions), and Shockwave. Figure 4 showed how participants could access course activities and assignments.

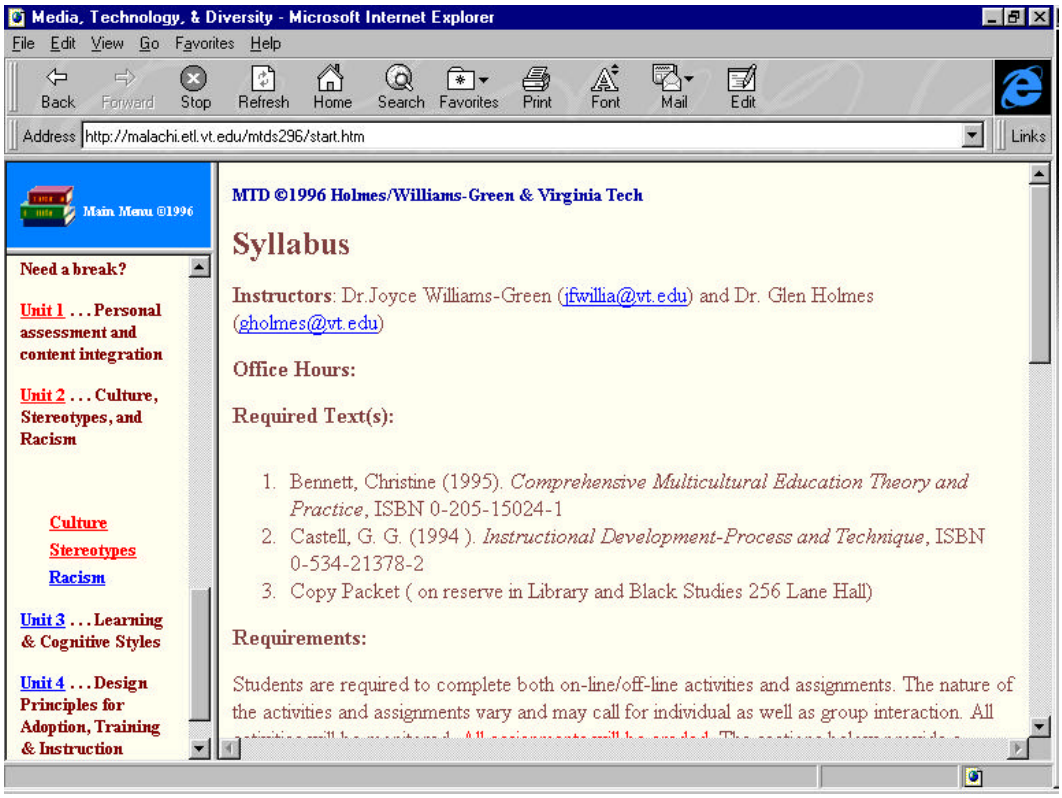


Figure 3

Students accessed content materials by clicking on one of the four units that would present another set of frames (Figure 4). While reading the material in a specific unit, students could send e-mail messages, if they had questions, by clicking on the"Let's Talk" button. They also accessed the on-line resources, activities, and assignments for each unit by clicking on a specific button.

Student biography pages

Students were encouraged to create homepages with images that were reflected their personal identity. The instructors' goals for this exercise were to familiarize the students to design principles for the Web and as part of the product of the"Who Am I" activity. The students perceived the goal of the Biography pages as a way of the instructors' to get to know the students in an on-line environment (J. Brown, personal communication, November 12, 1996). Some students completed the assignment but chose not to post their Webpages on public viewing. Only four of the student biography pages were posted on-line.

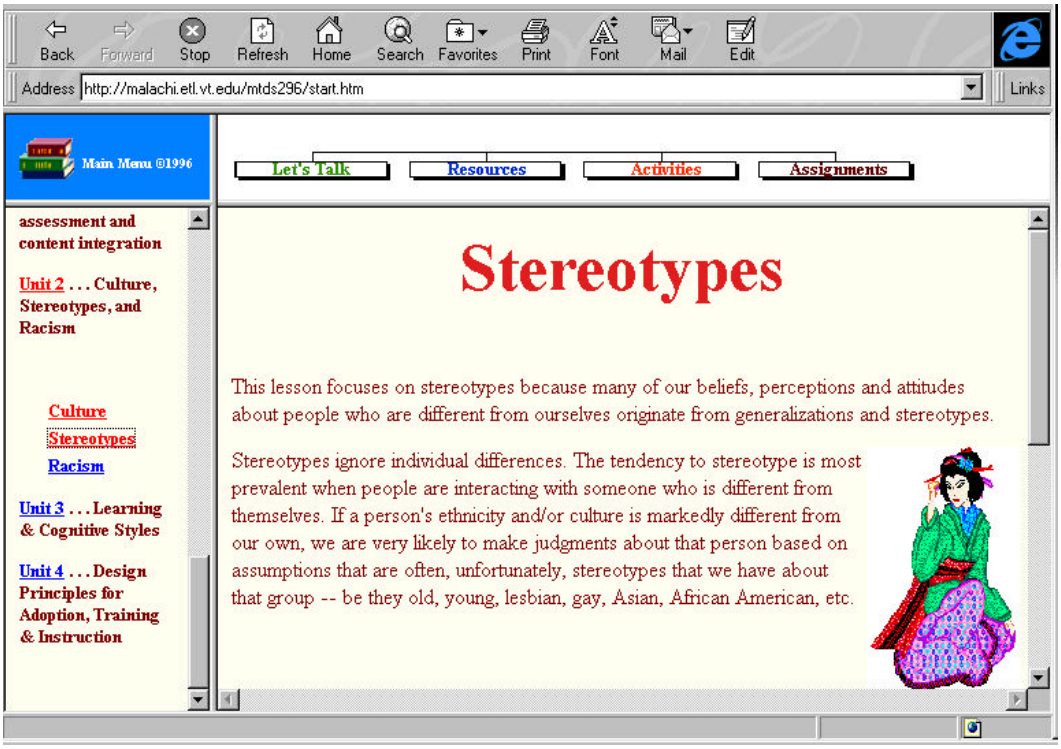


Figure 4

Webchats

The mode of classroom interaction after the face-to-face interaction was via the Webchat. The Webchat software works over World Wide Web browsers and is not platform specific: students could use their name and password as security clearance from PC-based or Macintosh-based computers. Webchat discussions are unique in that they can be posted as asynchronous or "nearly" synchronous, due to the nature of the interface. Because the interface is a homepage on the World Wide Web, each entry by a participant can only be seen by others if their page is updated or "reloaded". Participants are invited to enter their name, type in their remarks in the "window", and then click on "send message" to post any comments. A sample Webchat homepage is shown as Figure 5.

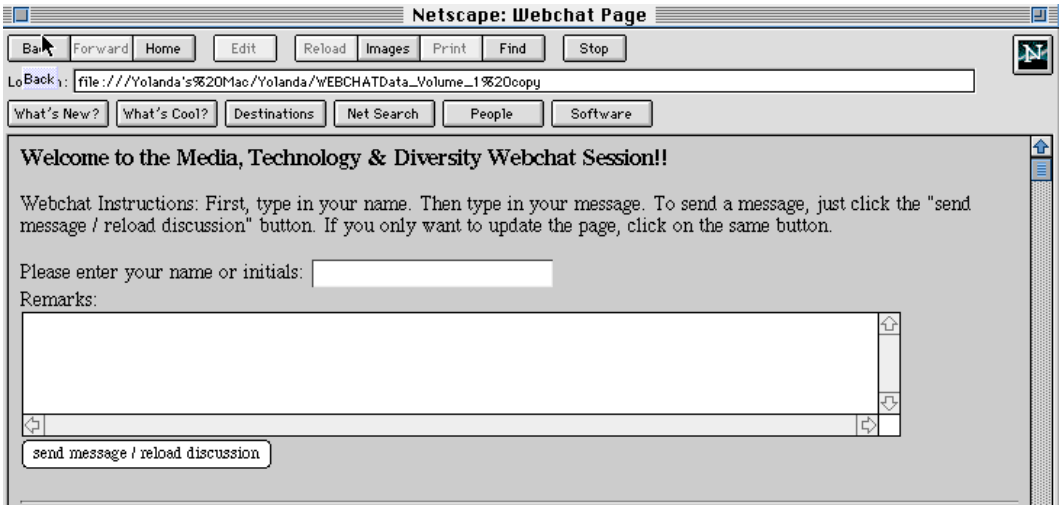


Figure 5

The MTD students were informed during the orientation that once the course was underway, they would be required to participate in Webchat discussions. However, there

was no required number of postings or grade assignments for such participation. The early Webchat sessions were unscheduled, asynchronous and exploratory. Although the students were instructed in the syllabus to "complete both on-line/off-line activities and assignments" (see Appendix G), inadequate participation led the instructor to schedule three mandatory Webchat discussions. The instructors announced these sessions as a Webchat posting, on a course homepage, and via an e-mail message.

E-mail communication

Throughout the course students were encouraged to contact the instructors and the TA if they needed technical assistance or had any other questions about the assignments. Students were told during the orientation, on the hard copy of the syllabus, and by Dr. Williams-Green's voice mail to contact the instructors by e-mail. Students could send e-mail by using an electronic mail carrier of their choice, or by clicking on the instructor's name on the "Communication/Talk Options" Webpage (see Figure 6). The grid cells contained student e-mail addresses to encourage student-student interaction. Neither instructors nor students were explicit about the protocol for the response time for e-mail messages or for specific subject matter to be discussed via e-mail at orientation sessions.

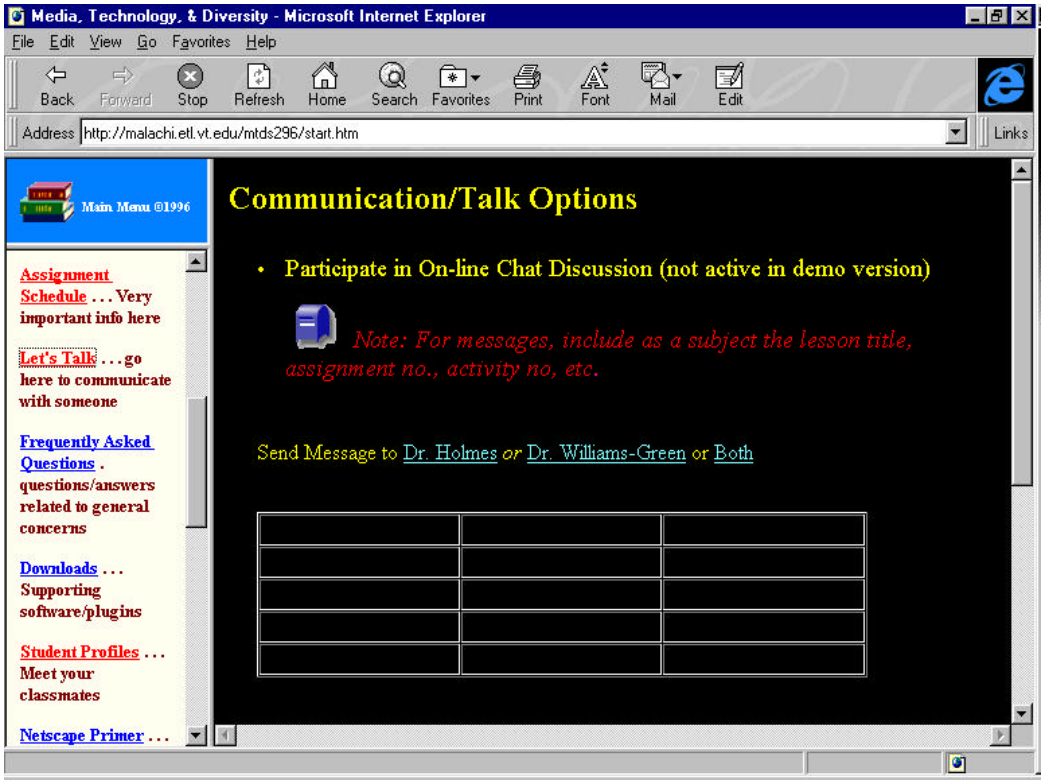


Figure 6

Course assignments and activities

The MTD course had off-line and on-line assignments. The off-line assignments included two "mini papers." Cultural assessment, and When I Was Young activities. These activities included writing papers, gathering and summarizing data, and planning and preparing course projects. The cultural assessment activity was intended to encourage reflection on personal biases. It required students to respond to a Cultural Assessment Form and then use the Cultural Assessment Form to interview a person from a different ethnic group. The students then wrote a report, comparing the two responses.

The When I Was Young activity was an advance organizer for Unit 2's topics: Stereotypes and Racism. It required students to interview six individuals from a different race, sex ethnic, and age group and summarize the results for the mini paper. The students were also required to refer to the "copy packet" and some videos on reserve in the library as resources for these assignments and activities.

The development of on-line assignments and activities was an impressive instructional strategy. Taking advantage of the multimedia capabilities of the WWW, the MTD design team was able to convert very complex exercises and tutorials for the on-line environment. These resources included simulations, videos, knowledge and skill assessments, and attitudinal inventories.

In some cases, the MTD assignments required merging of on and off-line environments. An example of an on-line activity that required off-line resources was called, Who Will I Hire? (See Figure 7)." This activity was designed to determine if racial stereotypes and prejudices are institutionalized and, often, unconscious. To complete this activity, students had to read five chapters from Bennett (1995) (see Appendix G), read the

Frankenburg (1994), Gould (1980) and Marger (1994) (article in the copy-packet, and watch the Understanding Cultural Diversity Video (on reserve in the library). The on-line activity called for the students to assume the role of personnel manager, about to hire an employee. Choosing from images of a group of individuals from different ethnicities, gender, and races, students ranked their selections for the imaginary position.

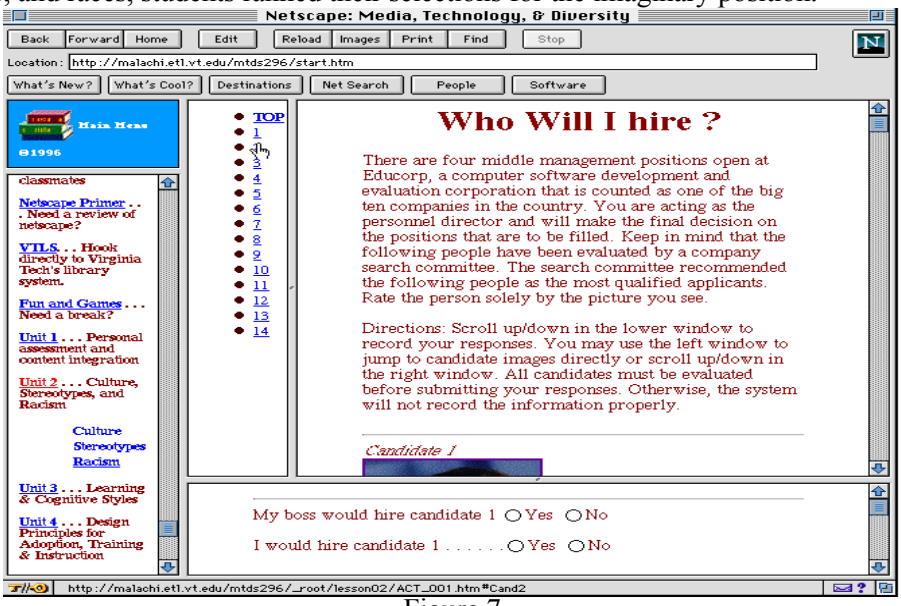


Figure 7

Data Sources and Collection/Recording Procedures

The data sources were comprised of: field notes of design phase meetings, course syllabus and homepage documents, artifacts of the course design phase, copies of biography pages, Webchat and e-mail archives, students' records, interview data, and investigator journal (see Table 1 for rationale for data collection). As Teaching Assistant and a member of the MTD course design team, Ms. Brown kept the following design phase records: meetings, course syllabus and homepage documents, artifacts of course design phase, and copies of biography designs. She gave the investigator photocopies of these data sources. Dr. Holmes, as the MTD course design technical expert, archived the Webchat postings and gave a copy to the investigator. Ms Brown and Dr. Williams-Green kept archives of their e-mail communication and gave copies to the investigator. The investigator audiotaped and transcribed the interviews and kept a journal, as an audit trail.

Data Sources

The data sources described below have been presented in Table 1 as they relate to the research questions.

Documents

Ms. Brown compiled the course design and development records. These records were very useful in creating a timeline and reconstructing the MTD orientation events. She kept hard copies of notes, design ideas, and e-mail communications among the design team members. She furnished the investigator with duplicates of all hard copy records in a manila folder, and the e-mail archives are on two 3 1/4 diskettes.

Electronic archives.

The electronic archives consisted of (a) homepage documents of the syllabus, assignments, lectures, activities, (b) student biography Webpages, (c) Ms. Brown's e-mail archives (which included copies of messages from students to the instructors), and (d)

Webchat archives. Dr. Holmes sent the Webchat archives to the investigator as an e-mail attachment. These archives were provided more information on the instructor's goals and expectations for course activities, pertinent student information, baseline information of interactional events, and corroborated interview and field note data. These archives had the advantage that the information was self-transcribed and collected without the intrusiveness of cameras or human observers. Also, each e-mail and Webchat posting had the specific date and time assigned, which made it useful to establish a time-line of the on-line communication. Despite these advantages, the data was voluminous and challenging to code. In this study, the NUD.DIST software was helpful in managing the data.

Student records

Dr. Williams-Green kept hard copies and electronic versions of student assignments and projects. She gave the investigator the hard copies for duplication and made a copy of the e-mail assignments on a disk. These records verified the conclusions of discourse analysis that examined the opportunities for learning.

Interviews

Face-to-face interviews as well as on-line interviews using electronic mail were conducted using an "interview guide" (Patton, 1990) (for more information on the interview guide, see Appendix H). An interview guide is "a list of questions or issues that are to be explored during the course of the interview" (Patton, 1990, p. 283). The guide was only a framework that was adjusted as issues and themes emerge during data collection. The student interviews were conducted three months after the MTD course ended, hence they assumed a reflective quality, similar to the instructor interviews. The interviews were conducted in a semi-informal manner, with investigator using the pre-constructed questions to guide the interview. These face-to-face interviews were audio taped and transcribed. All the on-line interviews were automatically archived. These interviews provided data regarding how participants view their own teaching and learning experiences from on-line interaction. To help participants relive last summer's MTD experiences, stimulated recall was used by revisiting the Website and showing participants on-line activities and exercises.

Field notes/Investigator's journal

The investigator kept an exercise book where she chronicled the dissertation research process. The entries commenced when the investigator began exploring research topics in the scholarly literature and in speaking with research committee members. These entries proceeded through out the preliminary investigation of Lucinda Roy's Civil Rights Literature and Movement Cyberschool course and continue during this data reduction/writing phase. There were two kinds of written field notes: weekly logs and a personal journal. Both entries provide traceable connections to email archives and other research documents, such as the interview notes and transcriptions. These entries were used to documents the types of data analysis that had been carried out.

Table 1

Rationale for Data Collection Procedures and Tools

Data Source	Rationale	Research Question
Course design meetings handwritten records	provides background information on instructors' intentions and expectations	2
Syllabus and homepage documents	provides more information on instructors' intentions goals and expectations	2

Biography pages	provides some background information on students and indicates their interpretation of Web design principles	1b, 2
Webchat and e-mail archives	provides baseline information of all interactional events and useful for analysis of observation and interview data. Also triangulation	all questions
Student records	should corroborate interview and electronic archival data on understanding the structure of class discourse	2
Interviews with consenting participants	provides access to Webchat discussions (current and past) regarding students' adjustment to using different on-line features, course requirements. Also triangulation	all questions
Investigator's journal	planning for trustworthiness--confirmability	all questions

Data Management and Analysis Procedures

The large volume of data generated by the different data sources made it necessary to develop a data management system that would provide structure for data organization and analysis. Miles and Huberman (1994) define data management as, "the operations needed for systematic, coherent process of data collection and storage and retrieval" (p. 428). Such data management facilitates accessibility of data and tracking of data analysis (Miles & Huberman, 1994).

Data management

The data collection and storage component was conducted manually; the instructors sent copies of data files to the investigator as e-mail attachments. All files were copied first, to preserve originality of source. The hard copies were labeled and placed in a large three-ring binder under three sections: documents, student records, and interviews. The electronic records were placed in word-processing folders on the office computer, with labels corresponding to the documents in the three-ring binder. Back-up copies of all electronic files were kept at the Virginia Tech Educational Technology Hydra file server. The interviews were transcribed/summarized and coded according to the interview questions and Webchat codes. The tapes are kept in the investigator's office in the Virginia Tech War Memorial building. Indexing in the form of codes were written down in the investigator journal.

Data analysis

Miles and Huberman (1994) define data analysis in three linked sub-processes: "data reduction, data display, and conclusion drawing or verification" (Miles & Huberman, 1994, p. 429).

Data reduction

Before manipulating the data in any way, copies of the raw data were preserved as a linear sequence of a string of messages each of which includes a name-tag from its sender. The Webchat software automatically assigns the name, date and time of each message. The field notes (taken by the Teaching Assistant during the course design phase), audiotapes of interviews, and electronic archival records were condensed into data summaries by labels and codes (Miles & Huberman, 1994). The labels and codes were the

deductive categories derived from prior research (McKenzie, 1996; Ruberg, 1994; Mehan, 1984). A peer reviewer (Carmel Vaccare, a Doctoral Candidate in Instructional Technology at Virginia Tech) verified the labels, codes, and data sorting of Webchat archives (see Appendix I for coding information). Data reduction in this manner aided in finding themes, clustering, composing mini stories, and getting confirmation or disconfirmation of the researcher's interpretations.

Deductive and inductive analysis

This process entailed creating structured summaries, synopses and diagrams to assemble information that permitted the researcher, peer debriefer (see section on Planning for Trustworthiness--Credibility), and member checker (Instructors, Teaching Assistant, and some students) to verify the conclusions. The NUD.IST (see Appendix A) qualitative research software was used to create output files and reports.

Miles and Huberman (1994) explain that qualitative studies that aim to describe a pattern of relationships can be done only with a set of conceptually specified deductive categories. They allow for inductive categories, depending on the emerging issues during data analysis (Miles & Huberman, 1994). In this study, both deductive and inductive categories were used. The Webchat discourse was analyzed for message type and flow using the three elements (Mehan, et al., 1983)--temporal factors (see Table 2), topical or content factors (see Table 3), and structural sequences (see Appendix J)-- as deductive categories. The Webchat inputs were manually grouped into the three categories (verified by the peer debriefer). The unexpected factors were considered as inductive categories and discussed as implications in Chapter 5.

Table 2

Temporal Factors—Electronic Discourse Lag time between Initiation and Response

Average response time to questions	1 1/2 days
Range of response time to instructor's discussion questions	20 minutes to 6 days
Range of instructor's response time to student's questions	1-3 days
Students' previous experience with computers did not influence their contributions to the electronic message discussion.	

Table 3

Electronic Discourse Topical Factors

Three types of question groups:
1. Choice questions--evoke a response from categories provided in the questions
2. Product questions--require factual responses
3. Process questions--query the respondent for interpretations or opinions

Table 3 Cont'd

Comparison of Question Types

	% directed to Students in electronic interaction
Choice	17%
Product	58%
Process	25%

To develop themes to synthesize the MTD experience and connect it to the literature, the data reduction was based on deductive categories from the review of

"successful on-line courses" (Levin, Kim & Riel, 1990). Levin et al. (1990) suggested five features that facilitated the building of networked instructional communities: (a) addressing accessibility issues to increase response opportunities, (b) addressing organization of the work group, (c) addressing task organization, (d) addressing response obligations, and (e) maintaining strong leadership and final evaluation of the group task. These findings have verified by recent studies on on-line discourses (McKenzie, 1996; Ruberg, 1994).

In this study, the findings are quantified but in-depth descriptions of the nature of the interaction. Quantification was accomplished by using the NUD.DIST software to sort the coded Webchat archives. The quantification was a two-step process: (1) discourse analysis -- characterizing the discourse in temporal, topical, and structural terms, and (2) discourse characteristics --classifying the Webchat postings.

In analyzing the discourse structure, the analysis for temporal characteristics was therefore limited to the Webchat archives. The e-mail and Webchat archives were initially analyzed to determine broad categories of messages typically posted via each medium as part of the typology. The member-checkers and peer debriefers verified these categories at subsequent interview sessions.

Categorization of discourse characteristics entailed coding each Webchat posting into one of three categories: Webchat mechanics (MECH), social (SOC), and course-related (see Appendix I for coding information). Even with this simple classification scheme, there was a lot of room for overlap (for examples of categories, see Discourse analysis section, in Chapter 4). Course-related postings fell into three categories: (1) those that are information submission, (2) those dealing with course logistics, and (3) engaging, thought-provoking, or probing postings. Once again, there was room for overlap (for examples of categories, see Discourse characterization section, in Chapter 4).

Conclusions drawing and verification

In this final stage of data analysis, the researcher interpreted and drew meaning from the data (Miles & Huberman, 1994). After data collection, the triangulation process continued as the researcher checked for common biases (Miles & Huberman, 1994). A concern for this study is "data overload' which could lead to "the analyst missing important information, over-weighing some findings, skewing the analysis" (Miles & Huberman, 1994, p. 438). Miles and Huberman (1994) propose the following tactics to minimize "data overload' and other biases; "checking for representativeness, checking for researcher effects (reactivity), and triangulation and weighing the evidence" (p. 438). These tactics can be summarized as getting feedback from informants (Miles & Huberman, 1994). Using these tactics, the investigator constantly verified emerging issues and conclusions with member checkers and peer debriefers. The investigator had follow-up meetings with the MTD instructors and students, and faculty advisor to verify emerging findings.

Planning For Trustworthiness

The literature on qualitative research stresses the importance of ensuring rigor. Lincoln and Guba (1985) suggest incorporating the following techniques: credibility, transferability, dependability, and confirmability. Erlandson and others (1993) propose specific techniques such as prolonged engagement, persistent observation, triangulation, peer debriefing, member checking, reflexive journaling, thick descriptions and audit trail to establish trustworthiness. These techniques are discussed below in detail and related to the present study.

Credibility

Lincoln and Guba (1985) discuss this method as the single most important aspect of establishing trustworthiness. They suggest the following techniques that make findings and interpretations credible: prolonged engagement, triangulation, peer debriefing, and member checking (Lincoln & Guba, 1985). The first, prolonged engagement allows the researcher to "learn the culture," test misinformation that can be self-introduced or

introduced by the participants, and build trust among the participants (Lincoln & Guba, 1985). In this study, the investigator worked with all the participants throughout the data reduction and analysis phases (a period of eight months) to obtain a convergence between researchers' and participants' perspectives. The second technique, triangulation, stresses the importance of verifying data from a number of different sources which also addresses the convergence issue. Triangulation was accomplished by using multiple sources of data sources (time, space, person), and collection (interviews, archives of all electronic discourse and analysis) (Erlandson, 1993). The third technique, peer debriefing is described as "a process of exposing oneself to an interested peer in a manner paralleling an analytic session and for the purpose of exploring aspects of the inquiry" (Lincoln & Guba, 1985, p. 308). The peer-debriefers for this study were the Faculty Advisor, Dr. Susan Magliaro and Carmel Vaccare. There were formal and informal discussions in person and via e-mail to find alternative explanations and triangulate perceptions and generalizations. The last technique to ensure credibility is member checking; which was the continuous, formal or informal checking of data with stakeholders to test categories, interpretations, or conclusions or constructions. In this study, the following persons served as member checkers--the instructors, the Teaching Assistant, and the consenting students.

Transferability

In qualitative inquiry, this notion is defined as the extent to which findings can be applied in other contexts or with other respondents (Lincoln & Guba, 1985). This can be achieved by providing "thick description necessary to enable someone interested in making a transfer to reach a conclusion about whether transfer can be contemplated as a possibility" (Lincoln & Guba, 1985, p. 316). According to Lincoln and Guba, it is not the researcher's task to provide an index of transferability, she or he is responsible to "provide the data base that makes transferability judgments possible on the part of the potential appliers" (Lincoln & Guba, 1985, p. 316).

Dependability

An inquiry should meet the criterion of dependability (Erlandson et al., 1993). Lincoln and Guba (1985) argue that the same techniques used to establish credibility can ensure dependability. An additional technique, suggested by Erlandson and others (1993) is the dependability audit. They explain that a "researcher must make it possible for an external check to be conducted on the processes by which the study was conducted" (Erlandson et al., 1993, p. 34). This can be done by providing an "audit trail"-- documentation (through critical incidents, documents, and interview notes) and the researcher's account of the process (journal). This investigator kept a journal of decision processes and informal interviews with key informants and members of her committee. This was part of the triangulation of the data analysis process in that, the journal provided insights about the same events.

Confirmability

A final method suggested by Lincoln and Guba (1985) to ensure trustworthiness of an inquiry is establishing objectivity. The researcher needs to illustrate that the findings are not the product of his or own biases (Lincoln & Guba, 1985). Three ways to accomplish these are the use of a confirmability audit, triangulation, and a convergence between researcher and participants' perspectives. The clarification of issues during the follow-up meetings led to a convergence of perspectives. A confirmability audit enables a reader to "determine if the conclusions, interpretations, and recommendations can be traced to their sources and if they are supported by the inquiry" (Erlandson et al., 1993, p. 35). The investigator preserved raw data, process notes and products used in analysis and synthesis as an audit trail. Triangulation is featured prominently in this study as the investigator kept reflexive journals.

Researcher's Stance

I am approaching this study with the view that the Internet and features such as the WWW present interactive opportunities for the traditional classroom and for distance education. I am currently co-teaching a graduate course that uses the Webchat for on-line discussions and also teaches undergraduate courses. I have researched and taught with the Virginia Tech and Virginia Cooperative Extension Service Faculty Development Institutes. My previous experiences include developing and conducting workshops on the use of the Internet in classrooms. In the past, I have trained office staff on the use of Local Automated Networks (LANs) at the USDA's Human Nutrition Information Service agency.

My background includes conducting a pilot study in a Civil Rights Movement and Literature Cyberschool course during the first summer session of 1996. As a preliminary inquiry for this study, I was part of the design team for an undergraduate on-line course. The inquiry included a employing qualitative research methods to interpret the events of that on-line course. The findings of that study have been referenced for the present study (Hegngi, 1996).

Based on the preliminary inquiry of Civil Rights Movement and Literature on-line course and experiences in supplementing live classroom instruction with on-line communication, I am familiar with circumstances where instructors communicate in novel and improved ways with their students. Students, whose language difficulties inhibit their participation in face-to-face classrooms, seem to interact better in the on-line environment. On the other hand, for students who lack computer experience, literary, and typing skills the on-line environment can be problematic (Hegngi, 1996).

Limitations of Study

The major limitation of this study is its retrospective nature. It would have been a more informative and complete study if the research occurred during the course enactment, which would have allowed for videotapes of the face-to-face classroom sessions and interviewing all participants. The small number of student participants comprising a partial representation of a small population also limits this study. Ideally, the study would have benefited from having all the on-line students as participants. Another limitation resulted from the loss of data during the implementation phase. The Web server crashed during the last week of the course and the hard drive had to be rebuilt. The information that was lost included e-mail communication with Dr. Holmes and some student responses of the CGI activities. The dissertation committee decided that the available data met the minimum resource limit.

Chapter 4

A Description of the MTD Course: From Design and Implementation to Discourse Analysis

The results of this examination of the MTD on-line course are reported in this chapter in three major parts. The first part of the chapter describes the events that led up to the course design, and development process. The second part reports the analysis of the actual implementation of the course as examined via the electronic discourse analysis, discourse characteristics, and course outcomes. The third part is an analysis of the course outcome, relating participants' expressed goals for the MTD course to the interview data, electronic archives, and participants' post hoc reflections.

Course Design History

In the fall of 1995, the instructors, Joyce Williams-Green and Glen Holmes discussed designing a course that would explore the issue of "culture as a decision point in the design process for media technology" (G. A. Holmes, personal communication, February 3, 1997; J. F. Williams-Green, personal communication, November 4, 1996). Their idea was to draw from their respective expertise areas: Dr. Holmes' experience in multimedia instructional design and Dr. Williams-Green's content specialty in multicultural theories. Because Dr. Holmes' prior experiences related to "stand-alone computer application" the discussions in 1995 revolved around stand-alone computer-assisted instruction.

The Cyberschool technology initiative at Virginia Tech which began in the summer of 1995 and other innovative uses of networked-computers or on-line instruction led the instructors to consider "on-line course delivery" (G. A. Holmes, personal communication, November 4, 1996). Dr. Holmes explains that on-line course delivery was "appropriate, practical, timely, and represented improved practice" (G. A. Holmes, personal communication, November 4, 1996). Dr. Holmes was interested in exploring the "convenience, standardization, and economy of use" issues. Consequently, in the Spring of 1996, the WWW was the chosen venue to offer the Media Technology and Diversity (MTD) course. The instructors elected to design the course content to be delivered via the WWW as a form of distance education (for more information, see Appendix C for timeline).

Given Dr. Holmes' expertise in instructional design and computer programming, his ideas drove the design phase as he sought to create a functional, yet resourceful interactive Web interface. Functioning in his dual role of instructional designer and technical expert, he set up a PC Web server to store course materials and support the course homepage. His design ideas were constrained by the end-user platform. Consequently, he designed for the user with simplest version of hardware and software. Decisions were made to include those functions that could be implemented by both DOS and Macintosh platforms, users with 14.4Kbps modem access and varying other software availability issues.

The ideas for course content were drawn from an undergraduate multicultural course in a traditional classroom setting taught by Dr. Williams-Green. She had devoted a lot of time obtaining relevant resources such as videos and questionnaires. She was pleased with the level of interaction in her previous courses but was curious to see if the "anonymity" factor in the on-line environment would encourage more candid dialogue among students. She aimed to use the multimedia applications which included text, audio, still-images, QuickTime™, and on-line forms for the simulations questionnaires. Dr. Williams-Green's role in the course design phase was primarily as content specialist.

Course Production

At the inception of course design and development, the design team assumed distinct roles. The original plan for the MTD course development called for Dr. Holmes to assume the roles of instructional designer and technician. Dr. Williams-Green would assume the role of content expert. Ms. Brown "was brought in to organize and coordinate design team meeting, obtain resources, search of materials and seek clearance" (G. A. Holmes, personal communication, February 3, 1997). She was a graduate assistant with the Black Studies program and was Dr. Holmes' advisee. Furthermore, Ms. Brown had previously taken some Instructional Technology courses with Dr. Holmes.

The roles quickly evolved to address the emerging needs. Dr. Holmes found it necessary to train the design team members to assume technical roles. He later assumed a fourth role as content expert as he produced course materials for Unit 4. Dr. Williams explains her technical role, "I had to create Webpages, learn to use HTML editors and image imbedding" (J. F. Williams-Green, personal communication, February 26, 1997). Ms. Brown's role evolved from design team coordinator to course designer/developer, and then to student. Based on the need to convert questionnaires and course activities into on-line forms and simulations, it was necessary to hire someone with CGI experience, who also had access to the CAS Webserver, where the CGI software was located. It became necessary to hire a second Teaching Assistant: Delia Greenville.

Initial research and development activities

By June 12, 1996, the production team was comprised of the instructors and two Graduate Teaching Assistants: Juone Brown and Delia Greenville. Dr. Holmes' preliminary role was that of instructional designer and technical expert. His technical expertise was used in "delivering content in the technical environment, hence he invested more time with technical support" (G. A. Holmes, personal communication, February 3, 1997). The dual role of instructional designer and technical expert required him to train the other team members to abide by the necessary conventions in developing on-line instructional materials. The training included explaining terminology, directory structure and location, and software functions. The technical support role proceeded throughout the course as subsequent units were developed. Bound by his agreement to teach "Unit 4--Principles of Design for Adoption, Training, and Instruction," Dr. Holmes reluctantly accommodated the instructor's role at the end of the course (G. A. Holmes, personal communication, February 3, 1997). He explained that, "we were constantly fighting against time, hence I spent a larger amount of time on the technology than on the design and content" (G. A. Holmes, personal communication, February 3, 1997).

In retrospect, Holmes considered the decision to "deliver" the course on-line as "naive." He explained that as instructional designers, they underestimated the significance of "advance planning, margin of error, uncertainty of project development, labor and time involvement" (G. A. Holmes, personal communication, November 14, 1996). He would approach such a project differently next time by conducting more feasibility studies, and more "formative and critical evaluations" (G. A. Holmes, personal communication, February 3, 1997). He added that assuming the role of team technical trainer was "impractical at the time, but paid off of in the course re-design" (G. A. Holmes, personal communication, February 3, 1997). He plans to dedicate more time to "his pedagogical role in the second iteration of the course" (G. A. Holmes, personal communication, February 3, 1997).

Dr. Williams-Green generated the course content and resource materials. Her role as content expert quickly evolved to include providing technical support; she was "forced to learn HTML, Webpage design, image editing, searching for on-line resources" (J. F. Williams-Green, personal communication, February 26, 1997). She concluded, "such rethinking actually helped the course content. It forced me to condense the course materials" (J. F. Williams-Green, personal communication, February 26, 1997). As instructor, she moderated all the Webchat discussions, received all course assignments, activities, tests, and research papers. She conducted all student assessment.

Ms. Brown's role evolved; in addition to her role as team coordinator, her experience in graphical design was utilized in the conceptualization of homepages and the design course unit presentations. Her role continued to evolve during the implementation phase, when she acted as a "buffer" between the instructors and the student prior to and during the orientation sessions (G. A. Holmes, personal communication, February 3, 1997). She was introduced to the students as the contact person for course-related questions. She maintained the role of Teaching Assistant in addition to her role as a student in the MTD course. Her activities as Teaching Assistant included "clarifying assignment instructions and expectations via phone calls, e-mail, and in person" (J. Brown, personal communication, November 11, 1996).

Ms. Greenville also played dual roles; liaison between the College of Arts and Sciences (CAS) and the Instructional Systems Development program in the College of Human Resources and Education (CHRE), as well as technical support with the CAS Web server and Common Gateway Interface (CGI) software programs. Her security clearances with the CAS server was vital to exchange data and generate output between the CHRE and CAS servers. Ms. Greenville's major contribution in the MTD project was to facilitate the generation of the on-line questionnaire forms by converting the multicultural resources on the CAS server MTD course materials and questionnaire forms.

Professors and colleagues from the Instructional Systems Development program and the Educational Technology Laboratory (ETL), both at Virginia Tech served as informal external evaluators for the course development phase. In the weeks prior to and during the course implementation, colleagues at the ETL lab tried browsing through the course materials in the earlier iterations of the on-line interface. They included Dr. Norman Dodl, Professor, Emeritus of the Virginia Tech Department of Teaching and Learning and his Appalachian Colleges Association Graduate Assistants.

Equipment and facility

The hardware equipment available for this project included a 486 with one gigabit of RAM, color flatbed scanners, and laser printers. The software programs included server software, CGI scripting, relational databases, Shockwave, Webchat, QuickTime™, image map generator, word processors, Eudora, WYSWIG editors, Adobe Premier, Acrobat, and Photoshop, and presentation graphics. The available facilities included copy machines, telephones, meeting rooms, etc. The College of Arts and Sciences and the Educational Technology Laboratory (ETL) provided these facilities and equipment, both at Virginia Tech. The MTD on-line course materials could have been developed satisfactorily on either the Macintosh or Windows platforms. The project developers constantly contended with end-user accessibility issues; ensuring that users with either platform and with older versions of software and equipment could access course materials (G. A. Holmes, personal communication, November 14, 1996).

Students were informed at the second class session that they needed access to a reliable computer. The list of required software and plugins were listed on the course homepage (see Appendix D). These plugins could be downloaded from the links on the homepage. Despite these provisions, one of the interviewees resented clearing his hard drive to make room for the necessary plugins and software programs. He voiced frustration with the equipment and software and felt impeded his progress during the course. The other interviewees had access to on-campus computer labs and expressed no accessibility problems. Those students who had accessibility problems participated less, in class activities and voiced those problems in the Webchat forum.

Production time

The time frame for producing the entire course was estimated at 2,000 person hours (G. A. Holmes, personal communication, February 26, 1997). Each team member worked on individual projects and forwarded them to Drs. Holmes and Williams-Green for feedback. Dr. Holmes placed acceptable projects on the Webserver. All pictorial

depictions of the homepage captured for this document, represents the fourth iteration of the interface.

Electronic Discourse Analysis

This second section presents the analysis of the electronic discourse structure, this analysis connects the theoretical perspective outlined in Chapter 2 (see section on Electronic Discourse Analysis) with electronic communication activities and interview data.

The intention for the discourse analysis of the Webchat and the available email archives was to determine the temporal, topical and sequential characteristics of the electronic discourse. This study had proposed to analyze the entire electronic archive; all Webchat postings and e-mail messages. Due to the storage of e-mail data on three different computers that contributed to the unsequencing of the e-mail archives, it was impossible to establish a timeline. Consequently, the investigator used the Webchat exclusively in analyzing for temporal and structural characteristics and used both e-mail and Webchat archives to distinguish between the content of the electronic messages. The analysis for temporal characteristics was therefore limited to the 235 postings in the Webchat archives.

Temporal Characteristic

The overall finding, as one can guess, was that there was a considerable difference between the asynchronous chats versus the scheduled (as synchronous as possible) chats (see description in Webchat section in Chapter 3). The Webchat archive could be divided into two categories: the asynchronous Webchat sessions and the scheduled (Synchronous as possible) sessions. Students were informed, during orientation, of the on-line Webchat requirement which was operational on July 8th. At the onset of the Webchat discussions, the students informally logged on to read and post messages until one student complained about the frustration that resulted from low participation. The instructor's decision to schedule three Webchat sessions was announced via e-mail, as a Webchat posting, and on the Unit 3-assignment homepage:

> For this assignment you should respond to the chat questions submitted by Dr. Holmes and/or Dr. Williams-Green. (Note: See "Let's Talk" link at the top of the screen). The required chat sessions will be held at 9:00am on July 30, 31, and August 1 at 9:00am.
> Topics : Questions posted by Dr. Williams-Green and/or Dr. Holmes concerning the required readings.

The student who expressed her frustration about the asynchronicity of the Webchat session later sent this e-mail message to the instructors:

> Thanks for the chat session. This was useful. I wish it were not asynch[ronous] for that takes some of the coherence away from the discussion.

Due to a personal emergency, Dr. Williams-Green canceled one scheduled session and the students then participated in two scheduled chat sessions. The result was that 53% of all the postings occurred during the two scheduled sessions, as opposed to 47% over 17 day or three-week period. Hence, most postings occurred during the two synchronous sessions.

There were also differences in lag time between postings and length of postings. As characteristic of electronic discourses (Mehan, et al., 1985; Levin, et al., 1990; Ruberg, 1994), there was a predictable time lag in the MTD Webchat postings. For example:

> Dr. Wms-G...7/13/96 12:11 PM
CL/CI R1
> The video Ethnic notions generally helps students understand how stereotypes can be exaggerated and the impact that they have on people. I wanted you to view the video as an advanced organizer for Unit 2.<p>

Mary:...7/12/96 4:56 PM
 CT I1
I found that video, ethnic notions, to be very powerful.

Note the contrast in the dates. The average between a typical initiation and response in the asynchronous sessions was 20 hours. On the other hand, the average time lag during scheduled Webchat sessions was four minutes. The following excerpt exemplifies the minimal time lag:

Mark:...7/31/96 9:58 AM
S/M R CT
WOW! I just got on! The server would not connect! You people must be getting really busy chatting on here or something!!!
Anyway, this is an exciting discussion. Ya'll have some good points on teaching and learning stuff. Personally, I have the naive look on life and have always assumed that culturally there is no difference in the way people learn. I always thought it was an individual thing....
But I reckon if you factor in the way people teach to different cultures with their attitudes and such...That could affect the quality of the teaching...Hmm.

Joe :...7/31/96 10:02 AM
R CT
Mark...I'm glad you do realize that people (even ethnic or racial) groups learn differently from one another.....our competence is even different than one another...especially on how we achieve being competence and even how we define it...<p>

Topical

In reading through the MTD Webchat archive, it is evident that there are multiple threads or topics that are being pursued simultaneously. The instructor categorized a total of forty different topics discussed over nineteen days (see Appendix K for the list of topics). The unscheduled Webchat sessions were marked by a climate of open participation as one topic elicited responses, redirections and building statements. An example of such a sequence occurred on July 16. The topic of interracial marriages was introduced and elicited two responses. The second posting calls for a definition of racism, based on the Marger textbook and then proceeded to ask a question about interracial dating. Here is the excerpt:

:...7/16/96 3:08 PM
 CRSTGHTP RESP6 INIT8
I just finished the When I was young interview. Based on my findings, The environment played a key role in how people get along. The educated black man I interview seemed racism is under control in his environment, but the white man from a low class family stated that racism is always a problem in his environment. Not your typical stereotypes, according to modern day society. While interviewing all the individuals, I asked them if they believe in interracial marriages. Only the Japanese female stated that she had no problem with this. HOW DO YOU FEEL ABOUT INTERRACIAL MARRIAGES?<p>

Rachel:...7/16/96 3:19 PM
 CRSTHGTPRESP8
In response to the question of interracial marriages. I have dated outside of my race. However I do plan to marry a black man. My two brothers are currently engaged to white women. My grandmother and mother have always taught us that love is color-blind. I only have a problem with interracial relationships when the black individual's preference is to date non-black only. That is when I take it personal and become offended and bothered.<p>

DR. WILLIAMS-GREEN:...7/16/96 3:20 PM
 CRSTGHTP RESP8
How do you feel about interracial marriages? Why did you ask the interviewees that question??

I am not sure that I understand your assessment of the two men in your group. Did the educated black man say that he did not experience racism and the white man did experience racism. Be sure to read Marger's definition of racism.<p>

DR. WILLIAMS-GREEN:...7/16/96 3:21 PM
 CRSTGHTP INIT9 Would dating only in your race be considered racist by Marger?<p>

This threaded pattern was consistent across the asynchronous and scheduled sessions. These topics generally followed the course outline activities: the Webchat topics corresponded with the course units. For example, the fifth and sixth topics corresponded with Unit 1 and the thirtieth topic corresponded with Unit 3.

Of significance in the MTD course is that the content of e-mail postings differed from the content of Webchat postings. The e-mail medium was used for "private" conversations and for administrative matters. Even though students met in the face-to-face orientation sessions and established contact, they had little inter-personal communication via e-mail. The "Communication/Talk Options" Webpage facilitated e-mail communication with peers (see Figure 6). In fact, earlier e-mail messages were sent to the instructors and entire class, but the reflective nature of the assignments demanded privacy. Dr. Williams-Green instructed students, via e-mail message to send all assignments directly to the instructors. She said "Please do NOT send your E-Mail summaries to the entire class. Send them to ME and Dr. Holmes. You may begin other e-mail sessions with your class members or even arrange a chat session with all of us to discuss the videos or any thing else" (personal communication, July 10, 1996).

All students indicated during the interview that, except for group meetings, the only peer who was frequently contacted was Juone Brown, who played the triad role of peer, mediator between students and instructors, and Teaching Assistant. This summation was also verified by the e-mail archive data analysis. Ms. Brown encouraged those contacts, as illustrated by the following excerpt:

To: "Dr. Williams-Green" <jfwillia>,
From: Juone Lorie Brown <jubrown@vt.edu>
Subject:

Good Morning Everyone,

Today I will be room 220 War Memorial instead of Lane Hall if you need any assistance from 9am-1pm. Have a nice day, and a good weekend.

See You Soon

JB

The recipients of above posting were removed to protect their anonymity. The objective of those contacts with the Teaching Assistant included administrative matters, logistics, resource location, and assignment clarification. The following excerpt represents the typical e-mail communication with the Teaching Assistant:

Date: Thu, 08 Aug 1996 10:35:22 -0400
To: jubrown (Juone Lorie Brown), jubrown (Juone Brown), gholmes (Dr. Holmes), jfwillia (Dr. Williams-Green),
From: mark@vt.edu
Subject: Re:
Status: RO

At 10:16 AM 8/8/96 -0400, Juone Lorie Brown wrote:

> The bookstore has to get ready for the fall semester rush, therefore
>they are no longer stocking I & II session books. If you did not purchase
>the book by the fourth week of classes, you will have to order it from the
>bookstore or perhaps borrow or purchase the book from someone who has it.

Actually, it was the third week when I went and they did not have them in stock. And they did not know how long the orders would take. (more than a week)

The bookstore is evil.
Mark

Date: Fri, 09 Aug 1996 14:16:17 -0400
From: Rachel <Rachel@vt.edu>
Reply-To: sgravely@vt.edu
Organization: Virginia tech
X-Mailer: Mozilla 2.02 (Macintosh; I; 68K)
MIME-Version: 1.0
To: Juone Brown <jubrown>, "Dr. Holmes" <gholmes>,
"Dr. Williams-Green" <jfwillia>,
Subject: Lesson Plan
X-URL: http://malachi.etl.vt.edu/mtds296/_root/chat.htm
Content-Type: text/plain; charset=us-ascii
Content-Transfer-Encoding: 7bit
Status: RO

Hey, is anyone else having problems with the final project.
Classmates, can you lend a fellow classmate a helping hand with Assignment 4.4(Lesson Plan)? Thanks, Rachel

Structural sequence

The structural sequence analysis on the Webchat archives revealed a variation of the strict IRE sequence. Although the participants discussed several topics concurrently, the postings were dominated by"replies." Table 4 shows that 60% of all postings during the asynchronous Webchat sessions were replies. That number increases to 80%, during the scheduled sessions and the overall reply average was 69%.

Table 4

Webchat IRE Breakdown

Posting Type	Asynchronous Raw Data %	Scheduled Raw Data %	Average Raw Data %
Initiations	29%	6%	19%
Replies	60%	80%	69%
Evaluation	11%	14%	12%
Total	100%	100%	100%

After in-depth analysis, it was evident that the default IRE sequence (Mehan, 1985) changed in two ways. First, it is interesting not only that students frequently initiated discussions or issues in the Webchats but that the initiations decreased in the scheduled chat sessions. There were a total of 40 initiations during the entire course on-line discussions. 57% of all those initiations were from students. Of the 8 initiations

during the scheduled sessions, none was posted by students. The eight instructor initiations all focused on specific topics from the first three lesson units (see Appendix K for Webchat topics). The student initiations were generally directed to the class in general. The following excerpts illustrate initiations from the asynchronous or unscheduled sessions:

> Mary:...7/18/96 11:01 AM
R CT I
> Wow, I found that book to be heavy reading. In very simple terms I understand her thesis to be that "racism is a white problem" and that it affects white woman in some very important ways. She of course interviewed a bunch of woman to explore that thesis. I think I will enjoy reading her interviews more than I enjoyed reading her theory which was very dense from my uniformed (in the theory of racism) perspective. Please comment on your understanding of her writings. I need help.<p>
>
> Jon:...7/23/96 11:01 PM
I CT
> This was a topic of discussion at dinner:
> Why is it that Indians have to be called Native Americans and Blacks have to be called African American. I am a White male from German dissent, but I don't refer to myself as a German American. The other individuals at the table were Italian and Jewish and they don't call themselves Italian or Jewish Americans. If we are all American citizens, shouldn't we all just be labeled as Americans? If people want to know our ethnic background, then inform them that we are Indian, African, German, etc. I am a proud German, but I don't feel that it is needed when informing people that I am an American. <p>
>
> Mary:...7/23/96 9:53 AM
I CT
> Are people naturally xenophobic? The Day of Atonement and New Year's liturgies of Judaism includes asking forgiveness for the sin of xenophobia, many times. Therefore I conclude that fear of strangers has been with us a long time. Can we overcome it so that we can implement the American creed? I assume that we are all somewhat hopeful or we wouldn't be taking this course, I am probably too idealistic but I want to hope that as people truly get to know each other, to hear each other's stories, to laugh and cry and discuss with each other, they will see the beauty and value of many different colors and stop fearing the differences that can be found between us. Does the African American community fear that African American culture will be lost with full acceptance into American culture. This is a great fear of Jews, loss of Judaism by assimilation. When anti-Semitism is strong the
> Jewish community seems to be stronger and more inwardly focused. With less anti-Semitism there is assimilation and the fear of possibly the total loss of Judaism as a culture and a religion.<p>

Although electronic discourse analysis demonstrates that the instructor has a great deal of influence on the direction, tone, and outcomes of the discussion the above excerpts illustrate that MTD students felt permitted to initiate conversations. Students posted Fifty-five percent of all the initiations in the asynchronous sessions (see Table 4).

Second, it is noteworthy that students never evaluate the instructor's or their peer's initiation or reply. The instructor posted all the evaluations (11%) in the scheduled sessions. This finding was similar to the results from Ruberg's 1994 survey. She explained that students would rather seek clarification or examples than evaluate their peer's posting. The instructor however, used evaluations to influence direction and tone of discussions. The following excerpts are some typical evaluations:

Mark:...7/9/96 1:30 AM
S
Howdy folks!
We've just finished our first day and I am excited about things to come. I've already torn through the first exercise and just waiting too see what happens! I'm
looking forward to learning NEW things about different people
and cultures. <p> Later!<p>

Dr. Williams-Green:...7/13/96 12:14 PM
CT I2
Did the Who Am I? activity help you begin to think about how you view your self and how others might view you? Which group did you have more difficulty listing descriptions?<p>

Dr. Williams-Green:...7/13/96 12:15 PM
S I3
Mark, I love your rose!!<p>

Mark:...7/13/96 6:30 PM
S/CI/CT R3/2
Gee, Thank you Dr. Williams-Green. ;) <p>
The "Who Am I" activity was rather difficult for me to do. I tried to be as honest as I could with the form. This was rather difficult, because I know a lot of the things I put down were not necessarily the best descriptions, but they were the FIRST that came to my mind. And they were their stories. Unfortunately I cannot type fast enough to get all their words down.<p>

The exchange between Dr. Williams-Green and Mark is typical of the early Webchat session exchanges. The question to the class and later the follow-up compliment to Mark is observed by the class and influenced the subsequent responses from Mark and other students about the specific course assignments (see Appendix L). As the Webchat excerpt in Appendix L shows, initiations, replies, and evaluations by the instructor guided and directed participation and interactions. Interestingly, Mark posted two more graphics after Dr. Williams-Green's compliment and instructor evaluations were rare during the scheduled chat sessions. During one scheduled discussion, the instructor posted;"I will stay out of the discussion now. You seem to be on a roll' (MTD Webchat archive, July 31, 1996)! A tally of all the Webchat postings is presented in table 5.

Table 5

Webchat Tally

Alias	
Jon	17
Mark	22
Otto	24
Mary	29
Sarah	22
Ms. Brown	0
Dr. Williams-Green	55
Dr. Holmes	2
Rachel	16
Jake	1
Joe	35
Elaine	12
Total	235

Another major distinction between scheduled and unscheduled Webchat sessions was the length and the type of the postings. The Webchat archives from two scheduled days contained 780 lines, whereas the unscheduled Webchat sessions across 18 days yielded only 660 lines. It was obvious that student responses during the two days of scheduled discussions were not only longer, but more thoughtful. A posting was characterized as thoughtful based the McKenzie (1996) categories. All postings were coded into three categories: social responses (SOC), Webchat mechanics (MECH), and course-related (CRSTHGTP). The course-related postings were further characterized as course logistics (LOG), information submission (INFO), and engaging or thought provoking (PROBE) (for more information, see upcoming section on Discourse Characteristics). Here's an excerpt from the scheduled days.

> Rachel:...7/31/96 9:21 AM
R CT
> It is not impossible to implement diversity in your teaching methods. I took a class 2yrs. ago that showed up the various methods of teaching that can be used in a multicultural, learning environment. For example, we know that in certain cultures it is not accepted to look people directly in the eyes or to speak out unless called upon. As a teacher, you should take the time to become familiar with the different cultures that are present in your classroom. You should know that maybe a girl from India may not be apt to speak out in front of the class. So, a teaching method can involve group participation rather than individual. Each lesson should be administered differently. One day present a lecture and the next have the class present it. Then another day, show visuals because there may be some students who learn better with visuals than verbally. These are just some examples. It is up to the teacher to want to learn, especially if it's not encouraged by the school system or the school.<p>
>
> Elaine:...7/31/96 9:26 AM
R CT
> I feel the ideal society would be pluralistic, but as far as the United States ever reaching that point it will probably never happen. I think where it goes back to is the time of slavery. Some people in our society still have this view that the superior race is the white race. These people want all minorities to assimilate into they're way of living. I'm not saying that all people are like this but I'm saying that we still have too many people who feel this way. <p>
>
> Joe:...7/31/96 9:26 AM
 R CT
> I think to become pluralistic we must learn to accept and agree on certain values...there has to be some middle ground, this in turns means that someone or some group will lose....and when you think about it will the majority group be willing to give up something that they are so familiar and used to??? Or maybe I'm totally out in left field....<p>
>
> Mary:...7/31/96 9:26 AM
R CI CT
> Craig, Quebec has not yet withdrawn from Canada although there are many Quebecois who would like to secede. The pluralism in Canada brings up some of the problems of a pluralistic country. I lived in Canada for four years and found the fighting among the different groups quite daunting. There are other very distinct groups in Canada, other than the French. Every ethnic and religious group can have their own state funded public schools. In Edmonton, where I lived, there were French and Ukrainian language schools, Catholic schools, Protestant schools and Jewish schools. There were probably other schools that I was not aware of. My children were of pre-school age when I lived there so we never had to make the decision of school enrollment. If we had school age children it would have

been difficult. The one or two Jewish schools were far from our neighborhood and were much more orthodox in their religious outlook than our home life. Therefore the schools tended to segregate ethnic groups into neighborhoods and forced families to be more radicalized.<p>

Sarah:...7/31/96 9:28 AM
RESP CRSTHGTP
On the first day of school, I have all my students complete a CONFIDENTIAL student information sheet. It includes completion statements such as "I study best when...." and "I understand better when the teacher...". I also include a section at the bottom of the one-page sheet for students to tell me ANYTHING about themselves that would help me better present material. I preface my distribution of this sheet by stressing the confidentiality of this sheet and that NO ONE will see it but me. This has helped me a great deal in providing for different learning styles and cultural differences--the comments are VERY insightful!<p>

Discourse Characteristics

The electronic discourse analysis occurred in two phases. Firstly, the Webchat archive was coded into three categories, based on the McKenzie (1996) study: social responses, Webchat mechanics, course-related. Secondly, course-related input was additionally coded into three categories: course logistics, offering information, and engaging or thought provoking. Given that the electronic discourse was the only social environment for students to interact and participate in class discussions, it was necessary to describe how well students were actively thinking and engaging in class discussions.

Phase one. Based on the McKenzie (1996) study, each Webchat posting was coded as one of three categories: Webchat mechanics (MECH), social (SOC), and course-related (see Appendix I for coding information). Even with this simple classification scheme, there was a lot of room for overlap. For example, the initiation "Dr. Williams-Green:...7/16/96 9:33: Is any body out there??' was judged as Webchat mechanics, because it was an attempt to log on and find out if anyone else had logged on. It was also considered a social response as well. Social responses ranged from courteous and encouraging responses not related specifically to the course, to comments like "Joe:...7/30/96 9:08 AM: It's too early..."

Phase two. Course-related postings fell into three categories: (1) those that are information submission (i.e."Dr. Wms-Green :...7/31/96 9:25 AM: Good points Rachel! Bennett discusses many of these same issues in chapters 3-6. She give excellent examples."), (2) those dealing with course logistics (i.e."Joe:...7/30/96 10:12 AM: Final Project??? When will we get the assignment for the final project???"), and (3) engaging, thought-provoking, or probing postings (i.e."Sarah:...7/31/96 9:16: I think as an educator it is my JOB to make sure all students learn; so it is imperative that I deal with diversity even though I may not have the training (until now) to do that.") The following excerpt is an example of overlap in multiple areas, containing a reply that were purely social, added on to a question that was engaging or informative and a Webchat mechanics posting:

Rachel:...7/31/96 10:34 AM
SOC MECH RESP CRSTHGTP sorry, I had to step out for awhile. I believe that as long as the white male keeps the power in the U.S., the future American will not look like a mixture of races. Currently the media and society projects an American who is white. As for interracial marriages, I believe that it's up to the person. But, I also understand someone who is against it. I see both sides and can relate due to personal and familial experiences. There's nothing wrong with wanting to keep your race within each other as a matter of pride for your race and wanting to uplift it to the point where helping each and standing together to obtain equality and earnings from the dominant culture.

Oftentimes, postings that offered course-related information also encouraged others to think. Such responses were recorded as more than one response.

As the Webchat grand totals of Table 6 show, there is a noteworthy difference in the course-related posting category between the asynchronous or unscheduled and the scheduled sessions. Because of the scheduling, all of the postings in this category were considered thought provoking. Participants greeted each other (SOC 20%) and complained about the early start (MECH 16%), and they seemed to have focused on the answering Dr. Williams-Green's questions. There was no course logistic or information submissions during the scheduled Webchat session. Yet the conversation could not be characterized as mechanic, for the students challenged each other's notions and ideas. They offered what was characterized in Table 4 as evaluations.

Table 6

Grand Totals of Webchat Postings

Code	Asynchronous raw data %	Scheduled raw data %	overall raw data %
Webchat mechanics	16%	16%	16%
Social postings	14%	20%	17%
Course related	70%	64%	67%
Information submission	15%	0	7%
Course logistics	24%	0	11%
Thought provoking/probing	31%	64%	49%
Total # of postings	100%	100%	100%

The Webchat categories and multiple thread findings are consistent with prior research (Quinn, et al., 1983; Levin, et al., 1990; Ruberg, 1994), where the criterion of relevance in the electronic discourse is the class discussion. Participants in the electronic discourse refer to broad array of preceding topics, differing from "preceding talk" in face-to-face discourse (Cazden, 1988). Such complexities contribute to variations in the default IRE sequence of face-to-face discourse.

The Webchat archives reveal an unusual absence. There was no record of the Teaching Assistant's postings. When asked why she did not post her biography or participate in the Webchats, she voiced security concerns, "That project reflected my views at the time and I did not want to create a permanent record for the entire world" (J. Brown, personal communication, November 12, 1996).

There was a difference in the content of e-mail versus Webchat postings. Dr. Williams-Green and Juone Brown (Teaching Assistant) found that e-mail postings included more candid opinions about texts, assignments, and exercises. This finding was verified by the data analysis, as well. Students felt more at ease to express dissension in private e-mail messages than on the public forum of the Webchat. One student repeatedly resisted participating in the Who Will I Hire? exercise and used the e-mail medium to explain the resistance (Dr. J. F. Williams-Green, personal communication, January 27, 1997). That specific e-mail message was not archived, but the student expressed having difficulty with that exercise. She called for "a change in the 'Who will I Hire' exercise by simply introducing the exercise gradually" (Mary, personal communication, November 8, 1996). She characterized that exercise as "sterile." Another student queried Dr. Williams-Green via direct e-mail that the textbooks were biased because the authors were black. She responded:

> >Date: Thu, 18 Jul 1996 14:27:31 -0500
> >To:Jon <Jon@vt.edu>
> >From:jfwillia@vt.edu (Joyce F. Williams-Green)
> >Subject:Re: Assignment 2.2
> >
> >Thanks for your comments.
> >
> >Let me give you little information about Frankenberg's study. Her work is
> >what we call qualitative research or sometimes ethnographic research. It
> >is generally accepted that small people can interview small numbers but do
> >extensive interviews. See if you can find some information on qualitative
> >research on the web. or get some information from the library. The belief
> >is that one can get much richer data and more accurate responses from
> >qualitative research.
> >

>Gould: Yep! People based a lot of decisions on data like that presented
>by Morton. It was the foundation of racial difference for a long time.
>My point in assigning this reading was to let you see how subjective
>research no matter how quantitative it is can be. We'll talk more about
>these things on Monday during our chat session.
>
>I hope you are enjoying this experience.

Dr. Williams-Green used the above excerpt to illustrate the marked difference between the content of e-mail and Webchat postings.

Course Outcome.

The intention of the analysis of the course outcome was to relate participants' expressed goals for the MTD course to the discourse analysis results, interview data, electronic archives, and participants' post hoc reflections. The instructors' overarching goal for the MTD course was for students to understand the design process for Media Technology and the role of culture as a decision point in that design process (G. A. Holmes, personal communication, November 4, 1996; J. F. Williams-Green, personal communication, November 4, 1996). Some of the subgoals included exploring the issues of offering convenient instruction, standardization of on-line course delivery, and economy of use (G. A. Holmes, personal communication, November 4, 1996). Dr. Holmes speculated that the on-line course delivery was practical because students could have access to instruction with little time and space constraints. He also considered exploring some ways to standardize on-line course delivery by designing and developing instructional materials that were re-usable. Dr. Williams-Green set out to test her hypotheses that the anonymity of the on-line environment would contribute to a "more pure and honest interaction on diversity issues" (J. F. Williams-Green, personal communication, November 4, 1996). This course outcome analysis will be described in two sections: understanding the design process, and the role of culture.

Understanding the design process

The participants expressed mixed estimations of the outcome of understanding the design process. The instructors are very pleased with the design interface of the MTD course because with some relatively minor adjustments, the course template is reusable. However, the main purpose of the course was for students to understand the design process for Media Technology and the role of culture as a decision point in that design process. Given such a purpose, students expected to spend more time analyzing Media Technology and learning about its design process. One student suggested that the MTD course activities could include the analysis of some Internet sites, discussing and redesigning for improved multicultural representations.

While in the process of revising the design of the MTD course, the instructors offered some salient reflections. Dr. Holmes conceded that spending more time on the technology rather than on the design, was unfortunate. The media design content was delivered as Unit 4. He explained that, "Unit 4 activities and resources are limited due to the time constraints; prior commitment and role in technical aspects" (G. A. Holmes, personal communication, February 3, 1997). He concluded that Unit 4 "lacked a certain richness to learning" (G. A. Holmes, personal communication, February 3, 1997). His summative evaluation of the course, as a whole was, "The MTD on-line instruction was a tutorial model....more interaction is needed to guide learners" (G. A. Holmes, personal communication, February 3, 1997). This estimation of the design process component of the course is verified by the topical categorization of the Webchat archives. As Appendix K shows, none of the forty Webchat topics related to Unit 4 or to the subject of understanding the design process.

The highly interactive multimedia design of the MTD course exploited the rich multi-faceted environment of the WWW. The use of multimedia features to deliver course content offered students valuable experience with these technologies, and in some cases, designing with these technologies. Although some students expressed frustration about the

software requirements, one of those students cherished the technical skills he developed in the MTD course. As members of the design team, Dr. Williams-Green and Ms. Brown said they learned a lot about the design process and developed some useful technical skills. Such prior experience now facilitates the redesign of the second iteration of the MTD course. The prior experience also confirms Dr. Holmes' speculation that designing re-usable on-line instructional materials can lead to "economy of use" (G. A. Holmes, personal communication, November 4, 1996).

Role of culture in media development

The participants' reflections on the outcomes of the role of culture in media development were also mixed. Dr. Williams-Green surmised that redesigning the course for the on-line environment improved the content because she "had to re-think the entire course structure and condense certain aspects of the course" (J. F. Williams-Green, personal communication, February 26, 1997). Yet, the teaching experience was frustrating. She felt that "the on-line environment was not as rich...the lack of non-verbal cues or body language prevented the personality of the teacher to be conveyed, especially considering the course content--diversity issues" (J. F. Williams-Green, personal communication, November 4, 1996). She concluded that the on-line environment did not facilitate the "pure, [and] honest interaction" that she had hoped. The Webchat postings reflected students' recognition of stereotypes, but she determined that "they were in denial" (J. F. Williams-Green, personal communication, November 4, 1996).

She deduced that students evaded sensitive issues in the Webchat settings and chose to e-mail the more poignant comments to her directly. She encouraged student grappling with diversity issues by responding to e-mail messages and Webchat postings with "follow-up questions, to probe issues further" (J. F. Williams-Green, personal communication, February 26, 1997). The following Webchat excerpt illustrates such follow-up probes;

> Dr. Williams-Green:...7/16/96 9:33 PM
> INIT MECH/S Is any body out there??
>
> DR. WILLIAMS-GREEN:...7/16/96 3:21 PM
> INIT CRSTGHTP Would dating only in your race be considered racist by Marger?
>
> DR. WILLIAMS-GREEN:...7/16/96 3:20 PM
> RESP/INIT CRSTGHTP How do you feel about interracial marriages? Why did you ask the interviewees that question?? I am not sure that I understand your assessment of the two men in your group. Did the educated black man say that he did not experience racism and the white man did experience racism. Be sure to read Marger's definition of racism.

On the other hand, students unanimously acknowledged their valuation of cultural issues, engendered by the MTD course. The following is an excerpt of interview data, expressing students interest and evaluation of the course.

> Interviewer: What was your interest in this course? Content, on-line context, or both?
>
> Students: The primary interest was in the content and secondary interesting the on-line context.

The following is an example of an e-mail message that adequately summarizes students' interest in the MTD course;

> X-Sender: Mary@mail.vt.edu
> Message-Id: <v02140b00adc0cc76a89c@[128.173.7.57]>
> Mime-Version: 1.0
> Content-Type: text/plain; charset="us-ascii"

Date: Thu, 16 May 1996 08:15:22 -0400
To: jfwillia (Joyce F. Williams-Green)
From: mary@vt.edu
Subject: Re: media, technology and diversity course
Status: RO

>Sure, we will have the first two lessons on video tape and the other info
>will be on line.
>>I would like to take your summer school course titled Media, Technology and
>>Diversity but I will be out of town for the first week of second summer
>session. Is
>>there any possibility that I might still take the course? I am interested
>both in the
>>course content and in the delivery of courses over the Internet.
>>I will register for your course. I may even be able to access the
materials over the Internet while at my conference in California.

Students were fascinated by the opportunity to discuss such an engaging subject as diversity in this new social environment. During the interview, the discussion led up the question of expectations:

> Interviewer: What was your understanding of the instructors' expectations for specific assignments and activities? (Most students recalled only 2 to 3 assignments or activities, so the investigator resorted to calling out the titles to stimulate student recall.)

The varied on-line activities and assignments offered by this course gave students many avenues to grapple with multicultural issues as well as media technologies. The students unanimously agreed that the course helped them understand cultural diversity. They attributed much of this enlightenment to the Unit 2 assignments, where the students were asked to:

> Visit the INTERNET and identify three sites that contain information about an under-represented minority group other than African Americans. Use these sites (along with other materials of your own choosing) as references in preparing a three-page paper discussing the culture, stereotypes, major societal contributions, etc. of your selected minority group. Your paper should also emphasize similarities and differences among the under-represented group you've identified and what Bennett refers to as the "macro-culture" of the United States (MTD homepage, Unit 2: assignments).

The students' recollections about this assignment conveyed vivid details and appreciation for that cross-cultural experience.

The When I Was Young assignment also figured importantly. It was the most student-referenced assignment (6 times) or activity on the Webchat. Here's an example of Webchat postings:

> I'm glad I did the "When I was young" activity. It helped me to get to know my grandmother more and also better understand another culture(Egyptian). The Egyptian male mentioned to me how he is also Arabic and Muslim. He talked about how people frown when he mentions the latter two cultures, but smile when he mentions Egyptian. I thought this to be very interesting (MTD Webchat).

The students found these projects interesting and memorable. The elements of choice and control of subjects for these projects provided strong motivation for the students. The instructions for that exercise required students to chose six people from mixed races, gender, and ethnicity to interview and write a report on.

Students recalled that two activities entitled Who Am I? and Whom will I hire? proved challenging. Two students commented on the Who Am I exercise during a Webchat session:

> Mark:...7/13/96 6:30 PM
THGHTP RESP2 RESP5
> Gee, Thank you Dr. Williams-Green. ;) <p>
> The "Who Am I" activity was rather difficult for me to do. I tried to be as honest as I could with the form. This was rather difficult, because I know a lot of the things I put down were not necessarily the best descriptions, but they were the FIRST that came to my mind. And they were HONEST descriptions that were based upon my heritage and my background....however limited those are. <p>
>
> Jon:...7/14/96 4:35 PM
CRSTGHTP RESPRESP5
> The Who am I survey was difficult for me to complete. I was putting things down that first came to my mind. This may not have been the correct method, but I felt this method was more truthful.

The second challenging activity, Who Will I Hire? was never referenced in the Webchat session. One student complained via the aforementioned e-mail message to Dr. Williams-Green about it and reflected during the interview that she encountered a lot of problems with it. She felt that the on-line environment was inappropriate for that exercise.

The flexibility and convenience afforded by the computer-mediated communication made for unique participation opportunities. One student, Jon, had to travel to Pittsburgh, Pennsylvania. He wrote this message;

> Date: Thu, 18 Jul 1996 23:37:44 -0700
> From: Jon <Jon@vt.edu>
> X-Mailer: Mozilla 2.02 (Win16; I)
> MIME-Version: 1.0
> To: Joyce Williams-Green <jfwillia>
> Subject: Thanks for your help
> X-URL: http://malachi.etl.vt.edu/mtds296/_Root/LESSON02/_ANCHOR.HTM
> Content-Type: text/plain; charset=us-ascii
> Content-Transfer-Encoding: 7bit
>
> I just wanted to thank you for checking into the class schedule.
> I will see you next week. I will also attempt to email you while in Pittsburgh to see if it works.
>
> Thanks,
>
> Jon

While in Pennsylvania, he used resources available there to complete one of MTD course projects. The e-mail posting below represent an excerpt of a message sent by the student in Pennsylvania, posted directly from the MTD course homepage (note the URL).

> Date: Fri, 19 Jul 1996 09:57:47 -0700
> From: Jon <Jon@vt.edu>
> X-Mailer: Mozilla 2.02 (Win16; I)
> MIME-Version: 1.0
> To: Joyce Williams-Green <jfwillia>, "Glen A. Holmes" <gholmes>
> Subject: assignment 2.5
> X-URL: http://malachi.etl.vt.edu/mtds296/_root/chat.htm
> Content-Type: text/plain
> Content-Transfer-Encoding: 8bit
>
> Looking for an under-represented minority group to review, the first

> group that came to mind was the Amish (pronounce (Ah-mish) of Pennsylvania. These people believe in horse and buggies, no electricity, and plain white and black clothing. They live a very simple life. Growing up only 20 miles from an Amish community, my friends and I used to make fun of the Amish children our age and would pick on them because their believes were different from ours. I (unfortunately) remember yelling out the car window while passing by an Amish family in a horse and buggy and demonstrating some terrible gestures. I never understood their history or culture until this assignment. I will discuss the culture of the Amish, stereotypes, the similarities and differences among the Amish, Mennonites and normal every day people.

Jon felt that the convenience of the on-line course delivery contributed to his success (the complete assignment can be seen as Appendix M).

Summary of course outcome

If the purpose of the class was for students to understand the design process for Media Technology and the role of culture as a decision process, then the opportunities to examine culture in the context of Media Technology design should feature prominently in the MTD course. Students participated in media design as part of the biography Webpage orientation activity and during Unit 4. However these opportunities were isolated from the diversity content.

Other subgoals for the MTD course also had mixed results. Where as some students benefited from the convenience of on-line course delivery, other students felt it hampered their learning. Students explained that fluctuating response timing hindered their interaction and work on course requirements. The discourse analysis indicated a temporal difference of twenty hours between asynchronous initiations and responses. Ms. Brown, the Teaching Assistant, related that students would get impatient if they did not get a reply to an e-mail message within a few hours. They would proceed to call her office and some stopped by in person for clarification on assignments or obtaining resources. On the other hand, students expressed less frustration with the Webchat discussions since the average time lag was four minutes. However, they found that the Webchat dialogue window limited the dialogue spatially and functionally, as they could not type as fast as they could think. One student said:

> I would have gotten more out of this class in a face-to-face setting. I found the Chatrooms unsatisfactory because the discussions were unthreaded and lacked genuine emotions. It would have been helpful to follow-up the textbook readings and assignments with reflexive discussions. I would prefer to have all the course materials on the Web. It was hard to plan ahead. It would have been interesting to conduct some analysis of specific media, for example Internet Sites and discuss on ways to improve it. I expected that the Webchats would address the analysis of media content and whether it is supportive of multiculturalism or not (Mary, personal communication, November 14, 1996).

Dr. Williams-Green's hope for more honest dialogue on diversity issues was not recognized as the lack of non-verbal cues hampered the discussion. One student echoed her concern:"The lack of contextual cues detracted from the on-line conversations. I didn't realize how dependent I am on visual cues when communicating with others" (Ruth, personal communication, November 14, 1996).

When asked if they would take another on-line course, the responses were also mixed:

> Joe: I am in another on-line course this semester, but this will be my last. In this semester's course, the professors also stagger the units and that drives me crazy. I would rather see all of what I am responsible for and then pace myself. I am tired of the uncertainty of the [on-line] environment and such ill-structured courses.

Mary: Yes, for the time and convenience. I would only take electives though because for courses in my major, I would like more contact with my instructors.

Otto: It would depend on the course content.

Summary

This section summarizes the entire chapter. It provides the main points about the MTD course design process, then it recounts the main points from the discourse analysis, and lastly, it relates the main points of the course outcome.

Results from the MTD experience can guide practitioners in designing and developing instructional materials for the WWW environment. Designing instruction for such a complex and fast-changing environment required a team whose members were highly skilled in their areas of expertise, yet were willing to learn new skills, to undertake additional roles. It is necessary to design with the lowest-common denominator end-user in mind. Hence, although designers may have access to the top of the line equipment and software, it is wise to consider the end-user's equipment and software. Lastly, designing for the WWW requires a major time commitment. Even with a team of four very proficient professionals, the MTD on-line course took 2,000 person hours to produce. Instructors are pleased with the outcome of a reusable template for a second iteration of the MTD course in 1997.

The discourse analysis demonstrates a complex description of the MTD pedagogical interaction. There were some major and noteworthy distinctions between the asynchronous and the scheduled discussions. With regard to temporal factors, the lag time between postings in the asynchronous discussions was twenty hours, while the average lag time in the scheduled discussions was four minutes. These discourse patterns were corroborated by voiced student concerns. In terms of topical characteristics, the on-line discourse reflected multiple conversation threads of forty topics, across twenty days. These topics generally corresponded with the lesson units during the asynchronous discussions, but were limited to the instructors' preset questions during the scheduled sessions. The Webchat postings were addressed to the entire class and dealt with general course content, while the e-mail was used for more administrative and assignment clarification matters. Lastly, the structural character of the discourse, like most electronic discourses, varied from the default IRE of face-to-face conversation. In the MTD experience, reflected a high number (69%) of replies in contrast to initiations (19%) and evaluations (12%). In terms of initiations, there was an interesting distinction between the asynchronous and the scheduled discussion. Where as most (55%) of the initiations in the asynchronous Webchat sessions were posted by students, none of the initiations in the scheduled sessions were posted by students.

The course outcome relates some hindrances in accomplishing the overarching goal of providing an understanding of the role of culture in the media design process. Students acknowledged more insight and sensitivity towards diversity issues, yet one instructor was disappointed by the lack of genuine interaction on the issues. There was no student initiation during scheduled Webchat sessions as student resorted to offering responses (80% of all scheduled Webchat postings). The time commitment required in developing and implementing the course detracted from the time spent on facilitating on-line learning in Unit 4.

Chapter 5

Interpretations, Implications, and Future Considerations

This study was conducted primarily to use the research and development framework to examine and describe the MTD on-line discourse. Having described the course design and development tasks, the nature of the electronic discourse that occurred during the implementation phase, it is now necessary to interpret the research findings, outline some implications, and offer some future considerations.

This chapter conceptualizes the findings of this investigation on the Media Technology and Diversity into 2 major parts (1) thematic interpretations, and (2) implications and next steps.

Thematic Interpretation of Findings

On the basis of the data analysis and the theoretical perspective, four thematics represent development and discourse conceptualizations.

A team-design approach, and accessibility issues such as end-user platform levels, hardware and software considerations, and complexity of Web interface need to be addressed when designing and developing on-line courses.

The MTD on-line course was the product of a team of developers who assumed four distinct roles: Technical Expert, Instructional Designer, Content Expert, and Technical Supporters. These individuals had distinct entry level skills, yet were also willing to acquire more skills to make some quick transitions. For example, the MTD participant roles changed with each phase of the course. During the design phase, the three team members assumed defined roles: Dr. Holmes was the Instructional Designer and Technical Expert, Dr. Williams-Green was the Content Expert, and Ms. Brown was the team coordinator. During the development phase, one more person was added to the team: Ms. Grenville. The roles shifted: Dr. Holmes added on the role of technical trainer, Dr. Williams-Green performed technical duties, Ms. Brown assumed an Instructional Designer role and Technical Supporter, and Ms. Grenville was an additional Technical Supporter and liaison with the College of Arts and Sciences.

At the implementation phase, the roles became more complex. Dr. Holmes reluctantly assumed a Content Expert role for developing Unit 4. Dr. Williams-Green's role shifted to Instructor and Supervisor of instructional strategy development. Ms. Brown's role also shifted to student and Teaching Assistant, and Ms. Grenville's role remained the same as she developed on-line CGI forms for units 2-3. The participants all described the involvement in the MTD experience as extremely strenuous and time-consuming. The Instructors assessed that they accomplished the one major goal of developing a re-usable interface and the team-design approach was crucial in that accomplishment.

As noted in the previous chapter, the MTD team designed instruction for the lowest common denominator. Designers selected development software in accordance with end-user expectations and limitations. In the on-line environment, it was necessary to design for cross-platform end-users with 486 IBM compatible or MAC Quadra 610 and 14.4Kbps modem access. The ease of access to on-line course materials varied across geographical locations. On-campus students reported few problems, while off-campus students reported repeated connectivity problems.

The software considerations include Netscape Navigator 2.0 or Internet Explorer 2.0 as the Internet browser of choice to support frames. Reliable Internet access through a service provider would include e-mail capabilities. The MTD course used some audio and video clips that needed real audio and QuicTime™ plugins. It also required students to have Adobe Acrobat reader and Shockwave programs, which could be downloaded for free. It was necessary to offer technical assistance since some students were inexperienced at

downloading software. The MTD experience revealed that end-user experience level affects participation in course activities. More time was necessary (extended orientation session from 2 to 3) to address end-user technical preparation. The availability of technical assistance by the Teaching Assistant was necessary for some students.

Lastly, the World Wide Web environment is already very complex hence an intricate course interface may be problematic for some students. Novice students may have felt lost as they attempted to access course information and found the volume of Webchat messages overbearing.

The organization of on-line tasks and community is necessary to facilitate student participation and interaction in on-line activities .

The on-line instructional environment is very complex. Consequently, personal contact and trust is necessary to facilitate group functions. Such facilitation is necessary for novices in the on-line classroom. In the MTD course, participation increased when the Webchat sessions were scheduled and more structured. The instructors also found it worthwhile to stagger the units, encouraging students to work on the same assignments and activities. Another way that tasks and the MTD on-line community was organized was simply to dedicate the first three class sessions to orientation activities. The personal contact in the face-to-face orientation sessions helped facilitate on-line participation, as students could associate peer names to their faces. A prior study indicated that increasing knowledge about other on-line participants encouraged increased interests in the on-line interaction (Levin, et al., 1990).

Discourse standards and guidelines are necessary to develop and sustain on-line interaction.

In practical terms, there needs to be tacit and formal response times requirement for asynchronous discussions. These expectations of response obligation need to be pragmatic and sensitive to technical glitches, but explicit and consistent. Where standards and guidelines for on-line participation and interaction were ambivalent, there was room for inconsistency and incontinuity. For example, at its inception, the Webchat discussions were unscheduled but the lack of participation compelled the instructors to schedule three sessions. Explicit response times can also reduce the volume of messages that participants have to read, by avoiding procrastination.

When the Webchat archives were analyzed to record the lag time, there was a difference between the lag time in the unscheduled Chat sessions, as opposed to the scheduled sessions. The average difference between unscheduled postings was twenty hours and the average in the scheduled sessions was four minutes.

What was the effect of the temporal difference? Students reported frustration with the feeling of incomplete conversations. They expressed that the temporal nature of the on-line discourse affected their learning. They speculated that they would have learned more about diversity issues if they had more in-depth discussions. Response standards and guidelines argues Burbules (1993) provide a reliable form of organization to activities, in this case, on-line instructional and learning activities, so that participants can anticipate and relate their actions to one another. Such structure is necessary in pedagogical dialogical activity that aims at discovery, new understandings, and improved knowledge. Given such goals,"dialogue represents a continuous, developmental, communicative interchange through which we stand to gain a fuller apprehension of the world, ourselves, and one another" (Burbules, 1993, p. 8).

Group task leadership and summative evaluation of group task are required in the on-line teaching and learning.

The onus of student participation in on-line interaction is on strong leadership (G. A. Holmes, personal communication, February 3, 1997). Such leadership generally originates from the instructor (Hiltz, 1994). In the MTD experience, interactivity of on-line course components and WWW environment was insufficient in promoting and sustaining student participation and interaction. It took strong leadership by mandating Webchat sessions for students and enforcing strict deadlines for completion of course activities. It is also noteworthy that most of the MTD students were in graduate school and

the "diversity" course content invited the expression of strong opinions. An undergraduate course with a different content may require the instructors to generate and maintain on-line discourse.

The MTD instructors encouraged pedagogical interaction by introducing structure in the form of questions. Using questioning that probed for understanding and clarification, they asked, "What did you mean when you said...?" Burbules (1993) explains that such questions are best seen as "invitations, open-ended requests for opinions, beliefs, evaluations, interpretations, elaborations, and so on" (p. 88).

Since the purpose of the MTD course was to develop a WWW course, the instructors are evaluating the product with regard to the specified goals for its perceived instructional impact.

Implications and Next Steps for MTD Course

In preparation for a second offering of the MTD on-line course, several changes are planned. The hardware for the summer, 1997 course is a Pentium 166 with 32MB RAM and 2GB hard drive. The software includes white boarding as the shared graphic space, streaming video with real-time dynamic allocation, and video conferencing. The planned instructional revisions include mandatory and scheduled on-line dialogues and delivering the videotaped resources via the Netscape browser. There is a proposed feasibility study to assess students' needs and the MTD instructors plan to pay more attention to guided feedback throughout the course by fine-tuning the course monitoring or formative evaluations.

Based on the findings of this study, some additional development and pedagogical considerations may increase student participation and interaction opportunities in this summer's MTD course. It is advisable to inform students of hardware and software requirements prior to registration and orientation. Students need to understand which software or plugin is optional or mandatory. In terms of pedagogy, there's a need to create a sense of responsibility to the group and tasks at hand. When creating on-line learning communities, the extent to which the participants are joined together to accomplish a specified goal can encourage group cohesion. Large group acceptable behavior may have to be negotiated during the orientation sessions maintained cooperatively throughout the course

Effective pedagogical discourse not only includes questions and responses but building, redirecting, and regulatory statements, as well (Burbules (1993). Building statements tend to carry a discussion along a particular line, for example, "If what you say is true, then such and such is the case" (Burbules, 1993, p. 91). Redirecting statements simply introduce a new topic or lead the discussion along a different course, for example, "Yes, I've always admired the work of Macmillan and Garrison, especially their erotetic theory of teaching" (Burbules, 1993, p. 91). Regulatory statements are directed toward the process of communication instead of the substance of the discussion. For example, "I could follow your argument up till now, but you lost me here." Regulatory statements can include explicit praise and reassurance, in which case they can serve a scaffolding function for the developing dialogue.

Also, effective pedagogical discourse requires minimal time-lag (Mehan, 1983). It is necessary to set some agreed upon response time expectations for asynchronous communication and adhere to these electronic protocols. Since, on the one hand, the asynchronous Webchat sessions encouraged student initiations and on the other hand, students posted more thought-provoking comments in the scheduled sessions, both need to be used. There needs to be specific times allocated to both formats.

Implications and Next Steps for Furthering Research and Development of On-line Course

Designing instruction for the on-line environment is not for everyone. The skill level of the instructional designer and design team members should be very high. Based on what we know about discourse reflecting participation structures and learning, research

is needed to facilitate group functions in on-line environments. Further inquiry could be extended so that the question of how is used to investigate the complexities of the WWW as a learning environment. Such investigation could be aided by participant observations, videotapes of the face-to-face orientation sessions, and interviews with participants during the course sessions, to further understand participant structures in on-line classroom discourses. Specific questions could be:

1. How does computer expertise and/or access to computer affect group membership?
2. How do the voices of individual participants depending on the computer expertise, intermingle over the construction of class discourse?
3. How does course content affect student participation and interaction?

References

Adler, P. A., & Adler, P. (1994). Observational techniques. In N. K. Denzin & Y. S. Lincoln (Eds.), Handbook of qualitative research. Thousand Oaks, CA: Sage.

Adler, P. A., & Adler, P. (1991). Backboards and blackboards. New York: Columbia University Press.

Albrektson, J.R. (1995). Mentored Online Seminar: A Model for Graduate Level Distance Learning. T.H.E. Journal 23(3), 102-105.

Baath, J. A. (1981) On the nature of distance education. Distance Education, 2 (2), 212-219.

Bakhtin, M. M. (1981). The dialogic imagination: Four essays by M. M. Bakhtin. C. Emerson and M. Holmquist (Ed.), V. W. McGee (trans.). Austin: University of Texas Press.

Bales, R. F. (1950/1976). Interaction process analysis: A method for the study of small groups. Chicago: University of Chicago.

Barker, B. O., Frisbie, A. G., & Patrick, K. R. (1989). Broadening the definition of distance education in the light of new telecommunications technologies. The American Journal of Distance Education, 3 (1), 20-29.

Brown, A. (1994, November). The advancement of learning. Educational Researcher, 4-12.

Burbules, N. C. (1993). Dialogue in teaching theory and practice. New York: Teachers College Press.

Burge, E., & Roberts, J. M. (1993). Classrooms with a difference: A practical guide to the use of conferencing technologies. Toronto, Ontario: the Ontario Institute for Studies in Education, Distance Learning Office.

Burke, J. (1978). Connections. Boston: Little Brown.

Butler, W. M. (1992). The social construction of knowledge in an electronic discourse community. Unpublished doctoral dissertation, University of Texas, Austin.

Cauthen, S., & Wroth, E. (1994). Supporting teachers as perpetual learners: A proposal model for ongoing, distance, inservice teacher education. Virginia Tech Blacksburg, Virginia.

Denzin, N. K., & Lincoln, Y. S. (Eds.). (1994). Handbook of qualitative research. Thousand Oaks, CA: Sage.

Denzin, N. K., & Lincoln, Y. S. (Eds.). (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), Handbook of qualitative research. Thousand Oaks, CA: Sage.

Dewey, J. (1925/1981). Experience and nature. In Jo Ann Boydston (Ed.), John Dewey: The Later Works, 1925-1953, Volume 1. Carbondale and Edwardsville: Southern Illinois University Press.

Dewey, J. (1916/1917). Democracy and education: An introduction to the philosophy of education. New York: Macmillan.

Erlandson, D. A., Harris, E. L., Skipper, B. L., & Allen, S. D. (1993). Doing naturalistic inquiry. Newbury Park, CA: Sage.

Faigley, L. (1992). Fragments of rationality: Postmodernity and the subject of composition. Pittsburgh, PA: University of Pittsburgh Press.

Flanders, N. A. (1970). Analyzing teaching behavior. New York: Addison-Wesley.

Garrison, D. R. (1987). The role of technology in continuing education. New Directions for Continuing Education, 36, 41-53.

Garrison, J. (1995). Deweyan pragmatism and the epistemology of contemporary social constructivism. Virginia Tech, Blacksburg, Virginia.

Harasim, L. (1993). Networlds: Networks as social space. In L. M. Harasim (Ed.), Global networks: Computers and international communication (pp. 15-34). Cambridge, MA: MIT.

Harasim, L. (1990). On-line education: Perspectives on a new environment. New York: Praeger.

Hiltz, R. S. (1994). The virtual classroom. Norwood, NJ: Ablex Publishing Corporation.

Hiltz, R. S., (1987). Branching capabilities in conferences: A manual and functional specifications. Newark, NJ: Computerized Conferencing and Communications Center, New Jersey Institute of Technology.

Holden, M. C. & Wedman, J. F. (1993). Future Issues of computer-Mediated Communication: The Results of a Delphi Study. Educational Technology Research & Development 41(4), 5-4.

Holmberg, B. (1979). Practice in distance education: A conceptual framework. Canadian Journal of University Continuing Education, 6 (1), 18-30.

Holmberg, B. (1988). Guided didactic conversation in distance education. In D. Stewart, D. Keegan, & B. Holmberg (Eds.). Distance education: International perspectives. (pp. 114-122). New York: Routledge.

Jonassen, D., Davidson, M., Collins, M. Campbell, J., & Haag, B. B. (1995). Constructivism and computer-mediated communication in distance education. The American Journal of Distance Education, 9 (2), 7-26.

Kaye, A. (1989). Computer-mediated communication and distance education. In R. Mason & A. Kaye (Eds.). Mindweave: Communication, computers, and distance education. (pp. 3-21). Oxford: Pergamon Press.

Keegan, D. (1980). On defining distance education. In S. David, D. Keegan, & B. Holmberg (Eds.). Distance education: International perspectives. (pp. 6-33). London: Croom Helm.

Kuehn, S. A. (1994). Computer-mediated communication in instructional settings: A research agenda. Communication Education, 43, April, 172-183.

Larkin, J. H., & Chabay, R. W. (1992). Computer-assisted instruction and intelligent tutoring systems: Shared goals and complementary approaches. Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers.

Levin, J. A., Kim, H., & Riel, M. M. (1990). Analyzing instructional interaction on electronic message networks. In L. M. Harasim (Ed), On-line Education: Perspectives on a new environment (pp. 185-213). New York: Praeger.

McKenzie, W. L. (1996). Investigative learning in an undergraduate biology laboratory: An investigation into reform in science education. Unpublished doctoral dissertation, Virginia Tech, Blacksburg, Virginia.

Mehan, H. (1979). Learning lessons: Social organization in the classroom. Cambridge, MA: Harvard University press.

Miles, M. B., & Huberman, A. M. (1994). Data management and analysis methods. In N. K. Denzin & Y. S. Lincoln (Eds.), Handbook of qualitative research. Thousand Oaks, CA: Sage.

Miles, M. B., & Huberman, A. M. (1994). Qualitative data analysis (2nd ed.). Thousand Oaks, CA: Sage.

Moore, M. G. (1973). Towards a theory of independent learning and teaching. Journal of Higher Education, 44 (9), 661-679.

Moore, M. G. (1980). Independent Study. In R. Boyd, J. Apps, & associates (Eds.). Redefining the discipline of adult education. (pp. 16-31). San Francisco: Jossey-Bass.

Moore, M. G. (1983). The individual adult learner. In M. Tight (Ed.). Adult learning and education. (pp. 153-168). London: Croom Helm.

Moore, M. G. (1983). Three types of interaction. M. G. Moore & G. C. Clark (Eds.). Readings in principles of distance education. (pp. 100-105). University Park, PA: The Pennsylvania State University.

Morse, J. (1994). Designing funded qualitative research. In N. K. Denzin & Y. S Lincoln (Eds.), Handbook of qualitative research. Thousand Oaks, CA: Sage.

Neufeld, G. R. (1985). Innovations in distance education applied to the professional development of teachers. (ERIC Document Reproduction Service No. ED294 574).

Peeters, O. (1983). Distance teaching and industrial production: A comparative interpretation in outline. In D. Stewart, (ed.). Distance Education: International Perspectives. London: Croom Helm.

Quinn, C. N., Mehan, H., Levin, J. A., & Black, S. D. (1983) Real education in non-real time: The use of electronic message systems for instruction. Instructional Science, 11 (4), 313-327.

Reddy, M. J. (1979). The conduit metaphor: A case of frame conflict in our language about language. In A. Ortony (Ed.). Metaphor and thought. Cambridge, MA: Harvard University Press.

Robinson, V. M. J. (1995). Dialogue needs a point and purpose. Educational Theory, 45, (2), 235-249.

Roschelle, J. (1994). Collaborative inquiry: Reflections of Dewey and learning technology. The computing teacher, 21(8), 6-9.

Roy, L. (1995). A personal perspective of Virginia Tech's CyberSchool/ACCESS Project[On-line]. Available: http://www.cyber.vt.edu/docs/papars.html

Ruberg, L. F. (1994). Student participation, interaction, and regulation in a computer-mediated communication environment. Unpublished doctoral dissertation, Virginia Tech, Blacksburg, Virginia.

Schwandt, T. A. (1994). Constructivist, interpretivist approaches to human inquiry. In N. K. Denzin & Y. S. Lincoln (Eds.), Handbook of qualitative research. Thousand Oaks, CA: Sage.

Sims, R. S. (1983). An inquiry into correspondence education processes: Policy, principles and practices in correspondence education systems worldwide. Report ICCE-UNESCO, 1977. In B. Holmberg, Recent Research into Distance Education. Hagen: Fern Universitat .

Tucker, R.W. (1995). The Virtual Classroom: Quality and Assessment. [On-line. Distance Learning, 9(1), 48-51. Available: http: / /www.syllabus.com/.

Vygotsky, L. S. (1978). Mind in society. Cambridge, MA: Harvard University Press.

Wagner, E. D. (1994). In support of a functional definition of interaction. The American Journal of Distance Education, 8 (2), 6-29.

Wertsch, J. V. (1991). Voices of the mind. Cambridge, MA: Harvard University Press.

Williams, F., Rice, R. E., & Rogers, E. M. (1988). Research methods and the new media. New York, N Y: The Free Press.

The Virtual Classroom (University of Connecticut), http://137.99.80.28/VirtualClass/index.html

The Cyber Classroom. (Florida State University), http://olis.mtx.net.au/html/school.html

Appendix A

Operational Definitions

Asynchronous communication refers to delayed interaction--communicants are not present at the same time or the same place.

Computer Assisted Instruction refers to the use of computers in instructional contexts that are individualized, interactive, and guided.

Computer-Mediated Communication (CMC) is the name given to the functions in which computers are used to support human communication. CMC technologies are also used to transfer, store, and retrieve information. Some examples of CMC tools are: electronic mail; Gopher, Mosaic and Netscape servers; bulletin boards; Usenets; electronic conferences; virtual terminal access; and switched video (Ruberg, 1994).

Interactions are reciprocal events that require at least two objects and two actions, which mutually influence one another. In an instructional setting, interaction is an event that takes place between a learner and persons or objects in the learner's environment (Wagner, 1994).

NUD.IST stands for Non-numerical Unstructured Data Indexing Searching and Theorizing. It is a computer package designed to aid users in handling non-numerical and unstructured data in qualitative analysis. NUD.IST does this by supporting processes of indexing, searching and theorizing.

Synchronicity is a term used to describe real-time interaction--concurrent speaking and listening.

TCP/IP is a set of protocols developed to allow cooperating computers to share resources across a network.

Virtual Classroom is a learning environment within a CMC system that "must support all or most of the types of communication and learning activities available in the 'traditional' (physical) classroom and campus" (Hiltz, 1994).

WWW is a network of files on computers all over the world. It is a software program that provides hypertext and hypermedia links to the Internet resources. It is an abstract space of knowledge where the files are connected with "links."

Appendix B

Consent Forms

The Review of Research Involving Human Subjects Package presented to the Institutional Review Board included:

- Protocol Describing Research
- Faculty Informed Consent Form
- Copy of Students' Consent Form

Proposal to Accompany IRB Request

Justification of Project

Institutions of higher learning have embraced the use of telecommunication technologies to supplement classroom instruction. Some of the technologies being used include; e-mail (listserves), World Wide Web homepages, bulletin boards, and Webchats. Although there has been a scurry to integrate these technologies in teaching, very little is known about the pedagogical implications. A survey of the literature has revealed very few scientific studies on this subject. These few research finding indicate that these technologies support cooperative and collaborative learning among learners who may be physically separated from each other (Harasim, 1993, 1990; Hiltz, 1994,1987). Such group activity is easier because these technologies enable both sychronous (real-time) communication and asynchronous (delayed) communication. Hence students can spend more time interacting online than they sometimes do in traditional classroom settings.

The few scientific studies on online classroom interaction have focused on quantified frequencies of occurences of various categories of online communication behavior. These categories have included:"teacher talk"[(1) accepts feelings, (2) praises and encourages, etc.]; and"student talk"[(1) response, (2) initiation] (Butler, 1993; Ruberg, 1994). While these categories are useful, there are some drawbacks. The limiting of a domain to behavior tabulated into discrete categories presents a partial description of an event. In the case of an online learning classroom, the relationship of a behavior to a specific context can be obscured when the discourse is represented in quantified categories of behavior only. A complex situation such as an online classroom where information is represented using a variety of media types (text, graphics, and audio), requires a methodology that provides a rigorous description of its events. This was the case in the Media, Technology and Diversity course, which is the site for this study. The classroom setting comprised of; 2 face-to-face classroom sessions, a WWW homepage, a Webchat program, and e-mail communication. There is a need to understand the full range of activities that occur among students and teachers in this class. Qualitative methodology, specifically constitutive ethnographic approach, will be employed to better understand the nature of interaction in this new and complex social milieu.

Procedure

This investigation focuses on the interaction that took place in the Media, Technology and Diversity course, offered during the 1996 summer session. Participants in this study include the course instructors and the 11 students enrolled in this class.

The corpus of materials (data sources) include: electronic archives of the online communication and learning activities which will serve as the primary data source for this study. I will retrieve of the electronically archived records of the interactions between the participants--students and teachers--from the server as text files and make copies. I will label and code all available text files for analysis.

The information will include the students participating in one unstructured interviews that focus on their perceptions of online learning activities. These interviews will take about a half hour and will be scheduled at their convenience. They will be audio taped and transcribed or conducted via e-mail.

As a part of this study, I will also collect samples of the participants' work and grades in this class. In addition, the participants will be surveyed to assess curriculum and instructional components and general learning in this class (see attached interview guide).

I will analyze the corpus of materials using the message act analysis first used in a traditional classroom setting, (Mehan, 1979) and subsequently used to analyze classes taught via e-mail (Quinn, Mehan, Levin, & Black, 1983; Levin, Kim , & Riel, 1990). The message act analysis will describe the discourse across the four settings (face-to-face orientation sessions, biography homepages, Webchats, and e-mail) of the Media, Technology, and Diversity (MTD) class. I will then describe how the participants in the MTD class established interaction competency (Mehan 1979).

The findings of this study may be limited by the loss of course assessment and online interaction data due to a systems failure. Any description and analysis of the MTD course is therefore somewhat incomplete.

Risk and Benefits

There should be little risk to the participants. The instructors risk exposing some uncomplimentary aspects of the course on the one hand, yet will benefit by incorporating some the research findings in redesigning the course. The students risk being viewed negatively in subsequent courses with these instructors, if the students disclose uncomplimentary remarks about the class. Participants are not likely to receive any direct tangible benefits from this research, and no promise of benefits is made here to encourage participation. The benefits to the participants are: (a) contributing to the redesign of the Media Technology and Diversity course and (b) assisting in a greater understanding of online teaching and learning. This research will be documented and shared with the educational research community through papers delivered at professional conferences, workshops, and publications.

Confidentiality/Anonymity

The identity of the participants will remain anonymous in all reports that include information from the Webchat sessions, interviews, journals, logs, classroom work, or assignment grades.

Since rigor in this qualitative research is a major goal, it is necessary to cross check patterns and coding rules that are emerging from a primary data source (electronic archives of the Webchats and e-mail messages) against other data sources. Other data sources for this research include participants' perceptions in the form of interviews with students and instructors, students' "get-to-know-you" homepages, and face-to-face classroom interaction. The interviews will be audio taped and transcribed by the investigator. Some excerpts of the audio tapes and online conversations may be presented to the dissertation committee, at professional meetings, or in university classes. The names of the participants will be changed. The investigator will store these data sources at her office in the War Memorial building and maintain the confidentiality of the participants' feedback. All data sources will be destroyed upon completion of the study.

Freedom to withdraw

Participants are free to refrain from any part of this inquiry or withdraw completely at anytime by notifying the investigator. Because participation is not contingent upon compensation, no penalty or forfeiture will be incurred as a result of withdrawal.

Informed Consent

See attached copies of consent forms for participants and instructors.

Biographical Sketch

Dr. Susan G. Magliaro: Associate Professor, Teaching and Learning, College of Human Resources and Education. Has taught Principles of Instructional Design, Educational Psychology, and Advanced Educational Psychology, among others. Has received numerous awards for her teaching excellence and is the Chair of the Curriculum Reform Committee for the College. Dr. Magliaro has conducted both quantitative and qaualitative research on teacher mentoring, problem solving, and is co-author of a textbook on instructional design (in-press).

Yolanda N. Hegngi: a doctoral candidate in Instructional Systems Development, Department of Teaching and Learning. My background includes conducting a pilot study in Civil Rights Movement and Literature Cyberschool course during the first summer session of 1996. I have researched and taught with the Virginia Tech and Virginia Cooperative Extension Service Faculty Development Institutes. My previous experiences also include developing and conducting workshops on the use of the Internet in Classrooms. In the past, I have worked as a research assistant and consultant with the USDA office of Human Nutrition and Information Service, where I performed nutrient data research for three editions of the Consumption Guide publications. I approach this study with the view that the Internet and features such as the WWW present interactive opportunities for the traditional classroom and for distance education.

INFORMED CONSENT FOR FACULTY PARTICIPANTS

Yolanda Hegngi
Department of Teaching and Learning

Project Purpose and Justification

Institutions of higher learning have embraced the use of telecommunication technologies to supplement classroom instruction. Some of the technologies being used include; e-mail (listserves), World Wide Web homepages, electronic bulletin boards, and Webchats. Although there has been a scurry to integrate these technologies in teaching, very little is known about the pedagogical implications. The purpose of this research is to gain insight into the nature of online interaction in the Media Technology and Diversity World Wide Web-based course. The results of this study will contribute to a redesign of the course for the summer, 1997 session and some further understanding of online teaching and learning.

Procedures

This investigation focuses on the interaction that took place in the Media, Technology and Diversity course, offered during the 1996 summer session. Participants in this study include the course instructors and the 11 students enrolled in this class.

The corpus of materials (data sources) include: electronic archives of the online communication and learning activities which will serve as the primary data source for this study. All of the electronically archived records of the interactions between the participants--students and teachers--will be retrieved, copied labelled and coded as text files for analysis.

The corpus of materials will include the students participating in one or two unstructured interviews that focus on their perceptions of online learning activities. These interviews will take about a half hour and will be scheduled at their convenience. They will be audio taped and transcribed or conducted via e-mail.

As a part of this study, samples of the participants' work and grades in this class will also be collected. In addition, the participants will be surveyed to assess curriculum and instructional components and general learning in this class .

The corpus of materials will be analyzed using the message act analysis first used in a traditional classroom setting, and subsequently used to analyze classes taught via e-mail. The message act analysis will describe the discourse across the four settings (face-to-face orientation sessions, biography homepages, Webchats, and e-mail) of the Media, Technology, and Diversity (MTD) class. A synopsis of the interactional competency of the online class will also be provided.
The findings of this study may be limited by the loss of course assessment and online interaction data due to a systems failure. Any description and analysis of the MTD course is therefore somewhat incomplete.

Risk and Benefits

There should be little risk to the participants. The instructors risk exposing some uncomplimentary aspects of the course on the one hand, yet will benefit by incorporating some the research findings in redesigning the course. The students risk being viewed negatively in subsequent courses with these instructors, if the students disclose uncomplimentary remarks about the class. Participants are not likely to receive any direct tangible benefits from this research, and no promise of benefits is made here to encourage

participation. The benefits to the participants are: (a) contributing to the redesign of the Media Technology and Diversity course and (b) assisting in a greater understanding of online teaching and learning. This research will be documented and shared with the educational research community through papers delivered at professional conferences, workshops, and publications.

Confidentiality/Anonymity

The identity of the participants will remain anonymous in all reports that include information from the Webchat sessions, interviews, journals, logs, classroom work, or assignment grades.

Since rigor in this qualitative research is a major goal, it is necessary to cross check patterns and coding rules that are emerging from a primary data source (electronic archives of the Webchats and e-mail messages) against other data sources. Other data sources for this research include participants' perceptions in the form of interviews with students and instructors, students'"get-to-know-you' homepages, and face-to-face classroom interaction. The interviews will be audio taped and transcribed by the investigator. Some excerpts of the audio tapes and online conversations may be presented to the dissertation committee, at professional meetings, or in university classes. The names of the participants will be changed. The investigator will store these data sources at her office in the War Memorial building and maintain the confidentiality of the participants' feedback. All data sources will be destroyed upon completion of the study.

Freedom to withdraw

Participants are free to refrain from any part of this inquiry or withdraw completely at anytime by notifying the investigator. Because participation is not contingent upon compensation, no penalty or forfeiture will be incurred as a result of withdrawal.

Approval of Research

This research proposal will be reviewed by the Human Subject Committee and the Institutional Review Board. If you have any further questions, please contact Dr. Susan Magliaro, Division of Curriculum & Instruction, War Memorial Hall, Virginia Tech (231-8338), Dr. Jan Nespor, Department of Teaching and Learning Reviewer (231-8327), or Dr. Tom Hurd, Chair of the Institutional Review Board at Virginia Tech (231-9359).

Participant's Permission

My signature below indicates that I have read the information above and have voluntarily agreed to participate in the research project. I agree to be audiotaped interviewed, and the release class assignments, projects, and grades.

Dr. Joyce Williams-Green _____ _____
Date

Dr. Glen Holmes _____ _____
Date

Should you have questions about this research or its conduct, You may contact:
Yolanda Hegngi (Investigator) 231-8348
Susan Magliaro (Advisor) 231-8338
Jan Nespor (Departmental Reviewer) 2318327
Tom Hurd (Chair, IRB Research Division) 231-5281

Student's Consent Form

Consent Form for an Examination of the Discourse in Electronic Course Environments
Dr. Susan G. Magliaro and Yolanda Hegngi
Department of Teaching and Learning

I agree to participate in an examination of the nature of the discourse enacted in Virginia Tech's on-line courses. The archives of the various telecommunications conversations will be acquired at the end of the semester and examined using a discourse analysis scheme from the sociolinguistic tradition of qualitative research. Specific speech events will be categorized and traced to establish patterns of discourse and learning behavior.

The investigators may also collect samples of my work (subject to course instructor's permission), electronic communication, and course grades. All archived data and audiotapes will be stored in Dr. Magliaro's office in the War Memorial Building and will be destroyed upon completion of this project.

My identity will remain anonymous in all reports that include information from interviews, logs, or classroom work and grades. Participation in this study should not affect my course grade. I am free to withdraw from this study at any time without penalty or prejudice, by contacting my instructor or Investigators.

This research proposal will be reviewed by the Human Subject Committee and the Institutional Review Board. If you have any further questions, please contact Dr. Susan Magliaro, Division of Curriculum & Instruction, War Memorial Hall, Virginia Tech (231-8338), Dr. Jan Nespor, Department of Teaching and Learning Reviewer (231-8327), or Dr. Tom Hurd, Chair of the Institutional Review Board at Virginia Tech (231-9359).

My signature below indicates that I have read the information above and have voluntarily agreed to participate in the research project.

Signature of Participant e-mail address Telephone # Date

Should you have questions about this research or its conduct, You may contact:

Susan Magliaro (Investigator)	231-8338
Yolanda Hegngi (Investigator)	231-8348
Jan Nespor (IRB Departmental Reviewer)	231-8327
Tom Hurd (Chair, IRB Research Division)	231-5281

Appendix C

Course Production, Implementation Timeline

Data obtained from design artifacts, Ms. Brown's e-mail archives, WWW homepages, and Investigator notes.

April 19, 1996 Ms. Brown's notes, corroborated by April 22-23 e-mail message sources

- Design team 5pm meeting. Discussions on possible on-line course ideas--diversity content, visual literacy, distance education.
- Ms. Brown reported on information from some Internet sites. Decided to investigate the use of fractal images.
- Decided to call Virginia Tech Educational Technologies for"cost of fractal images."
- Record of e-mail response to Dr. Williams-Green voice message by Dr. John Moore and Sharon Pitt of Educational Technologies discussing access by off-campus students to Powerpoint slides/images.
- Note from Dr. Moore suggests they use Cyberschool format--converting files to Portable Document Format (PDF) and/or Powerpoint slides.

April 19- May 13

- Decision to offer MTD course via WWW is made.
- The design team is set and roles are defined.
- During this design phase, the three team members assumed these roles: Dr. Holmes was the Instructional Designer and Technical Expert, Dr. Williams-Green was the Content Expert, and Ms. Brown was the team coordinator.
- Tentative syllabus calls for 5 units and work begins on those units.

May 13

- E-mail from Dr. Williams-Green to Ms. Brown to put course unit 2 on Powerpoint slides.
- These lessons included viewing video on Bias and Assumptions, lecture on Stereotypes, and lecture on Racism.

May 13-June 12

- Dr. Holmes works on course design and development of homepage. He also sets up Webserver.
- Dr. Williams-Green continues to develop content for units 1-3. Ms. Brown turns articles into PDF, creates Powerpoint presentation slides, searches for pictures and images to scan for Who Will I Hire and Lynch activities.
- A new member joins the team, Ms. Grenville . She gets to work on Cyberschool/CAS servers to convert questionnaires/activities/simulations into on-line forms with CGI scripts.

May 23

- Student inquiry about taking the MTD course at a distance because she would be in California, leads to this exchange:

- Student: I would like to take your summer school course titled Media, Technology and Diversity but I will be out of town for the first week of second summer session. Is there any possibility that I might still take the course? I am interested both in the course content and in the delivery of courses over the Internet. I will register for your course. I may even be able to access the materials over the Internet while at my conference in California.

- Dr. Williams-Green: Sure, we will have the first two lessons on video tape and the other info will be on line.

- Dr. Holmes : The URL will be activated on Monday 7/1/96. We've decided not to release it prior to that. You may contact me at that time for the correct address.

- The first two sessions will be conducted face-to-face but will consist primarily of those things you should already know (e.g., use of Netscape, logging on, installing plug-ins, other software, etc.)

- You should be able to keep up comfortably once you return. I'll work with you on this.

- Hope you enjoy your vacation!

June 4

- Team meeting. Discussions on logistics--sorting out and organizing individual projects.
- Dr. Holmes assuming Technical Trainer role, introduces file-naming and directory conventions, server instructions and group decide to use file-naming table to properly label files.

June 25

- Dr. Holmes working feverishly on third and fourth iteration of course homepage interface, testing it out on people in ETL.
- Dr. Williams-Green decides on tentative orientation schedule, syllabus, and continues to supervise course development materials.
- Ms. Brown experiments with CGI forms.
- Ms. Grenville continues to convert the questionnaires to on-line CGI forms and sends the results to Dr. Williams-Green.

July 1

- First day of class. Activities included:
- Introductions by Dr. Williams-Green
- Determining software/hardware needs by Dr. Holmes
- Introduction to the Internet by Ms. Brown
- Introduction to course syllabus and course requirements by Dr.Williams-Green
- Most of the students spent all of the first day getting remedial computer training, while the advances students began designing the bios on paper.
- The first day assignment was to check for e-mail and reply via e-mail. Assignment was part of teacher assessment of computer skill.

July 2

- Acrobat software handed out by Ms. Brown
- Students learn how to scan images-- Ms. Brown
- Introduction to Webpage design and HTML editors-- Ms. Brown
- Generating media, sound, text, and audio-- Ms. Brown

July 3

- Putting pictures and biographies on the Web. No mandatory class sessions.
- Instructor and Ms. Brown were available in the lab.

July 7

The course home page is ready for viewing:
Received: from GLENPC.etl.vt.edu (glenpc.etl.vt.edu [128.173.232.31]) by sable.cc.vt.edu (8.6.12/8.6.12) with SMTP id UAA05099; Sun, 7 Jul 1996 20:48:48 -0400
Message-ID: <31E084A0.2043@vt.edu>
Date: Sun, 07 Jul 1996 20:46:40 -0700
From: "Glen A. Holmes" <gholmes@vt.edu>
Organization: Virginia Tech
X-Mailer: Mozilla 2.02 (Win95; I)
MIME-Version: 1.0
To: Juone Brown <jubrown>, Delia Grenville <degrenvi>, "Dr. Holmes" <gholmes>,
"Dr. Williams-Green" <jfwillia>,
Subject: THIS IS IT!!! -- PLEASE READ THIS (Media, Technology & Diversity NEWS)
X-URL:
http://malachi.etl.vt.edu/mtds296/_Root/LESSON01/_ANCHOR.HTM
Content-Type: text/plain; charset=us-ascii
Content-Transfer-Encoding: 7bit

Finally, we've done it!

You should be able to access the first unit, etc. of the course using this URL:
http://malachi.etl.vt.edu/mtds296/start.htm. It will be active by 8:00 AM, Monday, 7/8/96.

We've deliberately omitted units 2-5 because we want to see how the first unit goes on-line.

Remember to download all your supporting software (plugins, etc.) BEFORE you try to view the
lessons.

This is a first trial for us. We are hopeful that everything goes well for you. We can be
reached at our offices 231-5812 / 231-5587 after noon on Monday, 7/8/96.

It may be necessary to convene the class face-to-face if we experience major problems during
delivery. We are hopeful that this will not be necessary. Please stay alert for additional
details sent via e-mail.

Good luck and smooth sailing!!!!!!

Dr. Joyce Williams-Green
Dr. Glen Holmes

The Webchat is ready as well:
:...7/8/96 10:56 PM
MECH
Hopefully, I am finally up and ready to go!!!
This is a test.<p>

Glen Holmes:...7/8/96 9:27 AM
This is a test<p>MECH

July 9

The entire team continued working on units 2-4

July 17

Frustrations expressed on Webchat:

Dr. Williams-Green:...7/17/96 9:04 AM
INIT CRSTGHTP
Comments from others PLEASE!! This is rich material and I love talking about it. I believe that talking about it will help US change this paradigm and WE can change the world!!<p>

Rebecca:...7/17/96 10:16 AM
 INIT CRSLOG/CRSINFO
I hate the asynchronous nature of this medium. I would love to have some discussions on this material too. what can we do? Schedule a chat session for a time when lots of students will be poised at their computers? Have a real live class? Are we forbidden to do that? <p>

Dr. Williams-Green:...7/17/96 11:47 AM
RESP CRSLOG CI/CRSTGHTP INIT
I have been thinking about scheduling a time for an on-line chat session. Since the class is scheduled for 9:00am. How about 9:00am on Monday? I providing an asynchronous learning environment was one of our design goals. I agree that it is not the ideal way to discuss these issues. WE may find that using this technology may not be the best way to teach issues like these. We welcome ideas. Let's see it if the Monday chat works. WE have made chats a REQUIRED ASSIGNMENT fir UNITS 3-5. I think this will help some.

August 8

Last day of class and Instructor posts this message:

X-Sender: jfwillia@mail.vt.edu
Message-Id: <v01540b03ae3140a01d07@[128.173.37.48]>
Mime-Version: 1.0
Content-Type: text/plain; charset="us-ascii"
Date: Fri, 9 Aug 1996 14:27:40 -0500
To: jubrown, gholmes, jfwillia,
From: jfwillia@vt.edu (Joyce F. Williams-Green)
Subject: Course Grades
Status: RO

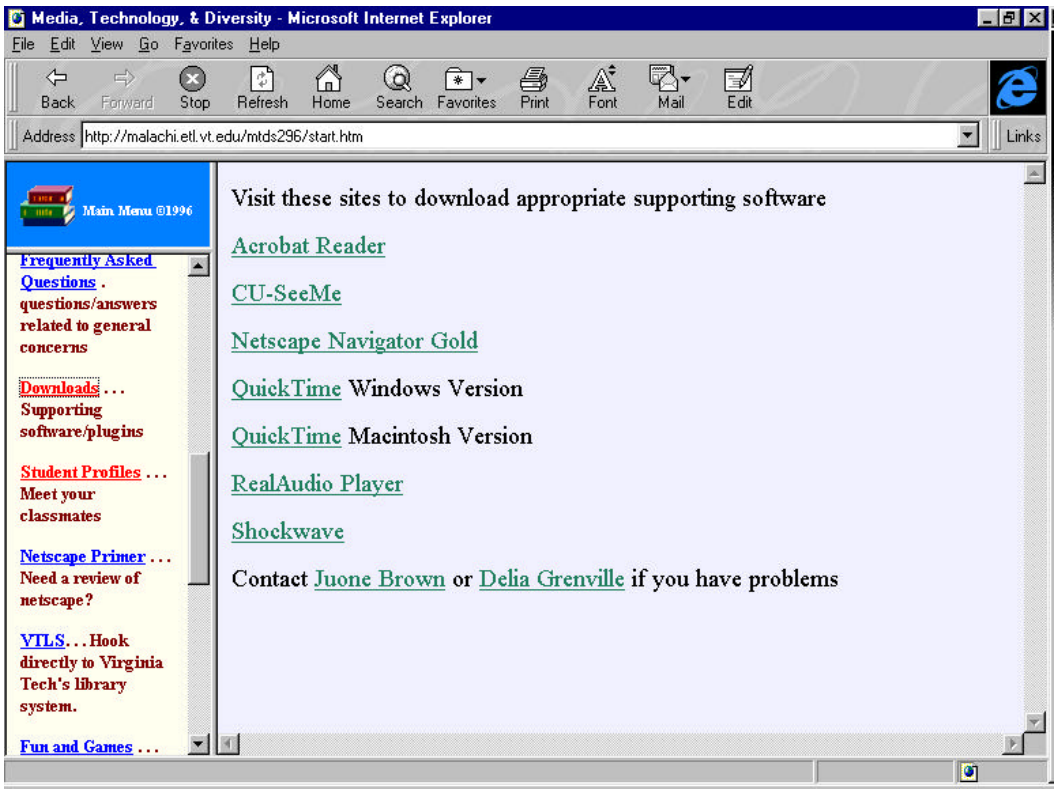
Some of you have asked to have an extension or and incomplete grade (I) concerning the assignments and I have given you permission to do so.

However, I must inform you that those of you turning assignments in after 5:00pm tomorrow will not be able to earn a grade higher that "A-".

This is only fair to those students who worked to complete their assignments on time and to forward them to me on or before August 10 at 5:00pm.

Appendix D

MTD Required Software and Plugins



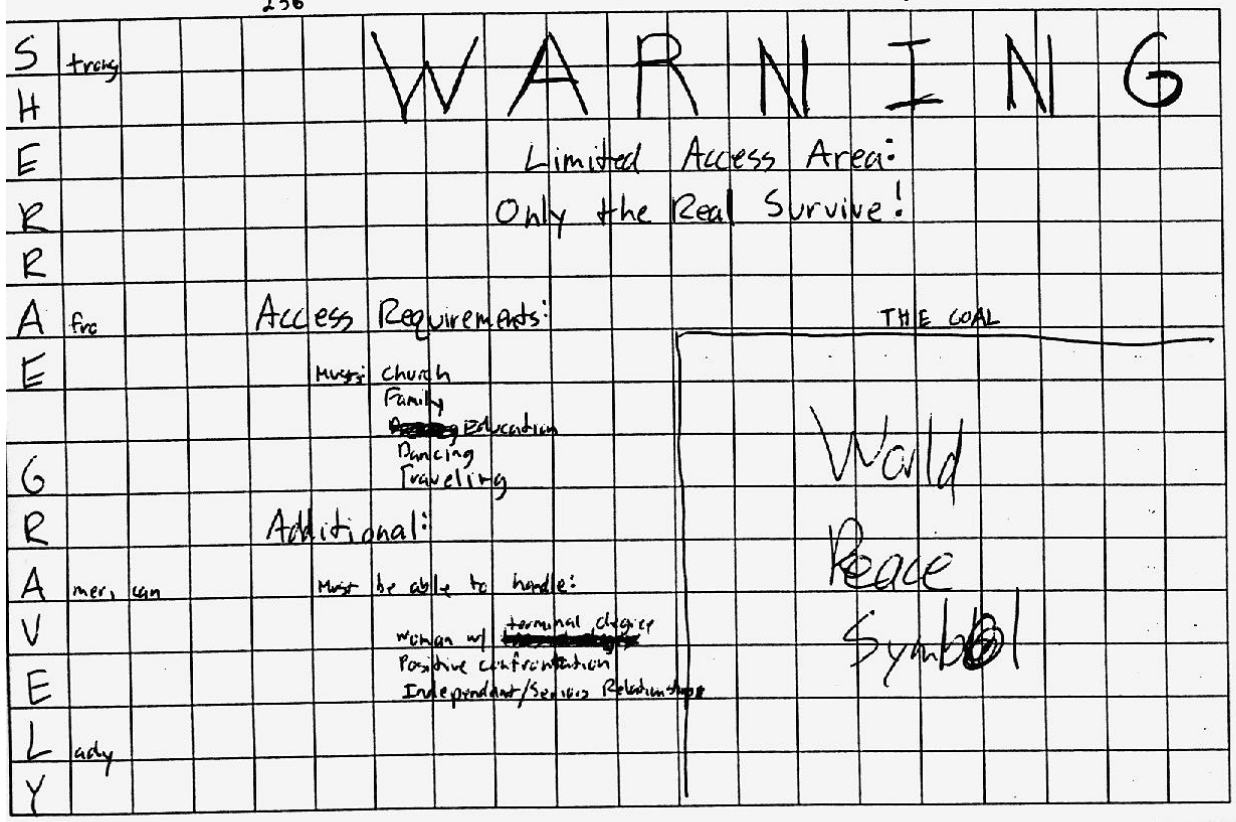
Let's Get Acquainted: Part II

This is a continuation of the earlier activity, "Let's Get Acquainted". Your task is to design/complete two WEB pages that can be used to introduce yourself and the person working with you to others via INTERNET. Your final presentation is limited to one web page per person. Each page must incorporate at least one image (static only), one sound source, and as much text necessary to communicate your message. Use the attached grid (640 x 480) to layout your screen design. The final pages must be submitted as valid HTML files with all supporting media (sound, image, etc.) saved in their respective files. Instruction and/or assistance will provided on days 2-3 to cover software tools necessary to complete the activity.

Name: Lord for Gravely Date: _____

Theme: _____

File Names Image: ~~288~~ 256 x 288 Text: _____ Audio: CD - Greg Howard #11



AC0101_1.doc

Appendix F

Syllabus

MTD©1996 Holmes/Williams-Green & Virginia Tech

Syllabus

Instructors: Dr.Joyce Williams-Green (jfwillia@vt.edu) and Dr. Glen Holmes (gholmes@vt.edu)

Office Hours:

Required Text(s):

1. Bennett, Christine (1995). Comprehensive Multicultural Education Theory and Practice, ISBN 0-205-15024-1
2. Castell, G. G. (1994). Instructional Development-Process and Technique, ISBN 0-534-21378-2
3. Copy Packet (on reserve in Library and Black Studies 256 Lane Hall)

Requirements:

Students are required to complete both on-line/off-line activities and assignments. The nature of the activities and assignments vary and may call for individual as well as group interaction. All activities will be monitored. All assignments will be graded. The sections below provide a general explanation of these requirements:

On-line activities

Include such things as web-site visits, email, completing forms and surveys, interactive multimedia presentations, tutorials, simulations, and the like.

Off-line activities

Include such things as data collection, reading, viewing audio visuals (videos, TV programs, etc.)

On-line assignments

Include such things as chat discussions, posting completed off-line assignments, completing formative course evaluations, knowledge/skill assessments, and the like.

Off-line assignments

Include such things as writing papers, gathering and summarizing data, project planning and preparation, and the like.

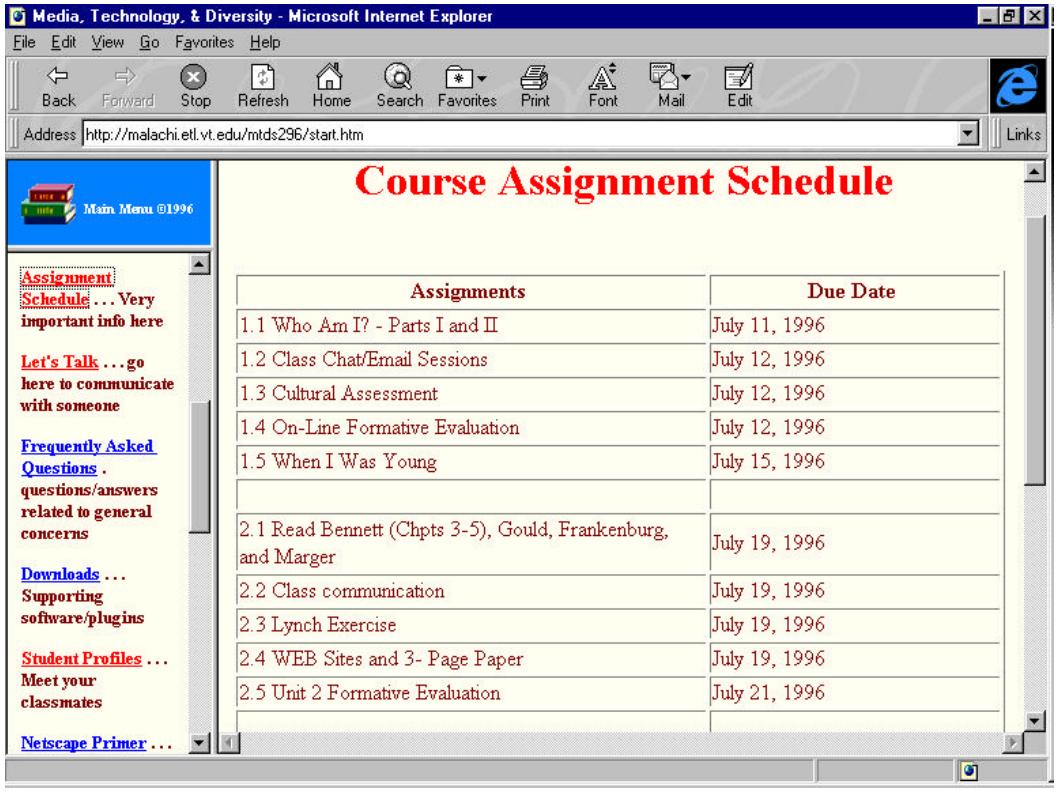
Assignments must be completed by the due date in order to receive maximum point value. Students are responsible for knowing when assignments are due (Please see the main menu Assignment Schedule link). Some activities and/or assignments may require students to obtain other materials not available on line (.e.g., reserved library materials, videos, and the like) Please contact our graduate assistant (Juone Brown jubrown@vt.edu) for further information

The final project (note project evaluation form) will be a multimedia presentation concerning some topic related to diversity. The accompanying documentation should present references relevant to the project as well as describe the project's goals and real or anticipated outcomes.

Virginia Tech Honor Code policies will be in effect throughout this class.

Appendix G

Course Assignment Schedule and Description



Appendix H

Interview with Instructors

1. What is your stance on the use of computer and telecommunications technologies in teaching and learning?

2. Why did you choose to offer the MTD course on-line?

3. What were your objectives for the course

4. What were your expectations for specific assignments: biography page, final project?

5. What were your concerns regarding on-line teaching?

6. How come you offered 3 orientation sessions instead 2 as was advertised in your flyer?

7. Think back to how the on-line classroom first looked to you, when you first saw it. How did it seem to you?

Probes:

clearly connected vs confusing
clear how to start vs difficult
complex vs straightforward

8. Could you describe what you actually did during the week or so before the students started using the on-line settings?

9. Did you make any changes to the course/on-line format after the orientation sessions? What kind of changes?

10. What were your roles during the course design phase?

During course development?

During course implementation?

11. What roles were viewed as scaffolding and what roles did you fight against?

12. What were the implications of your changing roles?

Interview With Students

What is your name? Major, College Level

1. What was your interest in this course? Content, online context, both?

2. What was your understanding of the instructors' expectations for specific assignments: "Who Am I" project, Biography page, "Who Will I Hire" project, True Colors exercise Training vs Teaching exercise, and Instructional Design project?

3. What were your concerns regarding online learning? What were the benefits?

4. Why was it that the instructors offered 3 orientation sessions instead 2 as was advertised in the course flyer? Could you describe the main learning, social, and training activities that took place at those face-to-face sessions?

5. Think back to how the online classroom first looked to you, when you first saw it. How did it seem to you?

Probes:

clearly connected vs confusing
clear how to start vs difficult
complex vs straightforward

How did you work with those issues?

6. I am interested in knowing all the different ways you used to communicate with your instructors and peers in the MTD class, after the orientation sessions. Can you list them?

Which ones were more helpful in your successful completion of this course? Who did you contact most of the time-- instructors or TA? Why was that?

7. How did you use these venues? How did the instructors expect you to use the online settings, and how often?

Could you participate in ways that make sense to you? Any constraints or freedom?

8. What were your expectations of the topics and content of the online discourse postings--your, others'?

9. What were your expectations of the structural sequence of the online discourse postings--your, others'?

10. What were your expectations of the response timing--your, others'?

11. How did you feel about the time delays between your questions and the responses?

12. Were there any limitations of the last four features?

13. Will you take another online course?

14. Is there anything else you want to add?

Follow-up interview via e-mail

I am interested in exploring your roles as students so (even if you haven't been interviewed) please think back through the course of events and answer the next three questions as in-depth as you can. You can simply reply via e-mail.

(1) In what ways did your role as student changed and/or stayed the same as you had envisioned prior to taking the MTD course?

(2) In what ways did your role as student changed and/or stayed while taking the MTD course?

(3) In your opinion, how did your role affected your participation and learning in that class?

Appendix I

Coding Categories

Code	Category
INIT	Initiation
RESP	Reply
EVAL	Evaluation
SOC	Social posting
MECH	Webchat mechanics
CRSTGHTP	Course-related--thought provoking
CRSLOG	Course-related--logistics
CRSINFO	Course-related--information offering
PROBE	Course-related-- thought provoking

Appendix J

Sequence of Classroom Lesson

Sequential organization of classroom lessons; Initiation (I)-Response(R)-Evaluation (E)
Here is a typical I-R-E sequence from Mehan and his colleagues' study:
Initiation. Teacher:...so where would you put that in this categorization scheme? Is that a comment on the teacher, student, learning, knowledge, maybe all four? Go ahead.

Response. Student: She's reinforcing speed.

Evaluation. Teacher: Okay, okay. So the process of learning is concerned with repetition recall and definitely speed, that is, very quick learning.

The structural sequence of the electronic discourse varied. Was categorized in these ways: Initiation (I)-Response(R)-Response(R)

Initiation. Teacher...I still need to know in more fundamental terms, what"ethnography "means?...

Response. Student 1...ethnography is the task of describing a particular culture. it involves the cultural experience, entering the field, doing field work, and describing a culture. it involves really getting in their and experiencing it...

Response. Student 2...In response to and in addition to Laurie, I would add that characteristics of ethnography would include the cultural scenes, informants, categories, and meanings in relation to participants in a cultural situation. These things would also be important in describing a particular culture...

In his study, the instructors provided only two (2) general evaluations. Answers to questions superseded by the teacher's new topical questions continued to appear after the teacher informally

Appendix K

Webchat Topics

Unscheduled Sessions		Scheduled Sessions	
Date	Topic	Date	Topic
7/8	System check	7/29	Scheduled chat
7/9	Welcome greetings	7/30	Ethnicity & ed.
7/9	Textbook inquiry	7/30	Culture question
7/12	Video-ethnicity	7/30	Racism
7/13	Who Am I?	7/30	Color-Gould
7/14	When I Was Young	7/30	Bennett issue
7/15	Frankenburg	7/30	Cogn. styles
7/16	Interracial marriages	7/30	Final project
7/16	Marger-dating		
7/17	Changing the world		
7/17	Asynch. frustration		
7/17	Jewish issues		
7/17	Scheduled chat proposal		
7/18	Social construction		
7/18	Women-black/white		
7/18	Small group work		
7/20	Census-mulatto		
7/21	Census-Appalachia		
7/23	Xenophobia		
7/23	Lynch assignment		
7/23	Native Am. V African Am		
7/25	Race and Gender		
7/25	Caste system-power		
7/25	Blacks, men v women		
7/25	Concepts of Africa		
7/26	Black male competence		
7/26	Bennett--stereotypes		
7/26	True colors		
7/26	Learning styles		
7/26	Olympics coverage bias		
7/26	Race deception		

Appendix L

Evaluation Responses

Mark:...7/9/96 1:30 AM

SOC Howdy folks! We've just finished our first day and I am excited about things to come. I've already torn through the first exercise and just waiting too see what happens! I'm looking forward to learning NEW things about different people and cultures.

Dr. Williams-Green:...7/13/96 12:14 PM
CRSTGHTP INIT PROBE Did the Who Am I? activity help you begin to think about how you view your self and
how others might view you? Which group did you have more difficulty listing descriptions?

Dr. Williams-Green:...7/13/96 12:15 PM
SOC Mark, I love your rose!!

Mark:...7/13/96 6:30 PM
S/CI/CRSTGHTP RESP Gee, Thank you Dr. Williams-Green. ;)

The "Who Am I" activity was rather difficult for me to do. I tried to be as honest as I could with the form. This was rather difficult, because I know a lot of the things I put down were not necessarily the best descriptions, but they were the FIRST that came to my mind. And they were HONEST descriptions that were based upon my heritage and my background....however limited those are.

Otto:...7/14/96 4:35 PM
CRSTGHTP RESP The Who am I survey was difficult for me to complete. I was putting things down that first came to my mind. This may not have been the correct method, but I felt this method was more truthful. I had an easier time answering the survey on my friends than on any of the other descriptions. I felt more comfortable giving information about people I fell close to than one's I don't. Once a person becomes a friend, I tend not to look at color or ethnic background as much I do when I don't know the individual.

Mary:...7/14/96 5:03 PM
CRSTGHTP RESP I was very objective with the people I knew least and very subjective with the people I knew best. The When I Was Young survey is a lot of fun. I am finding that older people love to talk about their childhood, good or bad. Most important they seem to want to be noticed. I am enjoying listening to their stories. Unfortunately I cannot type fast enough to get all their words down.

Appendix M

Pittsburgh E-mail Posting

(note the URL).
Date: Fri, 19 Jul 1996 09:57:47 -0700
From: Jon <Jon@vt.edu>
X-Mailer: Mozilla 2.02 (Win16; I)
MIME-Version: 1.0
To: Joyce Williams-Green <jfwillia>, "Glen A. Holmes" <gholmes>
Subject: assignment 2.5
X-URL: http://malachi.etl.vt.edu/mtds296/_root/chat.htm
Content-Type: text/plain
Content-Transfer-Encoding: 8bit

Looking for an under-represented minority group to review, the first group that came to mind was the Amish (pronounce (Ah-mish) of Pennsylvania. These people believe in horse and buggies, no electricity, and plain white and black clothing. They live a very simple life. Growing up only 20 miles from an Amish community, my friends and I used to make fun of the Amish children our age and would pick on them because their believes were different from ours. I (unfortunately) remember yelling out the car window while passing by an Amish family in a horse and buggy and demonstrating some terrible gestures. I never understood their history or culture until this assignment. I will discuss the culture of the Amish, stereotypes, the similarities and differences among the Amish, Mennonites and normal every day people.

The culture of the Amish is a religious group who live in established settlements in many states. The oldest group of Old Order Amish, about 18,000, live in Lancaster County, Pennsylvania. The Amish stress humility, family and community, and separation from the world.

The Amish, also know Pennsylvania Dutch, are different. They are not all one religion. Instead, their common bond is mainly German background. They also have some Welsh, English, Scottish, Swiss, and French ancestry.

The Amish have their roots in the Mennonite community. Both were part of the early Anabaptist movement in Europe, which took place at the time of the Catholic Reformation. They believed that only adults who had confessed their faith should be baptized, and that they should remain separate from the larger society. Many early Amish were put to death as heretics by Catholics and Protestants, and many others fled to the mountains of Switzerland and Germany. This began the Amish tradition of farming and holding their worship services in homes rather than churches.

The Amish and Mennonites share the same beliefs concerning baptism, non-resistance and basic Bible doctrines. They differ in matter of dress, technology, language, form of worship, and interpretation of the Bible.

Old Order groups all drive horses and buggies rather than cars, do not have electricity in their homes, and send their children to private, one-room schoolhouses. Children attend only through the eighth grade. After that, they work on their family's farm or business until they marry. Amish feel that their children do not need more formal education than this. Many Mennonites and progressive Amish are slowly trying new lifestyles (i.e., driving cars, and having electricity).

The interesting thing about the Amish are that they are trilingual. They speak a dialect of German called Pennsylvania Dutch at home; they use High German at their worship services; and they learn English at school.

The Amish are a private people who believe God has kept them together despite pressure from the modern world to change.

Most Amish women and girls wear modest dresses made from solid-colored fabric with long sleeves and a full skirt. These dresses are covered with a cape and apron and are fastened with straight pins or snaps. Women never cut their hair, which they wear in a bun on the back of the head. On their heads they wear a white prayer covering if they are married and a black one if they are single. They do not wear jewelry.

Men and boys wear dark-colored suits, straight-cut coats without lapels, broadfall trousers, suspenders, solid-colored shirts, black socks and shoes, and black or straw broad-brimmed hats. their shirts fasten with conventional buttons, but their suit coats and vests fasten with hooks and eyes. They do not have mustaches, but they grow beards after they marry. This clothing is not a costume; it is an expression of their faith.

Many people have stereotypes of the Amish that they are dirty, because they do not use soaps or deodorants. The Amish use only natural ingredients that they can make from animal fat or from natural flowers. They are actually very clean people.

Most people think that they are backwards because of the use of horse and buggy as transportation (most of them use this method) and none use electric. This is from the religious belief of keeping everything simple. I give the Amish credit for staying with all the basic methods. They are proving to people that sometimes basic and simple needs are just as effective as modern items.

Many people make fun of the fact that most Amish are inbred. They are a very strict community that want to keep there ethnic background within. Often times they marry distant cousins or someone in their family tree. From the research I have compiled, percentages are low of Amish people being deformed or retarded because of their use of this method to reproduce.

The Amish community have very few similarities of the American people of today(I use the word similarities being for most people not all). They are religious people who have strong families ties, believe in education even though they only pursue to the eighth grad, and try to do the right thing for their community.

While the Amish have few similarities, they have numerous differences of today's American people. The older Amish generation use horse and buggy as transportation, have no electricity in the house, raise their own animals and grow their own food for consumption throughout the year, and make all their own soaps and laundry items. They also have children attend one-room schools through the eighth grade instead of going to public institutions. They live a very simple life with hard work a way of life, instead of complex information highways of computer jargon like email, they communicate with people either by letter or physical seeing the person, no telephones. They wear the same type clothes day in and day out. The only two colors of clothing are black and white.

In summary, the Amish are very plain people who try to live a simple but joyous life without all the new technologies America creates each day. I talked about the culture and history of the Amish on how most came from Europe and are of German descent and live in over 22 states

(mostly in Pennsylvania). They are people who want no trouble, but seem at times to get picked on by ignorant individuals who don't appreciate their culture. I was guilty of this myself.

The stereotypes of Amish range from dirty, stupid and weird people because of their lack of use of modern technology. Stereotypes usually give a negative image on the groups they are trying to portray. This is unfortunate, but true.

Some Amish have crossed over to the new age, but most still live the same lifestyle that has went on for many generations and hopefully for many more. Their families are made a priority, they practice strong religious beliefs, while not making use of the technology available to them. These are good people who in my eyes just want to live in peace and harmony; let them be. I have learned more about the Amish way of life while writing this paper than I ever knew before. When you think about the way they live, without all the stress of today's new developments, no phone ringing in your ear, no email to answer everyday, no faxes coming in, and no last minute suspense to close-out, living simple doesn't sound so bad after all. If you can try to appreciate their culture and let them be who they want, you will gain a newfound respect for this group of people as I have.

Appendix N

Vita

YOLANDA NOKURI HEGNGI
Doctoral Candidate
Instructional Systems Development
Virginia Polytechnic Institute and State University

PROFESSIONAL ADDRESS:

322-A War Memorial Hall
College of Education
Virginia Polytechnic Institute and State University (Virginia Tech)
Blacksburg, Virginia 24061-0341
Telephone: 540-231-8348
E-Mail: yhegng@vt.edu
Fax: 540-231-3717

HOME ADDRESS :

355-A Newcomb St.
Christiansburg, Virginia 24073
Telephone: 703-381-4585

EDUCATIONAL BACKGROUND:

M.S. in Agricultural Extension and Education
Adult Education/International Development Programs
University of Maryland at College Park, 1990.

B.A. in Psychology
Trinity Western University at Langley British Columbia in Canada, 1986.

A.A. in General Studies
Trinity Western University at Langley British Columbia in Canada, 1986

PROFESSIONAL EXPERIENCE:

1997 (January): Virginia Polytechnic Institute and State University:

GraduateTeaching Assistant: Department of Teaching and Learning.

Duties included undergraduate instruction in college success strategies and designing and instructing athletic academic transition course, co-teaching graduate Models of Teaching course, researching and student academic advising with the Center of Academic Enrichment and Excellence.

1996 (August): Virginia Polytechnic Institute and State University:

GraduateTeaching Assistant: Department of Teaching and Learning.

Duties included undergraduate instruction in college success strategies, assisting in graduate instruction in Advance Educational Psychology.

1996 (August): Virginia Polytechnic Institute and State University:

Higher Education Teaching and Research Assistant: Athletic Department 'A'-TECH program.

Duties include designing and teaching a College Success Strategies Course for 'A'-TECH, a university-wide project in which educational technology is utilized to help student-athletes succeed academically, also assisting in the assessment of the project and providing computer training for athletic department faculty and staff.

1996 (Summer): Virginia Polytechnic Institute and State University:

Higher Education Teaching and Research Assistant: Faculty Development Institute.

Duties included designing, developing, and teaching workshops for faculty and staff to help them develop, utilize, produce and maintain multimedia instructional materials for both Macintosh and PC platforms and Internet use.

1996 (January-June):Virginia Polytechnic Institute and State University:

Graduate Teaching Assistant: Virginia Tech Cyberschool Project.
Duties included assisting in designing and teaching the Civil Rights Movement and Literature on-line course.

1994 -(Continuing): Virginia Polytechnic Institute and State University:
Independent Consultant.
Duties include designing, developing curriculum materials and teaching statewide workshops in instructional technology for the Virginia Cooperative Extension Service.

1994 (February-August): Hands For Christ:
Office Administrator: Oversees Operations.
Duties included training and supervising a staff of seven in managing 6,000 worldwide libraries.

1990-91: United States Department of Agriculture:
Research Consultant: Human Nutrition Information Services.
Duties included research on world-wide nutrition information to create, process and maintain databases of this information at the Nutrition Data Research Branch. Acknowledged for work in Nutrient Data and Food Consumption Guides.

1988-90: University of Maryland College Park:
Academic Advisor: Undergraduate Studies Department.
Duties included advising, and nurturing the educational goals of a multicultural student population.

1988-90: United States Department of Agriculture:
Research Assistant: Human Nutrition Information Services.
Duties included research on world-wide nutrition information to create, process and maintain databases of this information at the Nutrition Data Research Branch, and training new student employees.

HONORS :

Hands for Christ Certificate of Appreciation:
Volunteers Coordinator

Hands for Christ Organization, 1994

National Agricultural Library Award:
Program Evaluation
United States Department of Agriculture, 1989

PRINCIPAL WORKSHOPS TAUGHT :

Introduction to Eudora
Using Laserdiscs in the Classroom
Introduction to HTML
Macintosh@ Basics
Windows 95 Basics
Using Microsoft PowerPoint for Word
Using Microsoft Windows 95 (version 7)
for Windows 95 (version 7)
Introduction to Daedalus for Macs
Creating Homepages for the WWW
Using WebChats in Classrooms and at a Distance

PROFESSIONAL PRESENTATIONS:

Hegngi, Y. N (1996). Literacy and participation in an online course. Paper accepted for presentation at The National Reading and Research Center Conference, Atlanda, GA.

Hegngi, Y. N (1996). Webchats: A fun and easy way to communicate on the Internet. Paper accepted for presentation at the Virginia Society for Technology in Education, Charlottesville, VA.

Hegngi, Y. N. (1996). The socio-political and economic influences in the continuing evolution of Internet. Paper presented at the meeting of the Eastern Educational Research Association, Boston, MA.

Hegngi, Y. N. (1995). Distance education and its afforded equity: Reality or myth? Paper presented at the meeting of the Eastern Educational Research Association, Hilton Head Island, SC.

Nokuri, Y. E. (1990). Sustainable technology tranfer programs in

Cameroon. Paper presented at the Association of International

Agricultural Extension Education, Baltimore, MD.

Nokuri, Y. E. (1990). Maryland dairy farmers' reaction to using the bovine somatotropin growth hormone. Results of Master's degree research presented at Professional Seminar, University of Maryland, College Park, College of Education.

PUBLICATIONS :

Journal Articles:

Hegngi, Y. N., (In Press). The socio-political and economic influences in the continuing evolution of Internet. Review Journal of Philosophy and Social Science. Lady Lake, Fla: Anu Books.

Chapters in books of refereed proceedings or readings :

Hegngi, Y. N (In Press). Webchats: A fun and easy way to communicate on the Internet. In J.R. Wenrich (Ed.), Proceedings of selected presentations. Dublin, VA., Virginia Society for Technology in Education.

PROFESSIONAL AFFLIATION:

American Educational Research Association

1996

21st Century Teachers Organization

1996

Eastern Educational Research Association

1994-1996

Association of International Agricultural Extension Education

1988-1990