DOCUMENT RESUME

ED 437 921 IR 019 883

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TITLE Analysis of E-Mail Mediated Instructional Conversations: Employment of Sociolinguistic Conversation Mapping Techniques.
PUB DATE 1999-10-25
NOTE 33p.
PUB TYPE Reports - Research (143)
EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Discourse Analysis; *Discussion (Teaching Technique); *Electronic Mail; Higher Education; Interaction; *Sociocultural Patterns; *Sociolinguistics; Tables (Data)
IDENTIFIERS *Conversation; *Conversational Analysis; Mapping; Mediation

ABSTRACT

This study examined and described e-mail mediated instructional conversations conducted during a content area reading and writing course. Participants in the study included undergraduate students from three different content specialty areas, as well as an instructor who mediated the conversational interactions via e-mail communications. Conversational interactions were analyzed by employing sociolinguistic conversational mapping techniques. Students and the instructor engaged in extended conversational interactions in which they considered and discussed numerous topics related to content area reading and writing. Conversational data were downloaded directly from e-mail files, transcribed, coded, and mapped. Findings were interpreted from the perspective of Sociocultural Activity Theory. Conclusions based on study findings included: (1) the mapping techniques employed in the study effectively aided in the identification of patterns of interaction that developed during the conversational interactions; (2) each of the conversational groups included in the study responded to instructor moves in a distinct manner; (3) different content area conversation groups established distinct patterns of discourse; (4) several factors were identified that appear to have an impact on levels of participation in e-mail mediated instructional conversations; and (5) e-mail mediated instructional conversations appear to facilitate the appropriation of formal concepts. (Contains 46 references.) (Author/MES)

ANALYSIS OF E-MAIL MEDIATED INSTRUCTIONAL CONVERSATIONS: EMPLOYMENT OF SOCIOLINGUISTIC CONVERSATION MAPPING TECHNIQUES

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ABSTRACT

This study examined and described E-Mail mediated Instructional Conversations (Goldenberg, 1992/1993) conducted during a Content Area Reading and Writing Course. Participants in the study included undergraduate students from three different content specialty areas as well as an instructor who mediated the conversational interactions via e-mail communications. Conversational interactions were analyzed by employing sociolinguistic conversational mapping techniques developed by Green and Wallat (1981). Students and the instructor engaged in extended conversational interactions in which they considered and discussed numerous topics related to Content Area Reading and Writing. Conversational data were downloaded directly from e-mail files, transcribed, coded, and mapped using a variant of the Green and Wallat (1981) and Goldenberg (1992/1993) coding techniques. Findings were interpreted from the perspective of Sociocultural Activity Theory (e.g., Lave & Wenger, 1991; Rogoff, 1981; Vygotsky, 1978; Wertsch, 1985). Conclusions based on study findings included: (a) The Green and Wallat (1981) and Goldenberg (1992/1993) mapping techniques employed in the study effectively aided in the identification of patterns of interaction that developed during the conversational interactions, (b) each of the conversational groups included in the study responded to instructor moves in a distinct manner, (c) different content area conversation groups established distinct patterns of discourse, (d) several factors were identified which appear to have an impact on levels of participation in e-mail mediated Instructional Conversations, and (e) e-mail mediated Instructional Conversations appear to facilitate the appropriation of formal concepts.

INTRODUCTION

Content Area Reading and Writing strategies (e.g., directed reading/writing activities, prereading strategies, vocabulary reinforcement activities, critical thinking activities), which are taught in most Content Area Reading and Writing courses, are often not integrated into preservice and inservice teachers' instructional repertoires (Stewart & O'Brien, 1989). Even though these strategies have consistently been shown to be effective in enhancing student abilities to access textual information many preservice and inservice teachers do not believe that they are compatible with their conceptions of teaching or themselves as teachers (Stewart & O'Brien, 1989). Calderhead (1988) and Pajares (1992) examined how preservice teachers' personal experiences as students shape their beliefs about what constitutes effective instruction, and have found that these beliefs are often highly resistant to change. Furthermore, traditional methods of instruction (e.g., lecture, recitation, knowledge-based questioning strategies) appear to reinforce oversimplified notions of instruction and result in fragile (inert, naive, ritual) knowledge which is not accessible in problem solving situations.

Current researchers (e.g., Alvermann & Moore, 1991; Gee & Forrester, 1988; Ratekin, Simpson, Alvermann, & Dishner, 1985; Stewart and O'Brien,1989; Vacca & Vacca,1986) have begun to examine this seeming incompatibility between preservice teachers' beliefs about content area reading and writing strategies and formal concepts that are typically included in Content Area Reading and Writing courses. These researchers have documented widespread misconceptions about the nature of content area reading and writing strategies and a resistance by preservice teachers to adapt these general methods in their specific content areas. It has been suggested (e.g., Berliner, 1985; Burbules, 1993; Cruickshank, 1987; Spiro, Schmitz, Samarapungavan & Boeger, 1987) that traditional forms of instruction fail to influence preservice teachers' understanding of the perplexities of classrooms beyond a superficial level. Although many solutions to this problem have been hypothesized, two alternative approaches have recently appeared in the literature. One is referred to as Instructional Conversations (Tharp & Gallimore, 1988). Instructional Conversations are discussion-based lessons in which instructors act as facilitators for student ideas. Instructional Conversations encourage students to think, reexamine, and reflect on teaching. Such an approach enables instructors of content reading courses to identify student conceptions that conflict with the methods taught and, through participation in the conversations, students gain more in-depth understanding of reasons for incorporating the methods in their specific content area(s). Instructional Conversations (IC's) are consistent with a social constructivist view of learning

and appropriate for learning about complex topics like those taught in content reading courses (Goldenberg, 1992/1993).

Another approach which has received attention in the literature has to do with the use of nontraditional forms of communication. Lacey and Merseth (1993) and Anderson and Lee (1995) have explored the unique instructional characteristics of hypermedia environments and e-mail mediated conversations. E-mail, or electronic mail is gaining wide acceptance, not only as a way to write and send text messages on the Internet, but as a method for delivering instruction. Lacey and Merseth (1993) and Anderson and Lee (1995) have raised the possibility that e-mail mediated Instructional Conversations may have certain advantages over face-to-face conversational interactions when attempting to challenge or confront preservice teachers' informal beliefs about teaching.

Because students in in most content area reading and writing methods courses come from a wide array of content areas instructors typically teach general methods (i.e., not specific to content areas). These students have few opportunities to converse or collaborate with others from their field(s) about how to adapt these general reading and writing methods for use in their content area(s). Instructional Conversations, mediated via e-mail, were employed in this study as a means to increase interactions among students from the same content areas. The Instructional Conversations were transcribed and analyzed using a variant of the Green and Wallat (1981) and Goldenberg (1992/1993) sociolinguistic conversational mapping techniques. In this paper I will provide a description of the analysis techniques employed in this study and provide a rationale for their use in the analysis of e-mail mediated Instructional Conversations.

Sociolinguistic Conversation Mapping Techniques

In contrast to traditional instructional strategies, sociolinguistic conversational analysis is grounded on the notion that teaching is primarily a conversational process in which participants engage in the joint construction of meaning. This occurs through the reinforcement of sociocultural patterns of discourse that co-occur within instructional settings.

By engaging students in conversational interactions, instructors attempt to determine prior knowledge levels of students. Through the structuring of these discourse interactions with Instructional Conversations, instructors reinforce conceptions that are consistent with pedagogical concepts (e.g., concepts that have been systematically examined and/or are widely accepted) and challenge conceptions that are inconsistent with current theory and practice. In this way, everyday concepts and pedagogical concepts are merged and transformed into

knowledge structures that draw upon both individual knowledge derived from personal experience and the accumulated knowledge and findings of a particular field.

Sociolinguistic conversational analysis has been used widely (Cazden, John, & Hymes, 1972; Gumperz & Hymes, 1972; Sacks, Schegloff, & Jefferson, 1974) and grew out of naturalistic research methods used in sociology and anthropology. Conversational analysis is referred to by various labels (e.g., pragmatics, discourse analysis, interpersonal communication, ethnomethodology, ethnography of communication). Regardless of the label, however, researchers who use conversational analysis concern themselves with three overarching premises: (a) the regularity in structural organization of conversational interactions, (b) the notion that all such interactions are context bound, and (c) the recognition that no level of detail can be dismissed as irrelevant to the interactions (Holstein & Gubrium, 1994). Sociolinguists are centrally concerned with context, insisting that utterances can only be understood by examining discourse in particular situated frames of reference. In other words, utterances derive their meaning from the contexts in which they are embedded (e.g., an utterance such as "Is the window open?" can possess several meanings, depending on its context). For this reason, sociolinguists examine entire transcripts of conversations in an attempt to determine how Instructional Conversations differ across settings. Recently, sociolinguists have drawn on the work of Vygotsky (1978) and Leont'ev (1978) (e.g., sociocultural activity theory) and attempted to examine the relationships between discourse and cognition (e.g., Bloom & Green, 1984; Cazden, 1986) . This has led to an increased interest in the process of appropriation, or the way that ideas are transformed from everyday to pedagogical concepts.

Tharp and Gallimore (1988), Goldenberg (1991; 1992/1993), and Wells and Chang-Wells (1992) have each employed modified versions of conversational analysis. Although these researchers have analyzed and characterized particular aspects of conversational interactions (e.g., initiation, turn-taking, code-switching), the methods used for analysis and description were limited in that they do not identify the wide range of interconnections that exist in conversations. The methodology employed by these researchers consists of videotaping an instructional sequence, transcribing the conversation, indicating the chronology and speaker making the utterance (see Table 1 for an example), and analyzing the conversational transcription. The analysis has consisted primarily of continuous commentaries on utterances made by participants without systematically differentiating structural characteristics, connections among various utterances or cohesion with instructional goals (see Table 2 for an example). Although this method of analysis may be appropriate for analyzing videotaped and

transcribed conversations, it has several limitations when analyzing e-mail mediated conversations. They include: (a) failure to capture the conceptual complexity and richness that contributes to the overall context of e-mail conversations, (b) absence of attempts to link various utterance to one another and to instructional goals, (c) a system of notation that attends primarily to spoken language and the prosody that contributes to the conversational context, (d) absence of hierarchical analytic units, and (e) absence of systematic categorical and coding schemes. Moreover, the analysis scheme used by Goldenberg (1992/1993) appears to be arbitrary with regard to selection of conversational sequences that are actually analyzed.

Conversational mapping, a technique developed by Green and Wallat (1981) provides a possible solution for some of the dilemmas and limitations of the conversational analysis techniques employed by Tharp and Gallimore (1988), Goldenberg (1991; 1992/1993), and Saunders, Goldenberg, and Hamann (1992). Researchers who employ conversational mapping assume that teaching is primarily a conversational process in which socioculturally reinforced patterns of discourse co-occur with the transmission of content within complex instructional settings. Through mapping procedures, employing in-depth descriptions of conversational interactions, utterances are identified and categorized according to their cohesion, or lack of cohesion, with intended instructional goals. Furthermore, conversational mapping may reveal connections between and among all of the various utterances that are produced in the course of a conversation. This allows a researcher to determine the structural characteristics surrounding the conversation (i.e., patterns, connections, stable features) . In other words, by examining conversational maps researchers can establish the actual syntactic and semantic contents of messages, how the messages fit together to establish a sociocultural context, and how the conversational context contributes to the achievement of the overall instructional goals.

Green and Wallat's (1981) conversational mapping technique (see Table 3) provides a means of overcoming some of the limitations of Goldenberg's (1992/1993) method of analysis. Conversational mapping permits systematic examination of e-mail messages and facilitates the identification of sociocultural contexts in which conversations take place. Through systematic tracking of message content, source, form, strategies, levels of comprehension and cohesive ties (see Table 3) evidence of conceptual shifts from everyday to pedagogical concepts which are studied in the course should be discernible.

Table 1

Example of Transcription used by Saunders, Goldenberg & Hamann (1992)

001 Alice: ....How do you-How do you respond to a child who you're talking about one topic and he raises his hand an you think he's going to (hh) (hh) share something// about- J=

004 Mary: Oh nn (hh) (hh)]

005 Alice: =What do you respond to him. I would like to hear your ideas.

006 Mary: Oh gosh:. I-

007 Alice: Do // you say::]

008: Mary: Sometimes I will say-] Well that's fine, but...we're talking about *so and so?*

Transcript Notations:

( )	indicate transcriber's uncertainty about utterance.
...	indicates silence of less than one second.
(1.2)	indicates silence of greater than one second.
//	indicates the onset of overlap.
]	indicates the end of overlap.
=	indicates latched utterance; uninterrupted by silence or other break.

Table 2

Example of Analysis used by Saunders, Goldenberg, & Hamann (1992)

Alice raised a significant classroom issue. How does a teacher control the discourse. There are many children who might talk, and how do you maintain your instructional agenda when some children appear to lose sight of the topic? Mary's response treats this as a troublesome, but generic issue: "Oh gosh:. I- Sometimes I will say- Well that's fine, but-...we're talking about *so and so?*" In other words , Mary is saying, you mildly sanction the utterance, while signaling to the child that the contribution is off-topic. The strategy is familiar to Alice. As she suggests, it's exactly what she is accustomed to doing. Mary then follows with a slightly different, but similarly generic, approach.

Table 3

Types of Interaction Units Identified through Green & Wallat's Conversational Mapping

Type of Unit	Abbreviation Used	Example/Explanation
Message Unit	MU	Any individual utterance
Interaction Unit	IU	Message units that are related
Instructional Sequence Unit	ISU	Series of Interaction Units
Phase Unit	PU	Group of Instructional Sequence Units
Lesson	L	Series of related Phase Units

Message Boundaries Identified through Green & Wallet's Conversational Mapping

Boundary Type	Example	Symbols Used
Source of Utterance	Instructor/Student	2/3
Form of Utterance	Question/Response	Q/R
Strategies Used	Focus, Ignore, Activate, etc.	1, 14, 3
Level of Comprehension	Factual, Interpretive, Application	F, I, A
Cohesive Ties	Teacher, Student, Text, Other	I, S, M, O
Cohesion Toward Goal	Thematic/Divergent	Different Columns

Studies employing Sociolinguistic Analysis

Gilmore (1987), as well as Borko and Eisenhart (1989), have used sociolinguistic analysis to examine literacy practices and the ways in which students are successfully promoted to higher reading groups. Through examination of conversational dialogues, the researchers determined that movement from low reading groups to higher reading groups was contingent on students' ability to demonstrate to the teacher that their manner of interacting with and talking about written text was consistent with that of other group members. In the Gilmore

(1987) study, the researcher videotaped, transcribed, and analyzed verbal interactions between students and teachers in the course of classroom reading instruction. Gilmore (1997) identified and documented explicit discourse conventions which enable students to alter the manner in which teachers view them and negotiate between various diverse-ability reading groups. Furthermore, the researcher (Gilmore, 1987) found that students were required to overtly display attitudes toward conversational acts that were consistent with the patterns of discourse associated with particular socioeconomic classes. Such patterns of privileging of specific discourse strategies by teachers are consistent with the theoretical work of Bahktin outlined by Wertsch (1985).

The preceding findings are also consistent with results of a study by Dillon (1985) in which he employed sociolinguistic analysis. He found that teachers involved in his study often unwittingly foiled student attempts to become actively engaged in classroom discussions. He documented salient distinctions in student responses when interrogative and more open-ended questioning strategies were used by teachers. Non interrogative questions appeared to result in increased opportunities for students to produce more elaborate and syntactically complex responses. This finding is similar to results of studies in the area of communication theory (e.g., Dubrovsky, et.al., 1991; Siegel, et.al., 1986; Sproull & Kiesler, 1986). These researchers found that e-mail communication possesses subtle advantages over face-to-face communication because it enabled them to identify newly constructed meaning in student responses.

Although Goldenberg and Gallimore (1991), Goldenberg (1992/1993), and Goldenberg and Pathey-Chavez (in press) have devoted considerable energy to describing the benefits of instructional conversations in teacher education programs, the analysis techniques employed (Sacks, et al., 1974) are inadequate when attempting to analyze conversations conducted via e-mail. This is due, in part, to the deliberate nature of e-mail communication and the fact that e-mail communication appears to possess a different level of complexity than face-to-face communication. For this reason, I employed a modified version of Green and Wallat's (1981) sociolinguistic conversational analysis in this study.

The variant of conversational mapping used in the Formal Analysis in this study consisted of elements of both Green and Wallat's (1981) and Goldenberg's (1992/1993) analysis techniques. Table 4 presents the final version which was employed in analyzing the data in this study. This allowed me to examine conversational interactions as they naturally occurred in the course of the Instructional Conversations. In addition examining the syntactic and semantic features of participant utterances, conversational mapping allowed me to identify and explore the structural characteristics (e.g., organizational patterns, sources, forms, strategies,

levels, and ties) that contributed to the conversations. Student and Instructor strategies were borrowed from the coding schemes of both Green and Wallat (1981) and Goldenberg (1992/1993). The graphic symbols were borrowed from Green and Wallat (1981), with modifications, such as the use of a polygon to make a distinction between instructor "directives", "questions" and "responses".

Formal analysis of conversational interactions consisted of several phases which will be outlined below.

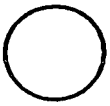
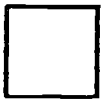
The initial phase of formal analysis consisted of identifying and coding the various units of analysis included in the Green and Wallat technique of Conversational Analysis (see Table 3). This phase of analysis was the most rudimentary of the phases performed in this formal analysis and included:

Identification of Message Units. Different message units (e.g., Green and Wallat, 1981) were identified and designated by employing the abbreviations used in Green and Wallat's (1981) conversational mapping technique (see Table 4). For example, each utterance was numbered according to its chronological order in the conversation. Instructional Sequence Units, (i.e., related utterances) were also identified by grouping utterances that maintained a particularly consistent topical emphasis. Abrupt topical changes typically signaled transitions between various ISU's. Figure 1 provides an example of this phase of formal analysis. Phase Units, as well as other units, were also identified.

Establishment of Connections among and between Utterances. Connections between the various utterances were then identified and recorded onto the conversational maps. This phase of analysis was accomplished by revisiting each conversation in its entirety. Although some of the conversations proceeded in a very straightforward and linear pattern, others were characterized by time lapses between responses and on-going challenges and debate among and between participants. These conversations often contained connections which bridged ISU's and possessed multiple connections to other participant utterances. Figure 1 presents an example of a conversational sequence that had been subjected to this second phase of analysis.

Identification and Coding of Message Boundaries. Message boundaries were then determined and plotted onto conversational maps. Each utterance was thoroughly reread and considered in the context of surrounding utterances, as well as distantly connected utterances. Establishment of message boundaries proceeded in the following manner:

Table 4: Elements of Instructional conversations employed in coding

	Transcript Line			
	Instructor			
Source	Student			
Instructor Forms/ Strategies	Directives			
		Focus	1	Initiate discussion or aspect of discussion
		Complex Lang.	2	Use of course concepts/terminology
		Activate Schema	3	Remind/provide background information
		Raise	4	Aimed at raising level of conversation (not init.)
		Relocus	5	Relocusing on previous question/response
		Restate	6	Repeat all or part of previous message
		Extend	7	Providing additional information
		Clarify	8	Ask for explanation/redefinition
		Ask for Evidence	9	Request for evidence to support statements
		Direct Teaching	10	Supplying information needed/teach concepts
		Control	11	Control interaction/behavior participants
	Questions			
		Focus	1	Initiate discussion or aspect of discussion
		Complex Lang.	2	Use of course concepts/terminology
		Activate Schema	3	Remind/provide background information
		Raise	4	Aimed at raising level of conversation (not init.)
		Relocus	5	Relocusing on previous question/response
		Restate	6	Repeat all or part of previous message
		Ask Evidence	9	Request for evidence to support statements
		Control	11	Control interaction/behavior participants
	Response	(+, -, or 0)		
		Focus	1	Initiate discussion or aspect of discussion
		Complex Lang.	2	Use of course concepts/terminology
		Activate Schema	3	Remind/provide background information
		Raise	4	Aimed at raising level of conversation (not init.)
		Relocus	5	Relocusing on previous question/response
		Restate	6	Repeat all or part of previous message
		Extend	7	Providing additional information
		Clarification	8	Explanation/redefinition
		Ask for Evidence	9	Request for evidence to support statements
		Direct Teaching	10	Supplying information needed/teach concepts
		Control	11	Control interaction/behavior participants
		Confirm + or -	13	Accept/Nonaccept previous response y/n
		Ignore	14	Failure to respond to question/directive
Student Forms/ Strategies	Responses	(+, -, or 0)		
		Focus	1	Initiate discussion or aspect of discussion
		Complex Lang.	2	Use of course concepts/terminology
		Raise	4	Aimed at raising level of conversation (not init.)
		Relocus	5	Relocusing on previous question/response
		Restate	6	Repeat all or part of previous message
		Extend	7	Providing additional information
		Clarification	8	Explanation/redefinition
		Direct Teaching	10	Supplying information needed/teach concepts
		Confirm + or -	13	Accept/Nonaccept previous response y/n
		Ignore	14	Failure to respond to question/directive
	Questions			
		Focus	1	Initiate discussion or aspect of discussion
		Complex Lang.	2	Use of course concepts/terminology
		Raise	4	Aimed at raising level of conversation (not init.)
		Relocus	5	Relocusing on previous question/response
		Restate	6	Repeat all or part of previous message
		Ask for Evidence	9	Request for evidence to support statements
Level	Factual		F	Simple restatement/recounting of info.
	Interpretive		I	Statements "I feel", "I think", "It seems to me", etc
	Application		A	Statements explaining how to use information/idea
Ties	Instructor		T	
	Student		S	
	Course Material		M	
	Other resource		O	

1. The sources of the utterances were the most easily identified of the boundaries. Utterances contributed by the instructor were displayed on the conversational maps employing larger symbols than the student utterances (see Figure 1 for details).

2. Next, the form of the utterance was determined and coded onto the conversational maps. The forms that were identified were either Instructor or Student forms. Instructor forms included directives (directing students to perform a particular analysis or consider a certain topic), responses (reacting and responding to student utterances), and questions (challenging, asking for clarification, requesting further details). Student forms included responses and questions.

Identification and Coding of Strategies. The strategies employed by the participants were then coded onto the conversational maps. This was accomplished by revisiting the utterances, closely studying the connections to surrounding, as well as distant utterances, and coding the strategies which most closely resembled the strategies employed in the utterance. Each individual utterance could potentially be coded as possessing all of the strategies identified, although few of the utterances recorded actually did possess all of the strategies.

Levels of Comprehension. Levels of comprehension were determined, by once again revisiting each of the conversational utterances and coding each as "F" (factual), "I" (interpretive), or "A" (applicative). Utterances which were coded as factual possessed statements which simply stated, recounted, or repeated information pertaining to course discussions, reading, lectures, or other materials. Utterances which were coded as interpretative possessed instances in which the participants proffered their own interpretation of topics that had been read, discussed, or presented in lectures. These (interpretive) utterances were indicated by the presence of phrases such as "I feel", or "I think". Utterances were coded as applicative when they referred to factual or interpretive information in new ways, such as making statements about how the information contained in readings or lectures could actually be integrated into new situations. Applicative utterances typically stated how information might be used.

Cohesive Ties. Finally, cohesive ties were identified and coded onto conversational maps. Cohesive ties were identified by reexamining each utterance and its interconnections to other local and distant utterances. When utterances specifically responded or referred to the instructor (or an utterance made by her) the utterance was coded with a "T" (teacher). Utterances that specifically mentioned, referred to, or repeated a statement made by another participant were coded with an "S" (student). Utterances which made references to, or directly discussed, topics contained in the text employed in the course received codes of "M" (materials). Finally, utterances which made reference to outside materials (e.g., different textual

information, other classes, personal experiences) were coded with an "O" (other).

Divergent or Cohesive Utterances. Last, utterances were placed into one of two categories: (a) divergent or (b) cohesive. Utterances coded as cohesive were directly related to the topic being considered in the instructional sequence unit. Divergent utterances, on the other hand, were utterances which appeared to be unrelated to the topic under consideration.

The next phase in the analysis procedures consisted of transferring all of the coded information from the conversational maps to separate coding sheets. This was carried out for each of the three conversations that were included in the final analysis phase of this study. The coding sheets (see Table 5) were designed to display coded information in a linear format that could be closely examined for emerging patterns of interaction. The data from the coding sheets were thoroughly examined and figures were tallied by percentages. These percentages were then placed on a chart (see Table 6) which allowed visual examination and provided opportunities to compare the three conversational interaction groups included in the study.

An additional procedure was also performed from the data contained in the conversational maps created for each of the three content area conversation interaction groups. Because it was difficult to understand the complex interconnectedness of many of the student and instructor utterances from examination of conversational maps (see example in Figure 2), large versions of conversational maps were created. These maps were constructed on long (25 foot) sheets of construction paper. Conversational utterances were printed, individually cut out, and mounted onto the sheets of paper. Various features of the conversations were color coded to highlight their presence and connections were placed on the maps with varying colors. These maps provided a valuable graphic representation of the conversations that standard size (8 1/2 X 11) paper was unable to create. In addition to aiding in enhanced understanding of the interconnectedness of the conversational interactions, these large maps allowed for the reproduction of the connections on a smaller standard page-sized format (see Figure 3). These graphic representations also allowed for the identification of connections that may have been elusive me had attempts been made to examine the original conversational maps without creating the larger graphic representations.

Through transcription of conversational data, coding of utterances, and mapping the interconnections that existed between and among the numerous utterances (Green & Wallat, 1981; Goldenberg, 1992/1993), it was was possible to identify specific regular patterns of discourse, isolate strategies that influenced interactions, and identify instances in which students appropriated formal concepts through engagement in e-mail mediated Instructional Conversations.

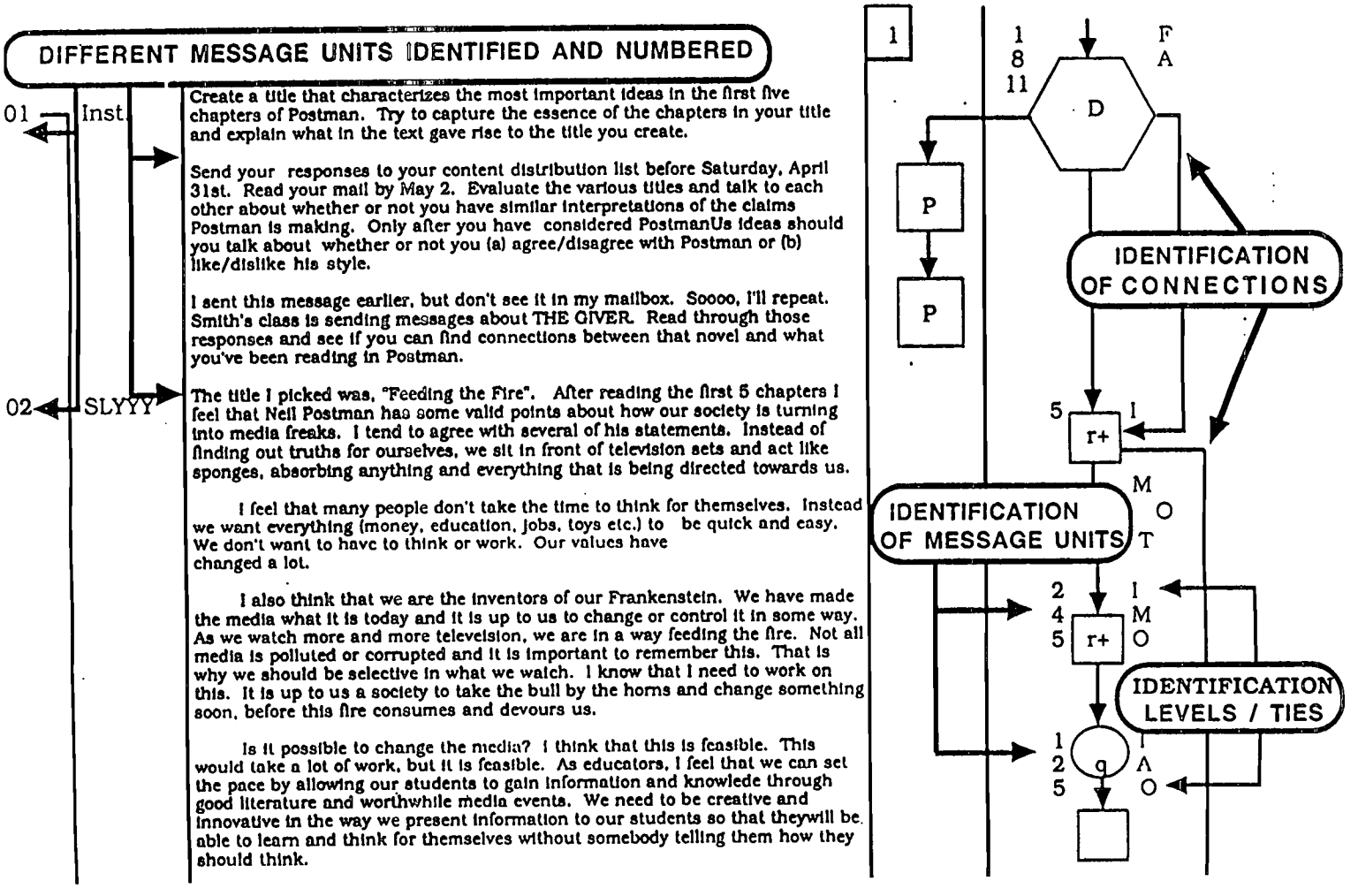


Figure 1: Example of Conversational Mapping with Explanations

Table 5: Coding from SPED Conversational Interactions

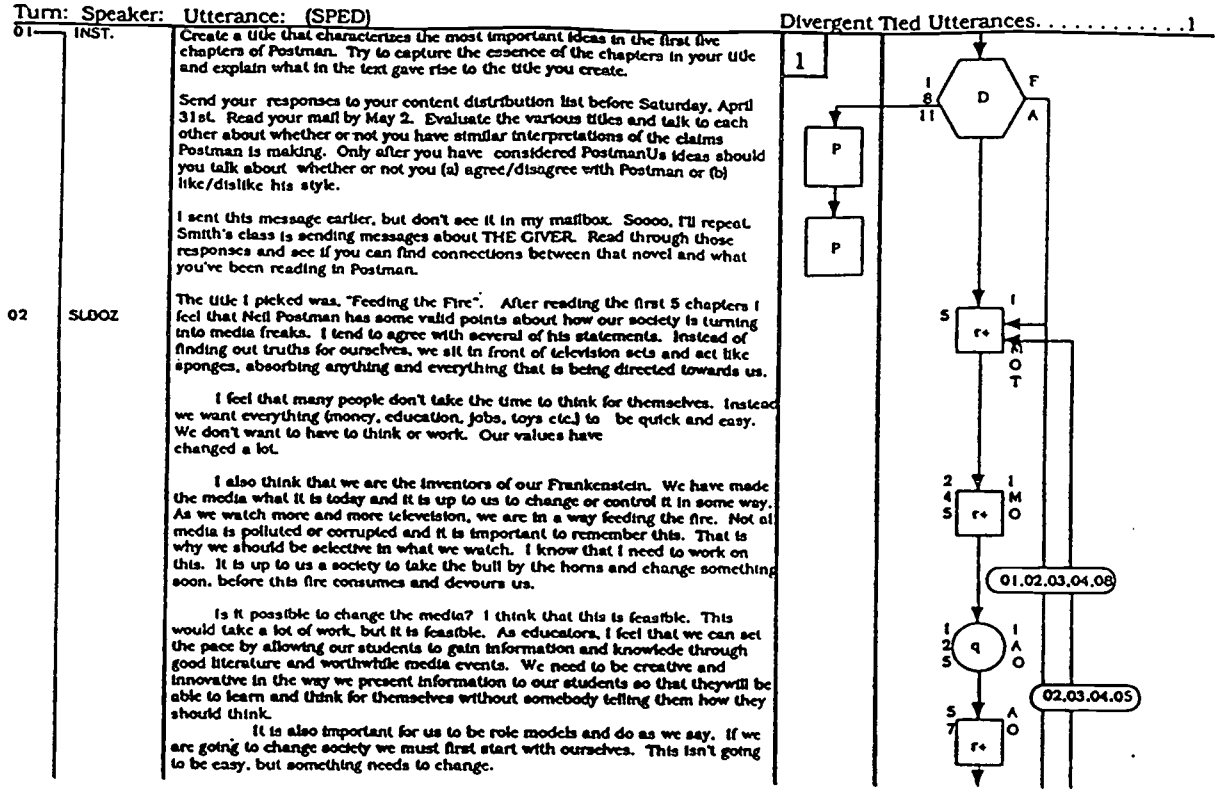
	Transcript Line		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Source	Instructor																	
	Student																	
Instructor Forms/ Strategies	Directives																	
		Focus	x															
		Complex Lang.																
		Activate Schema																
		Raise																
		Refocus																
		Restate																
		Extend																
		Clarify	x															
		Ask for Evidence																
		Direct Teaching	x															
		Control																
	Questions																	
		Focus														x		x
		Complex Lang.																
		Activate Schema					x											x
		Raise																x
		Refocus					x					x						x
		Restate										x						
		Ask Evidence					x					x						x
		Control					x					x						x
	Response																	
		(+ - or 0)																
		Focus																
		Complex Lang.																
		Activate Schema																x
		Raise																x
		Refocus						x										x
		Restate																x
		Extend																x
		Clarification																
		Ask for Evidence																
		Direct Teaching																
		Control																x
		Confirm + or -																
		Ignore																
Student Forms/ Strategies	Responses																	
		(+ - or 0)																
		Focus		x											x		x	
		Complex Lang		x	x	x		x	x	x	x		x		x	x	x	
		Raise		x	x			x									x	
		Refocus		x	x	x		x	x	x	x		x					x
		Restate											x			x		
		Extend		x		x		x	x		x				x			
		Clarification											x					
		Direct Teaching															x	
		Confirm + or -												+		+	-	
		Ignore																
	Questions																	
		Focus												.	x			
		Complex Lang.		x	x			x							x			
		Raise		x	x													
		Refocus		x	x			x	x						x			
		Restate																
		Ask for Evidence												.	x			
Level	Factual		x	x	x	x	x					x	x					x
	Interpretive			x	x	x			x	x			x		x	x	x	x
	Application		x	x		x					x		x		x			
Ties	Instructor			x	x	x				x	x		x			x	x	
	Student												x	x		x	x	x
	Course Material			x	x	x			x	x	x	x	x		x	x	x	x
	Other resource			x	x	x	x		x		x	x	x		x	x	x	x

Table 6

Patterns of Interaction emerging from coding sheets

	SPED	SOCIAL	SCIMATH
Instructor Contributions:	(9/33) 27%	(6/24) 25%	(7/20) 35%
Directives:	(1) 3%	(2) 8%	(1) 5%
Responses:	(4) 12%	(4) 16%	(2) 10%
Questions:	(7) 21%	(3) 13%	(5) 25%
Student Contributions:			
Focus:	(4) 12%	(0) 0%	(0) 0%
Complex Language:	(17) 52%	(13) 54%	(12) 60%
Raise:	(12) 36%	(10) 42%	(3) 15%
Refocus:	(18) 55%	(11) 46%	(13) 65%
Restate:	(9) 27%	(2) 8%	(8) 40%
Extend:	(10) 30%	(6) 25%	(5) 20%
Clarification:	(8) 24%	(5) 21%	(2) 10%
Direct Teaching	(5) 15%	(3) 12%	(2) 10%
Continuance +	(9) 27%	(5) 21%	(5) 25%
Continuance -	(5) 15%	(1) 4%	(0) 0%
Student Questions:			
	(7) 21%	(0) 0%	(1) 5%
Levels:			
Factual:	(14) 42%	(7) 29%	(11) 55%
Interpretive:	(22) 67%	(11) 45%	(10) 50%
Application:	(12) 36%	(7) 29%	(1) 5%
Sources:			
Instructor:	(16) 48%	(12) 50%	(11)55%
Other Students:	(18) 55%	(8) 33%	(7) 35%
Course Materials:	(22) 67%	(12) 50%	(14) 70%
Other Resources:	(16) 48%	(13) 54%	(15) 75%

Figure 2: Example of SPED Conversational Map



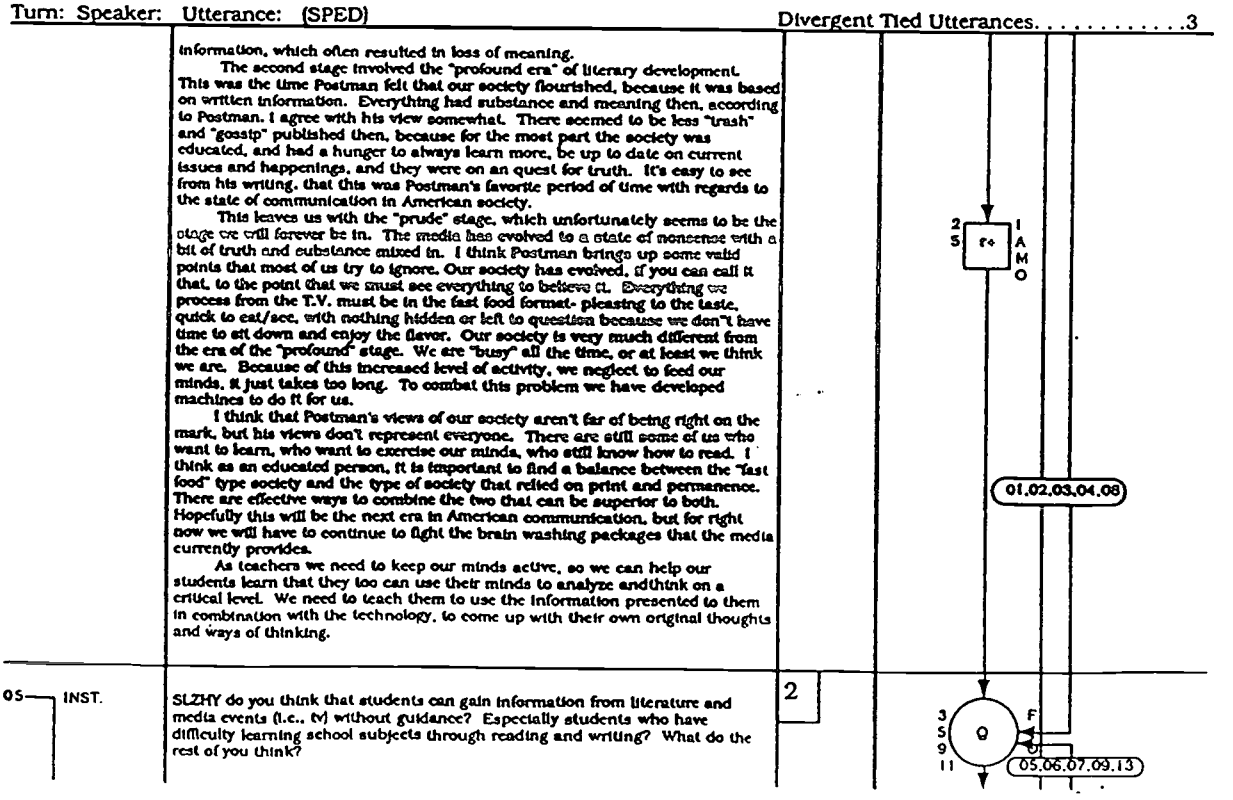
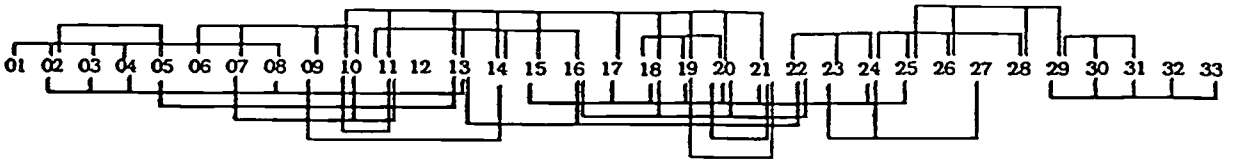
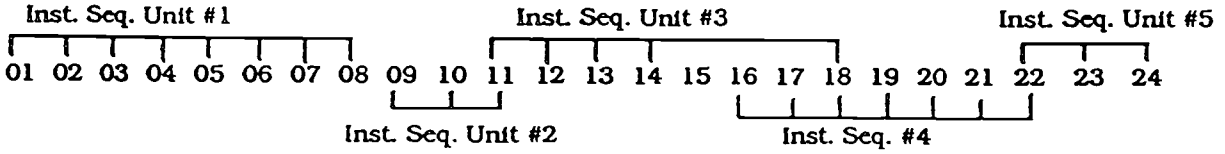


Figure 3: Conceptual Maps of Conversations included in analysis

SPED CONVERSATION



SOC CONVERSATION



SCIMATH CONVERSATION

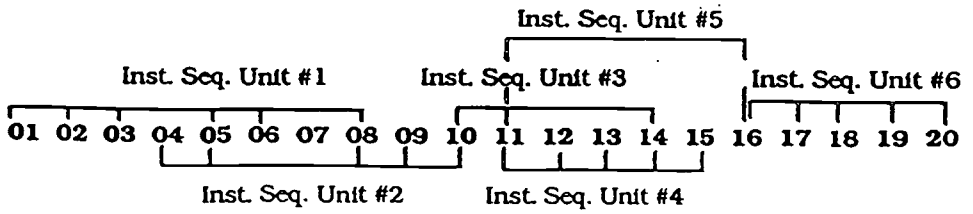
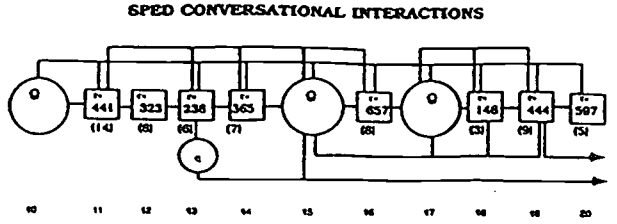


Figure 4 shows examples of some of the types of connections that emerged from the conversational maps and demonstrates the connections that were established as students responded to instructor questions in one of the conversational interaction groups (i.e., the Special Education Group). There are several notable features of the conversational interactions presented in Figure 4 (all from the SPED conversation group) that warrant further clarification. The first pertains to the clearly obvious complex and interconnected nature of the SPED interactions, as compared to the instructional sequence units represented from the other two conversation groups (see comparisons in Figure 5). A second feature pertains to the sheer quantity of utterances contained in the SPED instructional sequence units. Examination of the numbers in the student response boxes for the three SPED conversational interactions indicate that the utterances in the SPED conversation surpassed those of the other two conversation groups with regard to length of responses. This is further supported by the numbers in parentheses, which indicate the number of instances in which appropriate reference to course terminology was employed within the participant utterances. These differences can be understood even more clearly by examining the actual utterances themselves, in the conversational transcripts. It should also be noted that three maps represented in Figures 4 provide evidence that the study participants responded in a distinctive fashion to various *Instructor strategies* employed in the course of the conversational interactions.

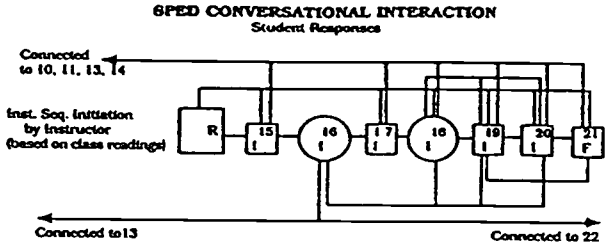
Furthermore comparative maps (in which identical chronological *Instructional Sequences* are compared among the three groups) succinctly demonstrate the salient differences between the interactions of the three conversational groups participating in the study. These comparisons, along with a careful examination of the types of connections associated with them, provide compelling evidence of distinct differences in both the quality and quantity of messages. Figure 5, which contains instructional sequences from all three of the conversation groups, supports the use of conversational mapping techniques and clearly demonstrates the differences that are displayed through the use of conversational maps. In the first map included in Figure 5 (SPED CONVERSATIONAL INTERACTIONS) numerous interconnections are obvious. In addition, the responses in the SPED group are consistently longer and of higher quality (see numbers in parentheses, which represent instances in which participants appropriately employ course terminology). Examination of the SOC and SCIMATH CONVERSATIONAL INTERACTION maps demonstrates the lack of both quantity and quality of these responses. In the SOC conversation group the same question that generated 12 responses in the SPED conversation group generated only 2 responses.

Figure 4: Example of SPED conversation group responses to *Instructor Questions, Instructor responses, & Instructor directives*

Instructor Questions: (SPED)



Instructor Responses: (SPED)



Instructor Directives: (SPED)

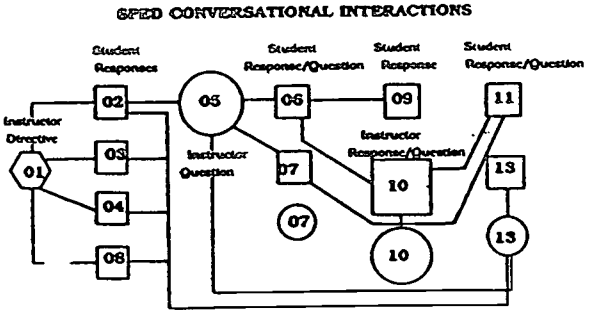
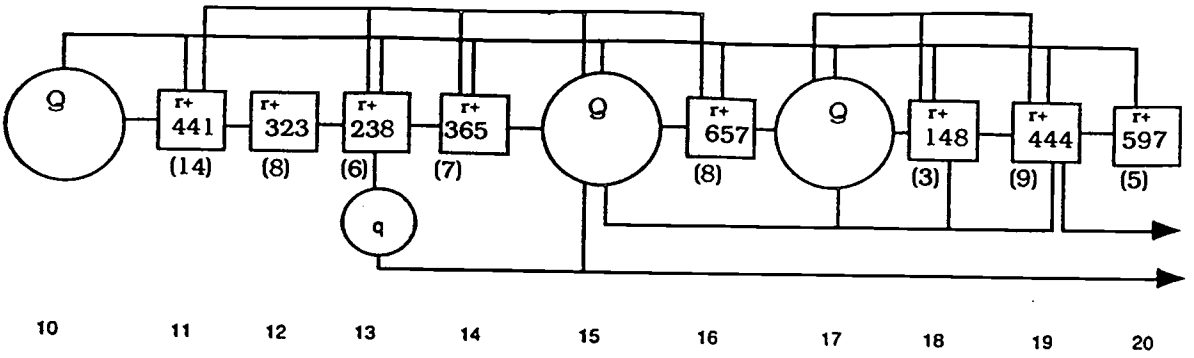
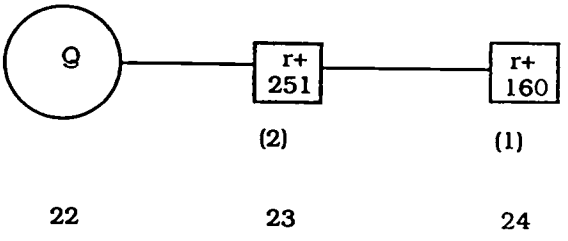


Figure 5 : Comparative examplesof responses of different conversation groups to instructor questions

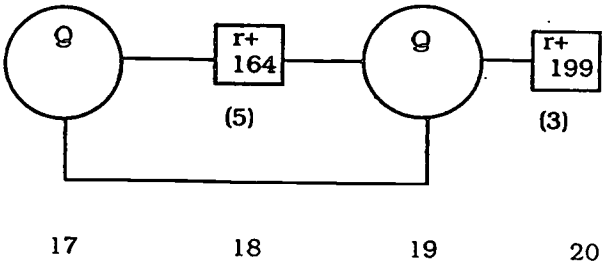
SPED CONVERSATIONAL INSTERACTION



SOC CONVERSATIONAL INTERACTIONS



SCIMATH CONVERSATIONAL INTERACTIONS



Similarly, the SCIMATH conversation group responses to the same question consisted of only 2 student responses.

One must wonder what factors may have influenced the various levels of participation in the e-mail mediated instructional conversations carried out as part of this study. Analysis of the surveys conducted as part of this study revealed that most participants were initially unfamiliar with e-mail communication. Thus, regardless of student's area of specialization, familiarity with e-mail as a vehicle for communicating probably did not influence student levels of participation in the IC's. One difference, however, did exist among the groups prior to the study, and this difference may have influenced the quantity and quality of participants' contributions. Students in the SPED group all reported having more than 100 hours of field experience in schools, whereas only three students in the SCIMATH group reported having 25 hours of such experience and only two students in the SOC group reported having at least 10 hours of field-based experience. Indeed, three of these students in the SOC group reported that they had less than 10 hours of field-based experience. Although speculative, this finding may have influenced the contributions made by participants in these three groups. This is consistent with the work of Lave and Wenger (1991), who have criticized the privileged position of decontextualized discourse patterns in formal academic settings and have challenged many of the basic assumptions that have come to dominate academic institutionalized settings. They assert that traditional approaches to learning (a) assume that teachers and students possess unified goals, (b) adhere to conceptions of learning in which learning is viewed as the simple transmission and absorption of information, (c) view knowledge as an individual cerebral phenomenon isolated from social practice, and (d) ignore the roles of learners in the construction of meaning. Lave and Wenger (1991) suggest that information learned in this traditional manner is seldom internalized in a form that can be readily accessed in new situations or results in what they refer to as *portable* skills (i.e., those available for previously unencountered situations). They maintain that any individual's power to construct usable knowledge is situated in the specific material and social situations in which the individuals co-participate. According to Lave and Wenger's (1991) accounts, the elevated levels of interaction and increased employment of appropriate terminology evident in conversational interactions of the SPED group may be a mere reflection of overall patterns of elevated levels of participation in the professional practices engaged in by teachers (i.e., systematically reflecting on, and articulating the philosophical and theoretical bases for practice). By engaging in actual classroom settings the members of the SPED conversation group were more fully inducted into the legitimate practices that comprise the work of professional educators. These heightened

levels of participation theoretically contributed to the movement of members of the SPED group toward fuller participation in the community of practice. Through increased levels of participation the members of the SPED group gained access to complex performances, not by memorizing formulas and rules, but by engaging in the community of practice, as well as by reproducing the communicative standards of discourse associated with the community. This, in turn, resulted in the conferring of increased levels of legitimacy, empowering the learners to openly defend their professional opinions, and leading to a status equalization that was not present in other conversation groups.

The next general characteristic that emerged from the analysis of e-mail mediated instructional conversations was related to the evolution and establishment of *communities* of practice. This is similar to findings reported by Blanton, Thompson, and Zimmerman (1993), in which they (Blanton, et.al., 1993) analyzed numerous messages to conclude that e-mail communication among preservice, cooperating, and supervising teachers contributed to the joint construction of meaning and mediated the transition from everyday to pedagogical concepts. In conversational interactions produced during the course of this study, in which the purported evolution of community was evident (e.g, the SPED interaction group), participants produced utterances which (a) reflected and expressed a progression away from the novice status which was apparent in many of the participant utterances from other interaction groups included in this study, (b) displayed an increased reliance on one another's responses to counter challenges posed by the instructor, (c) demonstrated a commitment and willingness to defend one another's responses, (d) accessed intellectual resources available through various sources in order to assist in conversational interactions, and (e) employed frequent statements of respect for others' opinions, regardless of obvious intellectual disparities. Once again, however, interactions which possessed these attributes were very limited when considering all of the conversational data gathered for the study. In fact, with the exception of student utterances recorded in the SPED conversational interactions, these attributes were rare, if not absent, in the participant conversational interactions recorded for this study. The interactions comprising the SPED conversation, on the other hand, frequently exhibited elevated levels of intellectual engagement, attempts to take advantage of a wide range of available resources, expressions of respect for one anothers" opinions, willingness to lend support to one anothers" statements, and expressions of professional cohesiveness that were absent in the other conversational interactions (i.e., SOC and SCIMATH conversational interaction groups) analyzed in this study (see Appendix I).

The attributes identified in the SPED conversational interaction are consistent with the

current notions of community (e.g., Lave & Wenger, 1991). Lave and Wenger (1991) specify that communities of practice involve much more than mere technical knowledge and skills. Instead, they (Lave & Wenger, 1991) suggest that communities of practice consist of sets of relationships that exist among members, activities, and other overlapping communities of practice in the world. Communities of practice provide a means and support for interpreting the world according to community standards. To this end, communities of practice engage in the act of reproduction, or activating reproduction cycles. A reproduction cycle relates to the time in which the cycle from novice to full participant takes place. Lave and Wenger (1991) assert that in many academic settings participants are actively denied full access into the community of practice until they have completed graduate school. According to the perspective offered by Lave and Wenger (1991), teacher education programs which rely primarily on course work and an abbreviated student teaching experience (i.e., devoid of an extensive field based component), may be unknowingly delaying access to the reenactment of the reproduction cycles associated with the professional act of teaching. In other words, by postponing field-based experiences until the last phase of the educational process, preservice teachers may be systematically being denied the benefits of early induction into the professional cycle of reproduction associated with teaching.

Based on the conversational analysis conducted in this study, and interpreted according to the work of Lave and Wenger (1991), it is conceivable that the wide disparity existing between the various conversational interaction groups participating in this study is more closely related to the various conversational interaction groups' relative positions within the respective reproduction cycles associated with the various content areas, than it is to individual levels of knowledge and understanding.

As has been reiterated numerous times in the course of this description, neither of the other conversational interaction groups (e.g., SOC & SCI MATH) contributed utterances that would lead one to believe that the participants were acting within a broader community of practice. In fact, the lack of connectedness is the most noticeable feature of both the SOC and SCIMATH conversational interactions analyzed in this study (see Figures 5). For the most part, participants belonging to the SOC and SCIMATH conversational analysis groups neglected to consider other student responses when framing the utterances that they contributed to the conversational interactions. Furthermore, few of the conversational interactions recorded in the SOC and SCIMATH groups referred or even alluded to professional members of their particular communities of practice. This suggests that (a) students comprising the SOC and SCIMATH conversational interactions groups had not been as fully inducted to the community

of practice (i.e., Social Studies educators and Science educators) as the members of the SPED (i.e., Special Education) conversational interaction group had been, (b) these students had not yet actively begun the reproduction cycles associated with induction to the community of practice, and (c) these students had been denied access to the available resources associated with the full participation in the community of practice. In other words, members of the SOC and SCIMATH conversational interaction groups were still, in their final years of preservice teacher training, largely estranged from, and unaware of, the broader community of professional practitioners in the fields of Social Studies and Science education.

One clear and obvious characteristic of e-mail mediated conversations which emerged from the analysis of conversational data in this study relates to the occurrence of explicit utterances that reveal levels of participant background knowledge. Numerous interactions recorded in this study revealed a willingness to disclose personal understanding of various phenomena, which would be highly unlikely in face to-face interactions. Instances in which participants disclosed unanticipated levels of background knowledge were recurrent in the instructional conversations analyzed. Many of the utterances that were made in the course of e-mail mediated conversations would be highly improbable in routine fact-to-face classroom interactions, due to the social constraints of face-to-face interaction. These instance created opportunities for the instructor to address specific issues that emerged from participant statements in an attempt to help facilitate the transition from informal to pedagogical concepts by engaging participants in discourse which provided opportunities to consider and renegotiate meanings.

The numerous utterances collected in the course of this study corroborate and are consistent with Lave and Wenger's (1991) and other Sociocultural Activity theorists' views of learning, in which they maintain that learning involves the reconfiguration, or transformation of preexisting knowledge structures through engaging in activity, or participating in the community of practice, which includes the reproduction of appropriate standards of discourse.

The contents of such utterances may be related to the recognition that spoken and written language often occupy distinct roles, in order to function in various social situations (Horowitz & Samuels, 1987). Because spoken language is typically produced, processed, and evaluated in specific immediate contexts, its structure is customarily episodic, or narrative in fashion. Narrative communication frequently relies heavily on phatic, paralinguistic, and prosodic cues in order to maintain cohesion. Written language, on the other hand, expresses cohesion through devices such as increased lexical density, anaphoric/cataphoric relations, conjunctions and symbolic devices (Horowitz & Samuels, 1987). Furthermore, written

communication allows conversational participants to consciously plan, elaborate, reflect, evaluate, and revise utterances that are in the process of being produced. These devices enable conversational participants to employ abstract, decontextualized patterns of discourse (Wertsch, 1991) when engaging in written discourse.

One explanation that appears congruous across the e-mail mediated conversational interactions analyzed in this study regards some participant utilization of intertextual resources when engaging in e-mail mediated instructional conversations. It appears that some participants displayed greater facility in drawing upon one another's experiences, textual information that may not be immediately accessible in face-to-face situations, and other resources (e.g., class discussions, instruction, etc.) that conceivably contribute to increased understanding and facility to engage in meaningful conversational interactions with one another, when communicating via e mail.

Another characteristic of e-mail mediated instructional conversations that emerged from this analysis relates to the breakdown of customary status and power boundaries. It appears that engagement in e-mail mediated instructional conversations may contribute to a weakening of traditional authoritarian, teacher-dominated instruction. Numerous instances were identified through analysis of conversational interactions in which traditional status boundaries were seemingly reduced or ignored. Sproull and Kiesler (1986), Siegel et al., (1986), and Dubrovsky et al., (1991) have referred to this breakdown, or weakening, as status equalization. Evidence of status equalization was identified in all of the content area conversational interactions included in this study and ranged from subtle opposition to ideas expressed by the instructor to direct and confrontational challenges directed at the course instructor. Through close examination of conversational interactions three perceptibly distinct patterns of status equalization and resistance emerged from the analysis of the data. These included (a) overt indifference to actively engaging in e-mail mediated instructional conversational interactions, (b) subtle but inconsequential complaints about the amount of work required for the course, and (c) direct and thoughtful challenges to the course instructor, as well as to concepts typically taught in content area reading courses.

The first, and most pervasive pattern of resistance that emerged from the data analysis consisted of a simple and overt indifference to actively participating in the content area-specific, e-mail mediated instructional conversations required for successful completion of the course. Numerous researchers (e.g., Goodlad, 1984; Cuban, 1984; Sizer, 1985; Alvermann, O'Brien & Dillon, 1990) have examined the dominance of teacher-talk, or what O'Brien, Stewart & Moje (1995) refer to as the *pedagogy of control*. O'Brien, Stewart and Moje (1995) assert that student

response to such instruction is often one of ordered disengagement or minimal engagement (p. 453). Although students are typically required to be physically present in classrooms during instruction, this physical presence alone seldom insures active engagement on the students' parts. Even though students are not typically free to physically remove themselves from instructional settings in which they are minimally engaged, they may passively resist teacher dominated instruction while remaining in the physical environs. However, because the students physically remain, this is often mistaken for engagement. It may be through the employment of e-mail for instructional purposes, such as Romiszowski's (1990) e-mail seminars or the present study's e-mail mediated instructional conversations, that new perspectives of school *culture* are activated in student minds. When teachers relinquish some of the control that has traditionally been associated with instruction, it is possible that the beliefs, values, and ways of acting among a group of people (e.g., schools) evolve new and distinctive ways of communicating and legitimizing knowledge. In other words, failure to actively engage in e-mail mediated instructional conversations may be a simple extension of an already firmly established practice (e.g., ordered disengagement/minimal engagement), that finds new expression when instructors employ e-mail for instructional purposes. Although not required to physically inhabit a seat in a classroom, students still retain the ability to reflect their estrangement from the community of discourse that dominates the instructional setting (i.e., e-mail), by limiting their participation. Unfortunately, however, it is impossible to determine the source of this detachment if the student neglects to participate in the community.

Perhaps the failure to participate was related to student participants' individual conceptions of their relative status within the particular community of practice. Stewart, O'Brien, and Moje (1995) assert that positivist orientations to pedagogical practices have tended to view pedagogy as something that is *done* to learners, or that involves teachers' control, or telling of information to students. Students accustomed to instruction in which "Initiation/Response/Evaluation" (IRE) patterns perform a primary function could fail to recognize how their participation in open-ended e-mail mediated instructional conversations might occupy a significant position in an instructional situation. This is clearly demonstrated in the numerous study examples, in which student participants candidly seek, and express willingness to acquiesce to the instructor's interpretation of highly complex instructional issues. Non-participation may be a natural outcome of any instructional setting. However, in approaching instruction through the employment of e-mail mediated instructional conversations, numerous opportunities to withdraw from participation are present for the learner. Likewise, opportunities for increased participation are available.

The second pattern of status equalization that was identified consisted of challenges to the course instructor. These challenges were typically subtle and usually consisted of little more than complaints about the amount of work required in the course. In other words, rather than actually challenging the validity of course concepts, these challenges were typically expressions of dissatisfaction with procedural issues involved in the course. Unlike the participants described in the first pattern of status equalization, most participants issuing these subtle challenges continued to contribute to the conversation over the course of the academic quarter, despite their expressions of displeasure. Although the utterances that displayed this kind of status equalization are more explicit challenges to authority than those described earlier, the implicit distinction between instructor and student still constrains the level at which these student participants may be comfortable in challenging the course instructor. Rather, conversational utterances included in this area of status equalization seem to possess elements of moderation that prevent direct and forceful challenges to the authority of the instructor. Unlike other participant utterances described, these utterances reflect an implicit concern to conform to the communicative norms that often operate in regular face-to-face classroom settings. The participants producing these utterances appear to want to openly express their opinions and attitudes about the topics being considered in the instructional conversation, but seem to fear reprisals from the instructor. Once again, this is understandable, given the probability that few of the students participating in this study have been placed in an instructional situation that diverges drastically from traditional communication norms in classroom settings.

The third pattern of status equalization that was identified was quite distinct from the other two patterns. It consisted of direct challenges to the academic authority of the course instructor. This pattern of status equalization was much more complex than the other two patterns and reflected the substantial theoretical and philosophical differences that have typically existed between special educators and regular educators (e.g., behavioral vs. constructivist learning theory).

Utterances that were categorized in this third type of status equalization seemed to reflect (a) a deterioration of traditional status subordination associated with expert/novice (e.g., instructor/student) relationships, (b) elevated levels of conversational participation, both in quantity and quality of utterances, (c) an elevated employment of decontextualized and abstract terminology, (d) a professional demeanor clearly absent in the majority of conversational interactions, and (e) possession of a commitment to ideas that was absent in the other two classes of resistance discussed earlier.

The emergence of these patterns of status equalization is consistent with the findings of Sproull and Kiesler (1986), Siegel et al., (1986), and Dubrovsky et al., (1991), who examined the phenomenon of the weakening of typical hierarchical status boundaries between instructors and students engaged in e-mail communication. In the course of this study I found that e-mail communication (a) contributes to the erosion of typical status boundaries, and (b) reveals significantly higher rates of uninhibited responses than face-to-face conversations.

This study addressed a number of problems germane to the use of e-mail mediated Instructional Conversations as a means of assisting preservice teachers in appropriating the formal concepts associated with content area reading and writing issues. First, it provides evidence to support the employment of the sociolinguistic mapping techniques of Green and Wallat (1981) and Goldenberg (1992/1993) in providing a powerful and effective means of examining conversational interactions from within the social and cultural contexts in which they occur. Second, this study has added evidence to support the view that the types of moves or strategies enacted by Instructional Conversation facilitators (i.e., course instructors) can influence the manner in which student participants react or respond to instructor moves. Third, regardless of instructor moves and strategies, specific conversational interaction groups possess social and cultural differences that are closely related to practical experiences associated with professional practice and the legitimacy that is conferred, or naturally ensues from such experiences. Finally, it has been demonstrated that e-mail mediated Instructional Conversations may possess certain advantages over traditional face-to-face interactions when attempting to facilitate the appropriation of formal concepts and establish discourse patterns more congruent with the practice of the professional community of educators.

Nevertheless, much remains to be accomplished in bringing about a more comprehensive understanding of how e-mail technologies might be effectively employed in instructional settings. Specifically, the analysis of e-mail mediated Instructional Conversations is an area in which further research is needed. Although employment of the Green and Wallat (1981) and Goldenberg (1992/1993) sociolinguistic conversational mapping technique offers a unique and productive means of analyzing conversational interactions, further employment of the technique will certainly bring about additional insights and refinements that will result in deeper clarification and understanding of the sociocultural contexts in which Instructional Conversations occur.

Likewise, even though the Goldenberg (1992/1993) strategies for conducting face-to-face Instructional Conversations (see Table 1) provide a starting point for extending these strategies to e-mail mediated conversational interactions, this study has identified important ways in

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