The Video Analyst's Manifesto
(or The Implications of Garfinkel's Policies for the Development of
a Program of Video Analytic Research within the Learning Sciences)

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Abstract: Cast as a manifesto, this chapter presents a set of foundational principles for conducting "video research" within the learning sciences. Our proposed approach draws chiefly upon the literature and methodology of Conversation Analysis (CA). Conversation Analysis developed out of and shares the thematic interests of the broader field of inquiry known as Ethnomethodology (EM). EM is centrally concerned with practical reasoning and the procedures (i.e., "methods") participants (i.e., "members") employ in making sense of their own actions and the actions of others, that is in creating "local rationality." CA focuses specifically on the methods members employ in competently producing conversation. Our proposal calls for analogous research into how members engage in instruction and learning. A rigorous methodology has been developed for conducting CA studies and an elaborate and carefully-integrated research literature has been amassed over the years. In some of the foundational writing on EM, Garfinkel proposed a set of policies for EM research. Since we suggest that video analytic research in the learning sciences be conducted using CA methodology and given CA's thematic link to EM studies, we believe that Garfinkel's policies might provide useful guidelines for future research on learning practices.

Keywords: video analysis, ethnomethodology, Conversation Analysis

The Role of the Video Analyst in Educational Research

The work of educational research is to identify ways of improving instructional practice through the design and introduction of instructional innovations. This work is traditionally carried out by two kinds of specialists: *Curricular designers,* including learning theorists, technology developers, and content experts (e.g., mathematicians, natural scientists, etc.), who develop the innovation, and *program evaluators* who assess its effectiveness. Instructional innovations, however, do not exist as abstractions. They are brought to life through the moment-to-moment interactions of classroom participants (i.e., teachers, students, curriculum designers) as they go about their daily activities. Documenting how innovations are produced as practical, emergent interactional achievements is the work of the *video analyst*.

Research on educational innovation requires a diversity of research skills and approaches. A typical attempt at significant reform involves the design of technical artifacts, activity structures, institutional practices, instructional scaffolds and curricula that interact with each other. Not only is a multidisciplinary team needed in the curricular design role, but the program evaluation role also needs a diversity of methods. This need has been partially addressed by discussions of design-based research (Brown, 1992; Design-Based Research Collective, 2003). However, it is not just a matter of measuring complex outcomes. It is necessary to look at the actual practices of instruction and learning that take place under evolving conditions. Innovations do not directly produce outcomes,

but are mediated by the activities and interactions that instantiate the innovations in the classroom. This essentially transforms and interprets the intended innovations of the curricular designers (Remillard & Bryans, forthcoming). Special techniques and methodologies are needed to analyze these mediational processes. Digital video provides an enabling technology and we propose a specific approach to conducting video analysis.

As video analysts, we are concerned with what might be termed *the practices of learning*. Instruction is one aspect of these practices, but if we say video analysts study instructional practices, this might be misconstrued to mean that we are only interested in the activities of teachers. All who are engaged in the conduct of education (i.e., students, teachers, administrators, evaluators, curriculum developers, etc.) are inevitably engaged in the practices of learning (though their roles may be different in each case), and so the province of study for video analysts in the learning sciences is indeed quite broad. Studies of the details of the practices of learning are only rarely included as part of the work of designing and evaluating instructional innovations. Such forms of analysis, however, could enable designers and evaluators of instructional innovations to become more articulate about the nature of the innovation itself. Video analysis offers a means for overcoming the 'theory-into-practice' problem by documenting how a pedagogical theory is actually constituted through concrete, interactional practices. Video analysis can be fruitfully performed at different stages of a project. First, an analysis of practice *prior to* development of an innovation can inform design work by revealing aspects of existing practice that are difficult or problematic. Second, an analysis of practice *during* the introduction of the innovation can help us understand the process (and problems) of changing practice. Finally, analyzing practice *after* introduction of the innovation can provide a basis for documenting the effective features of the innovation.

This paper is offered as a manifesto or declaration of principles for how a program of video research within the learning sciences might be undertaken. Our approach draws most directly upon the literature and methodology of Conversation Analysis (CA). Conversation Analysis (Sacks, 1992; Heritage, 1984, 1995) developed out of and shares the thematic interests of the broader field of inquiry known as Ethnomethodology (EM) (Garfinkel, 1967, 2002; Heritage, 1984; Psathas, 1995; ten Have, 1999). EM is centrally concerned with practical reasoning and the procedures (i.e., "methods") participants (i.e., "members") employ in making sense of their own actions and the actions of others, that is in producing what could be called "local rationality" (Heap, 1995). A variety of different methodologies have been developed for doing EM research. CA focuses specifically on the methods members employ in competently producing conversation. Research in CA employs specialized transcription conventions and a logic of "analytic induction" (Heritage, 1995).[1] A well-elaborated research literature employing this methodology has been amassed over the years. Heath (1987) introduced the term "video analysis" to describe a program of studies employing CA methods and with strong ties to the CA research literature. Video analysis represented a departure from traditional CA research, however, on two grounds first, as the name suggests, video analytic studies are based upon video-based materials (as opposed, for example, to audio recordings of phone conversations); second, video analysis concerns itself, not only with talk, but also with embodied aspects of interaction and the ways in which interaction depends upon and employs the material environment in which it is produced.[2]

In his foundational work, Garfinkel (1967) advanced a set of policies for EM research. Since we propose that CA methodology be appropriated for video analytic research in the learning sciences, and given CA's thematic link to EM studies, we believe that Garfinkel's policies serve as useful organizing principles for research on learning practices. An ethnomethodologically-informed approach to the study of learning practices, however, requires thinking about learning in new ways. Before addressing Garfinkel's policies, therefore, we will first address re-thinking learning as a phenomenon of social practice.

Transactional Inquiry into Instruction-and-Learning

Educational research in the United States is built upon the disciplinary foundations of educational psychology (Lagemann, 2000). Although educational psychology is dedicated as a discipline to the study of how educational practices might lead to improvements in learning, it has no tools for directly studying learning practices themselves. Its stock in trade is the development of instruments for indirectly measuring learning construed as an internal, "occult" mental event that is not directly observable by researchers. In this way, educational research devotes extensive resources to evaluating innovations in practice without having means of inquiring into the nature of the innovations as a form of practical accomplishment. Since instruction is an inherently social activity, it might make sense to turn to the social sciences for a means of studying the practices of learning. Mainstream sociology, however, suffers from a problem similar to that of educational psychology in that it attempts to identify structural elements that effect social order without ever studying the actual practices through which social order is produced

and recognized (Garfinkel, 1967, 2002). It, like educational psychology, therefore, fails to offer appropriate tools for studying learning practice.

Ethnomethodology, on the other hand, does provide a framework for studying learning practice as member's methods of sense production. EM emerged historically from sociology and serves as a critical response to the "structural functionalist" (Heritage, 1984) tradition in sociology. To apply an ethnomethodological lens to learning practices, however, we need to re-think what we mean by 'learning,' understanding it not in its conventional and psychologically-infused sense, but rather treating it as a form of practical reasoning embedded in social interaction.

Instruction and learning are such slippery ideas. They are used in so many ways to describe so many different kinds of activities. This, of course, can be a source of considerable confusion if people have different ideas about what instruction and learning are and what they are not. People conventionally talk of learning as an experienced, but not observable, mental event. Instruction is construed as a procedure for fostering this experience in others. Dewey and Bentley (1949/1991) in their call for what they termed "transactional inquiry" into human behavior wrote:

> In ordinary everyday behavior, in what sense can we examine a talking unless we bring a hearing along into account? Or a writing without a reading? Or a buying without a selling? (p. 127)

Similarly, to speak of some activity as instructive, we must give an account of the ways in which it was taken up as such by participants. It is not enough to hypothesize that something was learned. One must also explain how the participants jointly went about treating some matter as learnable and learned. To distinguish between our sense of doing learning as a transactional phenomenon and the more common sense of learning as a psychological matter, we will introduce the hyphenated form *instruction-and-learning* for the latter phenomenon. Our task here is to show how Garfinkel's policies might inform the study of instruction-and-learning.

Garfinkel's Policies for Ethnomethodological Inquiry

Garfinkel (1967) provided five policies as a starting point for ethnomethodological studies. Garfinkel's policies are densely worded and, though presented as five independent items, are complexly interconnected and overlap considerably in their scope. In attempting to summarize them here, therefore, we have extracted a key theme from each policy statement and have attempted to explain the significance of the themes to video analytic research. In particular, we have translated Garfinkel's terminology (indifference, inspectability, relevance, accountability and indexicality) into the manifesto proclamation that data for video analysis is everywhere, visible, grounded, meaningful and situated.

Policy 1: Data Is Everywhere

> An indefinitely large domain of appropriate settings can be located if one uses a search policy that *any occasion whatsoever* be examined for the feature that "choice" among alternatives of sense, of facticity, of objectivity, of cause, of explanation, of communality *of practical actions* is a project of members' actions. Such a policy provides that inquiries of every imaginable kind, from divination to theoretical physics, claim our interest as socially organized artful practices. (Garfinkel, 1967, p. 32)

EM is concerned with the practices people engage in to make sense of each other's activities. Since human interaction always constructs meaningful order, the EM researcher can analyze almost any interaction and discover interesting processes of meaning construction and order negotiation. Sacks (1992), for instance, argued that for people to be able to understand each other within a complex culture, social practices must be relatively standardized and ubiquitous, and that this has methodological implications for the researcher:

> Then it really wouldn't matter very much what it is you look at—if you look at it carefully enough. And you may well find that you got an enormous generalizability because things are so arranged that you could get them; given that for a member encountering a very limited environment, he has to be able to do that, and things are so arranged as to permit him to. (p. 485)

This addresses the problem of case studies. A traditional sociological approach seeks out special events to analyze or imposes laboratory controls on large numbers of cases and computes sophisticated averages. But the phenomena of everyday practice that are of interest to EM and fall below the radar of more mainstream social science and folk theories can be studied in depth in arbitrary individual instantiations. Such studies are not "merely anecdotal," as some critics might suggest, however. The charge of being anecdotal refers to the making of general or universally-quantified claims based on a single case. Most descriptive work is designed to warrant existensially-quantified claims, however something is noticed and argued to be true in a particular case. The charge of being anecdotal does not apply, therefore.

Because any site is as likely as another to reveal the artful practices of rational action, the EM analyst has great latitude in selecting settings in which to do analysis. In particular, any circumstance, situation or activity which participants treat as one in which instruction-and-learning is occurring can be investigated for how instruction and learning are being produced by and among participants.

As we will discuss in reference to Policy 3, below, the criteria by which site selection is to be done has to do with what the participants took what they were doing to be. The work of the analyst is to conduct an empirical investigation into what participants are doing through their interaction – it is not to impose a theoretical category from outside the interaction. If researchers begin their investigation by seeking out a site that represents 'best practice' or 'exemplary instruction' or 'an example of innovation x,' they will have begun their investigation by presuming what their investigation is ostensibly designed to investigate. As analysts, we do not presume that we are more informed about learning-and-instruction than the practitioners who do learning-and-instruction. It is not for us to bring to the table preconceived notions or theories of learning and instruction and then see if they are operational within a scene. Instead, the video analysis we propose consists of descriptions of the actions that practitioners perform. These descriptions are specifically oriented to display the sequential organization and orderliness that informs these actions and that these actions are designed to produce. The analyst does not select data as 'cases of x,' but determines what the data is about based on what the data shows the participants to be attending to; as Schegloff (Prevignano & Thibault, 2003) describes the methodology of CA or EM,

> The most important consideration, theoretically speaking, is (and ought to be) that whatever seems to animate, to preoccupy, to shape the interaction *for the participants in the interaction* mandates how we do our work, and what work we have to do. (p. 25)

The policy of setting aside or bracketing out externally-supplied characterizations of what participants are doing in conducting an analysis is sometimes described as ethnomethodology's studied indifference to members' matters, that is, refusing to impose one's own interests. It is this indifference that makes ethnomethodological input to a project problematic. Video analysis, conducted under the auspices of Garfinkel's policies, cannot pass judgment on what might serve as good or bad or even representative practice. EM studies are purely descriptive and cannot be used to form prescriptive judgments. We believe these problems can be overcome, however, through an appropriate division of labor among curricular designers, program evaluators and video analysts. EM studies can be used to document what members do in carrying out educational activities and, in so doing, produce the *data* by which curricular designers and evaluators carry out their respective tasks.

Policy 2: Data Is Visible

> It is not satisfactory to describe how actual investigative procedures, as constituent features of members' ordinary and organized affairs, are accomplished by members as recognizably rational actions in *actual occasions* of organizational circumstances by saying that members invoke some rule with which to define the coherent or consistent or planful, i.e., rational, character of their actual activities. Nor is it satisfactory to propose that the rational properties of members' inquiries are produced by members' compliance to rules of inquiry. (Garfinkel, 1967, p. 32-33).

The idea that social practices are a matter of following culturally defined rules is incoherent, as Wittgenstein had already argued (Wittgenstein, 1953): Tacit practices and group negotiations are necessary at some level to put rules into practice, if only because the idea of rules for implementing rules involves an impossible recourse. Although there is certainly order in social interactions that people are not explicitly aware of but that can be uncovered

through micro-analysis, this order is an interactive accomplishment of the people participating in the interactions. While the order has aspects of rationality and meaning, it is not the result of simply invoking or complying with a determinate rule. Consider, for instance, the orderliness of traffic flows at stop signs. The smooth functioning in accordance with traffic laws is continuously negotiated with glances, false starts and various signals. Although we do not usually explicitly focus on how this is accomplished unless we take on an analyst's perspective (because explicit awareness is not usually necessary for achieving the practical ends), the signs that are exchanged are necessarily visible to the participants and accordingly accessible to a researcher with appropriate means of data capture.

Participants, "as members to an organized arrangement" (Garfinkel, 1967, p. 32), are continuously engaged in the work of making sense or meaning of their own and others' actions. The imputed sense or meaning of an action or of a sequence of actions is not determinate, however, but is instead endlessly open to new interpretation. As Heritage (1984) explained, "The task of fellow-actors … is necessarily one of *inferring* from a fragment of the other's conduct and its context what the other's project is, or is likely to be" (p. 60). In other words, it is the way that actions unfold that gives them the sense they have. Furthermore, actors are selective in what they treat as relevant so that many aspects of an action's sense remain indeterminate. The only requirement that actors themselves place on their sense-making is that it be adequate for the purposes at hand. Meaning, therefore, is "a contingent accomplishment of socially organized practices" (p. 33).

Members' talk and action has a reflexive character, which is to say that it is simultaneously "context-shaped" and "context-shaping" (Heritage, 1984). The meaning of any action depends crucially upon the context within which it is performed. At the same time, the action itself re-shapes the context in ways that will inform the understandability of other actions that follow. Heritage (1984) referred to this as being "doubly contextual" (p. 242). To study instruction-and-learning as a form of practice, therefore, we need to examine how particular actions provide for their own understandability *as* instruction-and-learning. Said another way, we need to study observed actions as resources by which actors can produce the sense of prior actions in light of the current action, and make relevant and sensible possible subsequent actions.

An investigation must rely on the actual practices of the participants as they are engaged in the work of instruction-and-learning to provide an adequate description of this work. Such an analysis would constitute a description of the determinate sense of the situation that members construct through their actions. In order to document members' practices in detail, repeated inspectability of these practices is necessary. Video technology provides for the repeated inspectability of instruction-and-learning. This inspectability serves as the only legitimate basis for making claims about instruction-and-learning. As EM pioneer Schegloff (quoted in an interview published in Prevignano & Thibault, 2003) recently argued, "These days, only such work as is grounded in tape (video tape where the parties are visually accessible to one another) or other repeatably (and intersubjectively) examinable media can be subjected to serious comparative and competitive analysis" (p. 27f). In other words, analytical claims about instruction-and-learning practices must be grounded in observable actions captured in the recordings which establish the facticity and relevance of the claimed matter for the participants themselves. This point is closely related to the remaining three policies.

Policy 3: Data Is Grounded

> A leading policy is to refuse serious consideration to the prevailing proposal that efficiency, efficacy, effectiveness, intelligibility, consistency, planfulness, typicality, uniformity, reproducibility of activities—i.e., that rational properties of practical activities—be assessed, recognized, categorized, described by using a rule or a standard obtained outside actual settings within which such properties are recognized, used, produced, and talked about by settings' members. (Garfinkel, 1967, p. 33)

It does not suffice to offer descriptions that depend upon categories defined outside of the situation under study (e.g., student, teacher, gender, learning-disabled, low-achieving, socio-economic status, language ability, etc.) as accounts for what participants do or don't do. Garfinkel's third policy dictates that our theories about learning practices must not only be substantiated in the observational data, but should arise from and be grounded in that data. Specifically, we must "bracket out" our pre-existing theories and understandings while constructing our analyses and introducing

categories to account for behaviors only when we can empirically demonstrate their "relevance" as evidenced by the talk and activities of the participants. As Schegloff (1991) observed,

> There is still the problem of showing from the details of the talk or other conduct in the materials that we are analyzing that those aspects of the scene are what the parties are oriented to. For that is to show how the parties are embodying for one another the relevancies of the interaction and are thereby producing the social structure. (p. 51)

Further, this policy specifies that actors are not "judgmental dopes" who are incapable of monitoring and acting upon their circumstances. They are capable of making choices and they have a shared, if provisional and defeasible, sense of propriety with respect to what they both can and cannot do and what they should and should not do. While this sense of propriety may or may not be something actors can account for, it is evident in what they do and the way they do it. The work of instruction-and-learning, therefore, as it is actually done is an ongoing sequence of contingent practices commonly shared among and recognizable by participants. Whether or not a situation is an instance of learning-and-instruction or of successful innovation is not a matter for curricular designers or program evaluators to judge *a priori*, but for video analysts to demonstrate in their empirical analysis of how the participants took their own activities. This does not mean that it is a matter for the participants to address in post hoc surveys, interviews or focus groups either. For retrospective rationalizations are not the same as the sense making that is enacted *in situ*. It is up to the video analysis to ground judgments in the traces of the interactive actions of the participants.

Policy 4: Actions are Accountable

> The policy is recommended that any social setting be viewed as self-organizing with respect to the intelligible character of its own appearances as either representations of or as evidences-of-a-social-order. Any setting organizes its activities to make its properties as an organized environment of practical activities detectable, countable, recordable, reportable, tell-a-story-aboutable, analyzable—in short, *accountable*. (Garfinkel, 1967, p. 33)

Actors organize their activities in ways that provide for their intelligibility as reportable and inspectable. To be a bit more specific, we assume that people do things in ways that are inherently designed to make sense. This is a powerful assumption because it allows us to say that actions and the sense associated with them are sequential in nature and that this sequential organization produces, sustains and is informed by members' shared sense of the local social order. This allows members to recognize prospectively and retrospectively that they are engaged in the work of instruction-and-learning as they engage in that work.

When Garfinkel refers to behavior as being *accountable*, the word can be understood in two senses. First, members can (and are) responsible for their actions and are accountable to their interlocutors for utterances and actions which may appear to be without reason or rationale. Second, and more obliquely, Garfinkel is contending that all behavior is designed in ways to give an account of the action as an instance of something or the other. It is the work of the video analyst to document how this is accomplished.

Policy 5: Data Is Situated

> The demonstrably rational properties of indexical expressions and indexical actions is an ongoing achievement of the organized activities of everyday life. (Garfinkel, 1967, p. 34).

Indexical expressions are those whose sense depends crucially upon knowledge of the context within which the expressions were produced. The most obvious examples are expressions that contain deictic terms such as *here, there, I, you, we, now, then*, etc. To make sense of an utterance containing such terms, it will generally be necessary to know who is the speaker, who is the audience, where the speaker and audience are located, when the utterance was produced, etc. Any sentence containing such elements will have different interpretations or meanings depending on the circumstances in which it is produced. Because of this, deictics are sometimes referred to as "shifters" by linguists. Logicians and linguists "have encountered indexical expressions as troublesome sources of resistance to the formal analysis of language and of reasoning practices" (Heritage, 1984, p. 142).

One of Garfinkel's contributions was to note that deictic terms are not the only ones that have indexical properties. Heritage (1984) provides the example of the assessment, "That's a nice one," offered while the speaker and the listener are attending to a particular photograph. What qualifies the picture as nice (e.g., its composition, color rendering, content, etc.) is not made evident by the utterance and must somehow be worked out by the listener by inspecting the object in question. In this way, non-deictic terms such as *nice* are also indexical in use.

Not only expressions, but also socially-organized actions can have indexical properties. Imagine two people standing face-to-face and one participant reaching out and touching the other. The meaning of this act, however, as a warning, provocation, greeting, demonstration, empathetic gesture, act of belligerence, etc. depends crucially on context, on the nature of the interaction that immediately preceded and immediately follows the touch.

The fact that the meaning of indexical expressions and actions cannot be determined isolated from the circumstances within which they were produced does not usually present a problem for participants. For starters, participants inhabit the situations within which the expressions and actions are produced and, as a result, are naturally supplied with many resources for resolving their meaning for present purposes. Further, participants have the opportunity to dispel any residual ambiguity through additional sense negotiation. Ultimately, however, all indexical expressions and actions are always contingent and to some degree indeterminate in ways that are deemed acceptable to actors themselves. For Garfinkel, the question of how this indeterminacy is managed in the nonce on a routine basis was at the heart of all ethnomethodological inquiry. It would appear to have similar importance for video-analytic work in the learning sciences.

Bridging the Gap: The Proper Role of Video Analysis

An example of ethnomethodologically-informed research on an instructional innovation can be seen in a decade-long (and ongoing) project at Southern Illinois University School of Medicine to document what participants do in Problem-Based Learning (PBL) tutorial meetings (Koschmann et al., in press). In this case, PBL is a well-established instructional innovation, but one for which the documentation of how learners actually produce PBL as an interactional achievement is sparse (Hak & McGuire, 2000). This project illustrates not only the power, but also the challenge of doing video analysis in the way in which we have proposed here.

To the extent that the analysis attempts to evaluate participants' activities as 'good PBL' or 'bad PBL' or, more generically, as 'good instruction' or 'bad instruction,' it places itself in bad faith with regard to Garfinkel's policies (particularly the third). After all, it is a policy of EM research "to refuse serious consideration to the prevailing proposal that … intelligibility … be assessed … using a rule or a standard obtained outside the actual settings within which such properties are recognized, used, produced, and talked about by setting's members" (Garfinkel, 1967, p. 33). Schegloff's (1991) notion of "the relevancies of the interaction" (p. 51) dictates that what the participants are actually doing through their interaction is not a given, but rather is the very matter to be *discovered* through the analysis. Although EM's policies would seem to preclude using video analysis as an assessment framework, it does not rule out the possibility of video analytic work making meaningful contributions to a larger instructional reform effort.

The mechanism for bridging the gap between the purely descriptive work of video analysis as we have described it here and the prescriptive aspects of designing and evaluating instructional innovations is to be achieved through an appropriate division of labor within a project. Curriculum designers, for example, might design settings for studying an innovation, but would depend upon video analysis to describe and document what participants might be doing within these settings. In cycles of design research, designers could propose software and procedures to support instruction and rely on video analysis to better understand how members go about the work of doing learning-and-instruction in the presence of these artifacts (cf., Koschmann et al., 2003). To the extent that the member methods described by video analysis can be seen as relevant to the objectives of the designed innovation, this documentation of the members' methods can contribute to the development of a specification for the innovation. To our knowledge, such an approach to incorporating video analysis in learning sciences research has not been systematically attempted to date and the problems of conducting such forms of multi-disciplinary research have yet to be explored. We nonetheless hold it up as a promising direction for future work.

Endnotes

(1) We do not have space to provide a full description of this methodology here but instead refer the interested to reader to any of the several available introductory guides (e.g., Psathas, 1995; ten Have, 1999).

(2) Though Heath coined the term, he followed in a tradition of research examining situated aspects of communication (cf., Goodwin, 1981; Scheflen, 1974). Jordan and Henderson (1995) offered the term "interaction analysis" to describe a related program of study, one that highlighted the practical aspects of learning and instruction. Despite the different labels, CA, video analysis, and interaction analysis all have a common lineage that traces back to EM.

References

Brown, A. (1992). Design experiments: Theoretical and methodological challenges in creating complex interventions in classroom settings. *The Journal of the Learning Sciences, 2*(2), 141-178.

Design-Based Research Collective. (2003). Design-based research: An emerging paradigm for educational inquiry. *Educational Researcher, 32*(1), 5-8.

Dewey, J. & Bentley, A. (1991/1949). Knowing and the known. In J. A. Boydston (Ed.), *John Dewey: The later works, 1949–1952, Vol. 16*. Carbondale, IL: SIU Press. [Originally published as Dewey, J. & Bentley, A. (1949). *Knowing and the known*. Boston: Beacon Press].

Garfinkel, H. (1967). *Studies in ethnomethodology*. Englewood Cliffs, NJ: Prentice-Hall.

Garfinkel, H. (2002). *Ethnomethodology's program: Working out Durkheim's aphorism*. Lanham, MD: Rowman & Littlefield.

Goodwin, C. (1981). *Conversational organization: Interaction between speakers and hearers*. NY: Academic Press.

Hak T, & Maguire P. (2000). Group Process: The Black Box of Studies on Problem-Based Learning. *Academic Medicine*, 75, 769–72. Retrieved October 27, 2000 from the world wide web: http://www.academicmedicine.org/cgi/content/full/75/7/769

Heath, C. (1987). *Body movement and speech in medical interaction*. NY: Cambridge University Press.

Heap, J. (1990). Applied ethnomethodology: Looking for the local rationality of reading activities. *Human Studies, 13*, 39–72.

Heritage, J. (1984). *Garfinkel and ethnomethodology*. Cambridge, UK: Polity Press.

Heritage, J. (1995). Conversation analysis: Methodological aspects. In U. Quasthoff (Ed.) *Aspects of oral communication* (pp. 391-418). Berlin: Walter de Gruyter.

Jordan, B. & Henderson, A. (1995). Interaction analysis: Foundations and practice. *Journal of the Learning Sciences, 4,* 39–104.

Koschmann, T., Zemel, A., Conlee-Stevens, M., Young, N., Robbs, J., & Barnhart, A. (2003). Problematizing the problem: A single case analysis in a dPBL meeting. In B. Wasson, S. Ludvigsen & U. Hoppe (Eds.), *Designing for change in networked learning environments: Proceedings of the international conference on computer support for collaborative learning (CSCL '03)* (pp. 37-46). Amsterdam: Kluwer Academic Press.

Koschmann, T., Zemel, A., Conlee-Stevens, M., Young, N., Robbs, J., & Barnhart, A. (in press). How *do* people learn? Member methods and communicative mediation. To appear in R. Bromme, F. Hesse, & H. Spada (Eds.), *Barriers and biases in computer-mediated knowledge communication (and how they may be overcome)*. Amsterdam: Kluwer Academic Press.

Lagemann, E. C. (2000). *An elusive science: The troubling history of education research*. Chicago, IL: University of Chicago Press.

Prevignano, C., & Thibault, P. (2003). *Discussing conversation analysis: The work of Emanuel A. Schegloff*. Amsterdam, Netherlands: John Benjamins.

Psathas, G. (1995). *Conversation analysis: The study of talk-in-interaction*. Thousand Oaks, CA: Sage.

Remillard, J., & Bryans, M. (forthcoming). Teachers' orientations toward mathematics curriculum materials: Implications for curricular change. *Journal for Research in Mathematics Education*.

Sacks, H. (1992). *Lectures on conversation*. Oxford, UK: Blackwell.

Scheflen, A. (1974). *How behavior means*. Garden City: Anchor Press.

Schegloff, E. (1991). Reflections on talk and social structure. In E. Boden & D. Zimmerman (Eds.), *Talk and social structure: Studies in ethnomethodology and conversation analysis* (pp. 44-70). Berkeley, CA: University of California Press.

ten Have, P. (1999). *Doing conversation analysis: A practical guide*. Thousand Oaks, CA: Sage.

Wittgenstein, L. (1953). *Philosophical investigations*. New York, NY: Macmillan.

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