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UNDERSTANDING COMPUTER-MEDIATED DISCUSSIONS: POSITIVIST AND INTERPRETIVE ANALYSES OF GROUP SUPPORT SYSTEM USE[1]

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Abstract

This research considers whether interpretive techniques can be used to enhance our understanding of computer-mediated discussions. The case study considered in this research is the use of a group support system (GSS) to support employee discussions about gender equity in a university. Transcripts of the four discussions were analyzed using two analysis techniques: a positivist approach, which was focused on the GSS sessions themselves, and an interpretive approach which broadened the scope to include contextual considerations as well. What emerged from the positivist analysis was the conclusion of effective group behavior directed toward consensus around alternative solution scenarios. What emerged from the interpretive analysis was evidence of multiple, rich types of information at three levels: cognitive, affective, and behavioral. The interpretive analysis also uncovered the absence of shared consciousness about the issue and imbalanced participation in the sessions. Comparison of the results of both approaches showed that, while the positivist analysis provided useful information, the interpretive analysis provided a different understanding of the same evidence and new information not found in the positivist analysis of the group discussions. This research adds to the body of knowledge concerning the effects of virtual group meetings on the type of information that is shared and the value of a combination of positivist and interpretive analyses of GSS data.

Keywords: Anonymity, computer-mediated communication, ethnography, gender, group decision making, group decision support system, hermeneutics, information richness, interpretive methods, IS research methodologies, positivist methods, virtual group

ISRL Categories: AA0901, AC0402, AI0112, AI0116, AI0801, AI0802, HA0301

[1]Allen Lee was the accepting senior editor for this paper.

Introduction

As the technologies for computer-mediation evolve, businesses are increasingly relying on computer-supported forms of communication, collaboration, and coordination. One such technology, the group support system (GSS), is popular for contexts in which co-workers desire to engage in joint problem solving at the same time and in the same place (Jessup and Valacich 1993). Research on GSS suggests that, for certain situations, GSS provides some advantages over face-to-face discussion and other forms of computer-mediated communication. Among these potential advantages are anonymity (Connolly et al. 1990) and process structuring (Dennis et al. 1996; Wheeler and Valacich 1996).

Early publications on GSS called for research using multiple methods and conducted within multiple contexts (e.g., DeSanctis and Gallupe 1985, 1987; Jessup 1987). Toward this end, a number of early research efforts in the GSS area were case studies of GSS implementations that were focused either directly or indirectly on organizational issues (e.g., Dennis et al. 1990; DeSanctis et al. 1991, 1992; Nunamaker et al. 1989). Others have devised and/or used robust coding schemes to measure group interaction (e.g., Zigurs et al. 1988), studied groups over time (Chidambaram 1996; Chidambaram and Bostrom 1993; Chidambaram et al. 1990), supplemented quantitative, a priori measures with post-hoc analysis of unusual groups (Gallupe et al. 1988), used post hoc, qualitative findings to uncover unintended consequences of GSS use (Watson et al. 1988), proposed useful alternatives for theorizing about and studying GSS use (DeSanctis and Poole 1994), used interpretive methods to study GSS (DeSanctis et al. 1993; Rebstock Williams and Wilson 1997), and theorized on the interplay between technology and organizational form (Fulk and DeSanctis 1995). Similarly, there have been a number of interpretive studies focused on the implementations of computer conferencing (Orlikowski et al. 1995), groupware (Orlikowski 1996), and other computer-mediated communication systems within organizational contexts.

Nevertheless, a great deal of GSS research has been conducted within a positivist[2] paradigm (e.g., Connolly et al. 1990; Dennis and Valacich 1993, 1994; Dennis et al. 1990; Gallupe et al. 1992; Jessup et al. 1990, 1996; Jessup and Tansik 1991; Valacich et al. 1992, 1994, 1995; Valacich and Schwenk 1995). This research has generally relied on a specific set of assumptions about the technology and about the research conducted. Much of this research follows the technological determinism approach, which assumes that GSS are developed to improve group and organizational productivity. The intent of GSS research, according to this approach, is to understand whether the technology can be helpful, how the technology can best be deployed, and what the marginal contributions of the various components of the technology are to productivity (DeSanctis 1993; DeSanctis and Poole 1994). This research has relied to a great extent on the structured analyses of transcripts from GSS sessions. Comment categories determined a priori are designed to capture the useful ideas generated during the sessions. It reflects the positivist paradigm in that it aims to quantify social reality, subjecting it to experimental controls and hypothesis testing (Lee 1991).

While this has been a fruitful thread of research, it is not the only possible one. Another approach is suggested by the use of an interpretive paradigm, and there have been examples of this within the GSS literature as cited above. The recent IS literature gives evidence of an interpretive movement in IS research in general (Avison and Myers 1995; Harvey 1997; Harvey and Myers 1995; Kaplan and Maxwell 1994; Lee 1991; Myers 1997; Prasad 1997; Walsham 1995), arguing that methods such as case study, grounded theory, ethnography and hermeneutics, which facilitate deeper probing into the subtleties of context, are appropriate methods for mainstream IS research. Interpretive methods have been used to study both the introduction and management of IT (Davidson1997; Davies 1991; Davies and Nielsen

[2]The characterization of positivism provided in this paper is not a characterization of logical positivism as discussed in the philosophy of science literature (Hempel 1966; Kolakowski 1968) but of positivism-in-practice in the GSS arena.

1992; Hughes et al. 1992; Orlikowski 1991; Preston 1991; Simonsen and Finn 1997; Trauth et al. 1993). Therefore, an alternative research approach for understanding GSS discussions would be to engage in an interpretive analysis of them.

A variety of research benefits can derive from adopting a different research stance. Since each research method has different assumptions and procedures, one method can complement another. This triangulation is the rationale for mixed methods research (Trauth and O'Connor 1991), particularly that which employs both quantitative and qualitative methods (Greene et al. 1989; Jick 1979; Kaplan and Duchon 1988). This viewpoint is consistent with Lee's (1991) argument that positivist and interpretive approaches need not be viewed as mutually exclusive. Rather, they can become mutually supportive.

In addition to the contribution of mixed method approaches to IS research in general, there are benefits to GSS research in particular. Because interpretive methods were developed and are typically used to analyze face-to-face or written communication and, hence, have a different set of assumptions and procedures, they may help us to understand GSS in ways we could not understand them using positivist methods of analysis.

The adoption of a mixed methods approach meant analyzing the same GSS data—referring both to the discussion transcripts and to the organizational context—using both positivist and interpretive methods. In this paper, we both utilize and evaluate the positivist and interpretive approaches to GSS analysis. Printed transcripts of four GSS discussions were analyzed first using a positivist approach. This approach was narrower in that the scope of analysis was limited to the GSS sessions themselves and incorporated only a limited amount of contextual data.[3] The same transcripts were then analyzed using an interpretive approach. This approach was broader in that the scope of analysis included contextual data as well. The objective in conducting this dual analysis was to contrast the results of positivist and interpretive analyses of GSS use in the field in order to learn how our understanding of the information generated in the GSS sessions might be enhanced by the addition of interpretive techniques. We posed the following research question about the use of these alternative methods:

> Does an interpretive analysis of GSS use result in a different understanding of the GSS discussions than that provided by a positivist analysis?

In the next section, we present the context within which the GSS was used: a university-wide discussion of gender equity on campus. (We sought an emotionally charged setting in order to explore the potential benefits of anonymous computer-mediated discussions.) We then conduct two analyses of the discussion transcripts—first positivist then interpretive—and present the respective results. We consider the differences in the findings that result from use of these two different methods. The contribution of this research is two-fold. First, contrasting analyses of the same data facilitates critical analysis of each research method. Second, by adding the interpretive layer, our analysis provides evaluative insight into GSS use that is not captured easily by positivist methods of GSS analysis.

The Context: Coping with Gender Equity at State University

When State University,[4] a small, public university in the American southwest, was created in the

[3]This is not to suggest that all or most of GSS research is necessarily positivistic, narrow, or focused on individual and group phenomenon to the exclusion of organizational context. Indeed, the review of GSS literature provided above attests to the diversity in GSS research. Nevertheless, the positivist approach taken in this research is consistent with the significant body of GSS research that is conducted in similar fashion and was cited above. More important, this approach was selected because it demonstrates how, within the GSS context, one useful research approach and a set of corresponding methods (i.e., positivist) can be complimented with another, different, useful research approach and set of corresponding methods (i.e., interpretive).

[4]To preserve anonymity, the actual name of the institution is not used here.

early 1990s, the topics of gender equity and affirmative action loomed large on the political horizon of academia and particularly within this state and this state university system. As a result, one of the goals of this new university was to start with a clean slate and to build into the university an egalitarian mentality that would pervade its programs and its organizational structure and culture. Indeed, this stated goal and the expected opportunities it would produce were used in recruiting new faculty, staff, and administrators.

Despite the excitement of building a new university, literally from the ground up, several sources of conflict quickly emerged. First, the President pursued a hiring strategy weighted heavily toward administrators and staff. In response to grumbling from founding faculty members that the university was starting off rather top heavy, the President explained that whether a university had 2,000 or 20,000 students, it needed the same administrative infrastructure: a President, Vice President, Vice President/Provost, academic Deans, a Registrar, a Director of Financial Aid, librarians, janitors, a facilities manager, campus police, and so on.

A second source of conflict involved pay equity. Since the university system of which this campus was a part was heavily unionized, lower level staff members with seniority were generally well paid relative to their counterparts at other universities across the country. Faculty members (especially at senior levels), on the other hand, were generally not well paid when compared to their counterparts at other universities across the country, particularly considering the cost of living in the region. In addition, the University administration promoted an organizational culture of egalitarianism—some called it socialism—across levels and functions within the University; this received mixed support. For example, staff support and secretarial personnel were invited to participate in Dean searches, with voice and vote equal to that of tenured professors, resulting in one situation in which a cadre of secretaries was able to oust a Dean candidate from consideration in direct opposition to the tenured faculty.

Woven into this pay equity milieu was another issue of imbalance. Because faculty in business, engineering, and computer science commanded higher salaries in the marketplace, they were on a higher pay scale than other faculty in this university system. All universities within this state system follow a rigid pay scale of grades and steps for faculty, staff, and administrators, much like the federal government. This situation caused ill feelings among arts, sciences, and education faculty that were vocalized frequently in informal settings as well as in formal settings such as the Academic Senate and Administrative Council meetings. This resentment permeated other areas of the University such as the Provost's Office, which was heavily influenced by arts and sciences faculty members. When the infrastructure and rules to govern revenue-generating programs such as executive education were being established, business school faculty viewed the policy as an impediment. The Provost's position was that all programs would be viewed as equally valuable, would all charge participants the same fees, and would pay all participating faculty members the same rate. To some, this policy seemed just and egalitarian. To others, the idea of restricting what the business school could charge participants and pay participating faculty for their external programs seemed to fly in the face of free market principles and doomed the external programs to failure.

One final source of conflict was the heavy workload imposed upon employees as the University was being established. New courses and programs, new services, new buildings, and hiring new faculty all placed a heavy service load on people. Burnout was in evidence and junior faculty members approaching the tenure decision worried that the service demands would not be sufficiently taken into account come tenure time.

This description of State University provides the organizational and historical context within which issues of gender equity arose. While State University was full of opportunity and excitement, it also contained underlying and growing tensions among a variety of constituencies: administration-faculty, faculty-staff, and business/technology-arts/sciences faculty. In addition, within a few years of its inception, gender issues were already a controversial topic at State University. The primary evidence to support the claim of inequity was the absence of women in senior administrative positions. The President, Vice President of Academics and Provost, Vice President of Busi-

ness Affairs, and the three deans were men. Only a small number of mid-level directors were women. The event that escalated the gender issue and precipitated this research was the resignation of a female dean after serving only 18 months in the position. Following a negative ad-hoc personnel evaluation from the faculty, an acting dean replaced her and soon after a permanent dean, both of whom were men. Female employees on campus claimed that such behavior reinforced their perception of a hostile workplace with a glass ceiling for women.

In this increasingly divisive environment, many members of the campus community wanted these issues to be addressed. The process began when the faculty, through the Academic Senate, called for efforts to address perceived gender inequities on campus. A four-person team of two faculty and two administrators subsequently attended a workshop on gender equity. Upon their return to campus, this team began to explore innovative ways to collect information about gender inequities. They wanted to foster dialogue that would help to uncover problems and possible misperceptions and that might lead to concrete steps that could be taken to resolve these inequities. Because the team members sought a forum in which these employees could openly and honestly discuss gender equity on campus, they decided to hold a series of small group discussions on the topic. The groups would be small enough to promote discussion and each group would have a mix of faculty, staff, and administrators. In order to be fair, to build commitment to the process, and to enrich these discussions, participation from a diverse set of as many employees as possible was needed. At the same time, the team was aware that discussions might be inhibited because those whose input was especially desired were those most vulnerable to repercussions for providing it.

The solution to this dilemma was to call upon a faculty member—the second author—who had been conducting research on computer-supported collaborative work and the use of GSS software for anonymous brainstorming and voting. The team hoped that people would be more willing to participate and be more open when they did so if the identity of the person making a comment were not known to other participants. Consequently, with the blessing of the President's Cabinet, a member of the team worked with this faculty member to develop a plan for using GSS software to support the discussions of gender equity. All University employees were invited by e-mail to participate in one of four anonymous, computer-based discussions of gender equity on campus. The goal of these discussions, as formulated and agreed upon by the team, the faculty member with GSS expertise, and the President, was to bring together employees from various levels, attempt to raise their awareness of gender equity issues within their organization, and enable them to generate alternatives for managing these inequities. The sessions were anonymous in that identities were not divulged or linked to comments. However, insofar as all participants sat in the same room and knew each other, the sessions were not "anonymous." While it is typical with GSS use to spend several hours per session in order to delve deeply into issues with intact work groups, the University administration was concerned that lengthy sessions might inhibit widespread participation. Therefore, it decided that total session times should be kept to a minimum: participants were asked to allow one and a half-hours for this endeavor.

The four GSS sessions were conducted in a computer-based classroom with 30 personal computers recessed into special desks. The room contained five rows with six desks/computers in each; the rows of desks ran across the room so that each participant was facing the front. A facilitator's computer sat on top of a desk in the front of the room off to one side. The room contained a large projection screen on the front wall and a ceiling-mounted, color projection system. The second author facilitated all four of the GSS sessions.

Each of the sessions began with the facilitator giving a brief introduction to the GSS[5] followed by a 20 minute anonymous, interactive brainstorming phase using a tool which sent to each participant's computer monitor the seed question:[6]

[5]OptionLink, by Option Technologies.

[6]Seed questions were formulated and agreed upon prior to the sessions by the four-person team and the faculty member with GSS expertise.

Do you believe that this university is a place where both genders receive equal treatment? Why or why not?

Participants saw the seed question at the top of their computer screens and had two windows available to them: one for entering their own comments and another for viewing the comments that had been entered by other participants. Participants could at any time input ideas, questions, suggestions, clarifications, arguments, or any other relevant thoughts, and they could scroll through this list of all comments and reply directly to someone else's comment. The first session was followed by another 20 minute brainstorming phase using the same software tool, but with the new seed question:

What should be done to insure that both genders receive equal treatment at this university?

While participating in this second brainstorming process, the participants could at any time revisit the previous brainstorming topic.

After this second brainstorming phase, the participants spent 10 minutes individually, anonymously ranking a list of approximately eight alternative solutions gleaned from the second brainstorming session. The facilitator worked with the primary contact person from the original gender study team to glean these solutions from the list generated during the second brainstorming phase.[7] For this ranking, the participants were asked to use the following questions as criteria:

Does the solution address the problem?

Is the solution feasible?

Will the solution have a high degree of potential success?

[7]These two people basically monitored each of the solution-oriented brainstorming sessions and dynamically built separate lists of the primary, workable ideas for each session. Then, during the brief breaks just after the brainstorming and before the ranking, they edited this list of alternatives and entered it to be used as the basis of the subsequent rankings within each session.

The GSS software quickly tallied the rankings and produced the group's average ranking for each item, which was projected on the large screen and reviewed with the group. The participants then completed a post-session questionnaire and the session was ended.

Out of approximately 400 University employees, 40 people participated in the four sessions. There were seven participants in the first session, 14 in the second, nine in the third, and 10 in the fourth session. A total of 30 participants identified themselves on a post-session questionnaire as being female. Two participants chose not to identify their genders on the questionnaires. Despite persistent lobbying from the session organizers, no male faculty members participated. The men who did participate in the sessions came from the ranks of university staff and administration. They came in response to a presidential request sent via e-mail. The rest of the men indicated that either they didn't think gender equity was a real problem or else they didn't think it was their problem. Some men simply failed to respond to the calls for participation. Others indicated that they were too busy to participate. In subsequent discussions with male faculty members, we learned that some men did not really believe there were gender inequities to the extent that female employees claimed. Those who acknowledged that there were gender equity issues thought that this was a matter for female employees to take up with the administration (see Appendix A for further demographic details).

Despite the intentions motivating these GSS sessions, nothing was ever done with the information collected. A University-wide committee comprised of faculty, staff, and administrators charged with exploring diversity on campus planned to have an organized, full day activity during which the data from the GSS sessions and other data could be presented. This event never occurred. Members of that committee explained that they ran out of money allocated for such activities. A daylong workshop on diversity, affirmative action, gender, and other issues was announced for some later, unspecified date. In addition, the individuals charged with launching a campus-wide assessment of diversity and gender equity issues never got the project going. Some of these individuals kept trying to design a "perfect" research instrument tailored to State University rather than use a

less-than-perfect or an existing instrument. To date, there is no plan to conduct a comprehensive survey of the campus climate on these issues.

While there was no direct follow-up from the GSS discussions of gender equity, there was some activity on campus related to gender equity. Not long after these computer-based discussions, the faculty called for an ad-hoc personnel evaluation of one of the senior administrators in which the administrator was criticized for gender inequities. When this person subsequently left the University, a committee comprised of faculty, staff, and administrators charged with recommending an internal, interim candidate produced a short list of four individuals—three white males and one African-American female—from which the female candidate was chosen. Some people on campus believed that this choice was partly a result of calls to evaluate the performance of the other top administrators, which would include their record on gender equity. Informal discussions with members of the University community revealed the perception that the GSS sessions contributed to this subsequent change in the gender composition of the top administration by helping to raise awareness about gender inequities. People described the GSS sessions as the spark that raised people's awareness of the problem and led to a more proactive effort to fill the position with a woman. However, the search for a permanent candidate to fill the position resulted in a white male being offered the job.

The events described in this case suggest two reasons for triangulating our analysis of the data. First, given the highly charged nature of the topic, we suspected that a positivist approach with structured content coding focused on idea generation and using a priori categories might not capture all of the interesting and important aspects of the computer-mediated discussions that occurred in the sessions (even though surfacing ideas and opinions was a goal of the sessions). Second, a structured content analysis of the GSS sessions, alone, without some wider analysis of the context—what led up to and what happened subsequent to the sessions—would not tell the entire story. As this GSS analysis proceeded, it seemed increasingly evident that while a positivist analysis would be helpful, it would not be sufficient. Therefore, in addition to conducting an analysis in the positivist paradigm, using a more conventional GSS research methodology to understand the discussions, we expected to gain additional insight from conducting an analysis from the interpretive paradigm as well. For these reasons, we conducted an interpretive analysis of the GSS session transcripts in addition to the more positivist analysis.

Analysis of GSS Discussions

The case detailed how the authors gathered the data used in the analysis. The following sections address the analysis and interpretation and comparison of insights provided by positivist and interpretive analyses of this same data. First we present the positivist analysis of the GSS sessions, which includes a structured content coding of the session transcripts and an analysis of the results of this coding. We then present an interpretive analysis of the same transcripts borrowing from several interpretive traditions. Each of these sections is organized to provide an overview of the methodology before applying the methods to this case situation. The comparison, critique, and interpretations are presented after both of the analysis approaches are covered.

Positivist Approach to GSS Analysis

The underlying assumption of GSS use is that the technology can be useful in helping people to work together to solve problems and make decisions. The technology is typically used to support idea generation (referred to as divergence and/or conveyance) followed by idea evaluation and coming to consensus around one or a small set of selected solutions to the problem at hand (referred to as convergence; Niederman and DeSanctis 1995). The research then measures idea generation, evaluation, and consensus in quantifiable ways. Since the purpose of the technology is to perform a specific task, it is assumed that people will be task-oriented when using the technology and that the measurement techniques used will capture this.

One common approach used to gauge the effectiveness of GSS sessions is content coding to determine whether or not the sessions were effective in enabling the participants to achieve their goals. In this case, the goal was to bring together employees from various levels of the organization, attempt to raise their awareness of gender equity issues within their organization, and enable them to generate alternatives for managing these inequities. A conventional approach in conducting structured content coding and quantitative analysis of the session transcripts is to borrow an existing, tested content coding scheme from the research literature. Such an instrument enables the researchers to quantify the types and total number of comments that were generated in the brainstorming phases of each session and the degree of consensus around one or more of the solutions generated.

Since the comment categories used in the coding already exist, the job of the evaluators performing the content coding is essentially to parse and read each comment on each transcript and place it in the pre-existing category of best fit. There are typically strict definitions for comment categories and rules for determining when to place a comment in a category. The a priori analytical lens used for coding is idea generation, evaluation, and consensus; the results are expected to lend themselves nicely to quantitative analysis of group and member behavior. In addition, the researcher takes an "outsider's view" of the discussion. The focus is not on the meaning that participants assign to comments but rather on the type of comment made, such as a new idea versus supporting an idea already given. Comments from the session transcripts are taken at face value, for the most part, ignoring context when analyzing them. Indeed, a coding scheme would be most useful if a neutral, third party not involved with the use of the GSS and unfamiliar with the context of the participants could use the coding scheme to easily code the transcripts from the GSS sessions.

Positivist GSS Methods

The transcripts from each of the brainstorming sessions were content coded using the content coding categories, coding process, and corresponding constructs and measures from Connolly et al. (1990). These methods have been shown to be reliable and valid and have been used in Jessup et al. (1990), Jessup and Tansik (1991), Wilson and Jessup (1995), and many similar GSS experiments. This scheme is a classic example of a positivist approach and is ideal for determining how many unique ideas have been generated with a GSS. Each comment was read and placed into one of the preexisting categories of best fit. Redundant and/or infeasible ideas were not counted in the category labeled "Unique Ideas" and any comments that did not easily fit into any comment categories were placed in the category labeled "Off Topic." The complete list of comment categories is listed in Table 1.

Discussion of the Results of Positivist Analysis of GSS

Table 2 shows how many of each type of comment were generated during the first and second brainstorming phases within each of four GSS sessions. An average of 53.5 unique contributions were made in each of the eight brainstorming phases. The brevity of the brainstorming phases (only 20 minutes) combined with an average of 10 participants in each session indicates that the first goal of a high degree of participation was achieved. Such data suggests that in addition to reading other people's ideas and opinions, each person was able to contribute, on average, between 10 and 11 ideas and/or opinions during the 40 minutes of brainstorming.

Another measure of effectiveness in achieving participation was redundancy. This measured the extent to which ideas generated during a session had already been generated by others. A high degree of redundancy would suggest that participants were not reading and/or understanding each other's comments effectively. We interpret the low degree of redundancy (approximately 6.75% of all ideas generated were redundant within sessions) as an indication that participants were reading and understanding each other's comments.

To measure effectiveness in achieving the second goal of generating ideas about gender equity, we analyzed the total number of ideas (and the total number of ideas minus any redundancies) generated during the brainstorming phases of the sessions. An average of 10.38 total ideas and 9.25 unique ideas were generated during each of the eight brainstorming phases. While the first brainstorming phase of each GSS session was problem

Table 1. Content Coding Categories (Comment Categories from Connolly et al. 1990)
Tot Comments – Total number of comments generated.
Tot Ideas – Total number of ideas generated.
Unique Ideas – Total number of ideas less redundant ideas.
Supp Remark – Expresses support for a proposal without adding evidence or argument.
Supp Argument – Supports a proposal and gives evidence or argument.
Sol Clar – Adds detail or new features to a solution.
Prob Clar – Adds detail or new features to problem statement.
Crit Remark – Expresses opposition to proposal without adding evidence or argument.
Crit Argument – Opposes a proposal and offers evidence or argument.
Ques Sol – Requests clarification of a proposed solution.
Ques Prob – Requests clarification of problem specification or solution criteria.
Computer – Remark about the computer network or its operation.
Group – Remark about the interpersonal processes of the group.
Off Topic – Remarks that are "off the topic" and do not fit into the existing categories.
Uncodable – Uncodable text.

diagnosis, the second was problem solving. When focusing on the number of ideas generated during the second half of each GSS session, we found that in each of these problem solving, brainstorming phases an average of 17 ideas and 14.75 unique ideas were generated. Within a relatively short amount of time in each of these sessions, an average of nearly 15 workable, unique ideas were generated for insuring gender equity, with a total of 83 ideas generated across all sessions. This data suggests that the sessions were effective in achieving the goal of surfacing ideas about gender inequity.

We also analyzed the frequency of comments in other comment categories to measure the effectiveness of the GSS sessions in idea generation. For example, the relatively low frequency of supportive remarks and supportive arguments, and the relatively high frequency of questions about the problem and problem clarifications, particularly for the problem diagnosis brainstorming phases, suggests that during these sessions the participants were probing and challenging each other's ideas and opinions. It is also important to note that while the participants were probing and engaged in critical thinking, they were not particularly critical in a negative sense. Indeed, blatantly negative remarks were relatively low. Similarly, the frequency of critical arguments was significantly higher than critical remarks, and the frequency of supportive arguments was significantly higher than supportive remarks, suggesting that the comments (whether critical or supportive) tended to be substantial and thoughtful. In other words, it was much more probable to see a comment in which the participant explained why s/he agreed or disagreed with another person than it was to see a comment in which a person simply agreed or disagreed without providing any supporting information.

With respect to the third goal of generating alternatives for managing gender inequities there also appeared to be a fair degree of consensus among the participants—expressed in their rankings at the end of each session—as to alternative courses of actions. As described above, after the second brainstorming phase, each individual spent 10 minutes anonymously ranking a list of approximately eight alternative solutions from the second

Table 2. Raw Data from Content Coding

Comment Totals by Session and Brainstorming Phase									
	Sess1, Q1	Sess1, Q2	Sess2, Q1	Sess2, Q2	Sess3, Q1	Sess3, Q2	Sess4, Q1	Sess4, Q2	Cat Average
Tot Comments	45	45	69	70	41	44	50	64	53.50
Tot Ideas	3	11	3	20	3	23	6	14	10.38
Unique Ideas	3	9	3	16	3	21	6	13	9.25
Supp Remark	4	2	1	5	0	2	2	2	2.25
Supp Argument	0	4	3	5	1	10	4	6	4.13
Sol Clar	0	12	0	4	4	3	2	17	5.25
Prob Clar	25	5	39	14	21	1	19	3	15.88
Crit Remark	2	1	0	0	1	0	3	0	0.88
Crit Argument	2	8	8	7	1	2	3	7	4.75
Ques Sol	0	2	0	7	3	1	1	13	3.38
Ques Prob	8	0	15	7	7	1	10	0	6.00
Computer	1	0	0	0	0	0	0	0	0.13
Group	0	0	0	0	0	0	0	0	0.00
Off Topic	0	0	0	0	0	1	0	1	0.25
Uncodable	0	0	0	1	0	0	0	1	0.25

brainstorming session using as criteria the questions: Does the solution address the problem? Is the solution feasible? Will the solution have a high degree of potential success? Participants saw on their computer screens an unordered list of the alternatives to be ranked, they each ranked their own lists independently and anonymously, and they then submitted their rankings electronically. The GSS software quickly tallied the rankings and produced the group's average ranking for each item, which was projected on the large screen. Table 3 shows the raw votes for the highest ranked alternative solution within each of the four sessions. For example, the first column reveals that for the highest ranked alternative solution (enabling better mentoring for employees) within the first session, two people ranked this as the best alternative, one person ranked it as the second-best alternative, three people ranked it third, and one person ranked it sixth.

In the first session, seven people ranked six alternatives. Their highest ranked alternative was "enabling better mentoring for employees," with an average ranking for that alternative of 2.71 and a standard deviation of 1.58. In the second session, 14 people ranked eight alternatives. Their highest ranked alternative was "creating equity across job classifications and pay categories," with an average ranking for that alternative of 2.64 and a standard deviation of 2.02. In the third session, eight people ranked four alternatives. Their highest ranked alternative was "conducting an equity survey and then analyzing the data closely," with an average ranking for that alternative of 2.38 and a standard deviation of 0.86. In the fourth session,

Table 3. Raw Votes for Highest Ranked Alternative Within Each Session (Highest Ranked Alternative Was Ranked #1)

Session	Session	Session	Session
1	1	1	1
1	1	2	1
2	1	2	1
3	1	2	1
3	1	2	1
3	1	3	2
6	2	3	2
Mean = 2.7	2	4	3
SD = 1.6	2	Mean = 2.4	7
	4	SD = 0.9	9
	4		Mean = 2.8
	4		SD = 2.7
	5		
	8		
	Mean = 2.6		
	SD = 2.0		

10 people ranked nine alternatives. Their highest ranked alternative was "promoting mutual respect for all employees," with an average ranking for that alternative of 2.8 and a standard deviation of 2.71. In two of the sessions, "do nothing" was ranked as one of the alternatives and in both cases was nearly unanimously ranked at the bottom of everyone's list.

An overall indication of the groups' effectiveness in these computer-mediated discussions is the low frequency of comments that were "off the topic," uncodable, about the computer system, or about the group. On average, approximately 1.17% of the comments generated in each brainstorming phase were in these four comment categories combined. Therefore, it is safe to say that, for the most part, the people participating in these sessions were "on task."[8]

[8]By on task, we mean to say that the participants were focused on the task at hand.

The results of the positivist analysis can be summarized as follows. Both the degree of participation and participants' engagement appeared to be high. There was a fair degree of consensus among the participants about what to do and not to do. While participants were probing and challenging each other's ideas and opinions, conflict appeared to be low. Participants were not critical in a negative sense; comments (whether critical or supportive) tended to be substantial and thoughtful. The groups were effective in achieving the goal of surfacing many workable ideas about gender inequity. The information they exchanged was for the most part related to issues and possible solutions. Stripping participants' identities from comments provided anonymity. They appeared to be reading and understanding each other's comments. Finally, the groups were useful insofar as their comments were very much on task.

Taken together, these results suggest that the sessions were effective in helping individuals to surface ideas for better managing gender equity

within their institution. However, these results do not tell us about any attitudinal changes that might have occurred because of these discussions. The nature of the comments and replies, particularly in the areas of questions and clarifications, suggests that people were interacting with and informing each other. We cannot directly ascertain from this analysis, however, whether their awareness of gender equity issues was altered. We can only surmise that people were reading and understanding the ideas and opinions of others.

Interpretive Approach to GSS Analysis

While the positivist approach to analysis of GSS data is guided by a priori coding categories, the interpretive approach used in this study developed meaningful categories in grounded fashion. In addition, whereas the previous analysis provides a quantitative representation of the groups' interactions, the interpretive approach produces a qualitative rendering of group behavior. The objective of interpretive research is to piece together people's words, observations, and documents into a coherent picture expressed through the voices of the participants.

In choosing interpretive methods, the researcher is acknowledging that access to the world of the people being studied comes through social constructions such as language, consciousness, and shared meanings. We learn about the groups being studied by inductively exploring their behavior and communication in context. We engaged in this endeavor with no a priori lens regarding the information we would obtain. Unlike the positivist GSS analysis, participants' comments are not focused on convergence and decision making. Rather, we allowed the relevant information to emerge in grounded fashion through the iterative process of examination, connection to their world, and reexamination. This approach adopts an "insider's view" of the participants, their motivations, and their interactions by interpreting their voices within both the immediate and the larger organizational contexts.

Interpretive Methods

In conducting our interpretive study of these GSS sessions, we consciously drew from several different interpretive traditions including ethnography, hermeneutics, and grounded theory. Doing so is consistent with the published literature of interpretive research. Walsham and Sahay (1999) used ethnographic criteria to assess the quality of their research even though their work is not an ethnography, while Geertz (1973), an ethnographer, wrote about hermeneutics.

In contrast with the positivist analysis presented in the previous section, the scope of the interpretive analysis presented here is broadened to make significant use of the contextual data found in the organizational setting. By incorporating the organizational context as well as the context of use into the interpretation of the computer-mediated discussions, our analysis can be viewed as an interpretive case study of an organization's use of computer-mediated communication tools.

A broad criterion for our interpretive analysis is that after having read our work, an outsider would be able to read the transcripts and understand the logic of the comments within the context of this particular setting. We hope to satisfy this criterion by walking the reader through our development of our interpretation, involving "breakdowns" and "absurdities" and their resolution. Geertz expresses this as the reduction of puzzlement and the sorting out of local meanings. Open coding was used to sort out these local meanings.

The use of open coding to develop themes and meanings is a well-recognized technique employed in ethnography[9] as well as in the hermeneutic analysis[10] of text. According to Boland (1991, p. 439):

> Hermeneutics is the study of interpretation, especially the process of coming to understand a text. Hermeneutics emerged as a concern with interpreting ancient religious texts and has evolved to address the general problem of how we give meaning to what is unfamiliar and alien.

[9]See Trauth (1997) for further discussion of open coding in IS research and Orlikowski (1993), Trauth (1995, 1996, forthcoming), and Urquhart (1997) for some applications of this method.

[10]For an application see Davis et al. (1992).

Searching for the meaning of an aberrant passage occurs by using the hermeneutic circle. The reader seeks alternative understandings by cross-referencing the passage in question with other passages. In the process of reaching understanding, the reader goes back and readjusts previous understandings. Hermeneutic methodology has been employed in a variety of IS research settings (Boland 1985, 1991; Davis et al. 1992; Lee 1994; Myers 1994; Rathswohl 1991).

When the interpretive research includes open coding, the researcher approaches the data without an a priori framework to shape the understanding of the information. Instead, s/he allows the interpretive lens to evolve through the iterative analysis of the information within its context. This process is part of the grounded theory approach to qualitative analysis developed by Glaser and Strauss (1967). Using this approach, the researcher engages with the data without a preconceived commitment to a particular line of thinking. The essential features of open coding are (1) the inductive development of provisional categories; (2) ongoing testing of categories through conceptual analysis and comparison of categories with data that is already coded; and (3) the altering of existing categories as other ones are created or eliminated (Strauss 1987, pp. 11-13). Open coding requires considerable flexibility by the researcher who must let go of initial control over the categories and be willing to adjust them as the analysis progresses.

The more traditional method of analyzing the discourse of GSS sessions involves imposing an extant analytical framework on the data. This framework is used to guide the data collection and analysis and to focus the researcher's attention in on what is "relevant" to the task at hand. In contrast, the interpretive approach that we employed called for us to begin with a blank slate and let the coding categories emerge as our interpretive understanding and engagement with the text progressed. In this way, we let the data "speak" to us. The way in which we allowed the interpretive lens to evolve through the use of open coding is illustrated in the way in which these categories evolved. We began with inductive development of provisional categories, engaged in ongoing testing of categories and comparison of new categories with data that was already coded, and subsequently altered existing categories as others were created or eliminated. The categories and subcategories that emerged from this open coding process are shown in Table 4.

Interpreting Information Types: Having identified the interpretive process whereby the three types of information emerged, we can now take a closer look at the groups' discussions. By tracing the way open coding produced these categories of information from the GSS sessions, we can see how the interpretive understanding of the groups' discussions evolved. From our exploration of the discussion transcripts, we learned that, while participating in the computer-mediated discussions, group members operated on three different information levels. One was exchanging cognitive content, a second level was expressing emotions, and the third was evidencing consciousness change.

In our interpretive process, we use Agar's (1986) language: the meaning of *strips* is interpreted through the *resolution* of *breakdowns* that occurs by revising one's *schema*—the world view held by the researcher. The transcripts of each GSS discussion session constituted the recorded information that we analyzed. These discussions were subsequently segmented, categorized, coded, and revised in order to make sense of them within the participants' own understandings. Categorizing involved segmenting commentary into a meaningful unit of discourse (i.e., either a single statement or several people's comments about a single idea) called a strip. A strip can be an observable act, an interview, an experiment, a document, a comment, or any other bounded phenomenon against which the researcher tests his or her understanding. In this study, all strips were text segments, either a single comment or a collection of comments made by different people about a single thought. An example of a strip made up of two comments is the following:

> P1:[11] *We need constant reminders that we are aware that there are historical problems and that we are not satisfied with the status quo. Dwelling on the past will not help (although I am NOT suggesting that we ignore the past).*

[11]The labels P1, P2, etc. are used to differentiate the participants in a strip.

Table 4. Results of the Open Coding: The Information Exchanges of the GSS Sessions

Cognitive Information	Information about the content of the communication
Affective Information Talking about feelings Giving voice to feelings	Information about the emotions of the participants Discussing people's feelings Expressing one's feelings
Behavioral Information Talking about behavior Consciousness raising	Action-oriented information Discussing actions Expressing a personal change in consciousness or attempting to change another participant's consciousness

P2: *Yes, I think some of us are trying. Unfortunately, those who need to be cognizant of gender issues will not, and probably truly believe they don't need to make the effort.*

An example of a strip made up of a single comment is the following:

The problem with this solution is that until the men on campus believe that there is inequality, anything done by "all women for the improvement of women" will be seen as worthless. There are only a few male faculty members both junior and senior that believe in equality and equal opportunity. It is a sad affair, but one that is promulgated in Higher Education and Academia in general. Let's be real. The world's perspective has to change, before [State] University personnel can truly make a difference. We get our employees from the world outside these walls.

After the transcripts were categorized into strips, each strip was coded according to its cognitive content. This was a process of reading the text strips and assigning provisional labels with respect to the content of the exchange. The labels assigned to strips summarized the theme of the strip as shown in the following examples:

Gender discrimination is a systemic, societal problem.

There is resistance to change.

There are differing views in the groups about men's vs. women's ability to have power.

Women are not mentored.

Formal mechanisms currently exist to deal with diversity issues.

Sometimes the information that was shared was a direct response to a seed question and other times it was in response to another respondent. For example, in response to the seed question about both men and women receiving equal treatment in the University, the following types of information were shared.[12]

People come in with baggage they've accumulated from sexist socialization and institutions.

****

One of our problems that, "We have always done it this way before," is compounded by the notion that, "We have always done it MY WAY" at individual or campus sites that we don't explain or discover among our colleagues' backgrounds.

****

I don't believe that women receive the same type of mentoring or support necessary to solve problems or advance their careers.

[12]Asterisks are used to separate distinct strips.

When the seed question asking what should be done to ensure equal treatment was given, the following types of responses were given.

> *It would be fascinating to see how many individuals already feel they have "paid their dues" only to watch individuals from outside the campus community come on board and take the better positions. It would seem we need a situation that calls for an investment from the employee AND the University.*
>
> **********
>
> P1: *We need a mechanism for evaluating perceptions of equity on an ongoing basis.*
>
> P2: *Yes, perceptions seem to rarely match reality, especially when it is beneficial to see things in a given way.*
>
> **********
>
> *There is only one salary schedule but faculty can be placed on a step or at a level based on some pretty nebulous variables. Also, managers can be placed anywhere in the range. When prior salary is used as a jumping off place for salary placement, women suffer because they usually come from a position of underpayment.*

In addition to responses to the seed questions, other examples of exchanging information content occurred when respondents shared information in response to something said by another respondent. For example, in response to two individuals discussing the pervasiveness of sexism in American society and whether anything can really be done about it, one person offered additional information:

> *[T]he point is that there are people who benefit from the sexist status quo and will defend it, that there are people who are invested in sexism.*

During a discussion of affirmative action and quotas, several respondents had reacted negatively to the notion of targeting a particular group such as females in a search, suggesting that this would be a departure from common practice. In response, one participant commented:

> *Limiting searches to the male gender has been going on for a fair number of years. Hiring another man into an executive position will provide absolute proof that this university cares nothing about women. It's pretty evident now, but one always holds out hope for justice.*

As the coding proceeded, we began to recognize that not all of the interactions could be categorized according to the cognitive content of the statement. We noted that some segments were not instancing an existing content category or even suggesting a new one, for that matter. Instead, we recognized that there was something substantially different in some of these segments. We had encountered an anomaly. Both ethnographic and hermeneutic methods make use of the anomaly as the vehicle for focusing attention and gaining better understanding of the information in context. Attention is focused on a strip that appears to be a contradiction or somehow does not make sense to the researcher. This is what Agar calls a *breakdown.* It was through breakdowns that the categorization of types of information emerged in our interpretation. The first of these occurred with the following of strip:

> Strip 1:[13]
> P1: *We have no female representation at the executive level and currently we have no female college deans. Without such representation at this level, how can women receive equal treatment?*
>
> P2: *What do you call [name of a female Director]?*
>
> P3: *I call this woman executive an excellent leader. I also call the usage of her in this response an example of the exact type of tokenism practiced by people unaware of gender inequities. One woman in a mid-level power position does not equate with gender*

[13]This is the "Strip 1" to which reference is made in Figure 1.

equality or equity on a campus. She will be wielded against other women as an example of the falsity of women's complaints about lack of female leadership. One woman in power is not enough. One white woman in power is not enough. One lesbian woman in power is not enough. One woman of color in power is not enough.

This breakdown was resolved by revising the *schema* to make sense of such strips. The schema that had to be revised was the assumption that the information being coded was limited to *cognitive* content. We needed to revise our interpretive stance to acknowledge that sharing cognitive information was not the only type of information exchange occurring in these sessions. This recognition, then, required us to go back to previously coded strips in search of other instances in which something other than exchanging cognitive content was the essential meaning of the strip. Another example is:

P1: *Does the structure of the place offer equal treatment opportunity? I think so. Salary structures are essentially equal. Search committees look "equally" for both genders.*

P2: *Are we in the same institution?*

In the language of hermeneutics, this strip is an *absurdity* (Davis et al. 1992, p. 302). Of course the second speaker knows that P1 works at the same university. However, by examining this exchange in the context of the other exchanges occurring before it and in the context of the GSS sessions themselves, P2's reply can be interpreted as a sarcastic response. *Resolution* of this breakdown occurred when the schema was revised to include a second category: emotional information.

As the coding progressed, we noted that this new categorization of emotional information also required adjustment. The resolution that led us to establish the category of emotional information led, in turn, to another breakdown. Not all affective information was the *expression* of emotion; sometimes the speaker was only *talking about* emotion, as the following strip indicates:

Strip 2:[14]
I think the first thing that would need to be done is an attempt to eliminate whatever fear this question generates. Affirmative action issues always seem to strike fear in everyone's hearts—at least that's equal!!

This breakdown was resolved by expanding the category of emotional information into two subcategories: "Talking about feelings" and "Giving voice to feelings." In resolving this breakdown we were distinguishing between *talk* and *behavior*. An instance of the former is when a respondent refers to feelings that people might have about gender inequity. For example, respondents indicated that there is considerable reluctance to speak openly about this topic. Other feelings that were discussed include the emotional reaction that people have to the power dynamics and the need for people to really listen to and take seriously each other's feelings about gender inequity.

An example of the latter—actually expressing one's own feelings—is the exchange about female representation at the executive level. One respondent gives a strong emotional reaction, a tirade almost, when a counter-example is given to the claim that there were no women in executive positions at the University:

One woman in power is not enough. One white woman in power is not enough. One lesbian woman in power is not enough. One woman of color in power is not enough.

The speaker is expressing her/his considerable frustration with the use of a single instance being used to refute the claim of an entrenched pattern. This person is expressing an emotion—frustration—with respect to what s/he perceives to be tokenism. The ability to distinguish between talk and behavior with respect to this category of information enabled us to gain deeper insights into the interpersonal dynamics of these discussions. Exchanges such as this were clues that the GSS sessions were not always calm, logical discus-

[14]This is the "Strip 2" to which reference is made in Figure 1.

sions of issues and solution alternatives. Indeed, when the first author read the above exchange for the first time, she heard her own internal voice rise in pitch and volume as she connected with the emotion that was being expressed. She had heard these stories before in her research on gender.[15]

Once we adjusted our schemes to include affective information, we relied upon context and language cues in order to uncover and interpret the emotional meaning of the group members' discourse. The emotional messages were signaled in several ways. One was the use of writing conventions. For example, in response to the seed question, "Do you believe this university is a place where both genders receive equal treatment?" came the following reply:

> *Absolutely NOT!! Not only are there differences in pay for the same job and qualifications, but also, women's ideas are generally dismissed and demeaning comments are made to females that would never be made to men.*

Here the use of grammatical devices such as capitalization and punctuation are indicative of the strong negative feeling being communicated.

A second way of interpreting expressions of emotion was by examining a statement in relation to what surrounded it, as when the participant inquired:

> *Are we in the same institution?*

This response can only be understood as an emotional—specifically, an incredulous—reaction when it is viewed against the backdrop of the preceding comment. Two individuals are discussing the role of institutional structures in offering equal opportunity to both genders. The first respondent thinks that the structure of the university does offer equal treatment and opportunity to both genders. One can almost hear the sarcasm in the second person's voice as s/he wonders whether they work at the same place.

A final way that emotion was expressed was simply through the meaning of the words themselves. In the excerpt below, the final speaker is expressing skepticism about the recommendation for ensuring fairness.

> P1: *We need to redouble our commitment. Winding up three important searches just now....What is the gender picture of interviewees? Who searched? What happened?*
>
> P2: *[We need] discussions in considering positions. Talk about the person not the gender. Every few months [make sure] there is a "check" to make sure there is no de facto bias.*
>
> P3: *Who does the "checking"? Foxes in the henhouse.*

The first two comments in this strip set the stage for the cynical remark made in the final entry, but even without these, the cynicism in the third comment is evident in the phrase "foxes in the henhouse."

In some cases the emotional information was expressed through a combination of mechanisms. In the following exchange about diversity and assimilation, the feelings come across from a combination of the context, the language and the writing conventions.

> P1: *By keeping the feeling of groups, underrepresented or not, we create a gang-type climate. We are all here because we are Americans and this is our culture NOW. Think of the reasons that many "underrepresented" groups left their country—because those customs brought about societies that did not work for them and they came here to be an American.*
>
> P2: *Maybe, but you guys think we all want to be white middle class males.*
>
> P3: *Oh, yuck!!!!!*

The use of multiple means to express emotion is akin to face-to-face communication in which the

[15]See Trauth (1995), Kwan et al. (1985), and Mitroff et al. (1977).

words and nonverbal communication work together to convey an emotional response.

As we proceeded with our coding, another breakdown occurred when we encountered strips that fit neither the cognitive nor the emotional categories.

> Strip 3:[16]
> P1: *It doesn't make sense, to me, to think that we could possibly be an oasis of equity in a society where social inequities are so deeply institutionalized; we are also part of the larger [university] system and as such, must be cognizant of the larger system's lengthy history of sexism—in every aspect.*
>
> P2: *Yes, but we can try. Why give up and say that the "picture" is just too large to deal with?*

The response made by P2 in this exchange contains something other than cognitive content or emotional expression. This breakdown was resolved when we recognized that a third type of information was being expressed: behavioral information. This was information connected to action. In this exchange, P2 is attempting to rouse people into action; s/he is sounding a "call to arms."

However, as with emotional information, the development of this category subsequently led to another breakdown, which we resolved as we adjusted our interpretive schema, yet again, to recognize that strips contained information about behavior in two ways. Sometimes the people simply talked about the behavior of others: what should be done to change the gender inequity situation at the university or in society, as Strip 4 shows:

> Strip 4:[17]
> *I have talked to female faculty members who feel they weren't hired at a fair salary. They didn't negotiate as ruthlessly as others. Maybe women need to network on how to negotiate like the guys.*

However, at other times participants were more active. They were expressing some altering of their consciousness about this topic—a reinforcement of an existing view or a change in consciousness—or an attempt to alter another's consciousness. It is in this sense of consciousness change that the respondents are evidencing some sort of behavioral change.

In resolving these breakdowns, we created two subcategories for behavioral information: information about behaviors (talk) and information signaling consciousness change (action). Examples of simply talking about behaviors that do or should occur are comments describing behaviors participants say ought to occur in order to respond to instances of gender inequity. The behavior changes that they recommended range from women changing to the organization changing to society changing.

The evidence of a consciousness change was deduced from what the person said or how she or he said it. Examples are conveying a tone of surprise or a spirit of activism. As with expressions of feeling, expressions of consciousness change occurred in several ways. The most discernible indicator of consciousness change was the use of action words such as those used in Strip 3:

> *Yes, but we can try. Why give up and say that the "picture" is just too large to deal with?*

While the preceding comments serve to reinforce this respondent's call to action, they are not essential for understanding this strip. It stands on its own as a motivational statement to the rest of the participants to engage in activity that will change the inequity at the university. We see that s/he wants to **do** something to rectify the situation. In another place a strip stands totally on its own. The following comment was not a direct response to previous comments.

> *I think we ARE trying, even now. Otherwise, why did we come and engage in this process? It just isn't going to change overnight, but it will change.*

[16]This is the "Strip 3" to which reference is made in Figure 1.

[17]This is the "Strip 4" to which reference is made in Figure 1.

The second indicator of consciousness change was a statement observed in context. For example, the final statements in one of the sessions were the following:

> P1: *I think it begins with each individual learning that each person, no matter which gender, is capable of achieving and attaining the same goal. This may not be the case in today's society, but if we advocate and teach toward that belief—it may someday come true.*
>
> P2: *This is absolutely beautiful. I hope I see this statement again and again. It ought to drive our behavior. It has real promise for us.*

If viewed on its own, the second comment in this strip could be classified as simply talking about behavior, but its placement at the end of the session in a discussion about creating awareness suggested to us that some other meaning could be gleaned from the words. At a minimum, P1's comment resonates and serves to reinforce P2's consciousness about this matter. Alternatively, this participant's consciousness about gender equity could have been altered in some way by the discussion. Either way, the statement belongs in a category different from that which contains distanced discussion of other people's behavior.

The final expression of consciousness change is the subtlest and most difficult to discern. While it is akin to the other two forms of expression, it is also different. This type of consciousness change is signaled through the presence of emotion in discussing behavior. Without the emotional component, the words would be classified as talking about behavior rather than expressing consciousness change. Here, a sense of activism emerges from the exchange. It is as though the respondents are saying, "We have to **do** something!" The discussion is about pay equity across genders.

> P1: *[P]aying men and women equally is a requirement to equal treatment. Equality is only word without salary equity.*
>
> P2: *This is really hard to believe. Do you have concrete evidence of this happening on our campus?*
>
> P3: *Absolutely. The figures are available for all to see. The EOE[18] officer can gather them for you.*
>
> P4: *Is it really the case that we have different salary schedules for male and female? That's hard to believe [in this age].*[19]

Before leaving this discussion of types of information, it should be noted that multiple coding of strips also occurred. That is, segments were simultaneously placed into more than one category. Consider the following excerpt that talks about change behavior. At the same time it creates awareness, provides cognitive content, and expresses emotion.

> *There should be at least one (and of course preferably MORE THAN ONE) female at the top level of administrative decision-making. (That is, a President or a Vice President.) If there are not females present and participating when highest level decisions are being made, gender bias is almost inevitable (even if it is not conscious).*

Excerpts such as this are typical of face-to-face communication in which multiple motives inform messages.

The process employed to interpret the meaning of the information exchanges was an iterative one. As we moved through the discussion transcripts, we continuously adjusted our worldview (and expectations) about the nature of the information contained in them. Figure 1 depicts the way in which this method was applied in the interpretation of this text using Agar's (1986, pp. 27-29) method of breakdown resolution. Our initial schema or level of understanding encountered a breakdown when a strip did not conform to the expectations embodied in the schema. Resolution came when we adjusted our schema and revised

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[18]EOE stands for Equal Opportunity Employment.

[19]Since the identity of the contributors is not known, it is not possible to say whether this exchange involved two, three, or four different individuals.

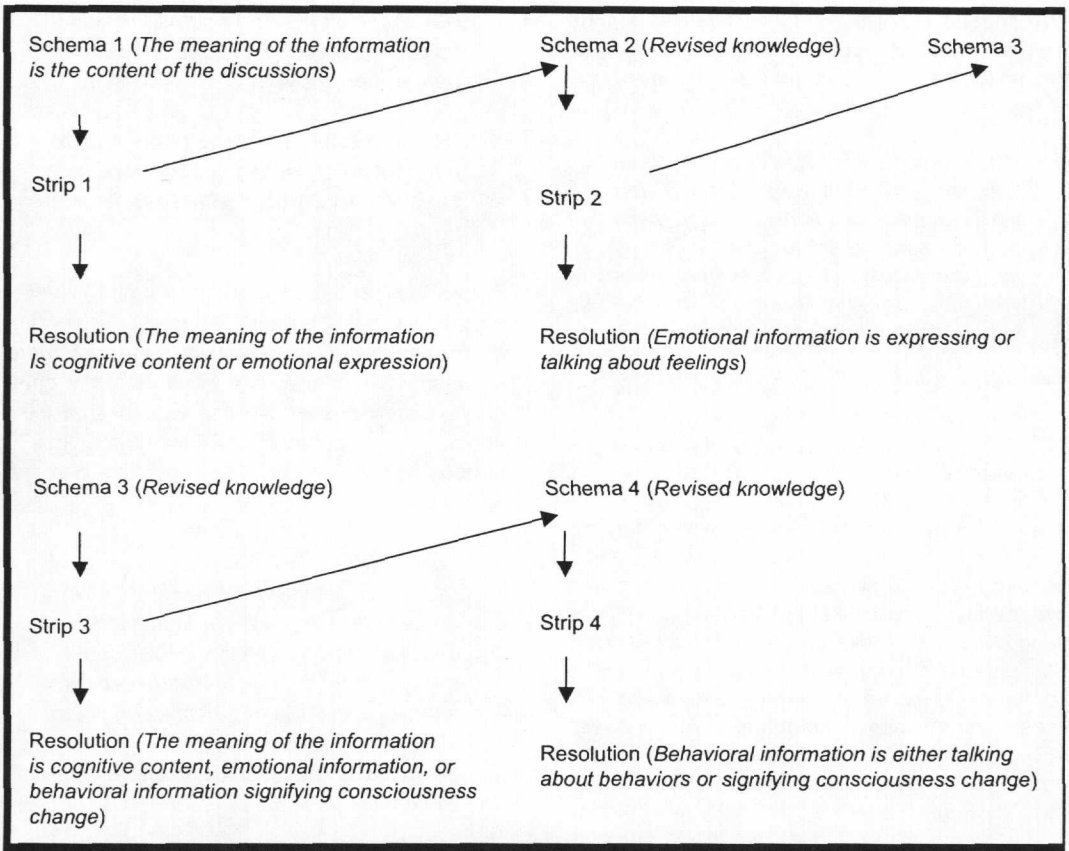

Figure 1. Interpreting the Meaning of Information Exchanges Through Breakdown Resolution

our knowledge about the meaning of strips contained in the discussion transcripts. But then a new breakdown would occur when a strip challenged this revised knowledge and the process began all over again. This process of schema revision continued until all of the strips were able to fit with the schema that ultimately resulted.

Interpreting the Meaning of the Information: Having used interpretive methods to uncover the types of information that were exchanged in these GSS sessions, we then employed the interpretive process to understand the meaning of the textual transcripts that resulted. In this section, we discuss our use of the hermeneutic circle to develop these interpretations.

In the course of expressing their feelings, we noted that the participants revealed very different perceptions of gender equity at the University. One group of participants used these sessions as an opportunity to express a number of feelings about the position of women at State University: anger, frustration, annoyance, and fear.

> *I am always being told that I perform better than expected for a woman.*
>
> **********
>
> *I trust absolutely no one here. I am afraid to discuss the hard reality of the situation here for women with anyone.*

Another group of participants used this as an opportunity to express feelings about male issues:

> *Oh, this really bugs me. Why is there WOMEN'S STUDIES and not Men's*

> *Studies offered here?????!!!!! I think the change in a man's role in society is often overlooked as women come forward in the workplace.*

In response to the question "Do you believe this university is a place where both genders receive equal treatment," they revealed very different perceptions about the status of inequality at the University. The following is a sampling of comments from one session:

> *No. Males at distinct disadvantage; in some case actively discriminated against.*
>
> **********
>
> *It seems so; distribution of faculty and administrators seems equal.*
>
> **********
>
> *I think that women in leadership roles are not recognized as such. A person told me that white males ran this university, and after checking, I found out that women were in the majority of management positions on campus. The perception was diametrically opposed to the facts.*

This group appeared to resent the focus on women. One participant expressed the viewpoint that focusing on gender or other "special interest groups" is diverting attention from the real interpersonal issues at the university, namely, faculty-student interactions. Another believed that an appropriate response to a group's charge about feeling disadvantaged is to counter with "the facts," implying that these "facts" would show otherwise.

Observation of these responses suggested that the discussion transcripts contained divergent meanings about gender equity at the university, but this conclusion produced an anomaly. The purpose of people coming together in the GSS sessions, at least as seen in the perspective of conventional positivist GSS research, was to do problem solving: to discuss aspects of the gender equity issue at the university and then to make suggestions about improving the situation. Implied in this motivation is the assumption that there is a common recognition of "the problem." Upon examination of the textual passages, however, we came to a different conclusion. It seemed that there were two points of view: one vehemently consistent with this assumption and another which did not "buy in" to it at all. We sought to resolve this contradiction by returning to the meanings that lay in the larger context. As we did so, we returned to the particular passages with new insights that led us—after a series of iterations—to new understanding about the meaning of the discussion transcripts.

Our first insight, therefore, was that there was an absence of shared consciousness. Participants' comments often seemed to be operating on two different "wave lengths" as though they were carrying on two different—and parallel—discussions. In one dialogue, the understanding of equality ranged from the lofty ideal to the gritty reality:

> P1: *Equality transcends "equal pay for equal work" issues. The essence of equality emanates from mutual respect.*
>
> P2: *Mutual respect is lovely. Status gains more respect. Equal pay for equal work is vital for self-respect and the respect of others because it translates into status. This is a patronizing statement.*

Other examples of being on different "wave lengths" come from the differing interpretations of affirmative action and mentoring. With respect to affirmative action, there were two distinct connotations given to the term. One was promoting equality of opportunity for underrepresented groups; the other was rewarding incompetence. With respect to mentoring, the same phenomenon occurred. One connotation was helping members of underrepresented groups to fill positions at all levels of the University hierarchy. Another interpretation linked mentoring for purposes of enhancing upward mobility to a "warm and fuzzy place" that based rewards not on competence but on length of employment.

Dialogues also revealed a low level of understanding about the reality and the language of gender discrimination. These authors find this

ironic in view of the fact that the majority of the male participants were in management positions.

> P1: *I have not witnessed nor experienced what I would consider unfair treatment of either gender. However it is true that the [State] University staff is well over half women. I am not sure why.*
>
> P2: *Which half of the staff is female? Most support staff is female.*

In another exchange, a participant refers to a "pink ghetto" to describe positions generally held by women and which tend to be low paying with little advancement, power, and prestige. This person is contrasting the low paying "pink ghetto" with positions in the trades held by men which receive higher pay. In response, another participant wonders:

> *What is a "pink ghetto"? It is difficult to understand why trade positions receive a higher salary than secretarial levels considering the advanced technology that "secretaries" have been required to learn in a short amount of time—jack of all trades....*

The abbreviated time period for the GSS sessions exacerbated this absence of shared consciousness with which participants embarked upon the discussions. There was not even enough time to negotiate common meanings of relevant terms, define the scope of the conversation, and establish participants' points of view much less to move on to finding an acceptable solution to the issue.

A second insight was that these transcripts did not reflect widespread participation. Our analysis of participation, which was derived from an understanding of the broader context, was the opposite of that which resulted from the positivist analysis. Only 10% of the University community participated. Among those who did participate, there were both gender and professional imbalances. Three-quarters of the participants were women. Faculty members were heavily under represented while administrators were over represented. There were no male faculty members in any of the sessions and only seven women self-identified as "faculty or librarian." On the other hand, there were 15 administrators, several of whom were part of senior administration. To generalize, male administrators/staff and female staff dominated these GSS sessions.

Finally, our growing understanding of the whole led us to question the anonymity that was suggested by the positivist perspective on the GSS sessions. Despite the technical attention to confidentiality, we questioned whether participants believed they were provided with a safe space to talk. While the name of the participant may not have appeared on the screen along with her/his comment, the people sitting in the room together all knew each other. They talked to each other by name before and after the sessions. Given the power relationships in the group makeup—males were primarily administrators, females were primarily staff and faculty—one wonders just how safe a space it really was. Indeed, on the post-session questionnaire 25% of the participants were reluctant to provide some form of identifying information: two participants chose not to reveal gender, five would not indicate ethnicity, and three would not give position titles (see Appendix A). This might also have contributed to the low turnout by female faculty, despite the Faculty Senate call for such a forum. There may have been a self-imposed censorship on the part of the women faculty.

By looking beyond the apparent meaning of the individual textual passages and into the context within which they occurred we developed insights into the whole. We came to understand the university context as one fraught with tension, suspicion, frustration, and incompatible differences in perception. The insertion of the GSS sessions into this setting was, at best, like dropping a pebble into a stream to build a dam; at worst, these sessions were mere public relations. The more we understood about this context, the more we were able to resolve the anomalies in the particular meanings of the individual passages. In this way, we moved back and forth from the larger context to the individual passages until we were confident that the story that was emerging was consistent with both the data in the transcripts and the meaning of the context.

Table 5. Interpretive Perspective on Goals of the GSS Sessions
Raising awareness about gender equity issues 1. Uncovering problems and misperceptions 2. Giving women an opportunity to air perceptions about a hostile workplace and a glass ceiling 3. Collecting information about gender inequity
Bringing people from various parts of the University together 4. Garnering widespread participation 5. Providing people with a safe space to talk 6. Fostering dialogue within the University
Generating alternatives for managing gender equity 7. Identifying concrete steps to resolve gender inequity

Discussion of the Results of Interpretive Analysis of GSS

What guided the interpretation of the information—and the criteria used to evaluate the effectiveness of these computer-mediated discussions—were the goals for the GSS sessions that were presented in the context description section of this paper: raising awareness about gender equity issues, bringing people from various parts of the University together, and generating alternatives for managing gender equity. Whereas the positivist type of GSS analysis used the goals at this level of detail, the interpretive analysis went deeper into the case description to produce greater refinement of the GSS session goals. These are presented in Table 5.

The evidence from the interpretive analysis of the groups' discussions suggests that the first and third goals of the GSS sessions—raising awareness about gender inequity issues and generating alternatives for managing gender inequity—were addressed if not fully achieved. The interpretive analysis, however, casts doubt upon the achievement of the second goal: bringing disparate groups together to facilitate communication.

With respect to the first goal of exchanging information in order to raise awareness about gender equity issues, the interpretive analysis shows that participants exchanged information on three levels, thereby going beyond the original intention of the discussions. The intention of these GSS sessions—based upon the assumptions of conventional GSS use—was, first, to discuss whether participants believed the University is a place where both genders receive equal treatment. It was, then, intended that they would discuss what should be done to ensure that both genders receive equal treatment. The intention was to have a focused discussion of two specific questions after which some concrete alternatives would result. However, our interpretive analysis shows that the participants in these particular GSS sessions went beyond these expectations. They exchanged other types of information in addition to responses about the two seed questions:

> *Do you believe that this university is a place where both genders receive equal treatment? Why or why not?*
>
> *What should be done to insure that both genders receive equal treatment at this university?*

While the results of the interpretive analysis show that the GSS sessions were effective in achieving the stated goals of raising the issues and generating solution alternatives, they show that the second goal was achieved only minimally, at best. This goal was to bring people from various parts of the university together in order to facilitate meaningful communication. Instead, the interpretive analysis revealed an absence of shared consciousness. Contextual factors that contributed to this were uneven participation by gender and status in the university, absence of real anonymity during the discussions, and insufficient internal motivation to participate in meaningful dialogue about this topic.

With respect to the third goal of generating alternatives for managing gender equity in order to encourage action, participants gave evidence of behavioral information exchange in the form of consciousness change which went beyond *talking about* what needs to be done. Once again, how-

ever, the viewpoints were at opposite extremes. While numerous concrete suggestions for change were made, others expressed the viewpoint that gender equity is not an important and actionable issue.

> *I think we do enough already. I don't think that we could achieve a substantial increase in equity (and we could probably not agree on it if we did) without a lot of cost—time, yet another committee.... Better ways to spend our energy.*

There were three overall findings that resulted from the interpretive analysis of the GSS transcripts. First, the GSS session participants exchanged three types of information: cognitive (i.e., content about the topic in question); emotional (discussing and expressing emotions); and behavioral (discussing the need for new behaviors and indicating personal consciousness change). The second finding is that these computer-mediated discussions were emotionally charged events. Participants gave impassioned, emotional reactions to each other and to the seed questions. Finally, the participants exhibited widely diverging worldviews about the problem at hand. There was no consensus that a gender equity problem even existed much less about the extent of it. These findings and a comparison with those of the positivist analysis are summarized in Table 6.

As Table 6 shows, the results of these two analyses paint very different pictures of the GSS sessions. The positivist analysis suggests that the GSS sessions were effective in helping these people to achieve their goals. There appeared to be an effective exchange of information. The technology appeared to have facilitated communication by helping the people involved to generate useful ideas to solve their problems. Finally, there was some consensus around possible solutions. Thus, we can conclude that the sessions appeared to have encouraged action.

The interpretive analysis, on the other hand, suggests that the discussions were, at best, only partially effective in helping the University to achieve its goals. There appeared to be an effective exchange of information associated with problem identification and solution scenarios. However, the sessions did not help to achieve a significant goal that was motivating these sessions: facilitating real communication among the participants. An interpretive analysis shows that the GSS sessions were most successful in exchanging concrete information or perceptions about gender equity, or in making concrete suggestions for action. In the course of sharing these facts and perceptions, however, wide divisions were made evident. Participants were not able to overcome the absence of a shared consciousness. The failure lies not in the technology, however. As exemplified in the time constraints imposed upon the process, factors that reside in the organizational context were responsible for the failure of the sessions to facilitate real communication.

The results of this interpretive analysis reinforce the point that GSS, like all information systems, are socio-technical systems. As such, technological characteristics alone will not ensure their successful use. Through the interpretive lens, we learned that the GSS was most effective in addressing the narrower goals of information generation and solution identification. Where this GSS project was least successful was in addressing the broader goals that were more connected to the organizational context. Because of features in the context—fear of reprisals, disconnect from the issue, lack of real anonymity, time devoted to the discussions, absence of shared consciousness—these computer-mediated sessions fell short of the goals they were, perhaps unrealistically, expected to achieve.

Criteria for Evaluating Interpretive Findings

We derive, from different interpretive research traditions, four criteria for evaluating our findings. They are triangulation, authenticity, breakdown resolution, and replication. We describe each of these criteria below and then show how we employed them in our study.

Triangulation. Triangulation—the use of multiple sources, methods and investigators to provide corroborating evidence—is commonly used in a variety of qualitative methodologies to show that there is evidence other than the researcher's own interpretation to support the discovery (Creswell 1998; Fetterman 1998; Miles and Huberman 1994; Silverman 1993; Yin 1989). The objective of triangulation in our study is to find information from

Table 6. Comparison of Findings Using Positivist and Interpretive Analyses of GSS Sessions

	Positivist	Interpretive
Unit of Analysis	The meeting	The meeting in its organizational and historical context
Participation level	High – number of comments relative to number of participants in sessions	Low – imbalanced representation of key University constituencies in GSS sessions
Participant's engagement	High – critical thinking evidenced by frequency of question/problem clarification	High – engagement shown through emotionally charged responses
Consensus	High – consistency in ranking of alternative solution scenarios generated from second brainstorming session	Some – widely varying perceptions of extent and reality of problem that were never resolved
Conflict	Low – frequency of explicitly negative remarks	High – number of impassioned, emotional reactions to each other. Expression of opposite world views on key topics (such as affirmative action). Use of sarcastic, ironic language.
Information type	Cognitive Behavioral (talking about) Expected	Cognitive Emotional (talking about and showing) Behavioral (talking about and showing) Unexpected Contextual
Anonymity	High – participant's identities stripped from comments	Low – people who knew each other well sat together in the same room
Shared consciousness	High – participants were successfully reading and understanding each other's comments	Low – major differences in perceptions and opinions, "ships passing in the night"
Usefulness	Yes – useful, "on task" solution scenarios generated	Partial – questionable meaningful interaction, failure to achieve shared consciousness, low participation, nothing ever done with session information

other sources to corroborate our findings that are based upon the interpretation of textual materials (the transcripts of the GSS sessions). The two sources of information that were used in this study were participant observation and member checking. The second author carried out participant observation in order to enable comparison of the interpretive findings with observations about the organization before, during, and subsequent to the GSS sessions. The second author was a member of this organization before and after the GSS sessions and was a cofacilitator for each of the sessions. On many occasions, such first-hand experience within this organization was used as a barometer with which to compare, challenge, and confirm interpretations that the first author was drawing from the analysis of the session transcripts.

The other source of information employed for purposes of triangulation was member checking. Member checking is a method of establishing the credibility of the findings in which the researcher checks her/his interpretations with representatives of the people being studied (Cresswell 1998; Ely et al. 1991; Lincoln and Guba 1985; Miles and Huberman 1994; Silverman 1993; Trauth 1997). In member checking, the researcher solicits the *inside* perspective on the credibility of the findings by reviewing the data, analyses, and interpretations with the participants. There was one key informant, in particular, who provided valuable feedback on interpretations. He is one of the staff members working within the library at State University.[20] He was heavily involved in all the significant events in the case study. In addition to his input, member checking occurred after the analysis of the transcripts and a complete draft of the manuscript had been written. Employees at State University were asked to review and validate portions of the analysis and manuscript as they were being developed. For example, on several occasions, the second author asked colleagues at State University to review interpretations that dealt with the subsequent effects of the GSS sessions on people's behaviors and decisions.

Once we had probed a little deeper into the context surrounding the computer-mediated sessions, we became more sensitized to the multiple layers within the computer-mediated conversations. We could more easily perceive the dynamics within the physical settings of the sessions and the broader, emotionally charged context within the organization. In short, the triangulation of case study analysis, interpretive transcript analysis, and member checking caused us to rethink and change our initial impressions derived from the GSS analysis about the degree of anonymity during the sessions and the subsequent effects that use of the GSS had.

Authenticity. An evaluative criterion that reaches across the spectrum of interpretive research is that the account must *make sense* or *ring true* to the reader (Geertz 1973; Miles and Huberman 1994; Sanday 1979). This is expressed as the *persuasiveness* (Reissman 1993) or *authenticity* (Golden-Biddle and Locke 1993) of the narrative analysis. An authentic account is one that is perceived by the reader as genuine and conveys the researchers' understanding of the members' world. The evocative quality of the narrative, including the use of quotations and rich, detailed description, is indicative of the researchers' connection to the people being studied. Walsham and Sahay (1999) have used this criterion to evaluate their interpretive information systems research.

In this research, authenticity refers to the interpretive rendering of both the discussion transcripts and the context from which they arose. By providing rich detail about the organization, the participants, the relevant perceptions, actions, and events, and the relevant issues, and by describing the local and broader contexts within which the research took place, we helped the reader to better sense the meaning of this context. In the second section of this paper, we provided an overview of the case study. In the third section of the paper, we made use of excerpts from the transcripts to illustrate the emerging interpretations.

We also endeavored to produce an authentic account by revealing the two authors' connection to the context and the transcripts. We revealed that the second author worked at the institution and was physically present for all four GSS

[20]As noted above, staff members such as this gentleman are considered to be the equivalent of faculty members within the University.

sessions. What he brought to the research was his own experience of the topic of gender inequity from participant observation in the context. We also revealed that the first author is a female university professor who has also done research on gender. We noted how her past experiences with gender issues came to light as she engaged in the interpretive process. In different ways, then, the authors were able to use their backgrounds in order to establish a connection to the case study. According to the principle of interaction between the researcher(s) and the subjects (Klein and Myers 1999, p. 10), the "facts are produced as part and parcel of the social interaction of the researchers with the participants." In our case, the authenticity of our interpretation is due, in part, to the way in which the authors interacted with the text and the context, and the way in which we deliberately shared the process of developing our interpretation openly with the readers, rather than simply presenting it as a finished product to them.

Breakdown Resolution or Hermeneutic Circle. What is necessary but not sufficient for reliability[21] of interpretive research is that detailed documentation of procedures be provided (Kirk and Miller 1986; Yin 1989). It is also necessary to employ methods that can demonstrate how the interpretation is consistent with the data. This occurs in interpretive research when the reader, after having read the researcher's account of the process, would be able to see how the interpretation is meaningful rather than simply made up. This is done by walking the reader through the process of developing the interpretations.

We accomplished this through the resolution of breakdowns, to use the words of ethnography (Agar 1986), or through the hermeneutic circle, to use the words of hermeneutics. Both terms characterize interpretation as an iterative process of examining the particular in relation to the greater whole and revising meanings as these iterations progress. When an anomaly or breakdown in understanding occurs, the individual strip is revisited with respect to the schema or "spirit of the whole," the one guiding idea that governs the text (Ormiston and Schrift 1990, p. 12). Through this dialectic process of reexamining strips and readjusting our schemas, we moved toward improved understanding of the whole text.

The following examples serve to show how understanding their relationship to the whole strengthened the interpretation of parts. Breakdown/strip-reformulation was explained and depicted in Figure 1 to show how interpreting the meaning of the information resulted in the understanding that several different types of information were being exchanged in the GSS discussions. As part of the verification of our work, we analyzed the texts in an iterative process, invoking the hermeneutic circle to verify that our interpretations had, in fact, uncovered and resolved as many anomalies as could be identified in the texts. An example of one of these anomalies was the absence of shared consciousness, as discussed earlier in the section on breakdown resolution. We believe that a robust approach to breakdown analysis, such as that offered through the hermeneutic circle, and subsequent reformulation of schemas increased the validity of our interpretations and conclusions.

Replication. A method used in case study research to support validity[22] is replication. Through replication across multiple cases, the findings are shown to be generalizable beyond the immediate case (Yin 1989, pp. 43-44). The interpretation that yielded the three findings[23] from this study was obtained by pooling the four transcripts and interpreting them as a single document. Thus, at the end of the interpretive analysis we did not know whether or not each of the four sessions instanced all three of the findings. Therefore, in order to check the validity of our findings, we revisited the transcripts of each GSS session

[21]Whereas reliability of positivist research is confirmatory—achieving the same results across repeated "experiments" (i.e., all research of a hypothesis testing nature)—the objective of reliability in interpretive research considers the extent to which the observational procedure yields consistent findings.

[22]The objective of validity in interpretive research is not to verify a *correct answer* but rather to convince the reader that a *believable story* is being told.

[23]These findings are (1) that GSS participants exchanged three types of information: cognitive, emotional, and behavioral; (2) that the GSS sessions were emotionally charged events; and (3) that the participants exhibited widely diverging world views about the problem at hand.

looking for evidence of each of the findings in each set of transcripts. In this second interpretation of the transcripts, we were considering each of the four sessions to be "replications" of our initial, pooled case.

By replicating, in the individual sessions, the analyses that derived from the analysis of the pooled transcripts, we were able to test our emerging interpretations. In the case of the first two findings (information sharing and emotion expression), the replication exercise was consistent with our initial interpretation. But the case of the third finding (worldview about the problem) was different. Coding of the pooled transcripts yielded the initial interpretation that participants exhibited a changed consciousness about the problem as a result of the GSS sessions. However, the replication caused us to revise that interpretation, highlighting a breakdown in schema that had not surfaced when aggregating the data and removing it from the context of the individual sessions. The literal replication using the individual GSS sessions became part of the "iterative" process common to interpretive research and specifically to breakdown resolution.

Whereas breakdown resolution is a process-oriented way to show how we developed our interpretations, replication is a post-hoc way to show how we evaluated and verified our interpretations.

Discussion and Implications

Having conducted these two analyses of the GSS sessions we can now return to the research question motivating this study:

> Does an interpretive analysis of GSS use result in a different understanding of the GSS discussions than that provided by a positivist analysis?

To answer this question about the value added by using an interpretive lens in addition to a positivist GSS lens to analyze the session transcripts, we begin by comparing the methods used and the results that were obtained from each approach. A comparison of the methods is summarized Table 7.

When comparing these two approaches, it is important to highlight the difference in the goal of each method. The goal of the traditional way that researchers and practitioners have used GSS is to efficiently produce conveyance of ideas and then convergence on a solution. This goal, in turn, shapes the collection and interpretation of the information generated during GSS sessions. Information that is useful in this analysis is that which gives evidence to conveyance of ideas, convergence on a limited set of workable ideas, and consensus of viewpoints. Participant comments that are not directly related to this specific goal are deemed not on task and, hence, are excluded from analysis and interpretation.

In contrast, the interpretive analysis had no such a priori goal and, therefore, no screening mechanism for "extraneous" information. The goal of the interpretive approach to GSS use was to understand all of the information exchanges of the computer-mediated groups. It was through immersing ourselves in the world of the participants through open coding of the transcripts that the information categories used for coding and interpreting the discussions emerged. While the conventional analysis placed the focus of the groups' attention on idea generation and evaluation, and on consensus about an action plan, the interpretive analysis placed the focus on better understanding of the problems and issues without regard to the development of an action plan.

One important distinction between positivist and interpretive understandings of the GSS sessions is the point of view taken during analysis of the transcripts. With the former approach, the perspective of the researcher is an "outsider looking in" on the group. With the latter approach, however, the researcher's perspective is that of one who is "inside" the group, observing and interpreting what is happening. While the conventional analysis documents and quantifies *that* people communicated, the interpretive analysis seeks to understand the meaning of *what* people communicated. The difference between the two approaches is evident in the richness of the information that is captured. Whereas the conventional approach would disallow certain topics as not being on task, everything was on task when viewed through the interpretive lens.

Table 7. Comparison of GSS Analysis Methods

	Positivist	Interpretive
Goal	Efficient conveyance of ideas and convergence on a solution	Understanding the meaning of the information exchanges of a computer-mediated group
Analysis	Quantitative	Qualitative
Assumptions	That technology would help participants to generate and evaluate useful ideas	No explicit a priori assumptions as to what meaning would arise from the transcripts
Coding	Established, pre-tested, a priori categories applied to transcripts	Categories developed in grounded fashion through open coding
Decision perspective	Focus on considering alternative solution scenarios	Focus on better understanding of the problems and issues
Viewpoint	*Outsider's: what text the participants* produced	*Insider's: the meaning of the* participants' text
Coding assumptions	Text has static meaning	Meaning of text is dependent upon the context

Table 8. Additional Information Acquired from Interpretive Analysis of GSS Sessions

Dimension	Additional Information
Participation level	Key University constituencies were absent from the meetings
Participant's engagement	Emotionally charged exchanges
Consensus	There was a lack of consensus about the perception and extent of the problem
Conflict	No additional information
Information type	Several types of information were exchanged: emotional behavioral unexpected contextual
Anonymity	No additional information
Redundancy	There was an absence of shared consciousness
Usefulness	No additional information

Consistent with the differences in methodological approach are the different results that emerged from these two analyses. In order to understand why these differences in results have occurred as well as to probe the contribution of the interpretive lens, we now take a closer look at the interpretive results. We define the contribution of the interpretive analysis as (1) developing different conclusions from the same evidence (see Table 6) and (2) acquiring additional information to that which resulted from the positivist analysis. This additional information is shown in Table 8.

On seven of the eight dimensions listed, different interpretations of the same evidence resulted. Whereas the participation level of those in attendance at the GSS sessions seemed to be high, the broader lens of the interpretive analysis, which took into account the organizational context within which the discussion sessions occurred, shows that participation was low relative to the key University constituencies. While both analyses showed that there was high participant engagement in the sessions, they did so for different reasons. The conventional analysis pointed to a low frequency of clarification requests to show that people were engaged in critical thinking; the interpretive analysis pointed to the way in which people interacted: with emotionally charged responses. The positivist GSS analysis used the rankings of solution scenarios to conclude that there was consensus within the sessions. The interpretive analysis found that people entered the sessions with widely varying perceptions about whether there was a problem and, if so, its extent. As the interpretation of the transcripts ended, there was only limited movement toward changed consciousness about the issues.

The conflict dimension, perhaps more than others do, points to the richness of the information that resulted from interpretive analyses. The low frequency of explicitly critical comments in sessions is used by the conventional approach as evidence of a low level of conflict in the sessions. The interpretive analysis, by turning to such literary devices as sarcasm, irony, and grammar along with recognition of several types of information including emotional expression, concluded that there were was an atmosphere of conflict regarding worldviews, feelings, and reactions to each other.

The overall conclusion drawn from the positivist analysis is that the sessions were useful. They showed consensus around viable solution scenarios and were generally on task with their comments. The interpretive conclusion, however, is that the sessions were only partially useful. This analysis wonders how much meaningful interaction really occurred. The absence of a shared consciousness on the part of entering participants was not significantly altered in these deliberately abbreviated discussions. Finally, nothing was ever done with the information generated from these sessions.

In addition to the different understandings that resulted on these dimensions, Table 8 also shows the additional information that the interpretive analysis provides. First, incorporating the wider context of the case into the analysis of the GSS discussions shows that key University constituencies were absent in these discussions. This information is important in determining the representativeness of the results of the discussions. Second, whereas there was consensus around the solution alternatives that surfaced in the second brainstorming session, to begin with, there was no consensus about the nature of the problem. Despite buy-in to a solution, in theory, a participant's failure to consider gender inequity to be a significant issue in the first place will influence her/his motivation to enact such a solution. Probably the most significant contribution of new information occurred for the dimension of information type. Emotional, behavioral, unexpected, and contextual information all helped to enrich the understanding of the information exchanges in these computer-mediated discussions. Finally, the absence of a shared consciousness with which participants entered the sessions and which was only partly diminished by the end is useful in trying to understand why nothing ever resulted from these sessions. To the extent that senior administrators did not perceive a significant gender inequity issue to exist—and only attended the sessions because of a presidential directive—there would be low motivation to take action.

For these reasons, then, our research question is answered in the affirmative. The interpretive analysis of the GSS sessions did, in fact, provide

different information from that which resulted from the positivist analysis of the same transcripts. Further, the understanding of the information exchanged within the GSS sessions was enhanced by the new information that only the interpretive analysis provided. The additional triangulation, which was achieved by this dual analysis of the same data, can give the researcher greater confidence in the results. In this research, triangulation verified the value of the GSS sessions. For example, the interpretive analysis revealed the presence of both passion and the absence of shared consciousness during the sessions, evidence that the participants spoke openly and honestly about their feelings and biases. Thus, the addition of this type of information helps to strengthen one's confidence in the issues that were raised in the discussions.

The other benefit of adding the interpretive lens—producing new insights into GSS—resulted from the hermeneutic analysis of both the transcripts and the organizational context. This analysis documented the absence of a shared consciousness and consensus about the issue of gender equity. What emerged from the interpretive analysis of GSS use in a highly politicized and volatile setting is that the technology can facilitate the process of laying the issues out for consideration. The "anonymity" of the discussions —partial as it was—nevertheless facilitated the expression of people's thoughts and feelings on this emotionally charged topic. Thus, while awareness in the sense of changed consciousness may not have occurred, tangible issues were made available for management's consideration. In addition, concrete steps for addressing gender inequity were raised. Again, while there was not common agreement about the nature and extent of the problem, State University's management was nevertheless provided with employee's suggestions about improvements. The insight into the use of GSS in this setting is that positivist analysis of the discussion data, alone, did not reveal for management all of the important information that was present in the sessions. While use of the GSS revealed information about issue and solution identification, management would have been left without information about the feelings of the participants on the issues or their motivation to enact the proposed solutions.

This insight suggests that different methods of GSS analysis might be appropriate for different circumstances. An interpretive analysis seems particularly suited to GSS sessions with greater uncertainty about the type of information that will be exchanged. This might occur when the problem is incompletely understood, when the problem is emotionally charged, or when the organizational context is highly politicized. A positivist analysis of GSS sessions as conducted here, on the other hand, seems best suited to documenting the communication characteristics of a group that is moving toward convergence about a decision.

Lee (1991) suggests that an interpretive study could be useful for indicating reformulated or new variables for use in subsequent positivist studies. The results of this study are consistent with this suggestion. The kind of information that only the interpretive analysis produced, such as feelings, attitudes, and consciousness about the issue, could become the seed questions for future GSS sessions. For example, a follow-up positivist study at State University or a positivist replication of this study at another university could use the coding categories that resulted from the interpretive analysis.

This paper shows the way in which two different stories can be told from the same set of facts. In doing so, it contributes new insights into our understanding about the choice of methods in IS research. The story portrayed by the positivist analysis of the GSS sessions is about four groups of university colleagues who came together for a brief period of time to generate alternative solutions for addressing a highly threatening topic: gender equity. The story told in the interpretive analysis is about a nonrepresentative group of people from a highly contentious university setting and with questionable motivation embarking upon a computer-mediated discussion of gender inequity with perhaps unrealistic expectations.

By focusing on the critical role of research methodology, this study makes a contribution to our understanding of IS, in general, and GSS, in particular. Table 6 illustrated how preconceived rules and instruments for coding utilized in positivist research might (perhaps, incorrectly) conclude that participation level is high, consen-

sus is high, conflict is low, anonymity is high, and usefulness is high, even though there may be convincing pieces of evidence (not fitting the predetermined framework of the positivist researcher) that suggests otherwise. Further, because the context of use is not typically incorporated into the analysis of the transcripts, rich contextual information that is part of the hermeneutic analysis is not taken into account. This study shows how an interpretive analysis can complement the positivist understanding of GSS use.

In a broader sense, this study contributes to our growing understanding of the application of interpretive research methods to IS problems. While interpretive methods have been used to study electronic mail and on-line discussion forums, as noted earlier, they have rarely been used to study computer-mediation in same-time, same-place contexts as was done here. As we move into the world of virtual organizations and electronic commerce, one fruitful line of research would be to extend to virtual groups what has been learned about interpretive analysis of computer-mediated discussions from this study. We believe that studying virtual groups in this way could present new and interesting challenges to both positivist and interpretive traditions and would be valuable to both managers and researchers in understanding the information exchanged in the physical workplace and the emerging virtual workplace.

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Appendix A

Further Demographics on Session Participants

Three-quarters of the participants reported on the University's ethnicity questionnaire used at the end of the sessions that they were White; the remainder labeled themselves as African American, Hispanic, Native American, and Mexican American. Despite the confidentiality provided by the GSS software, five participants chose not to identify ethnicity on the questionnaires. When we inquired about this, one participant, who was a member of a small ethnic group on campus, expressed fear that people might be able to identify him/her from answers to demographic questions and be able to identify his/her comments. S/he feared potential repercussions.

Seven participants identified themselves on the questionnaire as being either faculty or librarians, 15 participants identified themselves as staff, and 15 identified themselves as administrators. At this university, faculty and librarians are considered equal and, as a result, were grouped together on the university's survey instrument. Three participants chose not to identify their job titles on the questionnaire. The senior administration was well represented in the sessions: the President, vice presidents, and directors all attended the sessions. Thus, the group composition in each session spanned the organizational hierarchy, with participants in each session interacting directly with people both at their own and at other levels. In most cases, faculty/staff participants were in sessions with the supervisors and/or administrators for whom they worked. Because the university was so small, employees knew each other well. Participants in the sessions knew each other, referred to each other by name before and after the GSS sessions, and could identify the participants with organizational power and authority.