Theoretical and Methodological Issues in Group Support Systems Research: Learning From Groups Gone Awry

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ABSTRACT. The amount of research on group support systems (GSS) is growing quickly. One component of GSS, anonymous interaction, has received a great deal of attention recently. The quantitative and qualitative research thus far on anonymous GSS interaction suggests that the effects of GSS anonymity on group processes and outcomes are positive and/or neutral. In this article, the authors explore the potential for negative and/or dysfunctional consequences of GSS anonymity and discuss the relevant implications and research questions to be asked and answered.

THE DEVELOPMENT OF COMPUTER-BASED INFORMATION systems to support collaborative work—referred to here as group support systems (GSS)—is growing quickly. GSS combine networked personal computers, group decision support software, and structured group problem-solving methodologies to support group problem solving and decision making, typically in a setting much like a corporate board room. There are now more than 40 such facilities on university campuses, more than 100 such facilities in business settings, and there are a myriad of GSS software packages available commercially (see Jessup & Valacich, 1993, for discussion).

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Small Group Research Vol. 28 No. 3, 394–413.

The research literature on GSS is also growing quickly. For example, at a recent meeting of the Hawaii International Conference on Systems Sciences, approximately 100 researchers, representing nearly 50 institutions, collaborated on papers presented on GSS. Of the various components of GSS discussed throughout the research literature, one component of GSS—anonymous interaction—has received a great deal of attention (see, for example, published experimental investigations of GSS anonymity: Connolly, Jessup, & Valacich, 1990; George, Easton, Nunamaker, & Northcraft, 1990; Jessup & Tansik, 1991). By anonymity we mean the extent to which group member contributions are identified to others; that is, group members can make contributions without being identified as the author of those contributions. Similarly, when an individual receives a contribution from another member, she or he cannot identify the author of that contribution.

In a GSS setting, group members can potentially be anonymous either to other group members participating in the session or to individuals who are not participating directly in the group's GSS session (e.g., to the experimenter in a research setting or, in a work setting, to the group's manager or to coworkers who do not participate directly in the session but may be privy to transcripts of the session). Valacich, Jessup, Dennis, and Nunamaker (1992) described this as local and global anonymity, respectively. Further, GSS participants may detect the identity of the contributions during the GSS session based on seeing a participant physically enter a comment that then immediately appears on participants' screens or based on some cues in the content of a message that indicate the author of that message. Valacich et al. described these as process and content anonymity, respectively. For content anonymity, the history of the group and the familiarity of the members with each other will determine, in part, how anonymous the members are to one another during the GSS sessions.

The quantitative and qualitative research thus far on anonymous GSS interaction suggests that the effects of GSS anonymity on group process and outcomes are either positive or neutral. However, social psychological research on anonymity shows quite strongly that anonymity in interpersonal interaction can be quite dysfunctional (see, for example, Diener, Fraser, Beaman, & Kelem, 1976; Kerr & Brunn, 1981; Weldon & Mustari, 1988; Williams, Harkins, & Latane, 1981; Zimbardo, 1970). Thus, it seems reasonable to assume that there might be some negative aspects of GSS anonymity or at least situations in which anonymous interaction is not favorable in a GSS environment.

In this article, we will explore the potential for negative and/or dysfunctional consequences of GSS anonymity by analyzing four aberrant subject groups in four separate investigations of GSS. As Watson, DeSanctis, and Poole (1988) have shown, the unintended consequences of GSS investigations can be as enlightening as are the intended consequences. Our exploration of

these aberrant subject groups helps to understand anonymous GSS interaction. However, the value of the exploration is that it causes us to question our fundamental theoretical and methodological premises and predilections.

We offer next a review of some relevant literature in the area of small group and GSS research. We then present our summaries of four aberrant subject groups in four separate investigations of GSS. We follow that section with a theory of the effects, positive and negative, of GSS anonymity on group process and outcome. Finally, we discuss the relevant implications and research questions to be asked and answered.

Review of Relevant Literature

There are similarities between the study of GSS anonymity and the study of earlier methods for supporting group work. Structured group problem-solving methods, such as brainstorming (Osborn, 1957), the nominal group technique (Delbecq, Van de Ven, & Gustafson, 1975), and the delphi technique (Dalkey & Halmer, 1963), were believed to have functionally positive effects on interpersonal interaction, due in part to the fact that these techniques forced a relative degree of anonymity in the process. Similarly, early writings on GSS espouse the benefits of anonymous interaction in GSS supported group work (see, for example, Huber, 1982; Nunamaker, Applegate, & Konsynski, 1987). By positive effects we mean that anonymity helps to reduce barriers to open, effective communication and thus promotes full participation, which in turn serves to improve the products of group decision making and problem solving.

Calls for empirical GSS research (see, for example, DeSanctis & Gallupe, 1987) argued for the need to more rigorously investigate the effects of GSS anonymity on group process and outcomes. However, these calls to action have, for the most part, spoken to the positive aspects of the anonymity construct. Following these calls to action, subsequent empirical investigations of GSS anonymity brought to this line of research a much needed infusion of rigorous, objective inquiry.

Published empirical investigations of GSS anonymity (see, for example, Connolly et al., 1990; George et al., 1990; Jessup, Connolly, & Galegher, 1990; Jessup & Tansik, 1991) appear to be consistent. Collectively, this empirical work suggests positive or neutral effects of anonymity in enhancing group process to improve group outcomes.

Statement of the Problem

Although the literature on GSS anonymity is becoming increasingly empirical, the conclusions suggest only positive or no effects for anonymous GSS

interaction. The disparity becomes clear when one considers social psychological research on interpersonal processes. This line of research shows conclusively that anonymous interaction does not always result in positive outcomes. Indeed, this research shows that anonymity can have some very dysfunctional results.

For example, Zimbardo (1970) showed that subjects who were made to feel anonymous (by wearing identical white coats and hoods) delivered longer electric shocks to others than did subjects who were visible and wore large name tags. Diener et al. (1976) showed less frightening, yet equally devious consequences of anonymity. They secretly observed more than 1,300 Seattle children trick-or-treating. Experimenters greeted children, invited them to take one of the candies, and then left the room. Anonymous children were more than twice as likely to take extra candies than were those who had been asked their name and address. Although these examples are of research settings and subjects that are quite different than the settings and subjects used in GSS research, the examples show that in some contexts anonymity's influence can be dysfunctional.

Perhaps more relevant to research on GSS anonymity are studies of social loafing (Kerr & Bruun, 1981; Williams et al., 1981), which suggest that identified group members generally exert greater physical effort than those working anonymously. Weldon and her associates (Weldon & Mustari, 1988; Weldon, Mustari, & Brett, 1989) found that anonymity reduced cognitive effort in a parallel "cognitive loafing" paradigm. In these studies, identified group members were found to exert greater mental effort than those working anonymously.

These studies in social psychology show that anonymity can have detrimental effects on process and outcomes, in contrast to the general findings of studies of GSS anonymity. Despite the lack of published findings of a negative relationship between GSS anonymity and group outcomes, there are examples of potential negative effects of anonymity in GSS environments.

Example 1: an explosion of caustic comments in a group in an experimental investigation of GSS anonymity. In an experimental investigation published in *Management Science* (Connolly et al., 1990), the interaction within one experimental group exploded. The group experienced the electronic equivalent of a heated argument in a meeting, with an explosion in caustic remarks within the group. In this experiment, Connolly et al. (1990) used a 2 × 2 factorial design, crossing anonymity (anonymous/identified) with evaluative tone (critical/supportive), with 72 upper division business students satisfying a curse requirement for experimental participation serving as subjects.

The study called for 24 4-person groups. Of the 6 groups in the anonymous, supportive condition, Connolly et al. (1990) discussed the problematic group:

> One group, in the anonymous/supportive condition, was dropped from the analysis. In this group, the members became infuriated with the consistently positive but nonsubstantive comments of the confederate, and spent much of their time in taunting and abusing him, rather than generating substantive output. The members of this group, unlike other subjects in our sample, became impatient and would not tolerate the apparent loafing of the confederate. There is no evidence that subjects suspected deception, but the pattern of comments generated by this group was so atypical that we judged it best to drop them from the analysis. (p. 696)

This problematic group demonstrates the potential for anonymity to allow the group process to degenerate into overly caustic interaction, reminiscent of the phenomenon of "flaming" discussed in studies of electronic mail (Siegel, Dubrovsky, Kiesler, & McGuire, 1986).

Example 2: a degeneration into silliness in a group in an experimental investigation of GSS interaction frequency. Another example of the potential negative implications of anonymous GSS interaction comes from an experimental investigation of interaction frequency with a GSS (Jessup, Egbert, & Connolly, 1991). In this study, researchers tested for the effects of interaction frequency on group process and outcomes. Interaction frequency was defined as the length of time subjects worked alone generating ideas and the frequency at which group members then exchanged files with other group members. The researchers tested for three levels of interaction—no exchange of files, a 2-minute exchange, and a 10-minute exchange—with 70 business students satisfying a course requirement for experimental participation serving as subjects. The study called for 10 3-person groups in each of the exchange conditions plus 10 subjects working alone, which served as a control. In this study, all subjects worked anonymously.

Compared to the Connolly et al. (1990) experiment described above, in which the problematic group members became overly caustic with each other, the group in the Jessup and Connolly (1991) experiment degenerated into complete silliness and generated useless comments. At first, one group member contributed silly comments that were off the topic. Eventually, a second group member engaged in the frivolous commentary. The third group member pleaded that the other two group members return to the task but then gave in, joining in the frivolity. As did the researchers in the first experiment discussed above, the researchers in this experiment decided to throw out the data from this problem group. An interesting point is that, amid the silliness within this group, some comments were caustic and were directed not at each other (group members) but rather at issues external to the group (e.g., at administrative and policy issues within the College of Business).

Example 3: a distracting argument in a group in an experimental investigation of GSS anonymity and group leadership. A third example of the poten-

tial negative implications of anonymous GSS interaction comes from a pilot study for an experimental investigation of anonymity and leadership with a GSS (George et al., 1990). In this study, researchers tested for the effects of the use of a GSS anonymous interaction and leadership (either assigned in the group or not assigned). As in the previous examples, in this study the researchers used as subjects business students satisfying a course requirement for experimental participation. The design called for five 6-person groups in each cell.

One of these 6-person groups in the pilot for this investigation—within the condition in which groups used the GSS, were anonymous, and had no assigned leader—experienced problems that are very similar to the problems experienced by the groups in the first and second examples described above. The problematic subject group in this third example engaged in a heated electronic debate over alternatives to the problem at hand and simultaneously degenerated into silliness. A review of the group's transcript reveals repeated incidents of flaming toward the end of the session. For example, in the four (nonsequential) comments reproduced below, the group members used caps and exclamation points to make their points. Finally, at the end of the session, one of the group members, exasperated, made the fourth comment reproduced below.

> WHAT ABOUT SIMPSON'S TERRITORY . . . !!!
> —split the territories!!!!!!!!! it is the only way to make everyone happy
> SPLITTING THE TERRITORY WILL NOT SOLVE THE PROBLEM BECAUSE THEY BOTH WANT THE TERRITORY TO THEIR OWN.
> I VOTE SPLIT!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!! SPLIT, SPLIT, SPLIT!!!

Surprisingly, whereas the transcripts suggest that the group members were engaged in emphatic, fruitless disagreement, the researchers' lab notes reveal a different story. Although the seemingly fierce electronic exchange was happening, the group's verbal and nonverbal interaction was quite different. The group was reported as "loud and rowdy," with group members frequently "laughing." In any event, the group was not as task oriented as were other groups in the pilot and the actual experiment.

Example 4: contradictory results for GSS anonymity in a dissertation on the effects of GSS anonymity on group process and outcome. A fourth example of the potential detrimental effects of GSS anonymity comes from a dissertation (Jessup, 1989; reported in part in Jessup & Connolly, 1990) on the effects of GSS anonymity on idea generation. Undergraduate business students, fulfilling a course requirement, were randomly assigned to one of four conditions in a 2 (identifiability) × 2 (shared responsibility) design. Cell sizes of 17, 17, 18, and 19 were achieved. Subjects were asked to work on an idea-generation task using microcomputers and were allowed to leave whenever they wished.

Jessup (1989) concluded that anonymous subjects "loafed." Identified subjects were apparently compelled to stay longer and type more than did subjects who were anonymous. Anonymous subjects expended much less effort, leaving earlier and typing less than did identified subjects. Jessup did not use a true GSS (subjects worked independently on personal computers under the impression that their ideas would later be pooled with those of other group members). However, the setting closely approximated a GSS, and the study certainly helps us to understand motivation in a context where individuals work together anonymously via computers.

These four examples are striking and point to the potential for the negative effects of GSS anonymity. In each of the four cases, the subjects were anonymous to each other and to the experimenter. The 3 groups discussed above in the first three examples—3 out of the approximately 100 groups observed across the three experiments—deviated markedly in process and outcome from the other groups in the studies. In addition, in the fourth experiment described, the results suggest that anonymous subjects loafed, working less than did identified subjects. These examples suggest that the prevailing beliefs of the effects of GSS anonymity may be unnecessarily unidimensional.

Theory

The examples described above are perplexing. We do not and cannot know exactly what these subjects were thinking nor why they did the things they did. However, we must explain these events, or at least develop a theory of GSS anonymity that explains these events, if we are to truly understand anonymous GSS interaction. Why and how did these contradictory events happen? Why is anonymity's influence sometimes positive and sometimes negative?

We suspect that the first step in answering these questions lies not solely in the technology—not in the GSS per se—but in the subjects. What were the subjects thinking and doing? To begin to answer this question, we must look into the inner state of the individual and the combined forces that compel that person to act. What is this inner state, and what are the external forces that shape this individual's propensity to act? This is as much, if not more, about motivation and about the psychology of GSS anonymity than it is about technology and management information systems. We begin to answer these questions by discussing the issues in pieces: those issues that are part of the individual's external environment, those issues internal to the individual, outcomes, and the role of anonymity.

Piece 1: external forces. What forces serve to promote or inhibit an individual? Small group research and organizational behavior research on moti-

vational processes offer rich literature from which to begin answering this question. Research suggests that external forces that influence a group member can be categorized into three levels: components of the group, the job, and the organization.

First, there are a number of ways that the group members influence each other. Beginning with the work of Zajonc (1965) and Cottrell (1972), social facilitation research shows that the presence of others, whether part of the group or not, influences an individual's behavior. Similarly, Asch (1952) began a line of research that shows that there is strong conformity to norms within groups. Seashore (1954), Lott and Lott (1961), and others showed how group cohesiveness can lead to social influence and group member conformity. Janis (1972) showed how the group's desire for self-preservation can have dysfunctional effects on member behavior. Connolly et al. (1990) suggested that in a GSS setting multiple social forces serve potentially to enhance or stifle an individual. These forces include the encouragement and stimulation group members provide (or the lack of it), pressures to conform, or even hostile evaluations of contributions (see Connolly et al., 1990, for a complete discussion).

At the level of the individual's job, several forces will shape the individual's propensity to act. For example, Hackman and Oldham (1975, 1976) identified core dimensions of the job that affect an individual's psychological state. These dimensions include skill variety, task identity, task significance, autonomy, and feedback. Similarly, Steers and Porter (1987) identified several variables affecting individuals in organizational settings. Among these are the extent to which the job provides mechanisms for intrinsic rewards, autonomy, direct performance feedback, and variety in tasks.

At the organizational level, forces that will affect an individual include characteristics of the immediate work environment, such as peers and supervisors, and organizational actions, such as reward practices and organizational climate (Steers & Porter, 1987). These characteristics of the organization can carry over to the work that individuals perform in a GSS setting. For example, the pressure to work hard or perform well is likely to exist in and out of the GSS setting. Similarly, a reward system that rewards for hard work or good ideas, or that administers sanctions for poor work, is likely to operate in the GSS setting as well.

Piece 2: internal processes. What influence do these external forces have on an individual's psychological state? The external forces discussed above help to shape and continually influence an individual and his or her propensity to act and the level and nature of the individual's actions. Hackman and Oldham (1975, 1976) suggest that these forces influence critical psychological states that are important in the organizational motivational process. These

states include the extent to which individuals experience meaningfulness in their work, responsibility for outcomes of their work, have knowledge of the actual results of the work activities, and feel the need for personal and professional growth.

Steers and Porter (1987) suggest a similar set of variables affecting the motivational process in organizational settings. Relevant individual characteristics include the individual's interests; attitudes toward self, job, and aspects of the work situation; and the individual's needs for security, social relationships, and achievement.

Research on creativity supports the argument that external forces (aspects of task) are influential. Creativity research suggests that people are most creative when they are intrinsically motivated; that is, people will be most creative when they feel motivated primarily by the interest, enjoyment, satisfaction, and challenge of the work itself (Amabile, 1983, 1988; Hennessey & Amabile, 1988). Shalley (1989) proposed that thinking creatively requires a great deal of mental effort. To be creative, individuals thus have to be inherently interested in the task and motivated to find a solution (Barron, 1965; Steiner, 1965). In a GSS setting, Jessup (1989) reasoned that the individual's interest in and commitment to the task will influence the outcomes achieved through GSS interaction.

Piece 3: outcomes. What are the relevant outcomes and how are they influenced? Relevant personal and work outcomes include an individual's work performance, satisfaction, absenteeism, and turnover. In a GSS setting, outcomes might include, for example, the extent of effort that group members put forth, the quality of a decision made by the group, the group members' perceptions of the quality of their outputs, the extent to which a group was able to communicate effectively and efficiently, and the level of group member satisfaction with the process and output of their GSS-supported interaction. The forces described above influence how the individual will behave, how the group members will interact, and whether the outcomes described here will be either functional or dysfunctional for the group and the organization.

To better explain this, we describe as an example the potential effects of the degree of interdependence among groups' members and the extent to which social controls operate within or on the group. The degree of interdependence among group members, or the extent to which members must rely on each other to complete their work, is determined by the nature of the work that they perform together. The various social controls operating in and on the group may originate from within the group or from outside of the group and tend to serve to moderate member behavior. For example, social controls may result in conformity, performance norms, or groupthink. Interdependence and social

control are critical factors in determining how the group members will interact and what kinds of outcomes they will achieve.

We believe that interdependence and social controls act independently of each other. Interdependence can be conceptualized for simplicity as being bipolar, either low or high. Social controls can be either absent or present and when present can be either productive or not. Conceptually, one can think of this as a 2×3 matrix of possible outcomes. If a group is highly interdependent and productive social controls are present, then very positive outcomes are likely to occur. If a group is minimally interdependent and social controls are absent, then negative outcomes are likely to occur. If interdependence is high and social controls are absent, then outcomes are likely to be mixed. If interdependence is high and social controls are present and not productive, the group may well view the outcomes as positive, although outsiders may view the outcomes as negative. If the group lacks interdependence but there are high levels of productive social control, then the outcomes are likely to be positive. If the group lacks interdependence and there are high levels of unproductive social control, then the outcomes are likely to be very negative. Interdependence and social control are but two of many forces that influence how group members behave, how they interact with each other, and whether their outcomes will be functional or dysfunctional for the group and the organization.[1]

Piece 4: the role of anonymity. What role does GSS anonymity play in GSS interaction? As Figure 1 suggests, the role of anonymity is perhaps best thought of as mediator. Anonymity mediates the relationship between the internal psychological processes, the individual's thoughts and feelings, and the actions the individual takes, which in turn shape outcomes for the individual and the group. Anonymity is thus not a phenomenon that directly influences the individual; rather, anonymity is a contextual variable that may influence the level and nature of the individual's behavior.

The question, then, is what role does GSS anonymity play in influencing group process and outcomes? The answer depends on the context, the forces that serve to influence individuals and shape their propensity to act. Are the individuals committed to the task? Do they believe that the task and their job are important and that their contributions are useful and necessary? Do they believe that they need to work with the other group members to complete the task well? Is there pressure, either from other group members or from outside the group, to work hard and perform well? These are the types of conditions that are likely to lead to positive outcomes. If, on the other hand, these conditions are not present and the group is able to interact with each other anonymously, then the outcomes are likely to be negative. For example, if the individual is not committed to the task, there is no reward for contributing, and

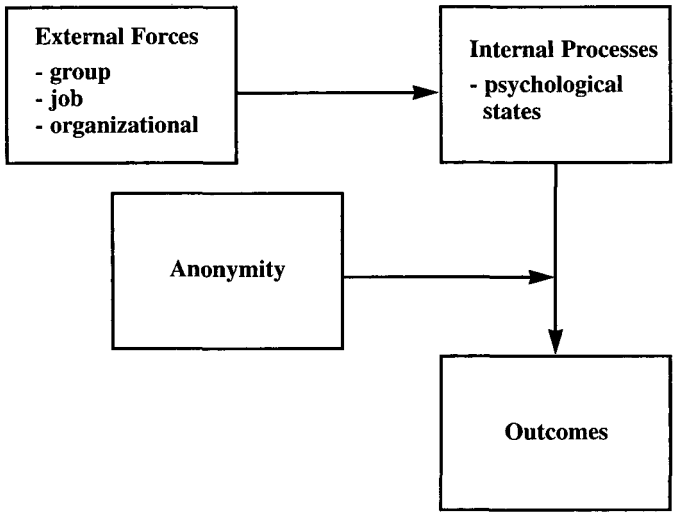

FIGURE 1: The Role of Anonymity in Motivation and Outcomes.

there are no social controls against loafing, then anonymity's influence is likely to be negative or dysfunctional.

Anonymity plays a role in one other way. The group may meet the conditions described above, but the group members may feel too uncomfortable, or even threatened, to speak out and to contribute to the group. Perhaps the task or issues under consideration are too sensitive to speak out on or the individual's ideas and opinions are not shared by others in the group. Perhaps someone else in the group is overly dominant and openly critical of the ideas and opinions of others. It may also be that speaking out against, or not being supportive of, the ideas of someone in authority will incur that person's wrath or worse. If these types of conditions exist, then group member behavior is likely to be inhibited, creativity and diversity of contributions are likely to be stifled, and the group is not as likely to be as productive as they might have been otherwise. If these conditions exist and the group is able to interact anonymously, then the group member behavior and contributions are likely to be less constrained, exchanges are likely to be more candid and open, and, consequently, outcomes are likely to be more positive. Under these conditions, anonymity's influence will likely be strong and positive and functional for the individual and the group.

Viewing anonymity this way, we can now understand the contradictory

findings for anonymity between the GSS and the social/cognitive loafing paradigms (see Jessup, 1989, for a more complete discussion). We suggest that in research on social and cognitive loafing, assumptions about task motivation are very distinct. The assumption is that individuals will loaf if given the chance. Loafing research thus attempts to identify situations (e.g., anonymous interaction) in which individuals will reduce their effort. We suggest that the perspective of (some) GSS researchers is fundamentally different. These researchers assume that individuals anxiously await participation. GSS researchers thus search for factors (e.g., anonymity) that foster interaction.

These are paradigmatic differences—differences in assumptions and theory—that also drive two very different sets of methodological choices (e.g., selection of experimental task and incentives). On one hand, researchers in the loafing paradigm choose complex, repetitive, quantitative tasks (e.g., systematically evaluating student job descriptions). On the other hand, GSS researchers choose relevant, straightforward brainstorming tasks (e.g., generating and evaluating solutions to the campus parking problem). In each case, anonymity serves as the shield, with different outcomes depending on the setting.

We argue, then, that within the GSS paradigm the results of studies on anonymity (whether the results be positive, neutral, or negative) are not a completely accurate reflection of the effects of anonymity, per se, but rather are a function of (a) the context in which anonymity was observed and (b) the subsequent motivational processes.

Implications

We believe that there are several implications of our model and related arguments for GSS research and practice. For researchers of GSS anonymity, or of any other context where human interaction is mediated electronically, the implications are clear. Researchers studying anonymity must be more sensitive to context. Researchers of GSS anonymity must somehow incorporate external forces into their model, either as an independent variable or as a control or constant. For example, researchers might consciously manipulate elements of context to better understand the role that anonymity plays. The researcher might manipulate the subjects' commitment to the task, the sensitivity of the task, the evaluation apprehension of the subjects, the social controls on member behavior, the rewards on individual and group performance, or any other contextual variable to better understand the mediating effects of GSS anonymity under those contextual conditions. Studies such as this would help us to discover under what conditions GSS anonymity will conceal the reduced effort of a loafer, or shield the guarded effort of an eager participant, or do nothing at all.

The four examples discussed here suggest that in settings where extrinsic rewards for participating or performing well are low, intrinsic motivation induced by the task is low, or if the maturity of the group members is low, anonymity's influence may be negative and detrimental. Alternatively, in settings where the extrinsic rewards for participation or performance are high or the intrinsic motivation induced by the task is high but where individuals feel inhibited in expressing their opinions or in offering their ideas the payoff of anonymity may be high.

There are also implications for the broader study of GSS. In all phases of GSS research, whether they be studies of group size, interaction frequency, structure, parallelism, proximity, or influence, we cannot ignore context. We may find that these other variables (e.g., elements of the organizational culture and reward system, group norms, standard operating procedures, attitudes toward the use of teams in the organization, and so on) are themselves simply mediators, or we may find that they are indeed part of the complex web of constructs that interact and make up the context in which GSS participants do their work.

Thinking in terms of context puts experimental laboratory research in a better light. Not only do the four examples described here testify to the difficulty of conducting experimental laboratory research with student subjects, but they suggest that we might do better to think of this research, where subjects are given tasks and roles, as but one of many useful contexts worth investigating. Experimental laboratory settings are thus not merely artificial, with little or no semblance of the "real" world; rather, the laboratory is a contextual setting, with a particular set of participant motivations (among other aspects), that approximates very well some settings and is very much worth exploring (see Swieringa & Weick, 1982; and DeSanctis, 1989, for similar arguments). Additionally, our difficulty thus far in understanding subject motivation in the laboratory setting, under relatively controlled situations, argues all the more for the importance of contextual factors in the relatively uncontrolled field setting.

For the practitioner or user of GSS, of groupware applications like Lotus Notes, or of other electronic communication systems such as electronic mail, the implications are more tentative but the implications are nonetheless important. We cannot simply think of anonymity as an entity that is good or bad in and of itself. The research suggests that our use of anonymity should depend on the context in which it will be used. For example, it may not be wise, in some situations, to use anonymity in GSS-supported idea generation for individuals who work physically alone, or for individuals whose work will later be pooled with the work of others, or for less interesting, less important, or disdainful tasks. Conversely, it may be wise to use anonymity for GSS-supported groups that experience a high level of creativity-stifling factors such as criticism or ridicule.

At an even broader level, the implication is that for GSS research, design, and use, we should take very seriously our unexpected results. They may be as beneficial to us as those results we expect.

NOTE

1. We thank an anonymous reviewer for his or her helpful suggestions for strengthening our discussion of outcomes and the relationships among components of the model.

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