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Towards an Integrative Model of Group Development

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Towards an Integrative Model of Group Development

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Abstract

Group development research has proposed various models to explain how new groups form, work together, and disband. Most of these models fall into one of two categories: stage models, often exemplified by Tuckman, (1965); and the punctuated equilibrium model of Gersick (1988). In this paper we develop an integrated model of group development that combines these two types of models into one model. We studied six newly-formed medical groups that worked on similar projects over a seven week period. Three groups worked "normally", while three used a Group Support System (GSS) that was new to them. The behavior of the three "normal" groups followed the punctuated equilibrium model while the group behavior for the groups that used a GSS more closely resembled the stage model. We use scripts (behavioral templates that guide a person in thinking about how to behave in commonly encountered situations) as the foundation of our integrated model of group development. We argue that when group members enact similar scripts, ones that fit with each other, they can quickly begin work on the task with little discussion (similar to the punctuated equilibrium model). When group members do not share common scripts and enact scripts that are not compatible, group members must first work to integrate their scripts and negotiate how they will work together before work on the task can begin (similar to the stage model).

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Towards an integrative model of group development

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Abstract

Group development research has proposed various models to explain how new groups form, work together, and disband. Most of these models fall into one of two categories: stage models, often exemplified by Tuckman, (1965); and the punctuated equilibrium model of Gersick (1988). In this paper we develop an integrated model of group development that combines these two types of models into one model. We studied six newly-formed medical groups that worked on similar projects over a seven week period. Three groups worked “normally”, while three used a Group Support System (GSS) that was new to them. The behavior of the three “normal” groups followed the punctuated equilibrium model while the group behavior for the groups that used a GSS more closely resembled the stage model. We use scripts (behavioral templates that guide a person in thinking about how to behave in commonly encountered situations) as the foundation of our integrated model of group development. We argue that when group members enact similar scripts, ones that fit with each other, they can quickly begin work on the task with little discussion (similar to the punctuated equilibrium model). When group members do not share common scripts and enact scripts that are not compatible, group members must first work to integrate their scripts and negotiate how they will work together before work on the task can begin (similar to the stage model).

Introduction

Group development research has proposed various models of how new groups form, work together, and disband (Arrow, 1997; McGrath, Arrow, and Berdahl, 2000). Most of these models fall into one of two categories (Chang, Bordia, and Duck, 2003): stage models, often exemplified by Tuckman, (1965); and the punctuated equilibrium model of Gersick (1988). In the stage models, groups progress through somewhat distinct stages such as forming, storming, norming and performing (Tuckman, 1965). Whereas in the punctuated equilibrium model they jump immediately into working on the task at hand, until a midpoint transition, when they re-evaluate their work and often decide to take a new direction (Gersick, 1988).

Both the punctuated equilibrium model and the stage models have been empirically validated (Chang, et al., 2003; Fisher, 1970; Romanelli and Tushman, 1994). Chang, et al., (2003) conclude that groups simultaneously follow

both models, and as a result researchers can use either model to explain group behavior depending on the unit of analysis and the dimension of observation the researcher employs (e.g., time awareness, task activities, group processes). Other researchers argue that there are fundamental differences between the two models that make them quite distinct (Arrow, 1997; Seers and Woodruff, 1997). We believe there are fundamental differences between the models and that the key to understanding the different developmental paths taken by groups lies in the interaction scripts that participants enact while working in groups (cf. Poole, Gray and Gioia, 1990).

This paper proposes an integrated model of group development that subsumes both the stage model and the punctuated equilibrium model. This model is based on the study of six naturally occurring groups formed to perform a specific project. Three groups were given access to a group support system (GSS) and three were not. The two sets of groups did not follow the same group development patterns. One plausible explanation is that GSS technology alters group development (Chidambaram, 1996), as it enables groups to use different communication processes. However, we believe that a more fundamental process is at work. GSS technology does alter the way individuals work together in groups, but we believe that it affects group development not through the communication features it offers, but because those features are different from how individuals traditionally work together. We believe that the group development process is influenced by the extent to which members of the newly formed group bring similar understandings of how groups should work. When group members have similar scripts for group work, group development proceeds very differently as compared to when group members do not have similar scripts. It is not the technology per se that influences development, but rather how it fits group members' expectations for the way in which they will work. The same technology could trigger very different group development processes depending upon group members' scripts for group work. Since our model does not focus on technology, it should apply equally well to situations without technology.

Models of Group Development

Most group development models fall into one of two categories (Chang, et al., 2003; Labianca, Moon, and Watt, 2005; Hackman and Wageman, 2005): the punctuated equilibrium model of Gersick (1988) and the stage models, often exemplified by Tuckman, (1965). Groups either jump immediately into working on the task at hand,

until a midpoint transition, when they re-evaluate their work and often decide to take a new direction (Gersick, 1988) or they progress through somewhat distinct stages (e.g., forming, storming, norming and performing: Tuckman, 1965). Both the punctuated equilibrium model and the stage models have empirical support (Chang, et al., 2003; Fisher, 1970; Romanelli and Tushman, 1994).

The Stage Model of Group Development

The stage model of group development was first proposed by Tuckman (1965) as a synthesis of the literature on group formation (see Table 1 for a summary). Tuckman proposed that groups go through four stages: forming, storming, norming and performing (this was updated by Tuckman and Jensen (1977) to include adjourning). In the forming stage, the group is in the process of getting to know one another and familiarizing themselves with the task at hand. Group members explore the goals and the boundaries of the task. They often look to existing standards to guide their interactions and discuss the work processes to be used in performing the task. This stage is characterized by the questioning of authority within the group.

In the storming stage, the group sorts out the work processes that will be used by the group. This is seen in an increase in the level of interpersonal conflict between the group members, as individuals question the controls that are in place to guide group work. There are often emotional, sometimes even hostile, reactions to requests.

After this stage, the group has begun to create a shared understanding and can move into the norming stage, when the group settles into a set of mutually accepted work processes and norms for the project. Conflict typically subsides as the group has come to agreement on the nature of the task and the way group members will work together. At this stage of development, the group typically begins to show a concern for the development of interpersonal relationships and a desire build group cohesiveness.

Finally, in the performing stage, the group has settled into an established set of behavioral patterns and has come to consensus on how to work together. They set about performing the task they have been assigned, showing an intense focus on attaining their goals, and the group members tend to be less destructive towards one another. There is increased task activity and the group focuses both on the task and individuals' roles within the group.

The Punctuated Equilibrium Model

Gersick (1988) proposed the punctuated equilibrium model (see Table 1 for a summary). She noted that the groups in her study did not follow the stage model, which led her to search for a new model that would explain her observations. She observed that groups formed rapidly, determining the method by which they would proceed within the first few moments of their meeting. There was rapid agreement on the task goals and on how the group should work together to accomplish them. The task goal and the way in which group members worked remained essentially unchanged until reaching a temporal milestone. However, initial work was often unfocused and unproductive.

At a temporal milestone, most often the project's temporal midpoint, each group underwent a series of radical changes (a "midpoint transition"). Group members became acutely aware that time was passing and this triggered them to rethink the project. They began questioning the goals and the way in which they worked, which typically led to a shift in goals and/or the way they worked. This second phase was characterized by an increased focus on the task and increased task performance. Subsequent research has shown that although groups evaluate their progress and processes, not all groups experience a transition; the midpoint pause presents an *opportunity* for change, but does not *guarantee* that a change will take place (Okhuysen and Eisenhardt, 2002; Okhuysen and Waller, 2002). It is this evaluation, not a transition, which is the marker of the punctuated equilibrium model.

Group Development in the Two Models

It is possible that these two models are complementary and co-exist by functioning at two different levels of analysis. The punctuated equilibrium model focuses on how a group works on a specific task, whereas the stage models focuses on the overall development of the group (Chang, et al., 2003). The stage model includes more components of the group's emotional and social interaction patterns, while the punctuated equilibrium model focuses on specific task-related activities (i.e. it looks for ideas put forward by the group that may impact the final product of the group – regardless of whether these ideas are immediately adopted by the group or not). In which case, both models can describe different aspects of a single group's development process. A close examination of the two models will also show that phase 4 of the stage model (perform) is a reasonable match to the post-midpoint transition activities in the punctuated equilibrium model (Chang, et al., 2003).

Although there are some similarities between these two conceptions of group development, we believe that there are some striking differences that may only become apparent in groups working on projects of longer duration

(Arrow, 1997). Both models argue that groups perform most of the task-oriented work in the latter part of the project but they differ in how group members behave in the first part of the project. With the punctuated equilibrium model, the first part of a group is characterized by the quick adoption of a goal and work processes, with the group immediately beginning work on the project task. With the stage model, the first part of a group's life is devoted to forming, storming and norming over the project's goal and its work processes. We do not believe that the differences in development for groups working on longer-duration tasks (i.e., tasks that require hours or days to complete, not minutes to complete) can be fully explained by the temporal granularity of analysis or by the fact that the punctuated equilibrium model is more task-oriented than the stage model. We believe that these two models predict fundamentally different behavior in the early part of a group's life (e.g., prior to the project midpoint).

We began this study with a goal of understanding how GSS technology impacts group development. Therefore, our research design entailed using three GSS technology groups and three non-technology groups. As we tracked the development processes within the groups, we noticed clear differences among the groups that neatly corresponded to whether the groups had technology or did not. However, as we probed more deeply into the reasons for the differences in group development, we became increasingly convinced that the major factor influencing group development was not the features offered by the technology – as we had first set out to study – but rather something more fundamental.

Method

Research Design

We used a multiple case study design with the unit of analysis being the group. We followed six groups from the same organization as they worked on similar projects over a 7-week time period. Three groups used their “normal” work processes (i.e., no interventions), while three groups (randomly selected) used a GSS that was new to them and had the potential to modify the way in which they interacted.

Participants

The six groups were from the Department of Nursing at American Medical Center (AMC, all names are pseudonyms). The project was undertaken jointly with American Physicians Corporation (APC), its sister organization of physicians working in the hospital. The Department of Nursing was divided into five principal directorates (e.g.,

Pediatrics) and three supporting directorates (e.g., Research) that reported to the Vice President of Nursing (“the VP”). Six groups were formed from the directors and managers in these directorates, plus their counterparts from APC. The six groups were organized around the five principal directorates with the exception of the Critical Care/Trauma directorate, which, due to its size, was divided into two groups, one for Critical Care, one for Trauma.

Groups ranged from six to eight members (mean 6.7) and were predominantly female, with an average of one male per group. Each group was comprised of one AMC director and members of the next management level below director and their counterparts from APC. All participants knew all the other members of their group and had worked together on other projects, although no individual had previously worked together with the exact set of individuals in his or her group and members of APC did not know members of AMC well – and vice-versa.

The Project

The project (and our involvement) was proposed by the VP. The groups' objective, as defined by the VP, was to write a proposal to improve the satisfaction of four customer groups: patients, families, physicians, and nurses. The project began with a kickoff meeting in which the VP introduced the project and its goals, and explained the role of the researchers and the GSS. To help organize, analyze, and report the project plans, groups were given the 15-page *Baxter Planning Worksheet* used by AMC to develop organizational change proposals. This worksheet covered items such as project overview, project definition, key success factors, required investment, experience with similar projects, project competitors, other alternatives considered, and potential impacts. The groups were asked to draft a project plan using the worksheets and to give a short presentation seven weeks later at the final meeting. In the kick-off meeting, the groups were given 45 minutes to organize their plans; no GSS support was provided. All groups were introduced to the GSS and told whether or not they had been randomly assigned to use it.

The GSS Technology

A GSS has both a *spirit* and its *structural features*. The spirit of the technology is the general intent of its structural features, and is broadly defined to include the system design, its features, user interface, and training materials (DeSanctis and Poole, 1994). The spirit of many GSS (including the one used in this study) is to promote a meeting process that is fair and participative (Ackermann and Eden, 1994; de Vreede and de Bruijn, 1999). The spirit encourages what Habermas terms *ideal speech*: “to ensure that (a) all voices in any way relevant can get a hearing,

and that (b) the best arguments we have in our present state of knowledge are brought to bear, and that (c) disagreement or agreement on the part of the participants follows only from the force of the better argument and no other force" (Habermas and Nielsen, 1990, p. 104).

Structural features are the specific components of the GSS, their capabilities, and the "specific types of rules and resources, or capabilities, offered by the system" (DeSanctis and Poole, 1994, p.126). Most GSS enable text communication, which can provide three structural features that may promote more participative interaction: parallelism, anonymity, and meeting memory (Nunamaker, et al., 1991; Zigurs and Buckland, 1998). Parallelism is the ability for members to exchange information simultaneously. Everyone can type at the same time, so no one needs to wait for others before contributing as they would without the GSS. Parallelism reduces production blocking (caused by an individual needing to wait their turn and thus being blocked from putting forward their own ideas) (Diehl and Stroebe, 1987; Lamm and Trommsdorff, 1973; Dennis, 1996; Harkins and Petty, 1987) but it can also increase the amount of information a group member is exposed to and reduce a group member's ability to pay attention to important pieces of information (Dennis, 1996; McLeod et al., 1997).

The second structural feature in the GSS, anonymity, was the ability for group members to make contributions without attaching their names, which is not possible when contributions are made verbally. Anonymity may reduce the reluctance to challenge the views of those in power, but may also increase free riding (Nunamaker, et al., 1991). While in our study anonymity was present, it was less effective since the groups were relatively small and the group members were familiar with one another. Although names were not attached to ideas, members could have identified who put forth which idea.

The third important feature, meeting memory, means that all typed comments are stored, which may increase the equality of participation because every comment that is entered is saved unless explicitly deleted; the group as a whole owns its memory instead of having one person take notes and be in charge of their collection, documentation, and distribution.

Finally, the GSS allowed the groups to structure their work processes (Nunamaker, et al., 1991; Zigurs and Buckland, 1998). Process structure helps a group structure the way in which they plan to work via the development of a task agenda that the group can follow to perform the assigned task (Zigurs and Buckland, 1998). Process structure

can be delivered using training that shows a group how to follow a planned agenda, or via facilitation (often provided by a person external to the group) that helps group members follow the agenda (Wheeler and Valacich, 1996). However, none of the groups in this study chose to use a facilitator; instead they created their group agendas on the fly during their meetings or at the beginning of each meeting (this was true in the non-GSS groups as well – in each case the group leader ran the meetings). However, the GSS groups did use a research group member to assist in the technical operation of the GSS and to act as a scribe when asked, but most of the time, the research team member sat in a chair observing the group.

With the form of GSS used in this study, group members worked together in a specially designed meeting room that provided each person with a computer and special purpose GSS software that enabled them to conduct anonymous electronic discussions, electronic outlining, group writing, and voting. The GSS meeting room was located in a building adjacent to AMC's main building and provided 16 networked microcomputers with a large screen video projection system. The GSS software was GroupSystems (for a description of the software, see Nunamaker, et al., 1991 and Valacich, Dennis, and Nunamaker, 1991).

Data Sources and Analyses

Data were collected from multiple sources (observation, transcripts of electronic discussions, and interviews). Observational data were collected to build a chain of evidence to describe each group's work processes (Lee, 1989; Yin, 1994). First, all meetings except one were observed by the first author with about one-third of meetings also being observed by a doctoral student (the doctoral student observed the one meeting missed by the first author). Detailed notes were taken and case reports completed within 24 hours of each meeting; minor differences in notes were resolved between observers. We wanted to audio tape meetings, but this was not permitted. Second, transcripts of electronic comments during GSS meetings were made. Third, each group leader was interviewed between each meeting.

Our analyses were conducted first within-group over time to determine the extent to which each model of group development fit each group. We then conducted a between-groups analysis to determine whether there were patterns in the fit of each model. The data were analyzed using a coding schema based on the descriptions of the stages in Tuckman (1965) and the activities in the punctuated equilibrium model (Gersick, 1988, 1989). We included

task-oriented categories as well as process categories to enable us to uncover various levels of temporal granularity. The purpose of the coding scheme was to identify actions that would fall within the various stages in the stage model, or that represented actions from the punctuated equilibrium model. Initial coding schemes for the two models were developed based on the theoretical constructs defined for each model. As we coded the case notes we considered not only the content of the behaviors we observed but also when they occurred during the group life span.

The first and third authors independently examined the data from one group and coded them using the initial coding scheme. The authors then discussed the codings, and revised the coding scheme by consolidating two categories based on insights from this analysis (“quick adoption of work processes” and “quick adoption of work roles” were merged into one category). Next, the second and third authors used the revised coding scheme to independently code the remaining groups. The authors met again and discussed the codings. There were few disagreements between the coders. Four categories were merged (“examination of goals” and “defining boundaries of task” were merged into one category; and “questioning of authority” and “emergence of a leader” into another).

The final coding scheme is presented in Table 1. For the stage model, we identified 12 behaviors linked to the four time-based stages. For example, in the first or second meeting, the group should examine goals and task boundaries. For the punctuated equilibrium model, we identified 8 behaviors linked to the two time-based phases (before and after the midpoint, which occurred in the fourth week of this seven week project). For example, during the first meeting the group should quickly adopt a project goal. Behaviors were coded only if they occurred in the theorized stage or phase period. For example, for hostility to be coded as “storming” under the stage model, it had to occur in the first two meetings; if a group had experienced hostility later in the project when it was not predicted by the stage model, it would not have been coded as “storming.” In some cases, it was not clear if a behavior was observed; there was some evidence that the behavior occurred but the evidence was not beyond a reasonable doubt. In these cases, we coded the behavior as a “maybe” because we did not believe it was appropriate to definitively code the behavior as occurring or not occurring.

Once we had coded behaviors within each group, we produced a summary table of the data showing how many of the coded behaviors were observed in each group and then converted this to a percentage for the relative fit

of each model. For example, if we observed 9 of the 12 behaviors of the stage model, the fit would be recorded as 75% “Maybes” were scored as .5.

As we noted above, the later time periods of development are somewhat similar between the two models, so some of the coded behaviors are similar between the two models. For example, the stage model predicts increased task activity in the final “performing” stage, while the punctuated equilibrium model predicts increased task activity after the midpoint transition. Thus if increased task activity were observed in the later time periods, then the behavior would be coded as matching both models and the resulting percentage fits would show both models fitting the data to some extent.

Analysis

The online supplement provides case descriptions of the experiences of the six groups. We began our analysis by examining the group development processes within the two types of groups, and then compared across the two sets. In the Discussion section, we interpret these patterns to develop our model of group development.

“Normal” Groups

The development processes used in the three “normal” groups that received no intervention (N1, N2, N3) are shown in Tables 2a and 2b. Table 2a shows the codings reflecting the punctuated equilibrium model while Table 2b codings reflect the stage model. Cells shaded in gray indicate those cells for which the codings match the model.

In Table 2a, we see a fairly consistent pattern across the three groups for the initial meetings up to the midpoint. All three groups quickly adopted almost identical work processes with very little discussion. The project goal was quickly proposed by the leader and immediately accepted by the group, and the groups began performing the task. The groups experienced a long period of stable interaction up to the midpoint meeting. We conclude that this pattern of immediate adoption of work processes without discussion, processes that were almost identical across the three groups, indicates the presence of a set of shared scripts among group members.

For two groups (N1 and N2), little was accomplished prior to the midpoint, but the leader of the third group (N3) began writing the project report in the very first meeting. In the meeting nearest to the midpoint, members of all three groups questioned the goals of the project and the amount of work accomplished. The leader of one group (N2)

completely changed the direction of the group at this meeting, while the leaders of the other two groups overruled their group and refused to change the project direction.

In Table 2b, we see a fairly consistent pattern across the three groups. There is no evidence that the groups engaged in any initial forming activities in their first meeting. One group (N3) experienced some hostility and emotion which could be categorized as the storming stage, but the other two groups did not. Activities associated with the norming stage for the three groups did not occur after the first two stages, but rather from the very first minute of the first meeting. Activities associated with the performing stage increased after the midpoint for groups N1 and N2, but started with the first meeting for group N3.

It is interesting to note that the only group that did not fit the punctuated equilibrium pattern well, N3, was also a group that failed to deliver on its objectives. It never settled into a good pattern of interaction and failed to produce a report because of it.

GSS Groups

The development processes used in the three groups that received the external intervention of a GSS (G1, G2, and G3) are shown in Tables 3a and 3b. Table 3a shows the codings reflecting the punctuated equilibrium model while Table 3b codings reflect the stage model. Cells shaded in gray indicate those cells for which the codings match the model.

We see a fairly consistent pattern in Table 3a. In none of these three groups was there a quick adoption of interaction patterns or a project goal, although the leader of one group (G3) was quickly accepted. There was no long period of interaction matching the original pattern, as groups experimented with the GSS. The initial work prior to the midpoint was unfocused for one group (G3) which never did succeed in accomplishing the task; they did not write a project plan as directed by the VP. The initial work in G2 was unfocused until the leadership issues were resolved in meeting 2. No group experienced a midpoint transition, although task performance increased as the groups worked on the projects.

We also see a fairly consistent pattern in Table 3b. All three groups performed activities associated with the forming stage in the first meeting or two: examination of goals and task boundaries, questioning of methods, and questioning of leadership. All three also experienced the problems of control, emotions, and hostility associated with

the storming stage in the first or second meetings. For group G3, the problems and hostility continued into their third and final meeting, so one might conclude they never made it past the storming stage. In the other two groups, the storming was followed by the development of norms which were used for the remainder of the project. The intensity of task focus and performance increased in later meetings.

Once again, the only group that failed to fit the expected pattern of interaction also failed to create their deliverables. As with N3, this group did not settle into a pattern of interacting and did not produce their deliverables on time. Neither N3 nor G3, the two groups that failed to complete their deliverables, appear to fit the expected patterns of group development and did not appear to have become functioning groups over the course of the project.

Comparison of “Normal” and GSS Groups

A summary of the codings in Tables 2 and 3 are presented in Table 4. This table shows both the raw behavior counts of behaviors fitting each model as well as the percentage fit.

Table 4 shows a clear picture of the differences in behavior between the Normal and the GSS groups. The punctuated equilibrium model better fit the behavior of groups N1 and N2 (88% to 17%) who experienced no intervention. The difference in fit is less for group N3 (56% to 17%), but we believe it is still conclusive (see our earlier discussion in reference to group N3). Therefore, based on the pattern of behaviors across these three groups, we conclude that the punctuated equilibrium model was a better fit than the stage model for groups.

Two groups who used the GSS (G1 and G2), and whose patterns of interaction were impeded, showed strong evidence that the stage model better fit their behavior (92% to 25% and 100% to 19%, respectively). For group G3, the evidence is less clear (67% to 44%). Group G3 spent far less time on the project than did the other groups and never did finish the assigned project, so it is perhaps not surprising that its behavior is hard to classify. Therefore, based on the pattern of behaviors across two groups (G1 and G2) and the more equivocal results from group G3, we conclude that the stage model was a better fit than the punctuated equilibrium model for groups who experienced an initial disruption.

Discussion

Why would the groups that used a GSS technology be more likely to follow the stage model while groups that did not use the technology followed the punctuated equilibrium model? Clearly, one plausible explanation lies in

the nature of the GSS technology. The new work processes enabled by the technology's features might have induced different patterns of group development. However, we do not believe that the changes we observed are due to the nature of the technology per se.

Instead, we believe that the technology hindered group members from enacting their normal group interaction scripts and that this hindrance (not the technology itself) induced the changes in behavior. Any hindrance to enacting scripts – technology or otherwise – is likely to induce these same changes in group development. In the section below, we begin by developing our integrated theory of development, then apply it to these groups, and later return to the issue of technology-induced change.

Toward an Integrated Model of Group Development

Group Work Scripts. When individuals come together to work on a project, they bring with them a set of scripts that they can draw on to help them establish work patterns (Bettenhausen and Murnighan, 1985; 1991; Lord and Kernan, 1987; Mathieu, et al., 2000, Gioia and Poole, 1984, Poole, et al., 1990). A script is “a schematic knowledge structure held in memory that specifies behavior” (Gioia and Poole, 1984, pp. 449). Scripts are used to both understand the behavior of others and to guide one’s own behavior (Lord and Kernan, 1987). They provide a road map to guide the way the individual should behave and the sequence of behaviors they should undertake in a given situation. Scripts are formed through cognitive processes and are transferred from one person to another through the enactment of the scripts. The interaction using the scripts and the feedback from using the scripts leads to their modification over time (Bettenhausen and Murnighan, 1985; 1991).

Scripts for group work provide knowledge templates that describe appropriate roles, responsibilities, procedures, and communication patterns for how individuals should interact in groups (Bettenhausen and Murnighan, 1985; 1991; Lord and Kernan, 1987; Mathieu, et al., 2000). Scripts often include a goal as their objective and thus groups must come to consensus over how to attain the goal when using a script (Brewer and Dupree, 1983; Poole, et al., 1990). For instance, a script may be used for a weekly planning meeting to understand what each member of the group is doing and to set out tasks to be accomplished in the coming week.

When individuals first meet as a newly-formed group (as did all groups in this study), they search for ways to organize and make sense of the task they are to perform and the work processes they will use to interact with other

members of the group. This sensemaking often entails drawing on past experiences and importing knowledge and scripts from past work into the current situation (Bettenhausen and Murnighan, 1985; Gersick, 1988; Weick and Meader, 1993). When an individual finds a script that fits the situation, he or she can enact that script. When the same script is enacted by two or more individuals working together, a shared script is enacted (Mangham, 1978; Poole, Gray and Gioia, 1990)¹. As individuals are repeatedly exposed to similar situations, they develop shared scripts that enable them to work together in an interlocking fashion observed in most organizations (Poole, Gray and Gioia, 1990). Through continued use, such scripts evolve into habitual routines (Gersick and Hackman, 1990) that are enacted when a situation matching the routine's cue is encountered. Habitual routines may be enacted deliberately, or via automaticity (without conscious thought) (Louis and Sutton, 1991; Triandis, 1971). Habitual routines can exist at the individual level (e.g., I read my email when I start my day) or at the group level (e.g., we start meetings with social banter).

The degree to which the group members share common scripts is likely to differ depending upon the familiarity that the individual group members have with each other and with the task the group has been asked to perform (McGrath, 1991). Established groups with long histories of working together on well-understood tasks are most likely to share a common set of scripts for group work processes that have been well honed through prior interactions (Feldman, 1984; Lord and Kernan, 1987; Mathieu, et al., 2000; Okhuysen, 2001). Little discussion will be needed about how to perform the task or the role each group member will play because these scripts will have evolved into habitual routines for the group; the group will be able to quickly begin work on a task (McGrath, 1991).

But what about newly formed groups whose members have not worked together before as a group? If the individuals are drawn from the same organization or organizations that share common cultures, it is probable that they will share a similar set of group work scripts for a task, even if the group is newly-formed (Gersick and Hackman, 1990). Such shared scripts often differ only slightly from one part of an organization to another (DeSanctis and Poole, 1994; Orlikowski, 1992; 2000), and form a powerful set of "habitual routines" (Gersick and Hackman, 1990) that define how individuals in that organization *expect* to work together in a group, even if they have never been part of

¹ Mangham and Poole et al. use the term "interactive script" but we prefer "shared script."

the same group (Majchrzak, et al., 2000). If a group is newly-formed and its members have never met before, but its members share a common organizational culture that has led them to develop similar scripts for group work, they will behave in ways similar to that of an established group when it comes to group development. They will be able to “carry-over behaviors” from other group work into the current situation (Feldman, 1984). Thus, a key factor influencing the nature of the group development process is the extent to which group members share common scripts that guide how they expect to work together.

Group Development with Shared Scripts. When a set of individuals in a newly formed group have common group work scripts, they can quickly enact these scripts and begin performing activities associated with the group task. Having such a set of shared scripts that fit together enables the group to quickly adopt these scripts to guide its interaction. Group members can thus simply enact and re-enact these shared scripts (Gersick and Hackman, 1990; Orlikowski and Yates, 1994). These groups will not need to form, storm and norm about group work activities. Instead they will quickly start to perform task activities. Thus these groups will follow the initial behavior theorized by the punctuated equilibrium model – the rapid adoption of shared work processes and a very quick movement into performing the task assigned to the group.

However, these groups may find that they jumped into the task-related work too quickly, without enough attention to the task goals and their work processes. After an initial period of performing task activities, the members may feel conflict over their quickly adopted task goal and work processes and they may consider alternatives to their initial task activities (i.e. a midpoint transition). It is unclear if this reconsideration of the group’s goals and processes is always at the exact midpoint but in groups that meet for a rather short period of time (e.g., days or weeks), it appears as though the midpoint in time triggers the group’s desire to re-evaluate their goals and processes. However, future work needs to focus on the timing of this transition in groups that are working on more complex problems, over a longer period of time such as months or years.

Group Development without Shared Scripts. In contrast, when individuals in a group initially do not share common scripts for group work, they cannot quickly come to consensus on what scripts to enact. For example, when individuals encounter a new situation, they are unable to quickly enact a script because the situation does not fully match any prior situation (Edmonson, Bohmer, and Pisano, 2001; Okhuysen, 2001). Likewise, when individuals from

different organizational cultures meet as a group, it may be difficult to quickly enact shared scripts because they are less likely to have shared scripts that match. Other circumstances may also make it difficult for a group to locate and enact a set of shared scripts; for instance when a technology new to the group members is introduced, or an unfamiliar task is assigned. In these situations, group members are much less likely to enact scripts that match the situation and also match the scripts of other group members.

Therefore, the group must first work together to establish a set of shared scripts to guide their behavior (Okhuysen, 2001; Poole, Gray and Gioia, 1990). Until group members develop and agree on a common script they will be unable to move forward and work on the task (Bettenhausen and Murnighan, 1985; 1991; Mathieu, et al., 2000.). Groups which are unable to enact a shared script for work processes need to discuss and negotiate the work process scripts to use before they can begin working on the task. That is, these groups will need to get to know each other (forming), experience conflict over work process norms and task goals (storming), and to agreement over work norms and task goals (norming) before they can perform the task using a common script (O'Connor, Gruenfeld and McGrath, 1993). Their behavior will match that of the stage model of development (Figure 1).

By taking this additional time to form, storm and norm, these groups may create greater group member buy-in to the task goals and work processes as compared to those groups that begin the project with similar scripts. Therefore, it may be less likely that these groups will undergo additional conflict in their task processes and/or goals at the midpoint because of these discussions.

An Integrated Model of Group Development. Figure 1 summarizes our integrated model. We argue that when a group comes together, the members enact scripts that they believe fit the situation. If these individual scripts fit together with the scripts of the other group members, the group will quickly enact those shared scripts and begin performing task activities. However, if group members lack a script that fits the situation (e.g., using a new group technology to communicate), if the scripts they enact do not fit together, or if there is disagreement in task goals, group members must work together to form (examine task goals, work processes, and roles), storm (debate these) and norm (establish accepted goals, processes and roles), before they can perform task activities.

As the group members perform task activities, they periodically reflect on their progress. This reflection may be triggered by endogenous factors (e.g., the completion of an activity, an unexpected event, or a disagreement), or

exogenous factors (e.g., new directives, reassignments of group members, or the passage of time – especially the midpoint). If this reflection identifies a discrepancy or conflict over task goals or work processes, then the group is likely to reexamine them (McGrath, 1991) by going through another cycle of forming, storming, and norming until they are able to resume task performance. We believe that groups that immediately enact shared scripts with no forming, storming, and norming are more prone to having this reflection trigger forming, storming and norming because they did not go through these processes initially and explicitly discuss group members' assumptions.

Interpreting the Group Development Patterns in Our Groups

“Normal” Groups. All three groups that did not experience an intervention quickly adopted existing scripts and began to work on the task. There was no initial discussion of group work processes. Group members simply enacted their existing scripts, which matched the scripts enacted by other group members. All three groups independently enacted virtually the same leader-centered group work scripts and quickly adopted the project goal proposed by the leader (as might be expected in a hierarchical culture often found in hospitals (Adams and Bond, 1997; Jones, et al., 1997)).

We conclude that even though group members came from two different organizations and had not worked together before as a group, the organizations had a long history of working together and shared a common culture – at least a common culture for group work processes – and that this common culture engendered the development of group work scripts that were common among group members. These common scripts enabled these newly formed groups to quickly come to consensus on work processes so they could begin performing task activities.

All three groups reflected on their work at the approximate midpoint of the project and felt some dissatisfaction with the progress. All three groups experienced conflict (forming, storming) before the group leader stepped in and quashed the group's concerns (a forced “norming” if you will). Two groups proceeded with no changes while the third followed the leader's change in direction.

GSS Groups. In contrast, all three groups who had access to a GSS began with forming behaviors. Since the technology was new to them, they lacked the common scripts for group work; the technology presented a novel situation to which their existing shared scripts did not apply. Instead these groups had to develop new ways to organize their group work process and form scripts that guided them through their interactions.

As the descriptions of the initial meetings of these three groups show, this process was not easy. The first two meetings of all three groups involved experimentation with work processes. The groups tried different processes, rejected them, and tried new ones during the course of their first two meetings. Lacking scripts that fit the situation, the groups experimented and attempted to develop new scripts that would work. They formed and stormed over work processes and the project goal.

Two groups (G1, G2) moved past the forming and storming stages in later meetings (establishing norms, building relationships and developing cohesiveness, and then performing the task). Group G3 was not as conscientious about the project as the other groups, and, ultimately, failed to complete the project. Thus it is not surprising that their behavior does not fit either the stage model or punctuated equilibrium model very well. Our proposed group development model predicts this outcome in groups that never find scripts from which to work and thus are unable to move into the performance stage of the group interaction.

The Role of Technology

A potential rival hypothesis to our conclusions is that the GSS technology itself could have induced these changes. In other words, it is not the hindrance of enacting shared scripts, but rather the structural features that the technology offered that induced the nature of group development. For example, perhaps the increased “rationality” in the technology affected the groups’ processes causing them to better match the stage model. The GSS did impact the way in which interactions occurred in the group rooms but it did not set the agenda for the activities that were undertaken during each meeting. The processes evolved like those in other small group settings (e.g., Majchrzak, et al., 2000) rather than the more “rational” highly structured processes seen in larger groups’ uses of GSS (e.g., Tyran, et al., 1992). Thus we do not see “increased rationality” as a plausible explanation for our results.

Another rival hypothesis is the spirit of the technology. The underlying spirit of many GSS, including the one in this study, is to promote a meeting process that encourages more participative decision making (Ackermann and Eden, 1994; DeSanctis, et al., 1993; de Vreede and de Bruijn, 1999), akin to what Habermas terms *ideal speech* (Habermas and Nielsen, 1990). The structural features of the GSS were designed to support this spirit, a spirit quite different from the culture commonly found in hospitals (Moss and Rowles, 1997; Warner, 1998). It may be that the

members of these groups saw their chance to use the GSS to challenge the shared leader-centric scripts (i.e., the work processes used by the three non-GSS groups).

We believe that this explanation had less of an impact than the disruption of scripts. From a theoretical point of view, which factor is likely to have more of an impact on group development over the long term: hindrance of the enactment of shared scripts or a technology's structural features and spirit? If a group reached the point at which the use of a GSS was part of their common culture, the members of newly formed groups would have shared scripts for its use. In this situation, members of newly formed groups would not need to form, storm, and norm over work processes because these technology-based work processes would be well understood parts of the shared scripts they hold. Instead, members of newly formed groups would immediately jump into performing the task at hand with little or no discussion of work processes. Even though they have never met before, their shared scripts, derived from a shared culture, would start the group in an equilibrium state. This would be true regardless of the spirit of the technology or its structural features. Therefore, we conclude that the primary driving factor in the nature of group development is not technology per se, but rather the extent to which members share common group work scripts.

Limitations

This study suffers from the usual limitations of field research. We studied a limited number of groups drawn from two healthcare organizations, so it is possible that factors idiosyncratic to those organizations or to the healthcare environment had significant influence on our observations.

Another limitation is our use of a GSS to impede the use of the groups' "normal" shared scripts. We used a technology specifically designed to introduce new group interaction patterns for group process. Other, less intrusive, technologies or other interventions might have less of an impact on the use of shared scripts, and ultimately less of an effect on the group development process.

Implications for Research and Practice

We believe that these results have several implications for future research. First, to address the limitations, more research is needed over a larger number of groups in a variety of different settings to replicate and extend these results, and to investigate the boundary conditions to the applicability of our model. To what extent does the existence of shared scripts enable a group to start in equilibrium, even if the group has never before met? To what

extent does the lack of shared scripts mean that the group will progress through the forming, storming, and norming stages of group development before reaching the performing stage?

Second, we believe our conclusions have implications for group development when *new* technologies are introduced in work groups or virtual teams. Since it is unlikely that all members would have shared scripts for the use of an unfamiliar technology, we would expect group development to begin with forming, storming and norming. This would suggest the need for time to be set aside for the development of common scripts for group work, time that might need to include the use of synchronous media (e.g., telephone, face-to-face discussion) for the forming, storming, and norming stages (Dennis, Fuller, and Valacich, 2008). Understanding and expecting the need for initial procedural discussions and disagreements could facilitate the transition from old scripts to new scripts. Likewise, including training on how to adapt traditional group work scripts into the new technology-supported environment could also ease the transition.

However, this conclusion only applies to technologies new to the group. The extent to which a technology is familiar to group members (and the extent to which they share a common culture for its use) will influence the need to form, storm, and norm before they begin working on task activities. For virtual teams where the culture is shared and the technologies used are familiar to the group members – even for groups which have never met before – we can expect little need for initial forming, storming and norming; a highly synchronous first meeting might be unnecessary.

Third, our results suggest that the group development process will change over time. We expect that the initial use of GSS technologies in organizations would invoke the need for initial forming, norming, and storming, the results which would be found in early research, however, would likely *not* apply to ongoing use once group work scripts have been developed and become assimilated into the organizational culture. At this point, groups would likely bypass forming, norming, storming and move very quickly into performing.

Fourth, we need more research on newly-formed groups in organizations that have a well established culture and widely shared scripts for virtual team work. Much research on virtual teams has examined the “start-up” phase in which the technology is novel and there is a lack of shared scripts for its use. Our research from the start-up phase may not apply to later phases once groups have developed shared scripts for using the technologies.

Fifth, these conclusions have implications for laboratory research, which is commonly done on newly formed groups using technology new to them: these groups would more likely need initial forming, storming, and norming than would groups in organizations after the widespread deployment of GSS technologies. To the extent that the need to form, storm, and norm before performing the task would affect the constructs of interest in the study, we should be extremely cautious in generalizing the conclusions to organizational groups. For example, the need to form, storm, and norm increases the necessary time and affects the media best suited to the task, so we should be particularly cautious in generalizing conclusions about the inefficiency of using GSS or media choices in laboratory settings to ongoing use in the field.

Sixth, there are many novel situations that would hinder the use of shared scripts and habitual routines (Bettenhausen and Murnighan, 1991). The introduction of new technologies is just one such hindrance, because new technologies often impede the use of existing shared scripts (Arrow, 1997; Barley, 1986; Bettenhausen and Murnighan, 1991; Edmondson, et al., 2001; Majchrzak, et al., 2000; Tyre and Orlikowski, 1994). Forming groups whose members are from different cultures with different scripts for group work would likely also result in the need for initial forming, storming and norming over work processes (e.g., cross-cultural groups, global virtual teams, inter-organizational teams).

Finally, we conclude that the forming, storming, and norming stages provide a useful model of the processes by which groups adapt scripts into mutually accepted interaction patterns. It would be of interest to understand the cyclicity of the group formation phases in understanding how change impacts the formation and re-formation of shared scripts and habitual routines (cf. Okhuysen and Waller, 2002). Furthermore, future work that utilizes various perspectives of time and the multi-tasking of groups would aid in our understanding of group processes beyond a single project (cf. Marks, Mathieu, and Zaccaro, 2001).

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Figure 1: An Integrated Model of Group Development

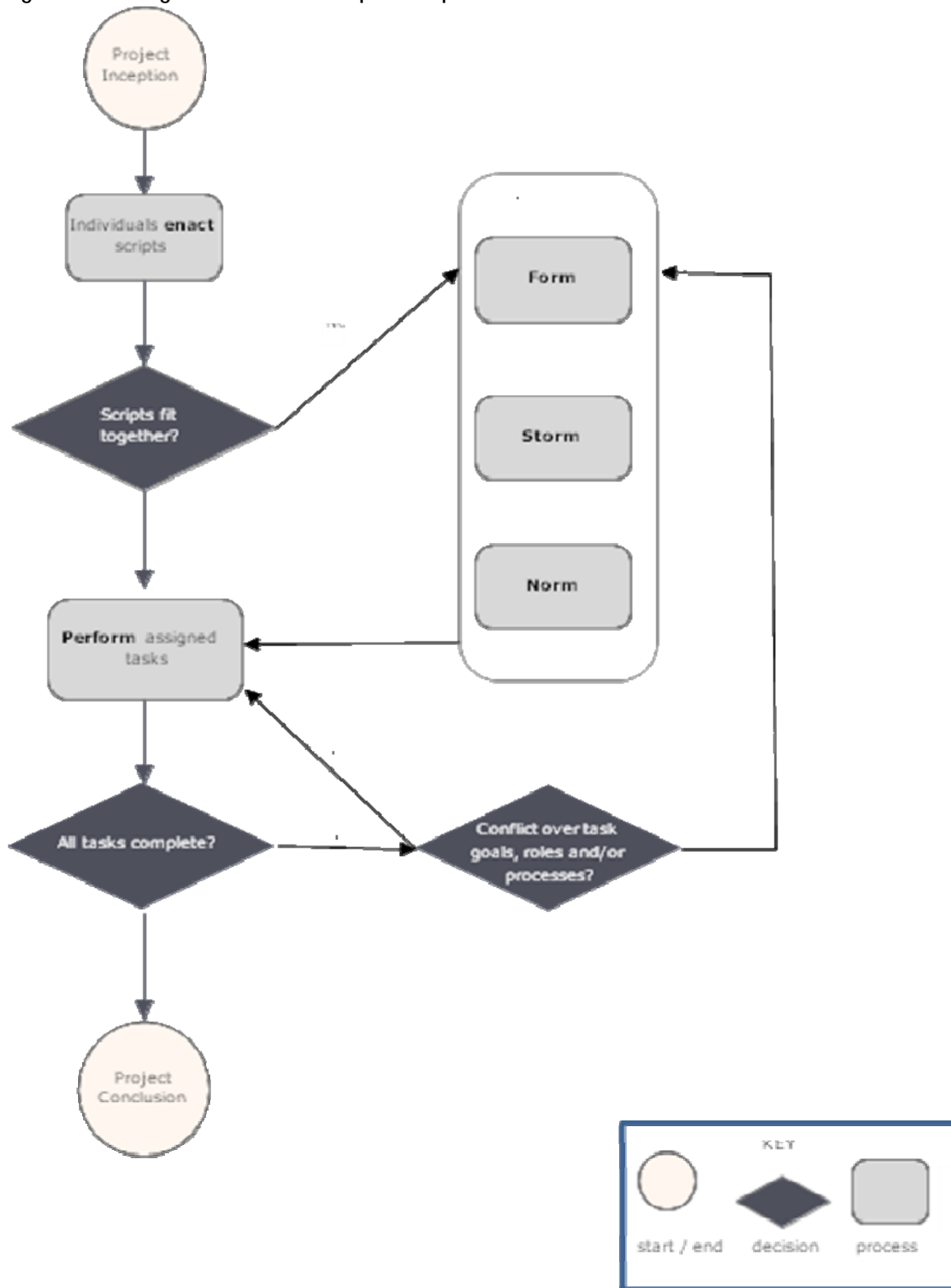


Table 1. Characteristics of the Two Group Development Models

Characteristics of the Stage Model	
Forming Stage (First meeting)	Examination of task goals
	Questioning of work processes
	Questioning of roles and authority; leader emerges
Storming Stage (After Forming)	Problems of control
	Emotional responses
	Hostility
Norming Stage (After Storming)	Establishment of work processes
	Emphasis on building relationships
	Development of group cohesiveness
Performing Stage (After Norming)	Increased attention to task
Characteristics of the Punctuated Equilibrium Model	
First Meeting to Midpoint	Quick adoption of task goals
	Quick adoption of work processes and group roles
	Long period of interaction matching original pattern
	Task performance unfocused prior to midpoint
Midpoint Transition to the End of the Project	Focus on time at the midpoint
	Questioning/shift of work processes at the midpoint
	Questioning/ shift of task goals at the midpoint
	Increased task performance after the midpoint
	Increased task activity
	Increased attention to role in group

Table 2a. "Normal" Groups: Punctuated Equilibrium Model

Characteristics		Group N1	Group N2	Group N3
First Meeting to Midpoint	Quick adoption of work processes and group roles	Yes. Highest ranking person assumed role of group leader and immediately began directing the meetings.	Yes. Highest ranking person assumed role of group leader and immediately began directing the meetings.	Yes. Highest ranking person assumed role of group leader and immediately began directing the meetings. Leader's deputy took over in her absence for one meeting
	Quick adoption of task goals	Yes. Highest ranking person proposed the project idea within 5 minutes of the start of the first meeting which was immediately adopted by the group.	Yes. Highest ranking person proposed the project idea within 5 minutes of the start of the first meeting which was immediately adopted by the group.	Yes. Highest ranking person proposed the project idea within 5 minutes of the start of the first meeting which was immediately adopted by the group.
	Long period of interaction matching original pattern	Yes. The meetings before the midpoint followed the same pattern: the leader directed the discussion and recorded the meeting notes.	Yes. The meetings before the midpoint followed the same pattern: the leader directed the discussion and recorded the meeting notes.	Yes. The meetings before the midpoint followed the same pattern: leader guided discussion by reading each item on the worksheet to the group, and by writing down the responses.
	Task performance unfocused prior to midpoint	Yes. No formal meeting agendas were done. The group discussed ideas in the first meeting, but no actions were taken. The notes from the first meeting were lost. No deliverables were identified. The actions during the meetings prior to the midpoint (locating office space and discussing how to sell the idea to the VP) were quite general.	Yes. No formal meeting agendas were done. The group brainstormed and discussed a wide range of general ideas.	Maybe. No formal meeting agendas were done. The group discussed ideas and the leader began writing the report immediately. All meetings prior to the midpoint began with some confusion over what had happened in the previous meeting.
Midpoint Transition to End of Project	Focus on time	Yes. Groups commented on the need to "get it done" and "finish it up."	No. No discussion of time.	No. No discussion of time.
	Questioning of work processes and/ or goals	Yes. In the midpoint meeting, group members pointed out problems with the project and questioned the project goals.	Yes. In the midpoint meeting, one group member commented that they had accomplished little. Group leader expressed dissatisfaction with the work to date.	Yes. In the meeting prior to the exact midpoint, two group members challenged the project goals and the meeting was spent rehashing prior discussions.
	Shift in work processes and/ or scripts	No. Group leader overrode the concerns of group members to prevent changes to the project. Some members became less involved in the project after this.	Yes. At the start of the midpoint meeting, the leader changed the project to something new. All prior work was reduced to one phrase.	No. Group leader overrode the concerns of group members to prevent changes to the project. Some members became less involved in the project.
	Increased task performance	Yes. Project deliverables were created and the report was written.	Yes. Meetings became more action oriented and focused on tasks required to produce the report.	No. The report was close to being finished by the midpoint meeting and the final meetings were spent discussing implementation ideas.

Table 2b. "Normal" Groups: Stage Model

Characteristics		Group N1	Group N2	Group N3
Forming (first meeting)	Examination of goals and task boundaries	No. Immediate adoption of leader's proposal for project	No. Immediate adoption of leader's proposal for project	No. Immediate adoption of leader's proposal for project
	Questioning of work processes	No. Immediate adoption of prior work scripts with no discussion.	No. Immediate adoption of prior work scripts with no discussion.	No. Immediate adoption of prior work scripts with no discussion.
	Questioning of authority; leader emerges	No. Highest ranking person assumed role of group leader without question.	No. Highest ranking person assumed role of group leader without question.	No. Highest ranking person assumed role of group leader without question.
Storming (first or second meeting)	Problems of control	No. Leader maintained control with no challenges to authority.	No. Leader maintained control with no challenges to authority.	No. Leader maintained control with no challenges to authority.
	Emotional responses	No. No emotional exchanges.	No. No emotional exchanges.	Yes. Some participants did not agree with the project idea.
	Hostility	No. No overt or covert hostility.	No. No overt or covert hostility.	Yes. Some participants disagreed with the project idea and said so.
Norming (second meeting or later)	Establishment of norms	No. Norms established at first meeting not after forming and storming.	No. Norms established at first meeting not after forming and storming.	No. Norms established at first meeting not after forming and storming.
	Emphasis on building relationships	No evidence of attempts to build relationships.	No evidence of attempts to build relationships.	No evidence of attempts to build relationships.
	Development of group cohesiveness	No. Group started as a very cohesive group and cohesiveness did not change.	No. Group started as a very cohesive group and cohesiveness did not change.	No. Group started as a set of two cohesive sub-groups and cohesiveness did not change.
Performing (second meeting or later)	Increased attention to task	Yes. Groups commented on the need to "get it done" and "finish it up."	Yes. Meetings became more action oriented and focused on tasks required to produce the report.	No. The leader began writing the report in the first meeting.
	Increased task activity	Yes. Project deliverables were created and the report was written at later stages in the project.	Yes. More tasks assigned and completed.	No. The report was close to being finished by the midpoint meeting and the final meetings were spent discussing implementation ideas.
	Increased attention to role in group	No. Specific roles develop in first meeting; some participants are introduced to group as designated as experts in specific areas at first meeting.	No. Specific roles develop in first meeting.	No. Specific roles develop in first meeting.

Table 3a. GSS Groups: Punctuated Equilibrium Model

Characteristics		Group G1	Group G2	Group G3
First Meeting to Midpoint	Quick formation and use of existing scripts	No. The highest ranking person did not want to be leader so a "coordinator" was appointed instead. During meeting 2, a different member emerged as the leader. Group experiments with GSS.	No. Highest ranking person became the leader after a series of challenges in the first two meetings. Group accepted her as the leader in meeting 2. Group experiments with GSS.	Maybe. Highest ranking person assumed role of group leader. Group experiments with GSS.
	Quick adoption of project goal	No. During the first meeting, the group discussed a wide range of project ideas and narrowed it down to two alternatives. These two alternatives were refined in subsequent meetings, until the groups chose to integrate the two ideas into plan at the end of the midpoint meeting.	No. The leader proposed the idea in the first meeting, but the group did not accept it. Only after group members discussed ideas in meeting 2 did they accept it.	No. The initial ideas for the project came from a verbal discussion (dominated by the leader and two others), but is never adopted by the group. The final idea for the project was proposed by a group member at the final group meeting.
	Long period of interaction matching original pattern	No. The group tried new meeting processes in all meetings before the midpoint as they tried to integrate the GSS scripts into their existing scripts.	No. The group tried new meeting processes in all meetings before the midpoint as they tried to integrate the GSS scripts into their existing scripts.	No. The group leader fails to attend the second meeting and the group flounders. Group challenges unclear goals. New work processes are tried using the GSS.
	Task performance unfocused prior to midpoint	No. Each meeting started with a review of prior work and a discussion of that meeting's objectives. Members volunteered for and completed "homework" assignments to move the project forward.	Maybe. Much discussion of project but little accomplished until group agrees to the ideas suggested by the leader in meeting 2.	Yes. The group leader fails to attend the second meeting and the group flounders. No work is accomplished. No further meetings held until the final week before the project is due
Midpoint Transition to End of Project	Focus on time	Yes. Some discussion of time at midpoint meeting.	No. No discussion of time.	Yes. Last meeting is held in the final week of the project and members are focused on time remaining.
	Questioning of work processes and/or goals	No questioning of goals at midpoint. Questioning of scripts reduced in the midpoint and later meetings.	No. These occurred at the start of the project, not at the midpoint.	No. The group had not selected a project goal or developed work scripts so questioning is not possible.
	Shift in work processes and/ or scripts	No. No shift in goals. Changes to the scripts by which the GSS is used reduced by the midpoint and later meetings; a routine develops.	No. No shift in goals. Changes to the scripts by which the GSS is used reduced by the midpoint and later meetings.	No. The group had not selected a project goal or developed work scripts so changes are not possible.
	Increased task performance	Yes. After the decision on the project goal, group members turned to writing the report.	Yes. The report is written after the midpoint, with the last meeting used to review the report.	Yes. The presentation is written the night before it is due. The report is never completed.

Table 3b. GSS Groups: Stage Model

Characteristics		Group G1	Group G2	Group G3
Forming (first or second meeting)	Examination of goals and task boundaries	Yes. Groups discussed goals, current problems, and task boundaries.	Yes. The leader attempted to constrain the group to her ideas but the group insisted on discussing the ideas and the task boundaries.	Yes. Open discussion of possible ideas and task boundaries.
	Questioning of work processes	Yes. The way in which the GSS was to be used was discussed in the first two meetings with different approaches used at different times	Yes. Open revolt over work methods. Leader refused to use GSS in second meeting, while rest of group used it in spite of her. Group then uses GSS in different ways in subsequent meetings.	Yes. The way in which the GSS was to be used was discussed in the first two meetings with different approaches used at different times
	Questioning of authority; leader emerges	Yes. When the leader declined, a “coordinator” was appointed instead. During meeting 2, a different member emerged as the leader.	Yes. Open revolt over leadership. Leader accepted by group only after her idea is accepted in meeting 2.	No. Highest ranking person assumed role of group leader. Chaos ensued when she missed a meeting.
Storming (first or second meeting)	Problems of control	Yes. The group wanted the highest ranking person to be the leader, but she declined. At one point the group went in a direction the leader did not like, so she redirected the group.	Yes. Group did not accept leader until late in the second meeting so the leader could not control group.	Yes. Leader missed second meeting and group is chaos. No one wanted to assume responsibility.
	Emotional responses	Maybe. There were a few emotional displays around the use of the GSS and disagreements about how it should be used.	Yes. Emotions ran very high around the leader’s lack of control.	Yes. There were strong positive emotions in meeting one and strong negative emotions in meetings 2 and 3.
	Hostility	Maybe. Some disagreements over how to use the GSS but not “hostile”; several members choose not to participate in the verbal discussions but to work as individuals on sections of the report.	Yes. Group members openly revolt against leader. Leader openly hostile to use of GSS and sarcastic to revolting group members.	Yes. Group could not agree on what to do in meeting 2 and left the meeting arguing over whether the meeting notes should be destroyed. In meeting 3, the leader says she will not be the “mommy” and argues with group members over who will give the presentation.
Norming (second meeting or later)	Establishment of norms	Yes. Norms for use of GSS and roles of group members emerge in meeting 3 and remain constant for rest of project.	Yes. Norms for use of GSS and roles of group members emerge in meeting 3 and remain constant for rest of project.	No evidence that norms developed.
	Emphasis on building relationships	Yes. Group members try to accommodate the requests of group members for changes in the way in which the group worked.	Yes. All group members decided to go to lunch together after meeting 3.	No evidence of attempts to build relationships. Last meeting ended with hostility.
	Development of group cohesiveness	Yes. Group becomes more cohesive. Members miss meetings due to scheduled vacations but comment that they trust others to continue to work on project.	Yes. Group becomes more cohesive in meeting 3 and cohesiveness gradually builds until the end of the project.	No. Group was not cohesive in meetings 2 and 3. Last meeting ended with hostility.
Performing (second meeting or later)	Increased attention to task	Yes. Last two meetings are highly focused on preparing report.	Yes. Last two meetings are highly focused on preparing report.	Yes. Last meeting is held in the final week of the project and members are focused on time remaining.
	Increased task activity	Yes. After the decision on the project goal, group members turned to writing the report.	Yes. The report is written after the midpoint of the project, with the last meeting used to review the report.	Yes. The presentation is written the night before it is due.
	Increased attention to role in group	Yes. Certain group members take responsibility for certain parts of the report.	Yes. Certain group members take responsibility for certain parts of the report.	Yes. The group argues over who will write what sections and give the presentation. The report is never completed.

Table 4. Extent to which the Models fit the Groups

Group	Number of Group Characteristics Fitting Model						Percentage of Group Characteristics Fitting Model***	
	Stage Model				Punctuated Equilibrium Model		Stage Model	Punctuated Equilibrium Model
	Forming	Storming	Norming	Performing	Pre Midpoint	Post Midpoint		
"Normal" Groups								
Group N1	0/3	0/3	0/3	2/3	4/4	3/4	17%	88%
Group N2	0/3	0/3	0/3	2/3	4/4	3/4	17%	88%
Group N3	0/3	2/3	0/3	0/3	3/4**	1/4	17%	56%
GSS Groups								
Group G1	3/3	1/3*	3/3	3/3	0/4	2/4	92%	25%
Group G2	3/3	3/3	3/3	3/3	0/4**	1/4	100%	19%
Group G3	2/3	3/3	0/3	3/3	1/4**	2/4	67%	44%

* In this group, two of the behaviors were possibly observed, but were not clear.

** In these groups, one of the behaviors may have been observed, but was not clear.

*** For percentage fit, behaviors that were possibly, but not clearly, observed were counted as ½.

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