MANAGERIAL OPENNESS AND THE ADOPTION OF DISTRIBUTED GROUP SUPPORT SYSTEMS
The Case of WebWide Participation

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Abstract: The full involvement of designated participants in meeting process is a well-recognized standard of group effectiveness, yet most face-to-face meetings are undertaken without the presence of every group member. The problem of total participation in asynchronous meetings convened with distributed group support systems has been noted frequently but investigated rarely. This paper describes a portion of a large field study using the distributed group support system WebWide Participation in which explanations for meeting involvement (and non-involvement) were explored. In particular, four WebWide meetings with varying levels of participation were selected, and surveys were sent to all designated participants. The hypothesis was that non-participants have less openness (i.e., one of the key personality dimensions in Big Five personality theory--the characteristic of being intellectually curious and receptive to new experiences) than active participants who willingly joined in the meeting process. Using two indices of managerial openness, a discriminant analysis was undertaken that correctly distinguished over four of every five participants and non-participants in the targeted WebWide meetings. The importance of this finding for advancing the adoption of other new group support technologies is discussed.

1 INTRODUCTION

With proliferation of virtual groups with members distributed in various sites who rarely work together in the same place at the same time, the use of online meetings has increased tremendously (Kock, 2000; Qureshi & Vogel, 2001). This presents additional challenges for group support, especially in circumstances where situational determinants such as distance, time pressure, and efficiency lead to the use of alternative technologies as communication channels (Haythornthwaite, Wellman, & Mantei, 1995; Hinds & Kiesler, 1995). Online group support has acquired even greater significance as organizations try to gain competitive advantage by effective facilitation of virtual teams (Furst, Blackburn, & Rosen, 1999; Beise, Niederman, & Beranek, 1999).

Typical of organization innovations generally (Kanter, 1988), most distributed group support systems were first designed and implemented in environments apart from organizational units in which their intended users are located. For this reason, such new technologies must be transferred from the R&D settings that hosted the development of the innovation to the organizational settings into which they eventually may be assimilated and institutionalized. Between the preliminary phase of innovation development when ideas are generated and realized, and the second phase, termed assimilation, when systems are adopted, adapted, and accepted, are found those activities of technology transfer best described as initiation, during which the use of some inchoate form of group support system (GSS) is introduced and used for the first time in an organization (Applegate, 1991).

Successful initiation arguably encourages a willingness to use the technology again, perhaps repeatedly, while problems at the time of introduction may doom, at least temporarily, subsequent progress toward assimilation (Fjermestad & Hiltz, 2001). While new technology must be modified repeatedly following adoption to suit the unique demands of each workplace, an organizational unit also must be able to change appropriately its established structures and processes. This mutual adaptation model suggests that the eventual assimilation of new technology

becomes threatened wherever it is rigidly introduced or wherever executive teams are not flexible enough to alter their decision-making routines at the time of initiation.

1.1 Managerial Openness and the Adoption of Distributed GSS

Openness was identified by the "Berkeley school" (Adorno et al., 1950) as an underlying trait of flexibility, although their emphasis was on the negative or pathological end of the dimension: intolerance, rigidity, dogmatism, and premature closure. There is growing evidence that an individual's capacity to be cognitively and behaviorally flexible in dealing with new situations is one of five key (i.e., the "Big Five") factors in personality structure (Digman, 1990; Goldberg, 1993; McCrae, 1987).[1]

Because the openness factor is connected to intellectual curiosity, creativity, and divergent thinking (McCrae, 1987) that tend to be encouraging of efforts toward organizational innovation and change, not surprisingly, its connection to training proficiency has been well established (Barrick & Mount, 1991; Hough et al., 1990; Salgado, 1997). Individuals who have greater openness to new ideas may benefit most from training opportunities. McCartt and Rohrbaugh (1995, p. 577) concluded that "over 30% of the variance in outcome reports of decision conference success can be predicted reliably from the degree of openness in client organizations." In a recent international survey of experienced facilitators, greater openness in groups (i.e., "members are intellectually curious, flexible, and creative in approaching issues") was identified most frequently (83% of the responses) as the reason why groups are effective at addressing problems and successfully accomplishing the tasks on which they work.[2]

Consistent with the early work of Rogers (1962; with Shoemaker, 1971), longer-term assimilation and institutionalization of distributed group support systems depend upon the potential adopters' openness to change at the time new technologies are first introduced in organizations. Applegate (1991), for example, identified the receptivity or resistance of end-users as a key factor associated with success and failure in technology transfer. It can be argued

that rigid adherence to established organizational structures and work routines will preclude any possibility of achieving the beneficial results frequently ascribed to new applications of technology. Managerial openness to change permits the creative use of alternative, even initially unfamiliar, methods of deliberation and conflict management provided by online group support. Successful introduction of new technology will increase willingness to use an innovation again, the basis of its eventual adoption.

1.2 Asynchronous Meetings through WebWide Participation

The focus of the present study is on a unique form of online meeting termed "asynchronous" to indicate that the communication of the virtual group is not concurrent in time (see, for example, Ocker et al., 1995; Shirani, Tafti, & Affisco, 1999; Warkentin, Sayeed, & Hightower, 1997). Such any-time any-place (ATAP) meetings give each and every participant complete control over their own schedules; they join in the group process whenever and wherever they choose. ATAP meetings are convened by computer through any local or wide area network or the Internet and can take place over a period of one to six weeks, since participants contribute to the group process whenever they have a few minutes to spare, even late evenings or weekends. ATAP meetings are different from other electronic forums such as bulletin boards, newsgroups, listservs, and chat groups. An ATAP meeting gathers individuals together who share responsibility for a common task, who need to focus on an explicit problem, and who must be successful in getting useful results from their collaboration. In short, ATAP meetings are convened to get work done with a broader base of effort.

WebWide Participation (WWP) was designed to support the simplest, most basic form of ATAP meeting. As a series of elementary Web pages, WWP allows first-time participants in ATAP meetings to join in the sessions without difficulty, as long as they have the capacity in their office or home to access the Internet. The use of WWP requires the designation of at least one individual to serve as the online meeting facilitator whose efforts on behalf of the group complement the responsibilities of the group leader(s) (Rangarajan and Rohrbaugh, 2003).

WWP meetings typically involve 5 to 100 participants over a two to four-week period. There are three stages to a complete WWP meeting: listing, categorizing, and prioritizing. In the listing stage, participants are asked to respond to specific

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[1] It is important to note, however, that an individual who displays substantial openness to change is not necessarily an innovator, that is, not particularly an initiator or "prime mover" of change, especially capable of originality of thought, greatly motivated to develop novel solutions to problems (Jackson, 1976, 10).

[2] *Special Report*, International Association of Facilitators, February, 1998.

elicitation questions by generating lists of proposed ideas; this is the brainstorming phase of the meeting. In the subsequent categorizing stage, each participant sorts all of the proposed ideas into clusters of identical or quite similar contributions to the list. The number of resulting categories usually is about half the number of initial ideas. In the final prioritizing stage, each participant ranks or rates the idea clusters according to one or more specific assessment criteria. Both the meeting facilitator and group leader(s) actively encourage the involvement of designated participants during all stages of a WWP meeting.

1.3 Specifying the Research Question

Since the argument has been made for mutual adaptation in successful routinization of new technology, the primary importance of managerial openness to change appears worthy of further investigation with respect to distributed group support systems. The hypothesis directing the present study was that non-participants in WebWide meetings have less openness (i.e., the characteristic of being intellectually curious and receptive to new experiences) than active participants who willingly joined in the meeting processes. It was expected that the measurement of managerial openness would allow for relatively accurate predictions of which designated participants either had become actively involved--or had remained uninvolved despite multiple invitations to join in the asynchronous meetings.

2 METHOD OF STUDY

A large field study of ATAP meeting facilitation has been initiated using WWP and e-mail as the primary communication channels for each group. Thus far, 12 ATAP meetings have been facilitated for external organizations facing real, not experimentally contrived, problems. Meeting size has ranged from 7 to 93 designated participants with a median of 19. Actual participation rates (i.e., the ratio of active participants to designated participants) have ranged from .41 to .94 with a median of .66.

For purposes of this study, four of these meetings were selected for further investigation: two meetings with higher participation rates (.94--16 active participants out of 17 designated; .92—23 active participants out of 25 designated); one meeting with a lower participation rate (.41--9 active participants out of 22 designated); and one meeting with a moderate participation rate (.55--28 active participants out of 51 designated).

A three-page questionnaire was sent to every active participant in each meeting. Altogether 76 of these surveys were distributed. This questionnaire asked respondents to evaluate the usefulness of (seven questions) and satisfaction with (six questions) the WWP meeting. In addition, respondents were asked to agree or disagree (using a six-point, Likert-type scale) with ten descriptive statements about the WWP meeting and to estimate the amount of time that they had devoted to meeting participation.

A two-page questionnaire was sent to every designated participant who did not at any time join in the WWP meeting. Altogether 39 of these surveys were distributed. This questionnaire asked respondents to rate on an 11-point scale the importance of 12 alternative reasons why they did not join in the WWP meeting.

The final page of both the three-page (for participants) and the two-page (for non-participants) forms of questionnaire were identical. All respondents were asked to agree or disagree (using a six-point, Likert-type scale) with statements about organizations and also about themselves. These items were selected specifically to measure the level of managerial openness for each individual. For example, statements about organizations included "Most managers fails to provide sufficient stability and consistency in office routines," "Organizations do not need to take any risks in order to achieve excellence," and "Experiments belong in the laboratory, not in the workplace." Personal statements included "I think it's interesting to learn and develop new skills and hobbies," "My friends and family might say that I'm a person who is pretty much set in my ways," and "I prefer a job that doesn't require me to keep learning new tasks."

The response rate (i.e., the ratio of returned questionnaires to distributed questionnaires) was .74 for participants and .51 for non-participants. Altogether 76 of the 115 distributed questionnaires were returned, producing an overall response rate of .66. The response rates for each of the four selected meetings were .94, .84, .64, and .47, respectively.

Respondents to the questionnaire were demographically similar to all participants in WWP meetings. Women only slightly outnumbered the men. Respondents typically were in mid-level management positions and between 35 and 45 years of age.

3 RESULTS

3.1 Participants Only

On the whole, participants (n = 56) reported quite positive experiences with WWP meetings. Nearly 60% generally or strongly disagreed that "first-time participants will find it difficult to join in a WWP meeting," and three-quarters (77%) generally or strongly agreed that "once group members join in, they will find that it is easy to contribute to a WWP meeting." When asked if they "would be very willing to participate in another WWP meeting," 80% generally or strongly agreed. More than 85% reported that they were either generally or extremely satisfied with the overall meeting process.

Participants did not appear to have spent a great deal of time joining in the WWP meetings. On average, participants reported spending about five minutes "initially finding and getting access to the right Web pages" and about 20-30 minutes for each of the three meeting stages: "contributing to the list building," "categorizing all the ideas that everyone had contributed," and "prioritizing the idea categories during the final week of the meeting." The greatest amount of individual time reported in any of these four-week meetings was four hours.

3.2 Non-participants Only

Although non-participants (n = 19) indicated a variety of important reasons for not joining in the WWP meeting, two explanations were widely offered. About two-thirds (65%) reported "My schedule was so full of other meetings and tasks that I just didn't have time." A second explanation given by over 40% was "The meeting could produce good results from others without requiring my time." Other reasons identified by two or three non-participants included: "I was away from my office and home during most of the meeting period without Internet access;" "I didn't know that I was expected to participate in the meeting;" "I didn't think that I could make a useful contribution to the meeting;" and "Our group should not be working on issues by using Internet meetings."

3.3 Openness Differences between Participants and Non-participants

As shown in Figure 1, differing levels of agreement with statements pertaining to managerial openness emerged between participants and non-participants.

In particular, significant differences $(p < .10)$ were found with two organizational statements: "Organizations do not need to take any risks in order to achieve excellence" (t = 1.99) and "Most managers fail to provide sufficient stability and consistency in office routines" (t = 2.10). In addition, significant differences $(p < .10)$ were found with two personal statements: "I think it's interesting to learn and develop new skills and hobbies" (t = 2.43) and "My friends and family might say that I'm a person who is pretty much set in my ways" (t = 1.80).

It is important to note that the differences in responses of participants and non-participants shifted in opposite directions from organizational to personal statements. Non-participants were significantly *less* open to risk taking and changes in routine than participants in responding to organizational statements. However, non-participants described themselves as significantly *more* open to developing new skills and *less* set in their ways than participants' self-reports. These differences allowed for the development of a multivariate statistical model for discriminating between participants and non-participants which is described in the next section.

3.4 Predictions of GSS Participation with Use of Discriminant Analysis

Using the two organizational statements where significant differences were found, a two-item index of managerial openness was formed by standardizing the 6-point coded responses of both participants and non-participants and then computing a mean for each pair of individual responses. Similarly, using the two personal statements where significant differences were found, another two-item index of managerial openness was formed in an identical way. As one might expect, both the organizational index and the personal index scores generated significant differences (p < .05) between participants and non-participants (t = 2.73 and -2.60, respectively) in the differing directions described above (see Figure 1).

A discriminant analysis was performed to test statistically how well the organizational and personal indices of managerial openness would distinguish between participants and non-participants.

The model chi square (14.77) derived for Wilks' lambda (.80) was significant (p < .01). Accordingly, the canonical correlation coefficient--which reduced in this two-group situation to the Pearson correlation coefficient between the discriminant score and the group variable--was .45. Both standardized

canonical discriminant function coefficients for the organizational index (.78) and for the personal index (-.76) were significant ($p < .01$).

An alternative view of the predictive efficiency of the discriminant analysis was gained through the construction of a classification table of correct and incorrect predictions. For over 80% of the respondents, the model's predictions of whether they did participate or did not participate in an asynchronous WebWide meeting corresponded to actual occurrences. The model had a high level of sensitivity (89%): only six of 53 participants (11%) were predicted incorrectly as likely non-participants. The model also had a high level of specificity (67%): only six of 18 non-participants were predicted incorrectly as likely participants.

4 DISCUSSION AND CONCLUSION

Lower than ideal participation rates for many of the ATAP meetings in our field study (the median rate for designated participants is .66) is a focus of considerable concern and well worth documenting for other applications of computer-mediated communication systems, as well. Outside of laboratory settings, participation rates of .40 to .60 are probably not uncommon. Certainly, not everyone who is scheduled will attend face-to-face meetings either (or arrive punctually, contribute actively, and stay through adjournment), but special effort appears to be required to assure reasonably high participation rates, especially when the distributed group support system is directed at *ad hoc* groups with little or no history of collaboration, that is, groups for whom the WWP process was especially developed. This is an area of inquiry that largely depends on field study rather than laboratory research.

This study indicated that measures of one of the Big Five personality dimensions--openness--were able to distinguish with about 83% accuracy between participants and non-participants in one form of asynchronous, Web-mediated group process. Such a significant finding implicating the openness factor in decisions of whether or not to become involved in ATAP meetings may have wider implications for predicting participation levels in other applications of distributed group support systems, as well. The empirical results reported here add to a growing body of evidence that managerial openness is a key variable in explaining successes and failures in the introduction and appropriation of a variety of new information technologies and management systems.

The level of accuracy of the discriminant function documented in this study was based on only four statements: two about the nature of organizations and two in the form of self-reports. It is both somewhat surprising and encouraging that differences between participants and non-participants could be uncovered with so sparing a set of questionnaire items. However, it is important to note that the organizational statements and the personal statements revealed opposite patterns of response. Although non-participants were more willing than participants to criticize organizations for inordinate risk taking and a lack of stability/consistency, they appeared more likely than participants to describe themselves as not so "set in my ways" and particularly interested in developing new skills.

Why would individuals who refused the opportunity to join in a meeting using a new distributed group support system (and who were relatively less comfortable with risk taking and disturbances in routine) reply so positively (some might say excessively) to personal statements about their openness to new experiences? Although the answer is not clear, one possibility is that respondents who are somewhat lower on the openness factor may be more susceptible to the demand characteristics inherent in this type of revealing self-report. As a result, in comparison to the rest of the population, they may tend to more strongly agree or more strongly disagree with personal statements in the scale direction that they perceive to be more socially desirable.

The difference in managerial openness between participants and non-participants documented in this study was relatively large: about three-quarters of a standard deviation unit on both the organizational and personal indices. With such a relevant and meaningful difference in openness between groups, there was no need for a more powerful statistical test (i.e., for a larger sample of participants and non-participants). However, there is no doubt that the findings reported here warrant replication, not with a larger sample but with more samples (of approximately the same size) of designated participants for additional ATAP meetings. This is one of the purposes of the extended field study currently being undertaken.

A better test of the research question would be to administer the managerial openness measures to designated participants *in advance of* the online meeting. With this method, the predictions from a validated discriminant function truly would be a forecast of participation or non-participation well before the distributed group support system was introduced to the group. The opportunity to assess the openness of a prospective management team to

innovation and change and, thereby, to anticipate the likely success or failure of the introduction of new technologies is an important objective. One eventually might avoid costly failures early in the adoption curve that would be due less to flawed characteristics of the innovation and more to the inflexibility and rigidness of the potential appropriators, since intellectual curiosity and receptivity to new experiences increasingly appear to play a considerable role in the observed adoption or rejection of new information technologies and management systems.

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