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Can the Adoption of a Leaner Medium Increase Group Outcome Quality?

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Abstract

There has been mounting evidence that the predictions of the media richness theory do not hold in a number of situations. For example, a number of studies indicate that a lean medium can be the choice of groups engaged in complex tasks, even when richer media are available. However, there is very little research evidence that the adoption of a leaner medium can lead to an actual increase in group outcome quality. In this paper, we go some way towards filling this research gap, by providing evidence that groups can adapt their behavior in order to overcome the limitations of a leaner medium and produce outcomes that are perceived by group members as being of higher quality than in richer media. We studied five process improvement groups in a New Zealand university. The groups voluntarily conducted most of their interactions through an e-mail conferencing system developed by the author.

Keywords: impact of group support technologies, communication effectiveness, rich media, lean media

Introduction

The increasing use of these technologies as tools to enable efficient communication in organizations has led to a growing literature on the impact of group support technologies on groups in the 1980s and 1990s. This literature, however, has been filled with mixed findings (Orlikowski, 1992), where success in the introduction and use of group support systems (GSSs) has been as commonplace as failure (DeSanctis et al., 1993). A number of theories and theoretical frameworks have been proposed which provide a basis for the understanding of these mixed findings. Examples of such theories are media richness theory (Daft and Lengel, 1986; Galbraith, 1973), adaptive structuration theory (Poole and DeSanctis, 1990; Poole and Jackson, 1993), and genre-based communication structuration (Yates and Orlikowski, 1992; Orlikowski and Yates, 1994).

Among the many theories devised, media richness stands out for its influence as a deterministic theory of communication media adoption and use since its development in the mid-1980s, in both academic and software development communities. Media richness theory claims that different communication media can be classified as lean or rich, according to their ability to convey knowledge and information. The classification scheme proposed by media richness theory

places face-to-face as the richest communication medium, and e-mail as a relatively lean medium (Fulk et al., 1990; Lee, 1994). Media richness theory claims that lean media are not appropriate for knowledge and information communication (i.e. equivocality and uncertainty reduction), and that the adoption of media and the outcomes of its use will usually reflect this fact (Daft et al., 1987; Lengel and Daft, 1988).

The influence of these claims can be felt in academic circles by the number of positive references to media richness theory in the group support systems and business communication research literatures; and in industry practitioner circles by the persistent attempts of developers of commercial group support software, through adding features to their products, to achieve the elusive communication richness of face-to-face interaction. This paper goes some way towards dispelling these claims, based on a study of five process improvement groups, and presents findings that beg a new theoretical framework to explain them.

Groups studied

We studied five process improvement groups, conducted at the University of Waikato, over seven months. The groups had from seven to thirteen members, and took on average forty-one days to be completed. Each group selected, analyzed and conceptually redesigned one or more business processes; redesign proposals were later implemented and led in most of the cases to process quality and productivity improvements. Most of the group members had been recently involved in face-to-face process improvement groups. Forty-six structured interviews addressing perceived technology effects were conducted with group members within two weeks of the completion of their groups.

This paper describes the evolution of the groups through four main group stages. These stages highlight the media adoption choice made by the groups, which have consistently lain on a leaner medium, and the behavioral adaptation of the group members to overcome the group communication limitations posed by that choice. All groups voluntarily adopted an e-mail conferencing system developed by the author as their main communication medium. The system was implemented using Novell Groupwise, and allowed members to post e-mail messages and attachments to their groups. The system has been offered to the groups as a service provided by the author in exchange to being allowed to collect research data. However, the decision as to whether the system would be used or not, and how much, was completely left to the groups themselves.

Stage 1: Choice of medium

All five groups have voluntarily chosen the electronic medium for the vast majority of the group interactions, that is, those interactions in which the communication mode was many-to-many. Phone and face-to-face media were used predominantly for one-to-one communication. In interviews, members were asked about the amount of time spent interacting through each medium. An aggregate analysis of the responses to this question indicates that the mean proportion of time the electronic medium was used by group members for either many-to-many or one-to-one interaction was seventy-six per cent, whereas the phone and face-to-face media were used about twenty-four per cent of the time.

These figures suggest that the electronic medium was consistently favored by the groups as their main medium for communication, in spite of being a "leaner" medium than the phone and face-to-face media. When asked to explain their choice, the overwhelming majority of the interviewees assigned a reduction in disruptiveness, typically linked with the possibility of interacting with the group at the most convenient time for them, as the main reason for the choice of the electronic medium.

Stage 2: Perception of medium equivocality

After the initial choice, however, several members pointed out that they had perceived the new medium as likely to increase the "ambiguity" in the discussion. The main reasons given by members were the lack of immediate feedback and the filtering of verbal cues inherent in the electronic medium. These perceptions are highly consistent with predictions based on the media richness theory (Daft and Lengel, 1986).

Stage 3: Adaptation to the leaner medium

Plausible predictions based on the media richness theory, for future scenarios involving the five groups would be: (a) The perception by group members of an increase in ambiguity in individual member contributions; and (b) Either a move to richer media (such as face-to-face) or the discontinuation of the groups, both as a consequence of the higher perceived ambiguity.

None of these scenarios became reality. On the contrary, not only the groups continued using the electronic medium for most of the group interactions, but, to our surprise, most respondents spontaneously reported a perceived increase in member contribution quality. A quote from one of these members illustrates this perception: "*You think more when you're writing something, so you produce a better quality contribution. Take for example what [group member's name - removed] wrote, she wrote a lot and it seemed that she thought a lot about it before she e-mailed it to the group. She wasn't just babbling off the top of her head, she tended to think out what she was writing. I know I did it a lot, specially my first message. I really thought a lot to put it together.*"

The perceived increase in member contribution quality can be explained by an adaptation of the members to the leaner medium. Three main pieces of hard evidence strongly suggest this adaptive behavior and some traits of its dynamics. Firstly, members spent more time preparing their individual contributions, which is evidenced by a dramatic decrease in member contribution speed through the electronic medium, in comparison with face-to-face meetings. The mean contribution speed in the electronic medium has been approximately 6 words per minute. In face-to-face meetings, this contribution speed has been estimated at 113 words per minute (McQueen, 1991). The contribution speed in the electronic medium was calculated based on group members' estimates (as well as direct measurements) of time spent preparing and posting contributions to their groups and the actual word count of their postings. The low contribution speed through the electronic medium could not be explained only based on the fact that "typing is slower than speaking", as average typists are expected to be able to type between 60 to 70 words per minute, which points to a better preparation of the postings as an alternative explanation for the low speed observed.

Secondly, group members seemed to have taken much longer to provide their contributions to the group through the electronic medium than in typical face-to-face meetings, which may be seen as partially suggesting that members reflected more on their contributions prior to posting them (it is not clear, however, whether this was a result of a conscious and voluntary effort by the members). An aggregate analysis of the time members took to respond to postings from the group leaders (most of postings from ordinary members were responses to group leaders' postings) provides some support to this assumption. According to this analysis, the mean response time to contributions by the group leaders was 138 hours (between 5 and 6 days) through the electronic medium. In face-to-face meetings this response time was estimated by us at no more than 1 hour (based on the figures provided by McQueen, 1991).

Thirdly, group members seemed to have provided much longer contributions (in number of words) through the electronic medium than they would have usually done in face-to-face meetings, which suggests electronic contributions as having more information and knowledge content than oral contributions in typical face-to-face meetings. An aggregate analysis of word counts per posting provides support for this perception. According to this analysis, the mean contribution length (per posting) has been 297 words through the electronic medium. In face-to-face meetings, this mean contribution length has been estimated at 18 words (McQueen, 1991).

The three pieces of hard evidence presented above - based on estimates of member contribution speed, response time, and contribution length - suggest that the adoption of a leaner medium by the groups led members to adapt their group communication behavior in a way that seems to have led them to overcome the limitations posed by the leaner electronic medium. This adaptation apparently led group members to prepare longer and better thought out contributions than in typical face-to-face meetings.

Stage 4: Medium limitations are partially overcome

Given that members perceived an increase in member contribution quality as a consequence of the adoption of the electronic medium, it seems plausible to expect that group outcome quality - i.e. the quality of process redesign proposals - would also be seen by members as being increased. In fact, this has been the trend of the perceptions gauged in interviews with group members. Forty-eight per cent of the interview respondents perceived an increase in group outcome quality; twenty-two per cent perceived a decrease; the remaining respondents perceived no variation in this variable. It is important to note that over ninety per cent of the forty-six interview respondents have recently participated in face-to-face process redesign groups, which lends more weight to their perceptions.

One of the two main reasons given by members for the increase in group outcome quality was an increase in member contribution quality; the other reason being a higher departmental heterogeneity enabled by the low disruptiveness inherent in the electronic medium. The main reason given by the respondents who perceived a decrease in outcome quality was a higher ambiguity in the discussion, also seen as directly caused by the electronic medium. These explanations partially confirm our hypothesis that group members perceived the electronic medium as a lean medium, but nevertheless decided to use it for the majority of their group

interactions and adapt their behavior to overcome the limitations posed by a high medium equivocality.

Conclusion

The groups in our study have initially chosen the leaner electronic medium for group communication because of some of its advantages, notably a low disruptiveness. Immediately after they have begun using the new medium, group members perceived the medium as equivocal and in consequence adapted their behavior in order to overcome the limitations posed by the new medium, rather than moving to a richer medium such as face-to-face meetings. This adaptation involved members preparing longer and more elaborate messages, which partially offset the higher equivocality perceived as inherent in the electronic medium.

While the initial perceptions of group members of the electronic medium were consistent with predictions based on the media richness theory (Daft and Lengel, 1986), the adaptive behavior displayed by the groups in this study was not so. This behavior is, nevertheless, remarkably consistent with that of groups in similar circumstances in different organizational settings (Kock and McQueen, 1996), and partially consistent with previous studies in which the adaptive power of groups has been illustrated (Markus, 1992; 1994; Orlikowski et al., 1995). The final and somewhat surprising conclusion of this study is that the existence of media constraints to group communication led to an improvement in group outcome quality!

No single existing theoretical framework provides a solid basis for explaining the adaptive behavior observed in the groups in this study. One emergent theory which tries to explain media adoption and use by groups as an adaptation process is the adaptive structuration theory (DeSanctis et al., 1993; Wagner et al., 1993). However, the adaptive structuration theory assumes that adaptive behavior emerges based on social and cultural norms existing prior to the introduction of the new medium (Poole and DeSanctis, 1990; Poole and Jackson, 1993). The adaptive behavior of the five groups in this study does not seem to have been caused by social and cultural norms of the group members prior to the introduction of the new medium. It rather seems to have been motivated by more general human cognitive patterns that are independent of such norms, as, although groups had a heterogeneous departmental composition, they reacted in a very similar way. Although our study does not clarify the nature of such cognitive patterns, it clearly suggests the need for more research on the origin and structure of these patterns and perhaps the development of alternative theoretical frameworks to explain media adoption and use.

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