December 2006

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ABSTRACT

Information and communication technology (ICT) alters the temporal conditions in which groups operate and transforms the way time is perceived, used, managed and disciplined in groups. A review of empirical research on groups interacting with ICT reveals that little research examines time per se as a variable of interest. This proposed research endeavors to examine (1) how the use of ICT is related to the temporal organization of groups' daily events and tasks, (2) how groups temporally organize tasks and events with and by IT, and (3) how groups interpret and perceive the temporal dimension of their work. A case study on the use of ICT in three groups of IT professionals engaged in distributed work will be conducted. The research will deepen the theoretical understanding of intricacies between time and ICT in group settings, and offer practical guidelines for implementing and designing distributed work arrangements.

Key Words

Information and Communication Technology, Time, Groups, Distributed Work

EXTENDED ABSTRACT

Groups are small collections of people who operate interdependently to achieve common goals. As groups occupy a crucial position in organizational life, a fairly large number of studies have been conducted to study groups. Of them, a stream of research (e.g., Gersick, 1988) focuses specifically on the role of temporal factors in group processes and outcomes. At the same time, as the use of information and communication technology (ICT) has spread very rapidly at all levels of organizations, ICT has played a large role in collaborative work of groups (McGrath and Hollingshead, 1994). In information systems (IS) field, the use of ICT in group settings has been extensively examined over the past two decades, and several research streams (e.g., group support systems, computer-mediated communication, virtual teams) have been developed and been evolving.

Time deserves the focused attention of as well as in-depth investigation by IS researchers for at least two reasons. First, recent advances in ICT alter the temporal circumstances under which groups operate (Kakihara and Sorensen, 2002) and impinge upon groups' temporal behavior and experience (Jaureguiberry, 2000). The increasing application of ICT in workplace is expected to induce changes in temporality in organization life. Second, prior academic research (e.g., Barley, 1988) and practitioner literature (e.g., Munck, 2001) have shown that changes in temporality prompt and enable other changes in organizations.

A review of IS research on groups interacting with ICT using an open coding technique reveals that time has been touched upon in four different ways in the past[1]: (1) time as a structure, (2) technological features related to time, (3) the use of ICT in groups over time, and (4) group temporal behavior. An analysis of the four usages of time shows: (a) that prior IS research took a clock view of time in their examination of the use of ICT in groups, (b) that the attention on how the various social, organizational, technological factors affect perception, experience and use of time (i.e., temporal patterning) in groups was

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[1] To better understand the temporal factors in IS research on groups interacting with ICT, I review empirical research on group process and outcome of ICT-mediated task-oriented groups in *Information Systems Research*, *Journal of Management Information Systems*, *Management Information Systems Quarterly*, *Management Science*, and *Organization Science*. IS research published in these five journals is not exhaustive but representative of the mainstream IS research on groups interacting with ICT. In total, 94 articles are included in the review.

limited to decision time, and (c) that little IS research took time specifically as a variable of interest. The tendency of current IS research to treat time as objective and quantifiable did not capture the complexity of time in groups interacting with ICT, as time is also a social and cultural construction (e.g., Roy, 1959). Not much knowledge other than that the use of ICT changed groups' decision time was gained on temporal patterning of electronic groups. The paucity of IS research on time itself as a variable of interest did not offer systematic understanding of the relationship between the use of ICT and group temporal dynamics.

The purpose of this thesis is to tap into the intricacy between the use of ICT and group temporal dynamics. Specifically, I propose to study the temporal patterning in organizational groups interacting with ICT. In this paper, the clock view of time is complemented with the concept of time having interpretive parameters (Barley, 1988) and the notion that time is intricately bounded up with space (Giddens, 1984). I conceptualize temporal patterning as constituted by temporal enactment, temporal construal, and spatial temporality (see Table 1 for details). The three dimensions of temporal patterning are marked by interpersonal adjustment and negotiation of conduct and interaction, as evident in group schedule, work time norms, project timelines, and the like. The resulting temporal norms, values, and practices then recursively guide and restrict group members' temporal perception and experience.

Dimensions	Definition
Temporal Enactment	The way people perform time through regularized patterns of behavior, as manifested in such temporal attributes as rhythm, sequence, duration, pace, and temporal location (when).
Temporal Construal	The way people experience or orient to time, as manifested in such temporal attributes as temporal orientation, temporal horizon, temporal scarcity.
Spatial Temporality	The way people spend time through their actions and motions in the space around them, as manifested in such temporal attribute as regionalization.
Table 1: Dimensions of Temporal Patterning	

Newer forms of ICT, such as mobile technology and instant messaging, are of particular interest to this proposed study. They enhance concurrent access to and processing of different information and activities in a given time period and instantaneous transmission and exchange of digital information over space, and free people from their reliance on specific location for communication and services. The emerging temporal features of newer forms of ICT redefine the temporal prerequisites of group work, provide greater opportunities for group members to manage interdependent and intertwining activities among group members, and impinge upon group members' enactment and experience of time. The increased decoupling of time and space, enabled by newer forms of ICT, reconfigures time-space paths of group members and renders the time-space configurations of group activities more irregular and diversified. The potential changes in the temporal patterning induced by the use of newer forms of ICT in group settings may affect the group task processes, social interactions and group outcomes (e.g., performance quality, satisfaction).

To examine empirically the temporal patterning in group interacting with newer forms of ICT, I raise two research questions. Research question 1: How does the use of new forms of ICT (e.g., mobile technology, instant messaging) affect groups' temporal enactment, temporal construal and temporal spatiality? Research question 2: How temporal enactment, temporal construal and temporal are dynamically intertwined in groups interacting with ICT and affect group process and outcome?

An in-depth case study will be conducted to answer my research questions. The case study research method is found appropriate for at least two reasons. First, case research is particularly useful for those in which research and theory are at their early, formative stages (Benbasat et al., 1987). As my literature review indicates there was very little theorizing and empirical research on the relationship between the use of ICT and group temporal dynamics, a case study is necessary to address my research questions. Second, case research is a preferred research strategy to answer "how?" and "why?" questions (Yin, 1994). I am interested in "how"- type research questions, and a case study can offer rich insights into temporality in groups interacting with ICT.

The research site is the Information Technology Service (ITS) Department of a mid-sized private university located in the Mid-Western United States. The ITS department is implementing flexible work, in which its staff can choose to work at locations other than their designated offices (e.g., home, other on-campus working areas) some part or all of their regular work week and remain electronically in touch with their offices. The groups to be studied are composed of technology

specialists willing to participate in the flexible work program. The work of the groups is characterized by a combination of solitary concentration and active collaboration, and group members use a variety of technologies (e.g., email, mobile phone, instant messaging, Cisco IP communicator) in their communication and coordination of work.

Data will be collected from observations, interviews, "shadowing" group members, tracking logs and debriefing interviews, surveys, and performance evaluation in the coming 10 months. I will observe and shadow the group members in their working settings with a specific focus on the use of ICT and their temporal behavior. For the group members whose work is not feasible for me to observe and shadow, I will ask them to keep their own logs of their daily activities and will conduct debriefing interviews to better understand the temporal aspect of the use of ICT in their work. While the observations, shadowing and tracking logs will offer me data on temporal enactment and time-space paths (i.e., temporal spatiality), formal interviews with group members will help me tap into their temporal construal, and their perception of group processes. Perceived group process and outcome will be collected by administering surveys to group members. Finally, the department's performance evaluation data will be collected.

This thesis investigates important but unexplored research areas in groups interacting with ICT. It shifts the attention of academic researchers from a narrow view of time to a broader appreciation of richer aspects of time related to the new capabilities offered by recent developments in ICT. Theorizing about ICT artifacts, their role in group work, and group temporal dynamics will deepen the understanding of the complexity of time in groups interacting with ICT. The research findings can also provide guidelines for implementing effectively technologies in work groups, designing spatially or temporally distributed work arrangements, and supporting group work under new temporal and spatial circumstances, and therefore can be of practical significance for organizations adopting new ICT capabilities.

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