



# Leveraging Collaborative Technologies for Sharing Tacit Knowledge: An Integrative Model

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## INTRODUCTION

Collaborative technologies (such as e-mail, instant messaging, chat rooms, discussion forums, groupware, etc.) seem uniquely positioned to assist in sharing knowledge within any organization, and between an organization and its environment. These technologies have the potential to help large, global organizations where their staff neither know who within the organization may have expertise that can solve their problems, nor have the opportunity to gather around a “water cooler” to share ideas and knowledge. A number of studies have looked at ways to make knowledge within an organization explicit and to share that explicit knowledge. Nevertheless, a large subset of knowledge within any organization is still not explicit, or is tacit in peoples’ heads. Organizations are eager to tap that tacit knowledge capital in the interest of the organization’s objectives, but current collaborative technologies have not met that challenge. Our research question is how to assess the potential of collaborative technologies for sharing tacit knowledge within an organization and what can be done to make the collaborative technologies effective “virtual water coolers” for organizations.

## CURRENT THEORIES AND MODELS

The effective use of collaborative technologies for sharing tacit knowledge, by definition, involves the acceptance and use of those technologies by individuals in an organization, and the behavior of those individuals in sharing and seeking tacit knowledge to carry out their work. Therefore, the starting point for this integrative model is the Technology Acceptance Model (TAM) that posits that an individual’s acceptance and use of technology is determined by its perceived usefulness, perceived ease of use, subjective norms, and gender and experience (Venkatesh, et al 2003). We extend the TAM by adopting other theories and models to examine the use of collaborative technologies for sharing of tacit knowledge within a collaborative environment. One such theory, the Theory of Planned Behavior is based on the assumption that individuals are usually rational and they make systematic use of information available to them on the implications of their action before they decide whether or not to engage in a given behavior (Aizen 2003). The Innovation Diffusion Theory says that behavior of individuals in diffusion/adoption of new ideas depends upon the characteristics of the individuals and also on the social system established in the organization (Rogers 2003). The Social Cognitive Theory indicates that consequences, such as rewards or punishment, influence the likelihood that an individual will perform a particular behavior again in a given situation; humans learn by observing others; and individuals are most likely to model behavior of others they identify with (Bandura 1986). In addition, other studies have identified individual and organizational factors that enable or inhibit sharing of knowledge (Jarvenpaa and Staples 2000).

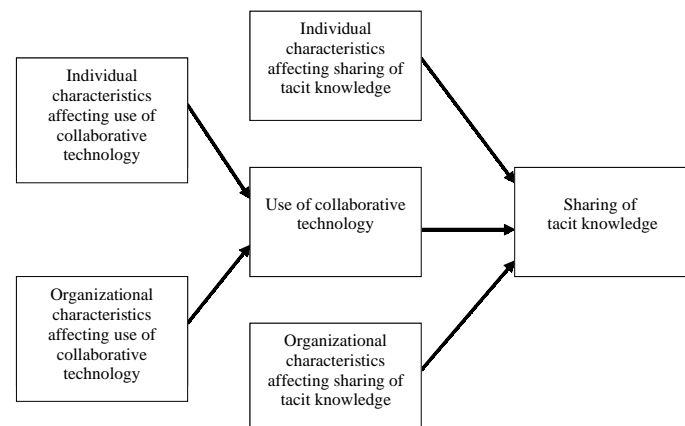
## PROPOSED INTEGRATIVE MODEL

Fig. 1 shows the schematic of the proposed integrative model, and the propositions of that model are given in the subsequent paragraph.

The model is defined further by the following propositions about specific characteristics in each box in the schematic affecting the outcome positively or negatively.

- Individual characteristics that will positively affect the use of collaborative technology are perceived usefulness, perceived ease of use, and subjective norm (that every one uses it).
- Individual characteristic that will negatively affect the use of collaborative technology is perceived behavioral control.
- Organizational characteristic that will positively affect the use of collaborative technology is availability of on-going support from MIS personnel.
- Organizational characteristic that will negatively affect the use of collaborative technology is actual behavioral control.
- The more collaborative technology is used, the more sharing of tacit knowledge will take place.
- Individual characteristics that will positively affect sharing of tacit knowledge are willingness to share knowledge, self-image that it will create, and perceived usefulness in work.
- Individual characteristic that will negatively affect sharing of tacit knowledge is perceived behavioral control.
- Organizational characteristics that will positively affect sharing of tacit knowledge are support and time for communicating new ideas, social system of norms, task interdependence, meaningful rewards, mechanism for reputation building, and mechanism for community building.

Figure 1. Schematic of the proposed integrative model



- Organization characteristic that will negatively affect sharing of tacit knowledge is actual behavioral control.
- Ownership of new ideas will positively affect its sharing if individual owns them, and negatively if the organization owns them.

## RESEARCH METHODOLOGY

We have so far conducted two sets of experiments, and plan at least one more, to gather descriptive statistics to help refine the model. After that, we plan to articulate appropriate hypotheses, and empirically test the model and hypotheses.

We have conducted two sets of experiments so far involving the use of discussion forums to share knowledge among groups of students at a large mid-Atlantic university. In the first experiment involving students in two courses during the Spring 2005 semester, a discussion forum was set-up for each course with intentionally no organizational settings or constraints, except that the students belonged to specific courses. In the second experiment involving students in two other courses in the Fall 2005 semester, each student had access to two discussion forums—one similar to that in the first experiment accessible to all students in a course, and a second only to members of the team that the student belonged to for working on a group project. The teams were determined randomly, each team consisting of 3-5 students. Beyond that, there were no other organizational settings of constraints, such as incentives or disincentives, in the use of those discussion forums.

Data was collected from the students at the end of each semester using survey instruments. If a student did use the discussion forum, the survey instrument asked what it was used for and what the reasons were for using it. If a student did not use it, the survey asked why it was not used and what will induce the individual to use it in the future. The reasons for using the discussion forum, or reasons that will induce them to use it, were formulated as statements reflecting the propositions of the model and the students were asked for a response on a 7-point Likert scale whether they agreed with each statement. The collected data was analyzed for descriptive statistics to see whether the propositions were supported.

The limitations of these experiments were that the target population was students in an academic setting. These students saw each other at least in classes, but did not seem to know every one in the courses. The survey instrument collected data self-reported by the students. At this stage of the research work, we did not try to corroborate the responses with objective data on use that can be collected from the discussion forum technology at the university. Finally, the survey did not segregate the data on what was shared by the students, between explicit knowledge and tacit knowledge, merely the fact that some knowledge was shared.

## FINDINGS AND CONCLUSIONS

A survey conducted at the end of the first experiment indicated that the students were neither averse to sharing knowledge nor averse to using the discussion forum, and still almost all the students did not use the discussion forum because they preferred other technologies, such as e-mail, instant messaging (IM) and telephone. The survey on perception of students indicated that most of the students perceived the discussion forum easy to use, useful in their work, and that they should not be forced to use it. The perceptions, however, also indicated that they were unlikely to use the discussion forum if offered again. This implied that students did not see any reason to come to the “virtual water cooler”, particularly with individuals they did not know. Without any organizational settings, this result was anticipated by the conceptual model.

The second experiment in the Fall 2005 semester provided more interesting results. Almost all the students in one course used the discussion forum to share knowledge but only within the project team and only dealing with their project, and they found the discussion forum to be useful in completing their project. In the second course, almost none of the students used the discussion forums, although none were

against sharing knowledge or using technology for it, because they found other technologies (e-mail, IM, telephone) more useful.

The reasons why the students from the first course did use the discussion forum and the reasons that may induce the students from the other course were, interestingly, the same for individual characteristics. The descriptive statistics show that the following propositions related to individual characteristics were supported:

- Individual characteristics positively affecting the use of collaborative technologies – perceived ease of use, perceived usefulness, subjective norm, perceived behavioral control;
- Individual characteristics positively affecting sharing of knowledge – willingness to share knowledge, perceived usefulness in work, perceived behavioral control;

The following propositions related to individual characteristics were not supported:

- Individual characteristics positively affecting sharing of knowledge – self-image;

Furthermore, the descriptive statistics for the second group of students, that did not use discussion forum, on what will induce them to use it show that the following propositions related to organizational characteristics were supported:

- Organizational characteristics positively affecting the use of collaborative technologies – actual behavioral control;
- Organizational characteristics positively affecting sharing of knowledge – social system of norms, task interdependence, meaningful rewards, actual behavioral control.

The following propositions related to organizational characteristics were not supported:

- Organizational characteristics positively affecting the use of collaborative technologies – support for its use;
- Organizational characteristics positively affecting sharing of knowledge – support and time for communicating new ideas, mechanisms for building reputation and communities, ownership of knowledge.

Our expectation, as indicated in the propositions, was that behavior control, perceived or actual, will negatively affect the outcome. But descriptive statistics from the experiments indicate a positive effect on the outcome. That may be appropriate for students in a university. It is also quite possible that characteristics, individual or organizational, represented by the propositions not supported by descriptive statistics from the two sets of experiments are not relevant for students in a university environment. Those propositions may be important to non-student populations.

## STATUS OF RESEARCH

We plan to conduct a third set of experiments, similar the second set, during the Spring 2006 semester with some changes. Students will be provided help at the beginning of the semester in becoming familiar with the discussion forums, so that they can make educated choices between the technologies available to them, e.g. discussion forum, e-mail, IM and telephone. The survey instrument will seek details on what type of knowledge was shared, explicit and/or tacit. We will also corroborate the data collected from the students through the survey with the objective data on usage available from the discussion forum technology. Results from this third experiment will be used to refine the model and propositions, develop appropriate hypotheses, and then conduct rigorous experiments to test the model and hypotheses.

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