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Virtual Teams: Towards Improving Work Effectiveness through Collaboration Process Structure Training

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ABSTRACT

Organizations are increasingly using virtual teams to execute business processes by leveraging a distributed workforce and advanced communication and collaboration technologies. Given the growing use of virtual teams in work-place settings, there is a need to impart students with collaboration skills in virtual environments to enable them to perform efficiently in a globalized economy. Due to the complex nature of collaboration in distributed and virtual environments, past research indicates that formalized structured processes are key to successful collaboration and group performance. In this paper, we propose a training program to teach students how to collaborate in virtual settings by focusing on the process aspect. The structuring of the collaboration processes is suggested through the application of successful collaboration patterns deemed thinkLets. These structured templates may be instantiated using common collaboration tools to generate desired collaboration patterns and group processes.

Keywords

Virtual teams, collaboration engineering, process structure, Bloom's taxonomy, training program

INTRODUCTION

Advances in information communication and collaboration technologies, an increasingly distributed workforce, and the emergence of a globalized economy have led organizations to increasingly utilize virtual teams to execute knowledge intensive and collaborative business processes. Given the growing use of virtual teams, the ability to work in a virtual team and collaborate in virtual and distributed settings is an important and necessary skill set for today's knowledge workers' to be effective at their jobs. Specifically, knowledge workers need to employ formally structured processes to ensure efficient and effective performance of virtual teams (Lurey and Raisinghani, 2001). However, difficulties with formalizing a structured process in distributed and virtual environments is greatly exacerbated due to the variety and complexity of communication and collaboration tools available, and the varying nature of group tasks that are executed by virtual teams.

Given the complexity of group processes, virtual environments, and the variety of communication and collaboration technologies available, there is a need for a training program that can help knowledge workers develop and employ structured collaboration processes that can result in improved overall group performance. However there is limited literature that explores training programs that can help knowledge workers to better perform in virtual teams and effectively use them to achieve business goals.

In this paper, we develop a training program that enables knowledge workers to enhance virtual team performance and also their individual performance in virtual teams. Our proposed training program is designed to teach students to develop and employ formally structured team processes through the use of collaboration patterns. The structuring of collaboration processes is suggested through the application of successful collaboration process patterns deemed thinkLets. ThinkLets are packaged, repeatable, and transferable facilitation techniques that can be deployed to create predictable patterns of collaboration among a group of people with a shared goal, during a collaborative process (de Vreede, Briggs and Kolfschoten, 2006). The rest of this paper is structures as follows. In Sections 2 and 3, we review related work in the areas of

[1] Amit Deokar and Surendra Sarnikar contributed significantly to this paper. They are not listed as authors because they served on the conference committee for the MWAIS 2009 conference.

virtual teams, and collaboration engineering. We present our collaboration process training program in Section 4, and present concluding remarks in Section 5.

VIRTUAL TEAMS

Virtual teams have been characterized by researchers in the past few years to enable a deeper understanding of their behavior (Dube and Pare, 2004; Pinsonneault and Caya, 2005). Among different types of virtual teams that have been identified based on their key characteristics (Dube and Pare, 2004), swift-starting virtual teams have received considerable attention by researchers (Iacono and Weisband, 1997; Jarvenpaa and Leidner, 1999; Munkvold and Zigurs, 2007; Piccoli, Powell and Ives, 2004). These teams are pulled together in an ad hoc manner to collaborate on specific short-term projects. The team members have little or no prior rapport with their teammates and are required to rapidly utilize disparate resources to complete the project goals (McKinney Jr., Barker, Smith and Davis, 2004). This paper focuses on such swift-starting teams.

A number of empirical studies have been conducted that relate to virtual teams. A review of such studies can be found in the works by Pauleen (2003), Martins, Gibson, and Maynard (2004), Pinsonneault and Caya (2005), Powell, Piccoli, and Ives (2004). Theoretical models pertaining to varied aspects of virtual teams have been summarized by Schiller and Mandviwalla (2007). It is evident that different factors can potentially influence virtual team outcomes. Munkvold and Zigurs (2007) note that some factors likely to affect positive outcomes of swift-starting virtual teams include ease of use of technology, trust among team members, well-defined task structure, variation in experience levels (with respect to effectiveness), acknowledgement and management of difficulties of virtual teamwork. Contrary to this, some factors with potential to affect negative outcomes of swift-starting virtual teams include time differences, mismatch in expectations, cultural differences, variation in experience levels (with respect to efficiency) and lack of norms for communication. Along similar lines, Pinsonneault (2005) proposes an input-process-output framework that integrates key variables affecting virtual teamwork. Based on this framework, input variable categories include personal factors, situational factors, task characteristics, group structure, and technology support, while the output variable categories include task-related outcomes (performance measures), group-related outcomes (attitudes and perceptions of participants toward group processes), and technology-related outcomes (attitudes and perceptions toward adopted ICTs). Intervening between the two are the group process variables, which are categorized into group dynamics (e.g., trust, leadership), interpersonal behaviors (e.g., relational links, socio-emotional information), interpersonal conflicts and conflict management, communication and information exchange (e.g., type of information exchange, process participation), and coordination and control (e.g., interaction patterns).

Collaborative activities encompassing communication, coordination, and collaboration are more difficult to carry out in virtual teams than co-located teams. Process structuring mechanisms can reduce these difficulties (Massey, Montoya-Weiss and Hung, 2003; McGrath, 1991; Montoya-Weiss, Massey and Song, 2001; Ocker, Hiltz, Turoff and Fjermestad, 1996; Yoo and Alavi, 2001), although process structuring mechanisms have their own negative effects, primarily decreasing trust in virtual teams (Piccoli and Ives, 2003). A survey study conducted by Lurey and Raisinghani (2001) emphasizes the importance of striking a balance between structuring collaborative processes and maintaining relational links among team members to improve virtual team effectiveness. In sum, introducing process structuring mechanisms along with effective relational links and trust building mechanisms can be posited to have positive effects on virtual team outcomes, through increased collaboration effectiveness. In order to foster collaborative effectiveness through process structuring, training virtual team members with relevant skills is a viable alternative. Previous studies began the process of evaluating virtual team effectiveness through the use of co-located group effectiveness models such as Hackman's model of group effectiveness. (Furst, Blackburn and Rosens, 1999). Within this model there are several variables which were thought capable of predicting group effectiveness, such as organizational context. Organizational context looks at the support provided to groups from their organization. One example of this type of support is the inclusion of training and development programs which provide task and group process skills. (Furst et al., 1999).

COLLABORATION ENGINEERING FOR PROCESS STRUCTURING

Collaboration engineering (CE) is focused on providing structured support for group processes through collaborative tools and technologies (de Vreede and Briggs, 2005). Collaboration engineering research originally began in response to the need to design repeatable and predictable collaboration processes (Briggs, de Vreede and Nunamaker Jr., 2003). Also, given that professional facilitators are often a scarce organizational resource, this research stream devised ways to encapsulate successful facilitation scripts in the form of collaboration process knowledge nuggets called thinkLets (Briggs, de Vreede, Nunamaker Jr. and Tobey, 2001).

Thinklets have been primarily used to design collaboration processes by collaboration engineers, not practitioners or participants. While this approach has the advantage of reducing process design load on the participants, it is also rigid in the sense that the practitioner is not equipped with knowledge to make any requisite changes to the process design in response to any situational changes. Swift-starting virtual teams are dynamic and are characterized by an emergence of novel collaborative tasks in completing the project goals (Munkvold and Zigurs, 2007). In such settings, reliance on collaboration engineers for designing a process, and transferring it to the practitioners, is no longer feasible. Enabling virtual team members with process structuring skills is crucial to the virtual team effectiveness and resultant outcomes.

Kolfschoten and de Vreede (2007) proposed an approach for designing collaboration engineering processes. This approach will be referenced as the Collaboration Engineering (CE) design approach. It consists of the following main stages: task diagnosis, activity decomposition, task thinkLet choice, agenda building, and design validation. The next section leverages this design approach in the devised training program.

VIRTUAL TEAM COLLABORATION TRAINING PROGRAM

In this section, the Virtual Team Collaboration (VTC) training program developed is discussed. This training program has been designed with the main goal of fostering the development of collaboration process structuring skills in participants with no previous formal training. The secondary, yet essential, goal of the training program is to provide participants with key concepts and ideas for enhancing relational links along with other team members. Toward this end, there are two key components in the training program. The first component focuses on the development of relational links among virtual team members, while the second component focuses on providing structure to collaborative work processes. The training program consists of a series of sequential training modules and has been designed for e-learning settings. This allows virtual team members, who are geographically dispersed, to easily participate in the training. It is recommended that the training program be modularize into smaller segments spanning an extended, but brief, period.

Table 1: Virtual Team Collaboration (VTC) Training Program Framework

	Virtual Team Collaboration (VTC)	Goal	Team Performance Model (TPM)	Goal	Collaboration Engineering(CE) Process Design Approach	Goal
Relational Links	Orientation	Build relational links: group introduction, formation.	Orientation	To understand why you are here.	-	-
	Trust building	Build relational links, develop communication.	Trust building	To understand who you are working with.	-	-
Process Design	Task diagnosis	Develop goals, deliverables and objectives.	Goal clarification	To understand what the team is doing.	Task diagnosis	Develop goals, deliverables and objectives.
	Task decomposition	Identify sub-activities with corresponding patterns of collaboration.	Goal clarification	To understand what the team is doing.	Task decomposition	Identify sub-activities with corresponding patterns of collaboration.
	Task thinkLet choice	Identify unit activities with appropriate thinkLets.	Commitment	To determine how the team will complete the task.	Task thinkLet choice	Identify unit activities with appropriate thinkLets.
	Agenda building	Organize activities	Implementation	To determine who does what, when	Agenda building	Organize activities
	Design validation	Validate the process design	-	-	Design validation	Validation of process design

Table 2: Virtual Team Collaboration (VTC) Training Program Structure

Training Steps	Agenda
Phase 2: Structuring collaboration processes	
Task Diagnosis	Task Diagnosis Module 1 (Bloom's level of learning: *knowledge*) • Receive 1 page outline of task diagnosis process, watch brief lecture video explaining process steps including: task, stakeholder, resource and practitioner analysis. • Complete activity to pick out the process steps from a list and arrange them in order. Task Diagnosis Module 2 (Bloom's level of learning: *comprehension*) • Evaluate the results of a GSS session and determine when, how and where each of the steps in the task diagnosis process were completed. Task Diagnosis Module 3 (Bloom's level of learning: *application*) • Receive an incomplete GSS session and work within a group to apply the task diagnosis process to develop a list of deliverables. • Receive the completed list of deliverables from a GSS session and discuss differences between the list they completed and the list provided to them. Task Diagnosis Module 4 (Bloom's level of learning: *analysis*) • Create a concept map, based on the task diagnosis process, for the completed list of deliverables and for the list they completed. Task Diagnosis Module 5 (Bloom's level of learning: *synthesis*) • Compare concept maps, discuss discrepancies and support their completed map. Task Diagnosis Module 6 (Bloom's level of learning: *evaluation*) • Combine both concept maps into one map.
Activity Decomposition	Activity Decomposition Module 1 (Bloom's level of learning: *knowledge*) • Receive 1 page outline of activity/process decomposition, including the patterns of collaboration and watch a brief lecture video explaining process patterns including: generate, reduce, clarify, organize, evaluate and build consensus. • Complete matching activity which will ask them to match the patterns of collaboration with their definition. Activity Decomposition Module 2 (Bloom's level of learning: *comprehension*) • Evaluate a GSS session and determine when, how and where each of the patterns of collaboration were applied. Activity Decomposition Module 3 (Bloom's level of learning: *application*) • Participate in a group activity requiring them to apply the patterns of collaboration to a list of predetermined tasks in a controlled environment. Activity Decomposition Module 4 (Bloom's level of learning: *analysis and synthesis*) • Create a concept map to match the patterns of collaboration with each task deliverable. • Justify concept map diagram. Activity Decomposition Module 4 (Bloom's level of learning*: evaluation*) • Evaluate the patterns of collaboration effectiveness toward activity decomposition.

The training program leverages Bloom's Taxonomy of Learning (Bloom, Engelhart, Furst, Hill and Krathwohl, 1956), which is a cognitive taxonomy for categorizing educational units based on their learning objectives. Bloom's taxonomy is a hierarchical approach to representing knowledge in a subject or cognitive domain. In this hierarchy there are six levels of learning; knowledge, application, analysis, synthesis and evaluation. (Howard, Carver and Lane, 1996). Each level within the hierarchy builds on the successful implementation of the previous level. Knowledge represents the lowest level of learning. A individual may exhibit this level of learning when they memorize terminology for a test. Evaluation represents the highest level of learning. Upon reaching this level of learning, students have the ability to determine a better solution within a problem domain among many solutions. (Howard et al., 1996). Bloom’s taxonomy has been used to design educational modules in a wide range of fields and training programs (e.g., Schatzberg (2002), Howard, Carver, and Lane(1996)).

In the first phase of the training program, development of relational links is fostered. The Team Performance Model (TPM), proposed by Drexler, Sibbet, and Forrester (1988) is used as the foundational theory for the design of training activities in this phase. This model summarizes the basic working dynamics of teams. There are seven stages in the TPM model. These stages are orientation, trust building, goal clarification, commitment, implementation, high performance and renewal. The first two stages - orientation and trust building - focus solely on the development of relational links. The later stages of the TPM model overlap with the various stages in the collaboration engineering process design approach, discussed earlier. This is reflected in the design of the training program modules. The second phase of the VTC training program focuses on the process structuring using the collaboration engineering process design approach (Kolfschoten and de Vreede, 2007). These modules are also in conjunction with the remaining five stages in the TPM. Table 1 provides a tabular representation of the combination of the TPM model and collaboration engineering process design approach in designing the VTC training program. Table 2 provides detailed information on three sections of phase 2, structuring process design, in the training program. The entire training program was not included due to space limitations.

CONCLUDING REMARKS

In this paper, we have presented the design of a training program for swift-starting virtual teams that can provide participants with knowledge about developing relational links in teams as well as process structuring. A pilot study to test the training program is currently underway. Based on the results of the pilot study, the training program will be revised before an extensive experimental study.

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