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Toward a Model of Student Teamwork

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Abstract

Teams are widely used in IS student projects. Training in teamwork principles and business process reengineering principles are proposed to facilitate the internal processes of student teams and produce improved outputs.

Introduction

As the information systems (IS) field increasingly relies on teams (Abdel-Hamid & Madnick, 1991, Ford & McLaughlin, 1992, Phan, et al., 1995), the need to effectively develop teamwork skills in IS students also becomes increasingly important (Van Slyke, et al., 1997a). This paper proposes a research study that will investigate two factors hypothesized to influence student team performance: teamwork training and business process reengineering (BPR) training. Teamwork training has been shown to significantly improve perceptions of student team performance (Van Slyke, et. al, 1997b). However, we believe that teams that have only received teamwork training will have highly convergent mental models of the organizational processes. We hypothesize that BPR training will allow student teams to generate more divergent mental models, resulting in conflict within the team. Those teams that positively resolve this conflict will produce higher quality process models of the organization. These student team members will eventually become IS employees able to work well within a team environment and develop systems that more completely address the organization's needs and opportunities.

Teamwork and IS Students

Use of Teams in Student Learning

IS undergraduate students often are confronted with class projects that require them to work in teams (Nance, 1998). Participation in team projects is driven by at least two issues. First, the team is a commonly used organizational form of delivering the information system (Trimmer et al., 1997). Teams within organizations provide for better communication, faster conflict resolution and collaborative problem solving.

Second, the ability to work in teams, teamwork skills, is valued by businesses (Case, 1997). Team-based projects equip students with valued skills in communication, conflict resolution, and problem solving, while they learn to develop systems that meet an organization's needs and opportunities. Unfortunately, teamwork training may not entirely address students' needs.

Process Training and IS Students

In addition to team based skills, an understanding of business processes has become a desirable trait for IS graduates to possess. The most recent study of key IS issues lists business process redesign as one of the top issues in IS management (Brancheau, et al. 1996). A survey of employers recruiting IS students reported that the respondents gave fairly high ratings to an understanding of business functional areas (Van Slyke, et al., 1997a).

IS students often learn to identify and decompose processes in Systems Analysis and Design (SAD) courses (Hoffer, George & Valacich, 1996). Earl (1994, p. 13) describes a process as "a lateral or horizontal organizational form, that encapsulates the interdependence of tasks, roles, people, departments, and functions required to provide a customer with a product or service". To effectively model a process, the student team needs to consider and understand these interdependencies.

Complicating the process of teams learning how to model processes through data flow diagrams is that teams have been identified as having four general stages of development: forming, storming, norming and performing (Tuckman, 1965). Because we, as educators, are ultimately focused on the team's performance, we should be facilitating them through the difficult stages of storming, which "is characterized by conflict and polarization around interpersonal issues" and norming, where "ingroup feeling and cohesiveness develop" (Tuckman, p. 396).

BPR training is hypothesized to help student teams during these two stages. BPR training is hypothesized by the authors to allow individual students to generate more highly divergent mental models of organizational processes than students that have

not received BPR training (see Figure 1). This is because the students with BPR training will attempt to improve the existing processes, leading to varied solutions. These divergent mental models in individual students will lead to more conflict in the storming stage. Those student teams that experience positive conflict resolution during the storming stage as they move toward consensus will be more cohesive in the norming stage. Negative conflict resolution will lead to less cohesion in the norming stage.
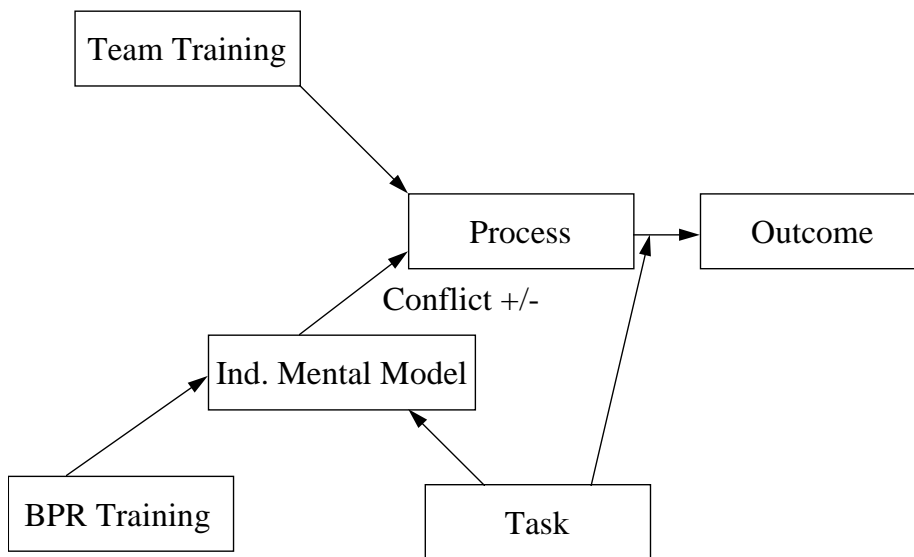
Thus, a framework is needed that puts into perspective the improvement of organizational processes and interdependencies. This framework should provide students with a strategy for more fully exploring the possibilities of reengineering the existing organizational processes. Such a framework is presented by Kettinger and his associates in their stage activities for business process reengineering (Kettinger, et al., 1997). The first stage is envision, followed by stages for initiate, diagnose, redesign, reconstruct and evaluate. We will be concerned with the three middle stages: diagnose, redesign and reconstruct. The first two stages deal with project identification and initiation which are typically already completed for students, allowing them to focus on a single project. The final stage, evaluate, occurs after the completion of a project, and again is typically outside the scope of a student project.

Figure 1. Model of Student Teamwork

Kettinger and his associates state that the diagnosis stage consists of two tasks, documentation and analysis of the existing process. They present a number of techniques, such as process mapping and fishbone analysis, employed within organizations to diagnose problems within the processes. These techniques allow organizations to determine the root causes for existing problems, which then can be addressed. Unfortunately, most students are neither trained in these techniques, nor do they have access to the organizational information necessary to perform them.

The redesign stage involves developing new processes that address strategic objectives and utilize existing resources. New processes can be developed by brainstorming and other creativity techniques, and then modeled using data flow diagrams or other process models. While students are typically trained in the use of process models, they again are not normally trained in changing an organization's processes.

The final stage we are considering, reconstruct, involves the implementation of the revised processes. Force-field analysis can be used by the students to identify forces that may resist changes in the processes. Careful implementation and training plans are needed during this crucial stage.

Exposing students to BPR training and requiring them to use an organized framework to analyze a business situation assists in the formation of mental models. The training in BPR helps students form or refine mental models of business processes and their analysis. When the students then employ the analysis framework these newly formed mental models are refined further. The concept of mental models may help explain the value in the proposed process. Mental models may be thought of as internal representations of systems in a given knowledge domain. Learning can be thought of as a process of building knowledge and refining mental models. Knowledge can be built by using what is known to find sense in new experiences. Existing mental models are used as the foundation into which new information is integrated, thus forming new, more complex, expanded mental models (Tobin & Tippins, 1993).

Mental models of organizational processes can be will be documented using process models such as data flow diagrams. This research will examine the conflict resolution process that teams undergo as they attempt to reach a team mental model of organizational processes.

Research Design

This research is a quasi-experimental design (Cook & Campbell, 1979). Undergraduate student teams in a systems analysis and design course taught over the Summer 1998 semester will be compared to student teams in the same course taught over the Fall 1998 semester. Both courses will be taught by the same instructors. The students in both semesters will receive teamwork training and traditional lectures on process modeling using data flow diagrams. The students will then be given an individual

homework assignment to produce a data flow diagram for an organization. This data flow diagram will be used as a measure of the students' individual mental models. At the next class meeting, the student teams will attempt to consolidate the individual data flow diagram. This first homework assignment will be used to determine each team's initial ability at producing data flow diagrams. An instrument designed to measure the conflict within teams and how that conflict was resolved will be given to the students.

The Fall semester group will then receive the treatment: BPR training. Another homework assignment will be given in both semesters. Students will work on data flow diagrams individually and then in teams with the Fall semester students attempting to apply the Kettinger (1997) framework. The same conflict instrument will be given to the students.

The solutions produced by the teams will be evaluated and the results from the instrument measuring conflict will be examined. Differences between the control and treatment groups will be determined and conclusions drawn.

Conclusions

In this paper we have discussed the need for training students in teamwork and BPR. Techniques in BPR will allow the students to focus on the difficult tasks of collaborative problem solving and conflict resolution. The techniques will enable them to be better prepared for a career in the IS field.

References

References available from the first author upon request (cgjestlan@bsn01.bsn.usf.edu).