TOWARDS LEARNING BUSINESS PROCESS MANAGEMENT THINKING

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Abstract

Business process management is indisputable an approach many organizations are aiming to adopt. While much emphasis is put on modeling business processes and designing information systems, the employees working in a process-oriented organization often struggle with these changes. Here, it is of major importance for organizations to take their employees with this change of mind towards process-orientation to be successful. However, the question how an organization can support its employees in learning process-oriented thinking, remains open so far in the literature. Thus, this research-in-progress paper presents first results in trying to explore how employees can be supported. A rather new empirical method in this research field, namely a questionnaire experiment, is used. Based on a sample of 114 participants, we find empirical support for our hypotheses that learning in general matters with regard to process-oriented thinking. Organizations are better off when their employees learn process-oriented thinking by doing in comparison to provide documentations in order to actively promote learning.

Keywords: business process management, process-oriented thinking, learning modes, explicit knowledge, implicit knowledge

1 INTRODUCTION

Understanding how process-oriented thinking can be learned is of major importance for research on business process management (Brazanga & Korac-Kakabadse 2000; Pathirage et al. 2007). Process-oriented organizations are expected to be faster in delivering outputs, more adaptable to changes in the market, more responsive to the needs of customers and superior in terms of quality (Hammer & Champy 1993; Braganza & Bytheway 1997). Consequently, turning a company into a process-oriented organization contributes to its success and therefore represents a competitive advantage.

However, although the advantages of a process-oriented organization as compared to a function-oriented one are acknowledged in science and practice alike, switching from a function- to a process-oriented structure comes along with severe challenges. For process-oriented organizations, though explicit knowledge might be present (Hawryszkiewycz 2010), tacit knowledge (Lam 2000) is of major importance and has to be acquired by the employees (Riege & Zulpo 2007). Tacit knowledge refers to implicit, individual-specific know-how and behavior (Leroy & Ramanantsoa 1997). In contrast to explicit knowledge, which is codified and can be easily transferred (Nonaka 1991), tacit knowledge relates to the individual and thus cannot be expressed and transferred that easily (Nonaka 1994). Accordingly, the acquisition of process-oriented tacit knowledge requires a fundamental change of mind of the employees which is not easy to accomplish (Hammer & Champy 1993; Kilmann 1995).

Interestingly, despite the central importance of this research topic, previous research has to the best of our knowledge not looked at the learning modes that could be promoted by organizations in order to enable such a fundamental change of mind. In the literature, different learning modes have been discussed (Lam 2000) which aim at enabling people to learn tacit knowledge: (1) Personal exchange (Nonaka 1994; Snowden 1998), (2) Learning by doing (Levitt & March 1988; Earl & Scott 1999) and (3) Usage of explicit knowledge (e.g. documented knowledge) (Nonaka 1991). Although in the literature, statements on the effectiveness of several learning modes can be found (e.g., personal exchange is assumed to be the most effective learning mode (Lee 2000), whereas the effectiveness of using explicit knowledge is considered to be marginal (Hawryszkiewycz 2010)), up until now there are no empirical studies comparing the effectiveness of different learning modes in a process management context. It seems to be reasonable to assume that personal exchange of employees takes place in every organization, at least to a certain degree. However, the question whether an organization should focus on supporting the acquisition of process-oriented knowledge by means of documented knowledge or learning by doing remains open. This is a troubling oversight because anecdotal evidence points to the fact that numerous organizations will undergo a transformation from function-orientation to process-orientation. Therefore, this study seeks to address this research gap by analyzing the effectiveness of the different learning modes in a process management context.

The paper is organized as follows: In chapter 2 the hypotheses are developed based on the relevant literature. The research method used is described in chapter 3. Chapter 4 presents the results of the experiment conducted. The paper concludes with a discussion of the findings and a summary of the study's contributions to research and practice.

2 HYPOTHESES

In the literature, there is a broad consensus that it makes a difference whether a job is performed by someone who has a function- or a process-oriented thinking (Nonaka 1991; Hammer & Champy 1993; Ambrosini & Bowman 2001). As a consequence, the transformation of a company towards a process orientation is not possible without ensuring a change of mind, which in turn requires active support for learning of the employees (Edwards et al. 2000). However, tacit knowledge (such as knowledge about how to think in a process-oriented way) guides our daily work although we are not aware of having this knowledge (Davenport & Prusak 1998; Stenmark 2001). As such, it can be assumed that learning

by doing might be a very effective learning mode for learning how to think in a process-oriented way. In contrast to that, the usage of documented knowledge seems to be less effective for promoting learning in this context. The reason for this is that a description of tacit knowledge will never be complete but instead contains the necessary know-how only to a certain degree (Ungan 2006). Against this background, the following hypothesis is formulated:

H1: With regard to the success of learning process-oriented thinking, learning by doing is more effective than using process documentations.

In order to better understand the success of learning process-oriented thinking, one should have a look at the major differences between function- and process-oriented organizations:

First, contrary to a function-oriented organization where similar tasks are bundled in departments, in a process-oriented organization, efficient value generating business processes are established within single departments (Kugeler & Vieting 2003). A business process is a set of connected activities which are necessary to deliver a defined business outcome (Davenport & Short 1990). Within a business process, inputs are transformed into outputs (i.e., goods or services) by the resources of an organization (i.e., for example, by employees) (Wernerfelt 1984). In such a process, the customers' demands determine the desired business outcome which in turn represents the starting point for the design of the business process. However, determining the sequence of activities within a business process is quite challenging and inevitably influences the success.

H1.1: Learning mode makes a difference in terms of success of assigning activities

Second, another disadvantage of a function-oriented view is that employees being involved in the production process often fulfill a customer demand without being responsible for the overall result. This is due to the fact that functions regularly strive for defined goals thereby ignoring the aligned goal of satisfying the customer. The ignorance of the aligned goal might even result in contradicting goals (Hammer & Champy 1993; Brazanga & Korac-Kakabadse 2000). In a process-oriented point of view, specific goals of activities are aligned with a superior process goal and employees are aware of this superior goal as well as of the overall context of their specific task (Kilmann 1995). Here, it seems to be reasonable to assume that the latter way of assigning goals is much more effective.

H1.2: Learning mode makes a difference in terms of success of assigning goals

Last, within a function-oriented organization a lot of departments are (often repeatedly) involved for the delivering of an order which in turn results in many interfaces. This is inefficient as additional effort is necessary (e.g., for the exchange of information), and waiting times do occur. Contrary, in a process-oriented organization, the bundling of similar tasks in functions is less important. Instead, in a process-oriented organization, efficient value generating business processes are established within single departments, so that less employees work on one customer order (Kugeler & Vieting 2003). In this context, Hammer and Champy (1993) point out, that in good business processes "many formerly distinct jobs and tasks are integrated and compressed into one." This statement points to the assumption that the assignment of roles to activities is also critical with regard to success.

H1.3: Learning mode makes a difference in terms of success of assigning roles

3 DATA AND METHOD

3.1 Experimental Design and Method

In order to address the research question, we conducted a questionnaire experiment. All subjects had to perform a task which required process-oriented thinking (namely, designing a process of handling exams in universities). In particular, subjects were required to serialize several predetermined activities, to assign roles to these activities, and to determine process goals. We chose a between-

subjects design. The treatment consisted of activating different learning modes prior to asking subjects to perform the latter task: In the first group (learning mode: “documentation”) documented knowledge related to the task was presented to the participants of our study, whereas in the second group (learning mode: “learning by doing”), subjects were required to perform a process-oriented task and got feedback insofar as the sample solution was provided. The third group of subjects (learning mode: “acting from scratch”) was not given any information at all. Participants were randomly assigned to one of the three experimental conditions.

We tested our hypotheses by performing a one-way Analysis of Variance (ANOVA) with the learning mode as independent variable. Its influence was tested for the overall performance as well as for the respective performance with regard to activities, roles and goals. To test for statistically significant differences between the learning modes, t-tests were applied.

3.2 Material and Measures

Independent Measure: As independent measure, we included a nominal variable consisting of three learning modes (acting from scratch, learning by doing, and documentation).

In particular, *acting from scratch* was implemented by instructing the subjects to perform the final task without providing them any upfront information.

Learning by doing was implemented by asking the subjects to perform a task that was similar to the problem which they had to solve later on. The two tasks only differed with regard to the context of the business process: The processing of loans was chosen as example as this context was expected to be familiar to all participants due to their academic background. As in the final task, participants were asked to serialize predetermined activities, to assign roles to these activities, and to determine process goals. Each of these sub-tasks was followed by feedback by means of a best practice solution.

Documentation was implemented by providing subjects with written information on the main ideas of function- and process-oriented thinking as well as with the final process model of the loan process. As in the learning by doing condition, the final model of the loan process included a best practice solution for the sequence of activities, the roles assigned to the activities, and for the process goals.

Dependent Measures: The process which the participants had to design in the course of the task in our questionnaire experiment was the process of handling exams in universities. This process was chosen in order to ensure that the participants were (at least to a certain extent) familiar with the process. The first dependent measure, *overall performance of process-oriented thinking*, relates to the overall success of subjects in performing the task. It is calculated as the mean of the three other inferior dependent variables: performance with regard to activities, roles and goals.

In the course of performing the task, first, participants were required to serialize twelve predetermined activities in a reasonable way. The resulting *performance with regard to activities*, being our second dependent variable, was measured by comparing the results obtained to a best practice process. At this, deviations have been calculated using a conformance testing technique from the field of process mining. This technique allows for measuring the fitness whether the observed process (in this case the ordered activities from each participant) complies with the control flow specified by the process (the best practice process model) (Rozinat & van der Aalst 2005). This procedure results in performance scores ranging from 0 to 1.

In a second step, participants were instructed to assign five predetermined roles to the twelve activities. In order to evaluate the performance of the latter sub-task, *performance with regard to roles* (our third dependent variable), the following criteria have been considered: (1) the number of reasonably assigned roles to activities compared to a predefined best practice, (2) the total number of roles used, and (3) the number of interfaces between roles. For the first criterion, the number of reasonably assigned roles was determined and then divided by twelve (as twelve roles had to be assigned to the respective activities in total). The second criterion was computed as the percentage of

the roles used compared to the maximum number available (i.e., compared to a maximum of five roles). The same procedure was applied for the last criterion; here, the number of interfaces between the roles was divided by eleven, which is the maximum number of interfaces that can result from a process with twelve activities. Performance with regard to roles has been determined by calculating the mean of the three criteria and therefore is defined between 0 and 1.

In a third step, participants were asked to determine process goals so that our fourth dependent variable relates to *performance with regard to goals*. The goals of the process were not given and thus had to be determined first and then could be assigned independently to each activity allowing for multi-activity goals and overall process goals. In order to determine the performance score, similar criteria as for the determination of the latter dependent variable have been applied. In particular, the percentage of activities that had been linked to goals has been determined; in addition, it has been checked how many of the assigned goals were reasonable and finally if the goals assigned were contradictory with regard to the generic process goals "time, costs, and quality" (Lee & Dale 1998). The three criteria were combined into the measure performance with regard to goals by calculating the mean, which again results in a metric measure ranging from 0 to 1.

3.3 Participants and Procedure

Overall, 114 undergraduate management students participated in our study. The sample consists of 72.8% men (83) and 25.4% women (29) and 1.8% subjects (2) not answering the question. Age ranges from 19 to 26 years and a mean age of 21.31 years (SD = 1.58; N = 110). 80.7% (92) of the subjects have already gained professional experience, whereas 17.5% (20) have no professional experience at all and 1.8% (2) did not answer the question related to the professional experience gained. Professional experience ranges from 0 to 72 months (M = 17.11 months; SD = 15.848; N = 112).

Questionnaires were distributed to students in lectures of a German business school. We asked the participants to fill out the questionnaire anonymously without consulting others. They were instructed to thoroughly consider the given information, to vividly imagine the situation, and to perform the task. Finally, they provided their demographic details. All the subjects participated voluntarily without being paid.

4 RESULTS

4.1 Manipulation Checks

To determine whether the process-related description presented to participants in documentation condition was effective, we asked subjects whether in a process-oriented organization structure an efficient value chain takes center stage or the similarity of tasks. Responses indicated that our manipulation was effective: In total, we had 128 participants in our study of whom 40 filled out a questionnaire with the documentation manipulation. 38 out of these 40 participants (i.e., 95%) correctly answered the question mentioned above. However, in order to ensure that the number of participants was equally distributed among the three conditions reflected in the questionnaires, we had to scale down the sample. At this, we first eliminated another 10 questionnaires randomly chosen to be excluded from the sample, which in turn resulted in our final sample of 114 participants.

4.2 Experimental Results

Table 1 contains the mean values and standard deviations of the performance scores as determined over the samples of the different learning modes. As can be seen, overall performances of process-oriented thinking as well as the concrete performance measures are lowest in the acting from scratch condition. Besides, the table shows that the overall performance of process-oriented thinking is highest

in the learning by doing condition (M = 0.71, SD = 0.10) as compared to the acting from scratch (M = 0.59, SD = 0.13) and documentation (M = 0.65, SD = 0.12) conditions. This observation is also valid for all but one of the concrete performance measures: Only with regard to performance related to roles, documentation (M = 0.60, SD = 0.11) is slightly better than learning by doing (M = 0.59, SD = 0.11). Thus, on a descriptive level, the hypothesized pattern predominantly emerged.

	Learning mode					
	Acting from scratch		Documentation		Learning by doing	
Performance	Mean	SD	Mean	SD	Mean	SD
Overall performance	0.59	0.13	0.65	0.12	0.71	0.10
Performance with regard to activities	0.81	0.09	0.81	0.07	0.85	0.06
Performance with regard to roles	0.55	0.14	0.60	0.11	0.59	0.11
Performance with regard to goals	0.40	0.33	0.55	0.34	0.69	0.29

Table 1. Means, and Standard Deviations for Performance in the Three Learning Mode Conditions

H1, stating that learning by doing is superior to using documentations with regard to the overall success of learning process-oriented thinking, can be confirmed (T(74) = -2,20, p < .04). Similarly, H1.1 can be confirmed (T(74) = -2,45, p < .02) indicating that the learning mode makes a difference with regard to the success of serializing predetermined activities. In a similar vein, we can observe a significant difference between the learning modes with regard to the success of assigning goals (T(72,02) = -2,04, p < .05), which supports H1.2. However, learning by doing is not superior with regard to the assignment of roles. Here, subjects in the documentation condition performed marginally better than the ones in the learning by doing condition. As the difference is not statistically significant (T(74) = 0,51, p < .62), H1.3 cannot be confirmed.

Finally, a comparison of both learning modes with a control group was performed. Both, subjects under the documentation (T(74) = -2,40, p < .03) and learning by doing (T(69,4) = -4,75, p < .0001) conditions, perform significantly better than those who are acting from scratch.

5 DISCUSSION & OUTLOOK

The purpose of this research was to investigate the effectiveness of different learning modes (learning by doing, documentation, and learning from scratch) in a process management context. We could observe that, with regard to the overall success of learning process-oriented thinking, learning by doing is more effective than using documented process knowledge. In particular, our results indicate that learning by doing is more effective than using documented knowledge with regard to the success of serializing predetermined activities and assigning goals, whereas it is not more effective with regard to the assignment of roles. Overall, we could observe that learning matters with regard to the success of performing a process-related task so that it should be actively promoted by organizations undergoing a transformation from a function to a process orientation.

A reason for the findings might be the varying complexity of the three tasks reflected in the sub-performance measures: The subjects performed worse the less structural information was provided. The major reason for this effect might be the accompanying increasing abstractness and difficulty of the tasks to be performed. The most structured task was the assignment of activities as predetermined activities were provided that only had to be ordered; there was no necessity to decide which activities to use as subjects were instructed to use all of them. Contrary, for the second task, the assignment of roles, not every role provided had to be used; rather subjects were instructed to only use those roles that they thought were reasonable for performing the task successfully. Finally, the third task, the assignment of goals, was totally unstructured as no information was provided. In general we find that

the more information is given to subjects, the better they perform. But there is one exception in the learning-by-doing condition: Here, subjects perform better in the third than in the second task. Additionally, the superiority as compared to the other learning modes is especially high with regard to this performance measure. This is an important result, as the third task, being the most unstructured one, required the deepest understanding of our participants. The conclusion is that people learning process-oriented thinking by doing are better in transferring knowledge to previously unknown situations.

The general superiority of our subjects in the learning-by-doing condition might be due to the high involvement in performing the tasks. They were more or less forced to perform the task consciously as they performed the same procedure before. Contrary, subjects in the learning-by-documentation condition might have had a more distant attitude to the documented knowledge. Overall, using documented knowledge seems to be less helpful with regard to learn how to do something and how to transfer knowledge within an uncertain environment. Thus, it seems to be less suitable for learning process-oriented thinking. Subjects in the learning-by-documentation condition needed more guidance, whereas subjects in the learning-by-doing condition performed better in uncertain situations. This relation seems to be the rule rather than the exception in practice. However, the conclusion is that learning matters with regard to the success of performing a process-related task. As a consequence, both learning modes should be actively promoted by organizations undergoing a transformation from a function to a process orientation.

So, for practitioners, the results of our study are particularly suggestive with regard to the learning modes that should be promoted. Our study raises awareness of so far understudied underlying variables influencing the success of transforming a process-oriented organization and allows for conclusions being drawn with regard to the promotion of process-oriented thinking. In particular, our study shows that learning matters and thus organizations should actively promote primarily learning by doing and to a lesser extent learning by documentation.

For the scientific community, the results of our investigation are insofar important as the effectiveness of different learning modes has not been investigated in a business process management context before. Furthermore, the study conducted provides a new instrument, namely questionnaire experiments. Questionnaire experiments allow for explicitly controlling certain variables that could have a causal effect on the dependent variable, i.e., on the success of learning process-oriented thinking in this case. Closely related to this point is that the systematic treatment coming along with experiments enables the analysis of causal relationships; that is why experiments, in general, are considered to be the most effective research method for analyzing causal relationships.

Although our study seems to contribute to science and practice alike, it comes along with several limitations. First, we used undergraduate management students as subjects in our questionnaire experiment. However, although we fall back on a sample consisting predominantly of students who had already gained professional experience, further studies are needed in order to verify whether our sample can serve as a good proxy for business professionals. Also, with regard to the content itself, a replication and extension of our study would be interesting. For example, the questionnaire experiment might be performed for other business processes in order to enlarge the generalization of our results. Furthermore, the focus on the real world should be enhanced; although we tried to integrate such a focus by choosing real world business processes and by asking subjects to vividly imagine the situation that they have to work on such a process as part of their job, the real world focus could be enhanced, for example, by conducting field experiments.

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