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Explaining Groupware Implementation Through Group Learning

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ABSTRACT

Implementation of groupware tends to be an evolutionary process. We apply a theory of group learning as a framework to highlight relevant aspects of such a process. Here we present the results of a longitudinal case study to which this framework was applied. A human resource information system introduced in a hospital was successfully implemented with one user group but failed in another group. Analysis shows a marked difference in the group learning procceses, which significantly contributes to the differences in success. The results confirm our assumption about the importance of learning processes in groupware implementation.

INTRODUCTION

Introduction of information technology (IT) in an organization tends to be an evolutionary process. Usually a new system is introduced, the organization gathers experience, and the system is fine-tuned according to the rising needs, in one or more cycles (Bardram, 1998; DeSanctis and Poole, 1994; Orlikowski, 1996; Ruel, 2001).

Systems specifically designed to support group work are called collaborative technologies, or groupware. Nowadays, however, much IT has certain collaborative features. Taking a broad view, we consider a system groupware when the use of the system involves group interactional processes. This can be "traditional" groupware or embedded "fragments" (like documents sharing facilities) that are part of a more general application.

Group interactional processes have an impact on the implementation of groupware. The literature emphasizes reflective group processes (Tucker et al., 2001; Hettinga et al., 2001); Sharing understanding (Mulder et al., 2000, 2002); collaborative knowledge building (Stahl, 2000).

In previous papers (Bondarouk and Sikkel, 2001, 2003) we proposed to base our understanding of adoption of groupware on collaborative experiential learning, built upon Kolb's model (1984). In this paper we apply our theory to longitudinal case study: the introduction of Human Resource Information System (HRIS) in a hospital in the Netherlands. Two user groups adopted the system quite differently. We collected and analyzed qualitative data from both groups and found big differences in group learning. We argue that these differences explain the differences in success in both cases.

After a brief overview of our theoretical framework we discuss the case study in some detail and present our analysis.

GROUP LEARNING AS ADOPTION OF GROUPWARE

Group learning or collaborative learning is understood as developing of a group behavior (Cannon-Bowers et al., 1995; Druskat and Kayes, 2000; Marsick, 1987; Onstenk, 1995). For the purpose of this research, we define group learning as iterative changing of the group behavior, which balances between exploration of new operations, and exploitation of routine actions with a newly introduced system. Group learning consists of behaviors and actions, carried out by the members of the group, through which they improve task performance (Edmondson, 1999; Schippers, 2000).

To provide insights in these processes we build our understanding of group learning behaviors on the concept of experiential learning (Kolb, 1984). On the inter-personal level, its mechanism can be described as a cycle of five different learning activities outlined in Figure 1. These activities support obtaining new information on using the system, training skills and exchange of experience among group members. Hence we argue that ensuring group learning behaviors will support implementation of the groupware system.

A learning cycle begins with *collective experiences and actions*, when employees are given a certain task to perform. According to Schippers (2000), action refers to the goal-directed behaviors relevant to achieving the desired changes in the objectives and strategies.

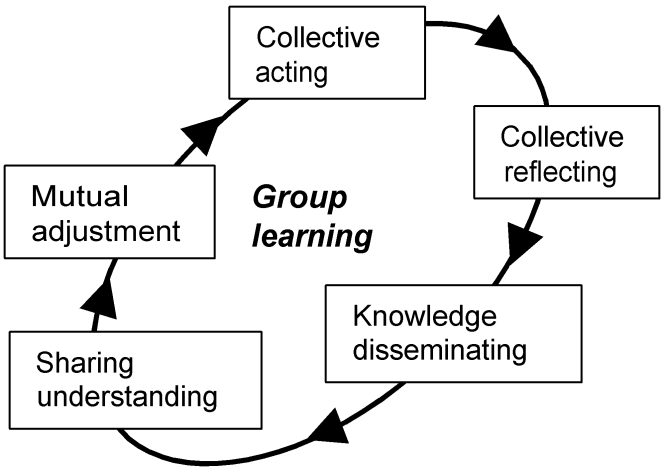
Collective reflection is the extent to which members of the group reflect upon, and communicate about the objectives and strategies (e.g. decision-making), and update them to the current circumstances.

Knowledge disseminating implies mutual informal acceptance and respectfulness of diverse ideas and suggestions. It can appear in many forms, including presentations, lectures, oral explanations of ideas, or codifying it in a knowledge system (Hendriks, 1999).

Sharing understanding involves using insights to help people see their own situation better (Kim, 1993). Internalization also takes on a great variety of forms: learning by doing, reading books, etc. It is oriented to those people who look for acquisition of knowledge.

Mutual adjustment supposes joint regulations, planning, arrangement and deciding.

Figure 1: Group learning processes



The five-step learning cycle a theoretical construct. In reality, steps are not executed consecutively. Groups engage in activities that relate to different learning activities at the same time. But in order to describe and understand group learning processes it is helpful to distinguish the elementary steps.

THE CASE STUDY

A human resource information system is introduced in a hospital in the Netherlands. The objective is to decentralize use of the personnel and salary administration.

The hospital, which we will call Medinet, is a large regional hospital, having 1070 beds and around 3700 employees, founded in 1989 by a merge of three local hospitals and two outpatient facilities. Two of these hospitals are located near to each other in a larger city. Medinet is divided into five clusters, which are further divided into a total of 65 departments.

The personnel and salary administration in Medinet is carried out by the personnel and salary department (PSA) and local HR managers from every department.

There is a tight cooperation between PSA and the local managers: every day the latter send information in special paper-based forms about all changes in personnel data to PSA. Day-to-day communication between all representatives of the personnel service in all departments and units makes use of internal paper-based mail, e-mail, fax and telephone.

The Social Affairs department initiated a new HRM policy in Medinet in 1998. The intentions were to improve the personnel service in the organisation towards more efficient administration of the HRM information and to decentralize the highly centralized personnel service. From this background, in 1999 Social Affairs started a project on implementing a new IT system across all levels, all departments in Medinet. In December 1999 the Beaufort system was selected.

The idea was that local managers should input the personnel data straight into the system and could share that information across departments. At the same time PSA employees could immediately use these data to make any salary mutations.

The System

Beaufort, developed by the Dutch software company Getronics, is a personnel and salary administration system, extensible with modules for time registration, human resource management, financial management, etc. One of its strengths is that it allows decentralized use. Data entry can be done locally in each department. Department managers can directly access management information for their department.

Two Beaufort modules were selected for decentral use at Medinet: sick leave administration and time registration.

Sick leave administration involves registration of absence (total or partial) due to sick leave and notification of this absence to various external administrative bodies related to the social security system in the Netherlands. It is important that these notifications are timely and correct; failure to do so may lead to a situation where Medinet is held liable for a financial compensation that could have been claimed elsewhere.

Time registration is essential for calculating the monthly salary. For doctors and nurses the salary is a function of the number of hours worked on different kinds of duties.

Project History

Space limitations allow only a brief overview.

SLA started using the system in October 2000. PSA specialists got used to the new system and performed their tasks within three to four months. The implementation plan was kept strictly until April 2001, when the two Beaufort modules were distributed to decentral departments.

After that, attempts to involve other departments in the pilots of using the sick leave module were delayed and, after all, failed. First, technical problems in the Medinet ICT infrastructure caused delays for two months. Then, the 'discovery' of the content functionality of the sick leave module complicated the decentral use. The local managers faced the necessity to learn tasks performed by PSA specialists. This appeared to have been underestimated: health administration required a lot of new professional competence before one could start 'clicking the buttons' in the new system. The lack of such knowledge led to wrong inputs in the system and mistakes in the outcoming financial documents. That could lead to incorrect salary for the employees, misunderstanding among PSA and other departments, and financial problems for Medinet. At the end of the day PSA specialists had to discover those mistakes, correct them and solve misunderstandings.

RESEARCH METHODS

We carried out a longitudinal 10 months-case study to investigate the implementation. This prolonged engagement allowed for a large variety of research methods: interviews, document analysis, observations in the field, participating in team building activities, etc. We were involved in a gradual process of implementation - discussing its issues with the steering group, visiting and observing the targeted employees in their day-to-day work. A lot of information about on-going development of the project was obtained from informal daily conversations with the project team members. It helped to develop a common language, to comprehend the professional lexicon used in Medinet, and to understand the Medinet culture and sub-cultures of different departments. We studied a variety of documents. That helped to develop the interview protocol in accordance to the Medinet environment.

34 interviews were conducted, covering 84% of the employees involved in the Beaufort project. These included: the manager of the Concern Staff, the board member from the department of Social Affairs, the manager of PSA, the Beaufort project manager, 3 project team members, and Beaufort end-users (From PSA: 16 non-managerial employees, decentral use: 4 HR local managers, 9 HR managerial employees, and 6 personnel secretaries).

Interviews aimed at getting insights in the different aspects of collaborative learning regarding Beaufort adoption by two groups of users: PSA and local managers. The interview protocol remained basically the same for all users, but we made different accents. Transcripts of all interviews were discussed with the interviewees for verification.

Also field observations turned out to be very informative. We took part in 3 departmental meetings devoted to on-going problems in use of the system, 2 meetings of the steering group of the project, and 4 instructional sessions for new users. A special protocol was developed for observing instructional sessions in order to explore group learning during instructions. In total direct observations took 18 hours.

In order to analyse the qualitative data, we operationalized group learning processes as shown in Figure 2.

FINDINGS

We present the results at the PSA department, afterwards the results among the decentral users

Beaufort and PSA

The group learning processes at PSA in order to adopt Beaufort were characterised as moderately high. The description of these processes is based on the textual analysis of the interview postscripts.

The PSA employees operated with the system very actively, in their day-to-day tasks performance. Mainly it was based on the running basis modules, while searching and testing new techniques were exceptional.

They used to critically reflect upon their experience with the system. Every morning they discussed different problems in on-going use during special sessions. Also informal discussions took place often. They had special notebooks, in which they noted every nuance of Beaufort to be discussed together. It led, for example, to a long chat about rules for sending the salary data away, triggered by some unexplainable system errors.

Everybody felt free to declare individual difficulties and lack of skills in use of some modules. They knew each other's difficulties with operating the system.

Knowledge disseminating was rather intensive and based on two streams. First, some active members stimulated, proposed and demonstrated new ideas with the intention to improve the usage of Beaufort. Second, at the 'minor' level, colleagues clarified for each other different aspects of Beaufort.

Sharing understanding among the PSA employees was moderate. Interestingly, they all had similar ideas concerning the role and functionality of Beaufort, but their understanding did not reflect the real purpose of the system.

Mutual adjustment was moderate and mainly related to arranging further learning activities and suggestions for system improvements. Collective agreements and developing new regulations to apply new ways of working with new system were not initiated.

In sum, collaborative learning processes among PSA employees can be characterised as strong. Task-related operations with Beaufort, communicating about different aspects of it, activities oriented towards knowledge externalization and achieving collective agreements were strong. Only the group understanding of the role and functionality of Beaufort was moderate.

Implementation Results at PSA

The PSA employees valued the system as very helpful and advanced in supporting their tasks. Especially they rated highly that all the personnel information was placed on one screen. They estimated that they could perform the documents and administration procedures faster than with the previous system.

Also they found valuable that the system helped them in communicating with their clients (employees of Medinet): during telephone calls it was enough to use only one screen without difficult paper-based searching processes.

Based on the observations and interviews we may conclude that PSA members have adopted the newly introduced system with a high level of efficiency. All employees (100%) got used to Beaufort in accordance to the scheduled plan - within three months.

Beaufort and Decentral Use

We identified group interactional processes among local HR managers as low: group acting, reflecting, sharing understanding, and mutual adjustment hardly took place, and only under strong pressure from the management. Only knowledge disseminating was observed as promising, as illustrated below.

Every time decentral users met with even small technical difficulties, they stopped operations with the system. They were not clear about the idea behind the decentral use. Actually they did not need Beaufort for their usual job tasks. Operating with the system brought only additional duties and complexity. Collective acting did not develop through exercising; instead, end-users had to start working with a new system immediately. Decentral users did not try to search for any new techniques in the sick leave administration module.

We did not identify group reflecting at all. They did not want to discuss any problems, but passively waited for external help. They did not communicate about errors in the system with each other, and preferred to talk about it directly at a higher level - to the project management.

Knowledge disseminating was initiated by the PSA employees, who used to give advice anytime upon requests of decentral users. The low level of sharing understanding resulted in unclarity about even the content of the sick leave inputs. Mutual adjustment was observed as absolutely low. Tasks and rules were not 'written on paper' - there wasn't any agreement on how to work together.

Implementation Results in Decentral Use

The HR managers held the opinion that the system did not facilitate their tasks, but rather brought new ones for them. They acknowledged the importance of Beaufort for the salary administration, but did not find their participation in it essential. They stressed that time registration and sick leave administration were just small administrative responsibilities among their HR work, but the system made them pay too much attention to those tasks.

At the same time the users even lacked some data necessary to make inputs to the system.

The system required changing the usual way of performing tasks (new collaborative responsibilities, sharing data, duplication of task performance, new schedule for making inputs).

The local HR managers have not adopted the newly introduced two modules of the system in accordance to the project plan. They were struggling with the implementation process, described above, during 7 months, and finally decided to stop it. All end-users (100%) shared the opinion that it was necessary to suspend the project until 'better times'.

CONCLUSIONS

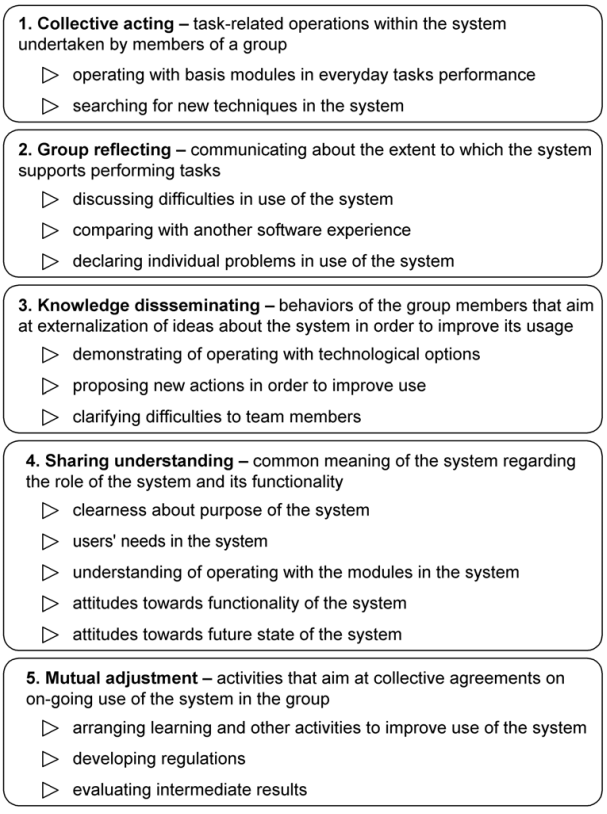
Regarding adoption of groupware as group learning processes, we have found the following.

Introduction of a software module in two different settings within one organization led to opposed results:

- The PSA case involved changes in tasks, but these were only related to that part of the work that was carried out within the department. In the decentral case, tasks distributed over different departments were infected in a subtle and not quite anticipated way.
- In the PSA case, groups responsible for tasks affected by the new system were co-located and, more importantly, had a group identity and experience in collaboration. In the distributed case, the group members were distributed and did not have experience in collaboration.
- Group learning processes were highly advanced in the PSA case; in the distributed case they were very low.

It is not possible to separate the contribution of each of these factors, it is their combination that lead to the success of the PSA case and the demise of the decentral case. Moreover, the factors are interrelated. If there had been a learning process in the decentral case, it would

Figure 2. Operationalization of adoption of groupware through group learning



have addressed and could have diminished the other problems: lack of experience in collaboration and subtle task shifts.

If there had been more contact between the collaborators in the decentral case this could possibly have lead to an improved learning process - although there is evidence that learning processes do not always arise spontaneously (Hettinga, 2001; Mulder, 2002).

On the whole, this case study confirms that the group learning approach is helpful to explain the relative success of groupware implementation projects.

We conjecture that before implementing a collaborative system, there is a need to create collaboration among its users. It doesn't mean that groups of users must have all collaborative prerequisites in advance in order to adopt the system. Group processes do improve over the use of groupware, but, at the same time, essential group characteristics must be built up in advance. Those are interdependence, individual accountability, tasks divisions. Such prerequisites prepare the basis for group learning processes which contribute the success of groupware implementation.

It calls for certain organizational tactics to promote learning atmosphere and concrete practices. In the Medinet case, a setting in which the decentral users could learn the new skills required, discuss the use of the system with PSA employees, and reflect about the new work practices with the involved parties would have improved the chances of success.

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