Group Cohesiveness and Extrinsic Motivation in Virtual Groups: Lessons from an Action Case Study of Electronic Brainstorming

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Abstract
One form of group support system that has received much attention from cross-disciplinary research is electronic brainstorming (EBS). While it is generally held that group cohesiveness is lower in virtual settings that in face-to-face interactions, it has also been argued that this does not matter in cognitive work such as idea generation. However, most work on EBS has been carried out in academic settings, and though such environments provide more control, they may be insufficient to capture all nuances of on-going office work. Hence, I describe an action case study of a failing attempt to introduce an EBS prototype in an organisational setting. The analysis suggests that virtual groups, counter to what is previously thought, need to establish and maintain a group identity. One circumstance under which this seems to be the case is in the existence of extrinsic rewards mechanisms.

1. Background and motivation
Much of the work done in today’s organisations is performed not by isolated individuals but by groups [9, 29]. Historically, these groups had to meet face-to-face with all the spatial and temporal restrictions associated with physical meetings, but with the advancement of information technology (IT) group work is now becoming increasingly virtual. Research aiming to support group work has largely been targeted at facilitating co-operation and collaboration between people distributed in time and/or space. In doing so, it has been suggested that the resulting applications should be understood not merely as technology to emulate traditional face-to-face meetings, but rather as an entirely new medium for group work [17, 34]. This implies that research on group support system (GSS) should not just provide support for current work practices, but enable possibilities beyond those utilised today. However, when moving into new territories it is important to carefully examine how the displacement of face-to-face work affects different aspects of group work. One such aspect that is currently largely neglected is motivation.

This paper reports from an action case study of what turned out to be an unsuccessful attempt to implement a intranet-based electronic brainstorming (EBS) system prototype in an organisational context. Having analysed the users’ experiences, the author shall compare group cohesiveness in face-to-face and electronic brainstorming, and show how the presence of extrinsic motivation in form of an institutionalised reward system in combination with the differences in cohesiveness negatively affected the group work. More specifically, the focus of the analysis is on the relationship between motivation, cognitive work, and group cohesiveness. Counter to what is suggested in the literature, the conclusion presented here suggests that low cohesion affect group work performance also for work of a more cognitive nature. This means that mechanisms to ensure group cohesiveness must be considered when designing GSS in general and EBS systems in particular.

Next, some previous work on aspects of computer-mediated group work shall be summarised as a theoretical framework for the discussion later. Thereafter the research site and the methodological approach are accounted for. The prototype EBS tool used in this research is described briefly in section four, followed by the presentation of the empirical findings. In section six, these results are then discussed in terms of the relationship between motivation and group cohesiveness. Consequences and implications for future research and design of EBS systems are also discussed, from both an IT and an organisational perspective.

2. Aspects of computer-mediated group work
Research regarding groupware and GSS as well as the work of social psychologists have previously shown that computer-mediated intra-group communication is unable to support the fuller range of communicative acts typically employed by face-to-face groups [17, 28]. Examples of such acts and cues difficult to mediate are facial expressions, gestures, and body postures. As a result of
this loss of media “richness”, work on virtual groups have consistently reported group members to experience lower group cohesiveness and feel more loosely connected [28], and that maintaining a clear group identity in such environments is problematic [9]. In this section, the complexity of computer-mediated group work in general and EBS in particular shall be highlighted, and the prevailing approach to GSS studies shall be criticised.

2.1 Critique of media richness

The use of the phrase “media richness” is somewhat unfortunate since richness connotes positive values such as wealth and prosperity. More is not always better; there are for example numerous occasions where in fact less information is to prefer. An alternative, albeit less frequently seen, interpretation of media richness would thus be media overload. Therefore, an emotionally neutral expression such as media density might be more appropriate, since an unreflecting use of the word richness may mislead us to implicitly perceive media richness as something inevitably good.

Furthermore, richness as an intrinsic and objective property of communication technology has been used to form theories on predictability of technology usage, with information richness theory (IRT) [5] being the most prominent example. However, IRT has been heavily criticised, not the least so by Markus [8, 16], who have shown impressive empirical results refuting the premises of IRT. The analysis of this paper is thus not based on IRT nor on richness as an analytical construct. We merely observe that the ability to support communication and convey meaning varies between different media.

2.2. Complexity of group work situations

The effects of reduction of media density and cohesiveness on group behaviour seem somewhat ambiguous, since what at first glance appears to be conflicting data has been reported. On the one hand, it is argued that many of the socio-emotional phenomena that arise when people interact face-to-face are present also when communicating and collaborating electronically, albeit less pronounced. This is nicely illustrated in a study of senior net users, who, aged 50+, let the social norms of their generation characterise their online behaviour [19]. It has on the other hand also been suggested that some of these mechanisms are depending on social presence, and therefore cannot easily be transferred to or sustained in a virtual environment [18]. Thus, it remains unclear whether or not a shift to virtual environments actually results in a loss of socio-emotional cues.

To further add to the complexity there is no consensus on whether a loss of socio-emotional cues, should it occur, is good or bad. Some data suggest that users of groupware tools miss the immediate social feedback that visual cues mediate in face-to-face interactions, and this may for example explain why such users seem to prefer being linked by video although no tangible effect on group performance has been observed [22]. There are also situations when social protocol is detrimental to group effectiveness, and under such circumstances, the loss of these conventions is not only acceptable but also in fact desirable. For example, the absence of participation regulators such as gender or hierarchical status explains why virtual groups sometimes have more equal participation than have face-to-face groups [9].

2.3. EBS as a group activity

Further examples can be found in the field of electronic brainstorming (EBS), where it is maintained that group idea generation is primarily a cognitive exercise and not a social activity [20]. This is true also for traditional face-to-face brainstorming, but since it is a physical meeting, social conventions kick in. An example would be turn-taking, which since long has been known to reduce productivity in face-to-face groups. Excluding such social hindrances eliminates production blocking and boosts the idea generating process, and may partly explain why EBS outperform face-to-face brainstorming [7]. During an EBS session, when the users have to rely on computer-mediated communication, it is suggested that the participants do not operate as a group in the social sense, and instead should be understood as a bunch of individuals interacting with an emerging set of ideas and therefore be unaffected of social aspects [20].

We can conclude this section by observing that the only thing that seems clear is that the effects of socio-emotional aspects on group work performance vary with group mode (physical vs. virtual), media density (high vs. low), type of work (cognitive vs. non-cognitive), cohesion (strong vs. weak) and possibly a number of additional parameters. When shifting from face-to-face to computer-mediated work practices several of these aspects may be changed simultaneously, and thus one must be careful when designing GSS, not to create a situation in which group performance is affected negatively.

2.4 Experiments vs. field studies in GSS research

Much of the GSS research carried out in the 1980s and early 1990s were laboratory experiments with students as subjects. In a review from 1994, Pervan [24] reports that 172 out of 203 investigated GSS research cases were carried out in research environments and not in business environments. The situation has improved slightly in
recent years. In a review from 2001, 54 case and field studies of GSS use in “real” settings were identified, and 55% of these were carried out after 1994 [10]. Although the number of laboratory experiments during the same period is not available, it can be assumed higher. This is understandable, since it is much easier to allocate a group of students than to persuade business executives to invest their time and efforts in research activities. Nevertheless, the use of students is highly problematic for a number of reasons: Student groups are formed solely for the experimental task and thus have no history [26]; Students show substantially other reasons for and reactions to participation than do the business people they are substituting [6].

3. Research site and method

An electronic brainstorming (EBS) application can be understood as a GSS targeted at enhancing organisational creativity. The work presented herein started as an action case study with the ambition to introduce an intranet-based, distributed EBS system prototype in an industrial environment. The results presented in this article are thus based on experiences from a real business setting. Below, the research site and the methodological approach are described in more detail.

3.1. The Volvo IT site

This research was carried out during December 1999 to May 2000 at Volvo Information Technology’s head office in Göteborg, Sweden. Volvo IT is an IT service providing company within the Volvo Group and had at the time of the investigation approximately 2,500 employees worldwide. Some 1,400 of these worked in Sweden, and roughly 900 in the Göteborg area.

Despite being an IT service company, Volvo IT was heavily influenced by its manufacturing siblings and the industry legacy was evident. Volvo IT’s organisational processes were all arranged to meet the business requirements of the other corporate companies, which for many years had been the only customers. As with many of the other companies in the group, Volvo IT had a traditional suggestion system implemented, which was based on extrinsic motivation in form of financial rewards. Employees were supposed to submit ideas and suggestions for improvement to a proposal-handling committee (PHC), which would honour a good idea by rewarding the proposer with an amount corresponding to half of the company’s first year’s savings. Such a bonus might come to a substantial amount of money. During 1999, the PHC received 226 proposals, and spent the sum of approximately US$ 45,000 on individual rewards.

Although not institutionalised, brainstorming as a method for idea generation and problem-solving was widely adopted within the company and had been used for many years. Brainstorming should however not be understood in the strict Osbornian [23] sense but rather as an unprejudiced and informal meeting where also “wild” and tentative ideas were allowed and encouraged.

As IT professionals, the employees were all well acquainted with various computer environments and systems. The employees had individual computers (PC or UNIX station), and these computers were all connected with the corporate intranet. The highly decentralised intranet consisted of approximately 750 web servers and contained both formal and informal information.

3.2. Research approach

A previous EBS prototype had been implemented in December 1998 [30]. Prior to that work, the author discussed the design and intended use of the application with various organisational members, including both members of the PHC, i.e. the people responsible for evaluating submitted ideas, and ordinary office workers such as systems programmers and application developers. The insights from the first prototype informed the design of a second prototype, which, when evaluated theoretically, showed promising results [32].

The second prototype, which is the focus in this paper, was introduced as a change agent in order to improve the suggestion system in use. The work was also part of a master thesis project and to set a baseline for the evaluation, the master student first conducted 10 semi-structured interviews about creativity and brainstorming in general. After the EBS prototype had been implemented, 32 users from various departments were explicitly invited to test the application. These 32 employees included the 10 users previously interviewed. Not all of the 32 invited employees took the opportunity to participate in the test, but since the application was available on the corporate intranet, other users found it and interacted with it. Log file analysis revealed that 52 different users visited the application during the first three weeks. After these three weeks, eight users were randomly selected from the log file and interviewed concerning their views of the application. These open-ended interviews, which lasted approximately 40 minutes, were all taped. Finally, the result of the master thesis work was presented and discussed at a workshop, which the master student, the author, and some 20 organisational members attended. The notes from this discussion and the interview transcripts were thereafter analysed by the author.

The author has applied a grounded theory-inspired research method in the sense that instead of starting with a pre-determined hypothesis that may later be tested, the
understanding of an EBS system were made to increase asynchrony to the usual start or stop, the brainstorming environment provided by the system enabled an equally uninterrupted and eliminating production blocking. Thirdly, since an EBS system is designed to help solve a problem or reach a decision, which means that there is a pronounced purpose of which all attendants are aware. There are also only a limited number of attendees and a limited amount of time available. Consequently, EBS sessions focus on producing as many relevant ideas as possible within the specified timeframe. The objectives of Mindpool were quite different since the idea instead was to blend in features from more traditional suggestion systems. Firstly, there was no specific problem to solve or topic to focus on. Instead, any suggestion that in some way improved the current work practice in the organisation was welcomed. Secondly, since the system was distributed, i.e., there were no physical restraints as to how many contributors the system could host, any member of the organisation could participate. Since participants were using individual computer terminals, idea entry and sharing could be performed simultaneously, thus eliminating production blocking. Thirdly, since an improvement process is a continuous event without any start or stop, the brainstorming environment provided by the prototype enabled an equally uninterrupted and asynchronous process. These alterations to the usual understanding of an EBS system were made to increase the number of entries, provide a wider range of topics, and activate a large portion of the employees.

4. Mindpool - the prototype EBS system

Mindpool, the prototype EBS application used in this research, is an intranet application and represents a hybrid system, i.e. a mix between an EBS application and a traditional suggestion system. A more thorough description of Mindpool was presented at HICSS-34 [32] and cannot due to space limitations be reproduced here. However, the most fundamental design principles behind Mindpool are derived directly from Osborn’s [23] original rules for brainstorming: i) quantity over quality; ii) elaboration on others’ ideas, and; iii) absence of criticism. Below follows a quick overview of Mindpool and the rationale behind the design decisions.

4.1. Opting for quantity

In compliance with Osborn’s ideas [23], there was a desire to opt for quantity and variation. Most EBS systems are designed to help solve a problem or reach a decision, which means that there is a pronounced purpose of which all attendants are aware. There are also only a limited number of attendees and a limited amount of time available. Consequently, EBS sessions focus on producing as many relevant ideas as possible within the specified timeframe. The objectives of Mindpool were quite different since the idea instead was to blend in features from more traditional suggestion systems. Firstly, there was no specific problem to solve or topic to focus on. Instead, any suggestion that in some way improved the current work practice in the organisation was welcomed. Secondly, since the system was distributed, i.e., there were no physical restraints as to how many contributors the system could host, any member of the organisation could participate. Since participants were using individual computer terminals, idea entry and sharing could be performed simultaneously, thus eliminating production blocking. Thirdly, since an improvement process is a continuous event without any start or stop, the brainstorming environment provided by the prototype enabled an equally uninterrupted and asynchronous process. These alterations to the usual understanding of an EBS system were made to increase the number of entries, provide a wider range of topics, and activate a large portion of the employees.

4.2. Idea elaboration

The benefit with the group approach to idea generation is the ability to see and get inspired by other group members’ ideas. When conducting a face-to-face brainstorming session, ideas are typically written down on a flip chart or a white board for all participants to see and elaborate on. The ideas are often recorded in the order they emerge, i.e. chronologically, without any links or other visible connections to the previous idea(s) that might have initiated them. Mindpool mimics the creative atmosphere often found in these group brainstorm sessions with the addition of using the intranet instead of a flip chart. The main design ideas are easy idea entry and company-wide exposure of ideas. Unlike most other EBS systems, Mindpool supports asynchronous brainstorming, allowing ideas to develop long after the point of introduction.

4.3. Blocking early critique

Since early negative feedback is one of creativity’s worst enemies, early critique must be avoided at all cost. This is why Osborn clearly stipulated that critique and evaluation must not be allowed during brainstorming sessions [23]. In Mindpool, this is achieved by not having a threaded discussion list, since it would otherwise be far too easy to enter negative feedback. Although systems with threaded discussions may be considered more user-friendly than unstructured bulletin boards, the possibility to publicly comment others’ suggestion run counter to the brainstorming principle. The system further allows the proposer to be anonymous to the public, since evaluation apprehension is known to be an impeding factor in brainstorming [7]. Not revealing the contributor also helps separating personalities from the real issues, thereby promoting a more objective evaluation, which is especially important when power differences exist among the participants [21]. At the same time, the logging capability of computer software can be used to reduce social loafing, since information on the relative performance of each individual may be made salient in retrospect. Mindpool also offered the readers an opportunity via a form to send comments to the proposer without the system revealing the identity of the latter.

5. Empirical findings

The data presented here has been organised under the three sub-headings that emerged out of the analysis, as described in the methodological section earlier. The three
themes or aspects that we like to examine the organisational understanding of are the following: Brainstorming, which depicts the respondents experiences of and attitudes towards brainstorming in general; The suggestion system, which describes Volvo IT’s institutionalised way of handling organisational creativity, and; The Mindpool application, which accounts for the users’ comments regarding the prototype system itself.

5.1. Brainstorming

Although not being institutionalised, brainstorming as a method for idea generation and problem solving had informally been used within Volvo for many years, and all respondents had participated in brainstorming sessions on several occasions. These interactions had all been traditional face-to-face brainstorming sessions since the company did not have any EBS system installed. The interviewees regarded brainstorming as a useful method both to solve problems and to think up new ideas. They further considered brainstorming sessions to be less prestigious than other meetings, especially so if the brainstorming participants already knew each other, which was often the case. 

“Usually you know all the other guys in the group and then it’s easier to, eh..., you don’t have to compete. You can relax and be crazy, which is usually better; you get a better result at the end of the day. And what you do during the process won’t backfire since only the final result of the group is what counts.”

The respondents expressed a sense of security that allowed them to suggest also wild ideas, or ideas not thoroughly thought through. None of the respondents expressed any concern for evaluation apprehension. On the contrary, several interviewees described the open climate that characterised these meetings.

“You can speak without thinking first. Whatever association you get, it’s okay to suggest it. And even if you say something really dumb, others elaborate on it and it becomes something else... so in the end no-one knows or cares who suggested what. It doesn’t matter.”

The respondent also set hierarchical differences aside while brainstorming. Individual identities and roles were suppressed for the benefit of the group.

“You’re all on the same level, so to speak. There is no ‘expert’ or ‘boss’ – it’s a group thing where you really co-operate.”

The three statements above also illustrate the commonly shared view of the result as a collective effort. It seemed to be generally so that no-one was keeping track of who suggested what or who contributed the most. The brainstorming group as a whole was responsible for the final outcome. None of the interviewees mentioned anything about being explicitly rewarded.

Summing up

Brainstorming was perceived as an informal, friendly, and useful group activity for coming up with wild and tentative ideas. In this un-competitive atmosphere, individual credits were not an issue and the reward system was never referred to.

5.2. The suggestion system

All respondents said they believed the suggestion system to be an important institution – there must be a forum to which you can send your ideas. However, none of the interviewees seemed very interested in submitting anything. In all, only four of the 18 interviewees had in fact ever submitted proposals, and in all four cases, the latest submission was several years back. The company proposal-handling committee (PHC) annually received proposals from approximately eight percent of the employees. None of the respondents knew how the PHC worked, but the general assumption was that submitted suggestion had to be both concrete and well thought through to be considered. Another opinion shared by all the respondents was that the threshold for contributing to the suggestion system was too high.

“It has to be serious stuff, which makes you a bit reluctant [to submit]. I mean, it has to be something really worthwhile. And much of what I do is part of my daily work and it’s not something you would submit – it’s part of my ordinary tasks.”

Despite the fact that not many of the interviewees were engaged in or submitted proposals to the suggestion system, all respondents viewed the potential reward as something good and motivating. They argued that a reward would be a fair and tangible recognition of a good performance. Without such a bonus, they argued, people would not bother or care to go through the process of suggesting improvements, as the following two quotes illustrate.

“The person [who suggests something that get implemented] should naturally have a part [of the profit/savings], not the least so considering that he or she would otherwise not do anything about it. If you come up with something that is financially very good for the company, and you know you can have a piece of it, of course you get motivated [...]”.

“It’s not more than fair that if someone manage to save a large sum of money for the company by doing something smart, they get their share. I mean, you want credit for being creative.”

Summing up
5.3. The Mindpool application

The users of the Mindpool prototype gave mixed responses. Some thought of it as a potentially useful system if only the critical mass problem was solved, while others had difficulties seeing any benefits at all. Most respondents automatically made the comparison between Mindpool and the traditional suggestion system, which they perceived as a competitor. Many interviewees also spontaneously started to discuss the reward mechanisms, which, in their opinion, worked against the concept of Mindpool.

“If you have a good idea, why post it here [in Mindpool] instead of submitting it to the suggestion system? There you might get a reward [...]”.

There was also a strong focus on the individual. Ideas were considered individual properties and exposing ideas to other might lead to loss of a possible reward. Hence, rather than risking being robbed of a good idea the respondents preferred to keep ideas to themselves, and, after having worked them over a bit, submit them to the suggestion system.

“If I post [my idea] on this web site, someone might steal it and send it to the suggestion system, and if it turns out to be useful I don’t get a thing. You don’t want that to happen.”

During the workshop when the master thesis work was presented an interesting discussion emerged concerning the underpinning idea to elaborate on each others’ ideas. The participants debated whether only the final outcome should be rewarded or if the entire process should be remunerated and thereby encouraged. The following is a condensed version of the discussion edited for clarity.

The participants assumed a scenario in Mindpool where one user submits remark A:

“Why don’t we close down our library? No-one goes there anyway”.

This suggestion may be observed by another user who totally disagree and instead proposes B:

“Why don’t we open a library in every office building?”

Note that though A inspired B, the two do not connect visibly. In practice, there may be weeks or even months between A and B. Suggestion B may in a similar manner eventually lead to C, which in turn inspires D and E, and so forth. None of these suggestions or ideas needs to be “good” or “useful”. However, this cumulative process eventually leads to a point where a useful, constructive, practical suggestion G can be identified:

“What’s make the library available on the intranet and have them deliver the books to us using the internal mail system”.

The organisational members considered it unjust to only honour the final suggestion G. In such an environment, they claimed, suggestions A through E would never be put forward and users would be discouraged from participating. Note that the relationships between suggestions A-G are not necessarily obvious to a bystander or even to the people making the suggestions. It is quite possible for a user to have been inspired by an earlier remark without being aware of this fact.

“Summing up”

Many users expressed a concern for not being recognised for their individual contributions. Mindpool was seen as a competitor to the suggestion system, and the lack of explicit reward mechanisms in Mindpool was perceived as a hampering factor.

6. Discussion

The research described in this paper started out as a small-scale action case study aimed at improving a company’s idea generation process, but the intervention failed. Accounts of failures are not as frequently found in the literature, as are success stories. However, failing often offers good opportunities for new insights [3], and an unsuccessful project is only truly a “failure” if nothing was learned from it. In this section, we shall discuss the lessons learned from this study. Firstly, the relationship between motivation and group cohesiveness is examined for both face-to-face and electronic brainstorming. Thereafter, we derive some consequences from the findings, and discuss the design implications these have on organisations and GSS in general. Finally, some limitations to this work are highlighted and discussed.

6.1. Motivation/group cohesiveness relationship

In this study, we have focused on three emerging entities: Physical group work in form of face-to-face brainstorming, virtual group activities using an EBS prototype, and extrinsic motivation in form of an institutionalised reward policy. We shall now in turn discuss the relationships between these entities.

Relation #1: Physical vs. Virtual group work

From the interview data, we notice how face-to-face brainstorms refer to the result as “a group thing”. The participants in a face-to-face brainstorming session are not simply randomly picked by-passers but carefully selected and invited individuals, which makes them share an affiliation even though the brainstorm group is highly
Relation #3: EBS and the reward system

EBS systems are also typically not designed to enhance group cohesiveness, and the Mindpool users consequently adopt a very egocentric perspective. The users speak in terms of themselves only and express a strong concern for not being appreciated or recognised for their individual contributions. The “group” is not discussed or even referred to at all, and the focus for reflection is entirely on the self. In compliance with the literature, group cohesiveness amongst the face-to-face group workers was strong and evident. In contrast, the group identity amongst the Mindpool users was very weak, not to say non-existent. As described above, conflicting data has been reported but the findings from this study seem to be consistent with the theories suggesting that computer-mediated group work fosters less of a group identity, e.g. [28].

However, it has been suggested that this loss of group cohesiveness should not affect cognitive work such as idea generation negatively. If anything, it should increase productivity. In conflict with this theory, we notice how this lack of group cohesiveness seems to result in the respondents being unwilling even to use the EBS system at all. This behaviour cannot be fully explained by the physical vs. virtual group work relationship alone. We need to consider additional factors and one aspect that came out strongly from the data was the reward system.

6.2. Consequences and implications for design

To solve the situation described in this study, two options are obvious: to abandon the reward system or to strengthen group cohesiveness. As can be seen from the empirical data, the employees considered the reward system to be a useful motivating factor, so abandoning the reward system may not be welcomed. However, this opinion might also be a misconception. Previous research on the use of traditional suggestion systems has shown that the reliance on extrinsic motivation limits participation to typically 10-15 percent of the employees, as opposed to 70-80 percent when no reward system is used, or when recognition is kept to a symbolic level [27]. This suggests that extrinsic motivation is not as important motivating factor as the organisational members seem to believe. Convincing the organisational members of this remains a challenge, though.

The other option would be to strengthen the group cohesiveness of the EBS users and thereby increase cohesiveness. This option holds important lessons for design implications for both organisational activities and applications such as GSS. By treating and rewarding EBS contributors collectively, for example by accumulating the reward that otherwise would have gone to individual proposers and splitting it amongst all contributors at the end of the year, the organisation would, simply by treating the proposers as a group, create a group cohesiveness. Letting the reward system favour the EBS users as a group would also enhance group cohesiveness without losing the possibility to financial benefits. On the application level, the identity of the individual contributors could be made salient without revealing what suggestions where theirs. By publishing the names of the “team members”, a stronger “we”-spirit would be fostered, not unlike the driving force of the open source movement [15]. It would also be possible to centre the EBS systems on established social units, thereby having an existing group identity to start with. While such an approach may work well for GSS in general, such a strategy would not be suitable for EBS.
since it would limit diversity and inter-disciplinary crossovers.

6.3 Consequences and implications for research

On a more general level, it can be noted that the role of motivating factors, which was identified as an important factor in this study, has largely been neglected in GSS and EBS research. Despite Grudin’s early and influential work on social aspects of groupware (cf. [11, 12]), the question why people would want to share ideas or co-operate in the first place is seldom asked. In a recent descriptive evaluation of GSS research conducted in the last two decades [10], no result regarding motivational aspects can be found, and hence the lack of references to recent GSS or EBS research in this paper. Work in the field of social psychology of creativity reports that when people are primarily motivated by their interest in the work and the enjoyment of that activity, they are more creative than when driven by some goal imposed on them by others [1, 2]. The use of extrinsic motivation such as rewards or bonuses tend to cause a focus on the reward rather than on the task at hand, and winning the reward becomes more important than finding the most creative solution [31].

The type of reward mechanism implemented at Volvo IT and examined in this paper is not merely an isolated local phenomenon. On the contrary, suggestion systems based on monetary compensation are quite common in industry, and have existed in Europe and the U.S. since the end of the 19th century [27]. It seems likely that the competitiveness that these systems invite could seriously hamper successful utilisation of EBS systems. However, as discussed above, much EBS and GSS research is only performed on students or other members of the academic community, e.g. [4, 13, 14, 24, 25]. While such controlled environments are convenient for testing isolated aspects of group activities, they may be insufficient to capture more subtle nuances of real office work. While both academia and industry present complex and challenging environments, their members, respectively, have very different agendas, and some aspects of group work can only be investigated in on-going organisational work [9]. The bias towards academic settings that presently exist in the EBS and GSS literature could explain why research has been unable to foresee motivational problems, and more case studies and longitudinal research in real business and industrial settings are thus called for.

6.4. Limitations

Although this research was conducted in co-operation with Volvo IT, it did not receive attention from top management and the intended purpose and objective was not communicated sufficiently within the organisation prior to the introduction of the application prototype. Several important stakeholders, for example members of the PHC, were thus taken by surprise and reacted perhaps overly defensively. It is also likely that misunderstandings concerning the objectives of this work have biased the respondents both explicitly and implicitly. Mindpool’s future relationship vis-à-vis the traditional suggestion system and the reward system had not been elucidated and this caused much concern amongst the respondents. Had these parameters been set up differently, the prototype might have been received with greater enthusiasm.

However, despite these uncertainties, the fact remains that although the reward system had co-existed with face-to-face brainstorming for many years without interfering, the introduction of an EBS system immediately raised questions regarding motivation and intellectual property rights. This is a clear indication of a more complex relationship between group cohesiveness, rewards, and cognitive work than previously suggested in the literature, and the theory presented here contributes to our understanding of these issues.

7. Conclusions

In this paper, we have seen how face-to-face brainstorms experience strong although implicit group cohesiveness while users of a distributed electronic brainstorming (EBS) application show a more individual focus. These observations confirm existing theories. However, counter to what is suggested in the literature, it is showed that this lack of group identity amongst the EBS users causes problems. It is concluded that the reward system, completely ignored by the physical group, in combination with low group cohesion of the virtual group is the determining factor. The most useful lessons learned from this work are that:

1) EBS tools are not intended or designed to promote group cohesiveness but to facilitate creativity and ideas generation. However, in the presence of rewards mechanisms that create a competitive climate and strengthen individualism, EBS systems need to establish and sustain a clear group identity.

2) Motivational factors, amongst other things, differ between business and academic actors and the effect of motivation on EBS and GSS work must be examined more thoroughly and over time. Such research should be conducted in real business or industrial settings and preferably include longitudinal studies.

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