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GROUP SUPPORT SYSTEMS IN HONG KONG:
AN ACTION RESEARCH PROJECT

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ABSTRACT

The last dozen years have seen a considerable investment of resources into the research and development of Group Support Systems (GSS) technology. This paper describes how a GSS was used to support a process improvement project in a Hong Kong accounting firm. Although the project encountered many difficulties, the application of action research facilitated the adaptation of the GSS to the shifting circumstances and the project was successfully completed. A variety of lessons concerning the use of GSS are presented while increased use of action research in complex organisational contexts is recommended.

Keywords:

Action Research, Group Support Systems, Process Interventions, Participation, Motivation

BACKGROUND

The last dozen years have seen a considerable investment of resources into the research and development of Group Support Systems (GSS) technology in organisations. GSS have been applied to a wide variety of circumstances, including: requirements engineering (Liou and Chen, 1993); strategic management (Tyran et al., 1992); software inspections (Mashayekhi et al., 1993); capacity building (Jones et al., 1998); and international diplomacy (Lyytinen et al., 1993). This literature paints a somewhat mixed picture of GSS, with the general conclusion that GSS, when appropriately applied, can benefit adopters.

This paper describes how a GSS[1] was employed in support of a process improvement project in an accounting firm in Hong Kong. The task, its setting and its actors are described, followed by a justification for the use of action research as a guiding methodology. Two sample cycles of activities are presented, while key problems encountered and the measures taken are described. The lessons learned, and their implications for researcher and methodology alike, are discussed.

TASK AND TASK SETTING

Background and Project Objectives

This paper describes how a GSS was used by a small project team in Zeta[2] – a medium-sized, international accounting firm - to improve the firm's client billing process. Zeta maintains offices around the world, employing around two hundred people in Hong Kong. Shortly before this study was initiated, a Chief Information Officer (CIO) was appointed with the remit of bringing Zeta into the IT age, while also revamping business processes within the firm so as to improve its competitiveness.

The objectives of the project, as defined by the CIO, were a) to re-engineer[3] the billing process, and b) to learn about the appropriateness of GSS technology in support of such a re-engineering process. The first objective involved examining the existing billing process and re-engineering its requirements. The new billing process, and a plan for its implementation, would be submitted to Zeta's Strategy Review Group (SRG). Table 1 charts the CIO's proposed meeting schedule.

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[1] GroupSystems for Windows v.1.1d, distributed by Ventana Corp., USA.
[2] Zeta is a pseudonym – at the firm's request.
[3] The CIO's use of terminology was sometimes potentially misleading. He referred to Business Process Re-engineering on a number of occasions, but did not communicate this effectively to the other team members, i.e. they did not feel empowered to introduce radical changes in the billing process. Despite the CIO's misuse of some terms, his discourse has generally been preserved since it provides important indicators of his style of interaction and control.

Table 1: Proposed Schedule of Billing Process Meetings

Week #	Proposed Activity
1	Identify problems with the existing Billing Process.
2	Identify goals for the new Billing Process.
3-4	Understand the existing Billing Process.
5-6	Devise an ideal Billing Process.
7-8	Develop a practical new Billing Process, together with an implementation plan, for submission to the SRG.
9	Review what had been learned about the appropriateness of the various process review tools and techniques applied.
10	Develop an action plan for the new Billing Process on the basis of feedback received from the SRG.

Team Membership

The project team was headed by the CIO and had six other members – see Table 2 for details. All team members, including the CIO, were in their late 20s or early 30s, and used a variety of information systems in the course of their regular work. An executive sponsor was identified for the project, but contact with him was conducted entirely through the CIO, as he never attended meetings.

The Action Researcher[4] and Zeta

Educated in the UK, I had lived in Hong Kong for six years, was working as a lecturer at the City University of Hong Kong and had considerable experience in the facilitation of meetings using GSS. I introduced the principles of GSS at a seminar organised jointly by the Hong Kong Management Association and the Macquarie Graduate School of Management, which the CIO attended. My motivation to work with Zeta stemmed largely from my appreciation of the potential value of applying

[4] Throughout this paper, the action researcher is referred to in the first person singular. To clarify, this is the paper's first author.

GSS to complex organisational circumstances - an application that is often called for in the research literature, but relatively infrequently encountered in practice.

Table 2: Team Membership

Title	Background & Education	Experience
CIO	He recently arrived in Hong Kong from the UK with degrees in Information Systems and Statistics. Current MBA student	Recently appointed at Zeta, with little work experience in Hong Kong.
Manager - Tax	He was born in Hong Kong, but worked and studied in Australia for many years.	Recently appointed in Zeta.
Manager - Insolvency	He was born and educated in the UK, is a chartered accountant, but has low computer literacy	Recently appointed in Zeta.
Manager- Audit	He was born in Malaysia, educated in the UK and is computer literate.	Several years working experience in Zeta.
Manager – Business Services	She was born in Hong Kong, is educated to A-level (Grade 13/ Form 7) standard and is computer literate.	Many years working experience in Zeta.
Manager – Secretarial Services	She was born in Hong Kong, has a bachelor's degree from a local university, and is computer literate.	Many years working experience in Zeta.
Admin Officer (EDP)	She was born in Hong Kong, is educated to O-level (Grade 11/ Form 5) standard and is computer literate.	About four years working experience in Zeta.

The CIO described the proposed project and I agreed that it had potential for GSS support. No formal protocol governing my involvement was specified, though senior partners at Zeta were informed of my presence. The CIO initially nominated me as a

technical facilitator, though later this was extended to include process facilitation. Ventana Corp. authorised me to install the GSS software at Zeta for the duration of the project at no charge, provided that I supervised the use of the software and subsequently shared research findings with Ventana.

I was the sole facilitator at Zeta, but I was neither bound by any formal contract nor remunerated for my work, which was restricted to this one project; furthermore, I was never requested to deliver a solution that would support any particular viewpoint. The key ethical dilemma I faced related to the dominance of the CIO. This I addressed by attempting to bring the other team members into discussions, and successfully persuading the CIO to relinquish some of his responsibilities. At all times, I attempted to ensure that the techniques I used in team interactions did not conflict with local cultural sensitivities – style of communication for instance. My formal involvement with Zeta lasted from January to July 1997, during which time I visited Zeta's offices primarily to facilitate meetings (see Table 3), though on two occasions I visited solely to fix software-related problems.

Project Reports and Operationalisation

The CIO reported project progress to the executive sponsor on a regular basis. When the project was completed, I wrote up a report describing the discussions and the agreements reached, distributing this to all team members. The CIO was given access to an early version of the report from which this paper has been drawn. He responded critically and assertively to many instances of his described behaviour, vigorously defending himself, rejecting some arguments and demanding that the text be toned down. In this paper, the CIO’s legitimate concerns are addressed, but the accuracy of the descriptions is maintained.

The CIO realised that participation in the process review was essential to the subsequent implementation of the new billing process in Zeta. He further recognised that the participants were too busy to commit much of their time to face-to-face interactions, thus requiring a process that permitted them to work remotely. The CIO believed that a GSS could support this process, facilitating productive group discussions and enabling all team members to benefit from their shared interaction. While the GSS was continuously available for ‘remote’ activities, it was not always used during face-to-face meetings. On some occasions, a whiteboard was used to draw team members’ attention to system details. At other times, verbal discussion was found to be more effective than text input. Overall, the GSS was used for approximately 50% of meeting time, though the over-riding concern was to ensure that usage was appropriate to the context.

METHODOLOGY, GSS REVIEW AND PROJECT STRUCTURE

Improving the client billing process was a complex task involving actors from different departments with differing vested interests. Consequently, the gathering and analysis of substantial rich information and the asking of probing 'why', 'how' and 'how to' questions was mandated. At the same time, it was desirable that the team members should play as active a role in the project as possible, since their insights, and those of their colleagues, should be relevant to the re-engineering process. Furthermore, it was believed that this participation would increase the likelihood that the new client billing process would be implemented effectively in all departments.

Given the task context, both the CIO and I agreed that action research would be the most suitable methodology to employ. Not only would action research mandate my active intervention and empower the team members, but its cyclic

structure would provide a framework for ensuring that the problem would be reconsidered continuously throughout the project. Furthermore, given action research's emphasis on reflection, the opportunity to glean lessons - both about the problem and its solution, and about how GSS can be applied in organisations - would be provided, thus linking theory and practice.

Action Research

Elden and Chisholm (1993) explain that action research is a change oriented research methodology that seeks to introduce changes with positive social values, the key focus being on a problem and its solution. Baskerville and Wood-Harper (1996, p.239) point out that "the ideal domain of the action research method" is one where: "the researcher is actively involved, with expected benefit for both researcher and organisation; the knowledge obtained can be immediately applied…; the research is a cyclical process linking theory and practice". Furthermore, problems for which previous research has provided a validated theory are particularly appropriate for the application of action research, since the researcher can intervene in the problem situation, before applying and subsequently evaluating the value and usefulness of the theory. Such practice enables the researcher both to validate or improve upon existing theories and to introduce practical improvements in the problem situation investigated (Checkland, 1981; Heller, 1993). However, Eden and Huxham (1996) note that such an intervention may result in changes within the organisation and so threaten the status quo. They also emphasise (ibid., p.84) that action research must have implications "beyond those required for action … in the domain of the project. It must be possible to envisage talking about the theories developed in relation to other situations".

The practice of action research is cyclical. A researcher starts with **planning** what action to take, continues to **intervention** with the action, **observes** the effects of that intervention and finally **reflects** upon the observations in order to attempt to learn how better to plan and execute the next cycle. The reflections also inform the assessment of theory that must take place subsequently.

Group Support Systems

GSS (Nunamaker et al., 1991) are networked, computer based systems designed to facilitate structured, interactive discussion in a group of people communicating face-to-face or remotely, synchronously or asynchronously. Group members type their contributions into the system which immediately makes each contribution available to all other participants. Thus, nobody forgets what they want to say while waiting for a turn to speak. It is also possible for a group to enter ideas anonymously if that is thought appropriate, e.g. if members feel unwilling to submit ideas that are considered abnormal, unusual or unpopular.

Project Structure and Protocols

In conjunction with the CIO, I initiated planning for the project. This helped me understand the CIO's objectives and the project's limitations as imposed by organisational structures. The CIO demonstrated that he had a clear idea of what he wanted to achieve, his forceful style of interaction dominating discussions. It was agreed that each meeting would be planned in advance and its progress discussed afterwards – often these discussions took place through email. It was also planned that the GSS would be used for idea generation/categorisation and for forging consensus. The literature (e.g. Nunamaker et al., 1997) suggests that GSS should

work well for these two activities. Team members were informed in advance of forthcoming activities to give them preparation time; they were also reminded to meet task deadlines.

The CIO suggested that the project team should first unravel the details of the existing billing process, before considering the requirements for and design of the new process. This would involve looking at the various actors involved (clients, managers of the various departments, secretaries, partners) and analysing dataflows and decision making policies. Finally, the project team would review the effectiveness of the techniques employed in the process review and analyse their suitability for other process reviews in the firm.

The CIO intended that the team members would meet face-to-face once a week. After these meetings, he would prescribe 'homework' for the team members to work on during the week, i.e. asynchronously and in a distributed fashion since their offices were located in two buildings a mile apart in Hong Kong's central business district. This 'timetable' was frequently interrupted, with up to six weeks separating some meetings – see Table 3 for the actual timeline of meetings.

Table 3: Timeline of Meetings (January 26th – June 17th, 1997)

Week	1	2	3	4	5	6	7	8	9	10	11
Date	26/1	2/2	16/2	23/2	2/3	16/3	30/3	6/4	13/4	26/5	17/6

Through the eleven cycles of meetings and other project activities, I collected data from a variety of sources. These included:

- my own subjective observations of, and discussions with, team members before, during and after meetings about project progress and problems;
- unstructured telephone and email interviews/discussions, initiated by me, with:

- individual team members conducted regularly throughout the project – typical questions covered: team member comfort with the technology, satisfaction with the project process, and belief that the project was managed in an appropriate manner;
- the CIO two to three times per week to consider completed and current activities, as well as future plans;

- company and project documentation;
- an instrument (see Appendix) developed by Davison (1997, 1998), used to collect data concerning team members' perceptions regarding the following meeting processes: ease and effectiveness of communication; discussion quality; status effects experienced; team work; efficiency.

While the CIO agreed that the questionnaire should be completed after each meeting, this was confounded by team members who refused to do so on a number of occasions, with data collected only in the first, second, fourth, fifth and seventh cycles.

THE FIRST TWO CYCLES

In order to illustrate how the action research protocol was operationalised, the first two cycles of activities are briefly described.

Cycle One

Planning

The CIO and I agreed in advance that the first meeting should be primarily introductory, lasting about one hour, familiarising the team members with the task and explaining my role, while also describing the GSS software and how it had been

used by other organisations. An initial application of the GSS to explore relevant issues would follow, with the team members asked to complete the meeting process questionnaire. Subsequent analysis of this data would determine how the second meeting should be organised.

Intervention

Following the CIO's introductions, team members vigorously challenged the anonymity of the GSS, observing that the process review would threaten the status quo in Zeta and would therefore be controversial. Consequently, their participation would be conditional upon the confidentiality of their input. The CIO reassured them with respect to confidentiality, clarifying that he would take personal responsibility for the project.

Familiarisation with the GSS was achieved by asking the team members to brainstorm issues relevant to the billing process, new features of the GSS interface being progressively introduced. This illustrated how the GSS could be used to handle various aspects of the billing process. After some twenty minutes, twenty ideas and fifteen comments had been entered into the GSS[5]. At this point, the CIO wrapped up the meeting, requesting members to continue to input ideas remotely during the week: a total of thirty ideas and seventy comments were generated in this first week. However, the meeting process instrument was not completed immediately, members pleading fresh meetings to attend.

Observations

I noted the team members' healthy level of initial interest in the GSS and the task, as well as their perception that the issues involved would be controversial. They did not appear to experience task or GSS related difficulties, contributing many sensible and

[5] About 2-3 pages of single-spaced A4 paper.

thoughtful ideas. The CIO privately confided that immediate completion of the questionnaire would be better, yet professed himself unable to require compliance.

Reflections

Subsequent data analysis revealed few problems, team members disagreeing that the language used (English) prevented their participation, though they only weakly disagreed that they were reluctant to contribute ideas. Discussions were seen to be reasonably meaningful, open and appropriate. Importantly, members evinced comfort with the technology itself, sensing that it did facilitate their work. Finally, although the first meeting ran smoothly enough, it was apparent that the CIO's positional power was limited.

Cycle Two

Planning

The CIO and I held a ninety-minute reflecting and planning session before the second meeting. It was noted that the ideas generated in the first cycle were wide-ranging, but lacked focus. To remedy this, the CIO proposed that the second meeting should focus on the scope and objectives of the new billing process, with the GSS being used to support the necessary idea generation.

Intervention

Two team members were unable to attend this meeting, and were substituted by colleagues unfamiliar with the software. After reacquainting themselves with the material, the CIO initiated a verbal discussion of the issues. This lasted some thirty minutes, but was little more than a conversation between the CIO and the Insolvency Manager. At my suggestion, all team members verbally discussed and categorised each of the thirty ideas as lying inside or outside the scope of the billing process. The

discussion was initially dominated by the CIO, but I intervened to ensure that all team members had the opportunity to participate.

The GSS functioned in this meeting as a form of team 'memory'. All members had access to the thirty ideas and seventy comments, using them to inform their discussion. I 'moved' ideas in real time from the main list to one of two new 'categories' - 'inside scope' and 'outside scope'.

Observations

After this meeting, I discussed project issues with the CIO and the Insolvency Manager, both of whom felt that the other team members were very unwilling to get involved in discussions, not appreciating either the purpose of the project or their involvement. This attitude stemmed in part from Zeta's organisational culture which did not encourage, let alone reward, innovation or working outside one's immediate task environment. The CIO explained that he wanted to encourage participation, with all team members having a fair go at contributing to the processes, yet he also felt the occasional need to be autocratic to ensure that things did get done.

Reflections

Clear problems emerged in this meeting that related to the interaction between the CIO and the team members. Although the team members were competent to perform the work required, their willingness to take responsibility appeared to be low. Indeed, they appeared to have little vested interest in, or motivation for, the problem they had been assigned to tackle. Instrument data corroborates this, revealing a general apathy towards the meeting processes, with a lack of team spirit and diminished discussion quality. This lack of interest was augmented by the CIO's failure either to communicate why the review process was important or to allocate a sufficiently high priority to the task himself.

KEY PROBLEMS ENCOUNTERED DURING THE PROJECT

Five key problem areas were encountered during the project.

Chargeable Time

It became apparent that a key demotivator for the team's participation was that they could not charge the time so spent to any account. As in many similar firms, Zeta employs a system of 'chargeable time', but the time team members spent on the project was not chargeable. A senior partner in the firm was confronted with this inconsistency, but he merely replied that the firm did value the time and effort committed by the team members. The lack of substantive evidence to support this assertion made it very difficult to believe that the firm was sincere in its intent.

Empowerment

The CIO clearly identified the need to empower the team members and entrust them with the responsibility for re-engineering the billing process. However, he did not explicitly communicate his rationale to them, nor could he appreciate their lack of interest in solving the task. Instead, he supplied them with weighty texts on re-engineering, which remained unread. Privately, some team members expressed the view that the new system might improve some aspects of the billing process, but if they found that it obstructed their work they would simply ignore it and create work-arounds. Indeed, they had little interest in being empowered (none of them having volunteered to work on the project), believing that the task of re-engineering was more properly the CIO's. None of the team members commented on or contributed to the final project report. Indeed, their unwillingness to undertake any more work

than absolutely necessary meant that they could not be considered as co-researchers in the project.

Misappropriation of Anonymity

The CIO misappropriated the anonymity of the GSS, projecting large numbers of his own ideas without their authorship being positively attributable. He freely admitted to me that he sometimes submitted wild or provocative ideas so as to see what he could get away with. Team members noted, individually, to me that they would prefer that the communications using the GSS be identified since this might improve the value and sincerity of the discussions. The CIO, however, vetoed this proposal.

Conflict between the CIO and the Researcher

Initially, the CIO identified my responsibility as being primarily technical, advising him on how to apply the GSS most effectively in order to achieve his objectives in running the project. This became an increasingly untenable role to play as the CIO's dominance of meetings increased. On one occasion, for example, I intervened in a heated debate between the CIO and team members to suggest that some cultural confusion might underlie the discussion and its lack of progress. The CIO took grave offence at this intervention and subsequently reprimanded me. I was careful not to align myself with either the CIO or the other participants, in order not to be accused of bias. However, my dissonant stance had clearly aggravated the CIO.

Data Quality

The instrument employed was designed to collect perceptions of the participants concerning five key meeting processes, viz.: discussion quality, communication,

efficiency, teamwork and status effects. While useful, the instrument only measured perceptions within a single meeting. After the third meeting, the CIO criticised the instrument design, arguing that it would be more useful to make comparative measurements from week to week. In consequence it was redesigned.

REFLECTIONS AND ACTIONS

Assessment of the Situation

The role of an action researcher is to work with team members so as to devise the most appropriate solution to the problem being tackled. While problems were intertwined in this project, many related to the CIO's paradoxical dominance of activities, but lack of positional power.

The team members recognised that the CIO was frustrated by the tortuous progress of the project, but also suggested that his own preference for open and rigorous debate contrasted sharply with their reticence to express opinions publicly and preference for private discussions. They further recognised there was a need for a neutral moderator who could draw out the views of the team members, while neutralising the excesses of the CIO. Ironically, the GSS offered the opportunity to communicate ideas anonymously, but a culture of cautiousness hampered the situation: the manager from the Tax Department commented that the female members in particular would typically not contribute ideas if they were unsure of their accuracy. I observed such behaviour on a number of occasions.

The CIO was not at all reticent about making his views known. Although he recognised from the outset that participation might turn out to be a problem, his apparent lack of awareness of the *importance* of chargeable time for the team members was an unexpected revelation. His comments, however, are most

insightful, if a little beguiling: "For me personally, chargeable hours are not of importance as I do not do client work. Although I knew that chargeability is used as a measure of performance for client service providers, I did not fully appreciate the influence that it has".

With the approval of the CIO, I took a leading role in meetings from cycle seven onwards. Having observed the negative effects of the CIO's style of leadership, as well as the fact that the GSS was used effectively for discussion of billing process problems, but ineffectively for consensus development, I consciously attempted to:

- imbue meetings with a more friendly style of communication;
- ensure that tasks were rich in opportunities for idea generation and discussion;
- reduce the normative influence of the CIO by increasing the involvement of team members in specific tasks;
- identify learning opportunities that the project presented for team members.

The original instrument for collecting data on participants' perceptions of meeting processes did not incorporate any element of comparison with previous meetings, hindered analysis of processes in longitudinal meetings. During the third cycle, it was agreed that some of the instrument items should be realigned to reflect changes from meeting to meeting. Thus, team members were asked whether a process (e.g. discussion openness) had improved, deteriorated or remained the same when compared with the previous meeting. This instrument revision is seen as a critical element of the action research, in that tools and techniques should only be used for as long as they are useful. Realigning the focus of the instrument was a joint solution that helped to ensure useful data collection.

The comparative data collected proved very useful for future planning of meetings. It also enabled me to observe, for example, that while the level of conformance pressure fluctuated through the project, the levels of intimidation and influence dropped as I took a more active role in meeting processes. Despite these fluctuations, the extent to which team members actually felt inhibited from participating was initially low and remained unchanged throughout the project. Certainly participation was problematic, but data collected appears to confirm the earlier finding that notional willingness to participate was high.

DISCUSSION AND LESSONS LEARNED

The organisational circumstances and group dynamics encountered in this research setting were taxing. The fact that the CIO lacked the positional power to enforce any of his requests contributed considerably both to the length of the project and his own frustration with the meeting process. However, the CIO failed either to increase his own prioritisation of the task or to seek direct power from the executive partner, so as to complete project tasks more effectively.

Senior partners ostensibly approved the initiation of the project, yet failed to give the team members any overt recognition of the value of their work, and it is certain that the system of chargeable time mitigated against their involvement; that the firm, and the CIO, failed to take account of this when the project was approved was short-sighted at best. At the end of the project, the project's executive sponsor expressed some appreciation for the work that the team had accomplished, but did not indicate that changes in Zeta’s policy concerning chargeable time would be forthcoming. Although the GSS literature pays little attention to the issue of participant motivation, the facilitation literature is more forthcoming with the

suggestion that the motivation of a group to accomplish its task, and the need to keep it focused on its outcomes, are critical (Clawson et al., 1993; Niederman et al., 1996).

In the following discussion section, the roles of the two key aspects of this research, viz.: the action research methodology and the GSS technology are evaluated. This evaluation will lead to the identification of key lessons that can be applied in similar contexts.

Reflections on Action Research

Motivation to participate was always low, features of the organisational setting and reward mechanisms playing a contributory role. The direction of the project was sometimes unclear, and the CIO might have abandoned the notion of involving the team members at all, attempting to re-engineer the processes himself; equally, the team members might have totally ignored the CIO and ceased attending meetings or contributing. The fact that these did not happen, despite the CIO's wry comment that the team members probably autodeleted his email, testifies to the robustness of a methodology that supports flexibility, continuous intervention and appropriate change.

A central tenet of action research is that a researcher should act to introduce changes with positive social values, even if these conflict with the status quo, while considering the needs of the clients. The team members were consulted as to their views on the progress of the project, the appropriateness of the goals and the suitability of the CIO as a project leader. Feedback from these consultations was usefully incorporated into the way that the project was run, with the result that changes were made, and, most critically, the project continued to run. However,

these actions that I took should be seen as essential modifications to what was an intentionally tenuous initial plan. When the project was initiated, there was no long term plan about how to proceed, nor indeed should there have been one. Checkland (1981, p.153) notes that action research "cannot be wholly planned and directed down particular paths". Lévi-Strauss has made similar comments about field research, observing that one should "go along with the lie of the land" rather than expecting to stick to pre-determined techniques and styles of enquiry (cited in Descola, 1996, p.40).

The researcher's flexibility is an essential component of action research, and thus not a weakness in the research design. If one instrument or technique proves inadequate, it should be revised or discarded to be replaced by a better one. I refined the data collection instrument mid-way through the project, redefined my own and the CIO's roles, and reallocated responsibilities accordingly. It is conceivable that motivation-related questions could have been included in the instrument, but in other meetings a different factor could contribute negatively. While the instrument was valuable, therefore, in eliciting certain key problems and supplementing the richer information obtained in interviews, it was not designed to identify all potential problems; my own intervention was essential for this. None of these experiences cause us to dispute the value of planning as a key element of the action research cycle, but do lead us to caution that such plans should incorporate flexibility, an attribute of facilitation identified as being important by Niederman et al. (1996). This flexibility permitted me to intervene in a manner impossible with other, more structured, methodologies. In consequence, the solution attained was probably better than would have been the case had no intervention been performed.

Checkland (1981) notes that a researcher should not remain an observer outside the subject of investigation, but become a participant in the action. Mid-way through the project, participants suggested that I take a moderating role in the project discussions and so neutralise some of the CIO's excesses. When I changed my role in response to this request, attempting to increase the involvement of participants and decrease the normative influence of the CIO, the private feedback from participants was positive and the levels of perceived status influence diminished. It has been suggested (Gersick, 1991) that a radical change in group organisation can disrupt dysfunctional behaviours and so improve a group's productivity.

Reflections on GSS

The CIO observed early on in the project that he could re-engineer the billing process himself, but needed the participative co-operation of the whole team to ensure that the final system would be acceptable to different departments. The history of GSS use elsewhere (e.g. Grohowski et al., 1990) suggests that its application in complex organisational circumstances could indeed be successful. Thus, there was reason to think that use of GSS was warranted and would be received openly. Indeed, the literature (e.g. Nunamaker et al., 1997) suggests that a GSS can enhance effectiveness and efficiency, resulting in higher levels of participant satisfaction than might be attained in the absence of technological support.

If the CIO had tackled the project without either the GSS technology or my interventions, it is unlikely that such a process would have produced results acceptable to Zeta's employees. Therefore, it can be asserted that the GSS did exert

a significant and positive influence on the meeting process. What became apparent early in the project, however, was that the GSS could not be used in the same way that the literature suggests. Although team members appreciated being able to use the GSS for tasks that required substantial idea generation, given that it markedly improved their productivity and enabled them to contribute ideas at their own pace, it was definitely not appreciated for tasks requiring the development of consensus or fine points of detail. These findings encouraged me to vary the application of GSS to fit the characteristics of the team more effectively. Previous research in GSS seldom mentions the importance of matching GSS tools with tasks, but evidence from meeting facilitators does indicate its importance (Niederman et al., 1996).

Furthermore, anonymity was used in a manner not described in the literature, with the CIO taking advantage of it to cloak his own many contributions with a quasi-team authorship. Anonymity is often seen as a vital aspect of GSS research and practice, the usual rationale being that it promotes unbiased and task focused discussions, while diminishing the negative effects caused by domination and intimidation. Lyytinen et al. (1993), however, observe that its use may not always be appropriate, citing the example of international diplomacy where it is essential for all contributions to be identified for them to be meaningful. In this project, it is certain that anonymity contributed negatively, team members commenting that discussions would have been more frank and sincere had contributions been identifiable.

CONCLUSIONS

This research underscores the difficulties encountered in applying GSS in organisational contexts in the presence of dysfunctional circumstances. Issues that affected motivation in this project, including chargeable time, leadership style and

sense of responsibility for the project's outcomes, should all have been accounted for before the project was initiated. Of particular concern are organisational culture issues. The GSS was used to mediate some of the dysfunctions, demonstrating that key stakeholders can be involved in the improvement of organisational processes and that tools such as GSS can be useful.

Action research enabled us to investigate the key issues underlying some of the organisational problems. The combination of GSS and action research supported an exploration and analysis of ideas that enabled the team to achieve some semblance of success. The project was tentatively completed and a pilot system was running nine months later in one department, although considerable angst was experienced during the review process. The modest outcomes, while better than what could have realistically been attained had neither GSS nor action research been used, could nonetheless have been achieved less painfully and more efficiently in more ideal circumstances.

The results reported here have implications for future work with GSS in a number of respects. GSS can be effectively used for longitudinal meeting contexts so long as the GSS facilitator/researcher employs the technology flexibly when tackling problems. Participants in this project, despite their lack of familiarity with GSS software expressed comfort with the technology, believing that it facilitated their work.

For Zeta to make any significant, IT-related improvements in the future, significant changes to its organisational culture would be necessary. Barriers to participation, concerning chargeable time and the reward system must be addressed. Although I sought to introduce positive social changes during this study,

these were countered by Zeta's organisational culture, which did not appear to value motivational issues.

Research and practice that draws upon the synergy of GSS and action research is not frequently encountered, yet as this paper demonstrates, has much potential. Researchers and practitioners are encouraged to explore this domain further in different cultures and organisational contexts.

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APPENDIX

The instrument developed by Davison (1997, 1998) includes five constructs measuring: communication in meetings (C), discussion quality in a meeting (D), status effects experienced in meetings (S), team work in a meeting (T) and efficiency of meeting processes (E). Two versions of the instrument were developed. The first, referred to as the absolute version, is designed for one-off meetings, or initial meetings in a series. The second, referred to as the relative version, is designed to be used when it is necessary for respondents to compare their perceptions with those made in previous meetings. Each item within a construct is followed by a code, e.g. C1. The letter refers to the construct, i.e. C=Communication in Meetings. The digit refers to the nominal order of the item within the construct.

Absolute Version of the Instrument:

With regard to your own participation in the meeting, please indicate to what extent you agree with the following statements:

The language of the meeting prevented you from participating. (C1)
Strongly Agree [] [] [] [] [] Strongly Disagree

You found it hard to understand other group members when they talked. (C2)
Strongly Agree [] [] [] [] [] Strongly Disagree

You experienced problems expressing yourself. (C3)
Strongly Agree [] [] [] [] [] Strongly Disagree

You felt reluctant to put forward your own ideas. (C4)
Strongly Agree [] [] [] [] [] Strongly Disagree

You experienced pressure, either to conform to a particular viewpoint or not to contradict others. (S4)
Strongly Agree [] [] [] [] [] Strongly Disagree

With regard to all meeting members as a whole, how would you rate the discussions in the meeting in terms of the following scales?

Meaningful	[]	[]	[]	[]	[]	Meaningless (D1)
Appropriate	[]	[]	[]	[]	[]	Inappropriate (D2)
Open	[]	[]	[]	[]	[]	Closed (D3)
Imaginative	[]	[]	[]	[]	[]	Unimaginative (D4)

Please indicate to what extent you agree with the following statements:

Other members appeared willing to answer questions when asked. (T1)
Strongly Agree [] [] [] [] [] Strongly Disagree

Members worked together as a team. (T2)
Strongly Agree [] [] [] [] [] Strongly Disagree

Members had sufficient access to the information they needed so as to participate actively in and fully understand the meeting. (T3)
Strongly Agree [] [] [] [] [] Strongly Disagree

The time spent in the meeting was efficiently used. (E2)
Strongly Agree [] [] [] [] [] Strongly Disagree

Issues raised in the meeting were discussed thoroughly. (E3)
Strongly Agree [] [] [] [] [] Strongly Disagree

Some group members tried to intimidate others, e.g. by talking loudly, using aggressive gestures, making threats, etc. (S1)
Strongly Agree [] [] [] [] [] Strongly Disagree

Some group members tried to use their influence, status or power so as to force issues on the other group members. (S2)
Strongly Agree [] [] [] [] [] Strongly Disagree

You felt inhibited from participating in the discussion because of the behaviour of other meeting members. (S3)
Strongly Agree [] [] [] [] [] Strongly Disagree

What percentage of meeting time do you think was spent on serious discussion?
___ % (E4)

To what extent would you say that this meeting was result oriented? (E1)
Strongly Result Oriented [] [] [] [] [] Weakly Result Oriented

Relative Version of the Instrument

Compared to previous meetings of this team, do you feel that:
Your ability to participate in the meeting (C1)
Improved []; Stayed about the same []; Deteriorated []

Your understanding of the typed comments from other group members (C2)
Improved []; Stayed about the same []; Deteriorated []

Your ability to express yourself (C3)
Improved []; Stayed about the same []; Deteriorated []

Your willingness to put forward ideas (C4)
Increased []; Stayed about the same []; Decreased []

The pressure you experienced, either to conform to a particular viewpoint or not to contradict others (S4)
Increased []; Stayed about the same []; Decreased []

Compared to previous meetings of this team, do you feel the discussions improved, stayed the same or deteriorated on the following scales:

Meaningful (D1)	Improved	[];	Stayed about the same [];	Deteriorated []
Appropriate (D2)	Improved	[];	Stayed about the same [];	Deteriorated []
Openness (D3)	Improved	[];	Stayed about the same [];	Deteriorated []
Imaginative (D4)	Improved	[];	Stayed about the same [];	Deteriorated []

Compared to previous meetings of this team, do you think that:
The willingness of other members to answer questions when asked (T1)
Increased []; Stayed about the same []; Decreased []

The extent to which members worked together as a team (T2)
Increased []; Stayed about the same []; Decreased []

The extent to which members had sufficient access to the information they needed so as to participate actively in and fully understand the meeting (T3)
Increased []; Stayed about the same []; Decreased []

The time in the meeting was used (E2)
More efficiently []; As efficiently []; Less efficiently []

Ideas were discussed (E3)
More thoroughly []; As thoroughly []; Less thoroughly []

The extent to which some group members tried to intimidate others, e.g. by talking loudly, using aggressive gestures, making threats, etc. (S1)
Increased []; Stayed about the same []; Decreased []

The extent to which some group members tried to use their influence, status or power so as to force issues on the other group members (S2)
Increased []; Stayed about the same []; Decreased []

The extent to which you felt inhibited from participating in the discussion because of the behaviour of other meeting members (S3)
Increased []; Stayed about the same []; Decreased []

What percentage of this meeting's time do you think was spent on serious discussion? ____% (E4)

To what extent would you say that this meeting was result oriented? (E1)
Strongly Result Oriented [] [] [] [] [] Weakly Result Oriented