THE IMPACT OF ELECTRONIC MEETING TECHNOLOGIES IN TWO LESS DEVELOPED COUNTRIES

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Abstract: Electronic meeting support, such as Group Support Systems (GSS), can play a crucial role in supporting groups engaged in development activities. Being an American invention, research into GSS is predominantly focused on Euro-American settings. GSS field studies in other cultural environments are scarce. The objective of our study is to explore the applicability of GSS in two particular environments: Tanzania and South Africa. Our data suggest that the use of GSS is evaluated positively in both countries, although Tanzanian groups perceived more benefits. In South Africa, top management displayed very open and non-conservative behavior towards the technology, while in Tanzania hesitance from top management can be expected to be the greatest hindrance for GSS acceptance and application. The data further indicate that GSS do not replace existing meeting customs, but rather introduce new ones that co-exist next to the traditional ones. The main difference between application of GSS in western and non-western is a stronger focus on the electronic discussion in Africa where anonymity is the key feature.

Keywords: Collaborative development, Group Support Systems, groupware, Tanzania, South Africa, Cross-cultural

INTRODUCTION

It is only in recent years that there has been a shift from doing development to or for those who are perceived to need it towards doing development with or empowering those who need development to doing it for themselves, see e.g. World Bank (19961). As development finance moved from investment in large infrastructure projects such as roads, bridges, dams, and other big engineering projects to projects involving the environment and human resources, there has been a growing realization of the complexity of development. There has been a growing recognition that successful development initiatives are those where the beneficiaries and other stakeholders in development have played an active part in the development process. In summary, there are various reasons for taking a group perspective on development activities:

- *Complexity*

  Development problems are often so complex that no single person has all the understanding, information, and resources to solve the problem alone.

- *Evaluation*

  A group of people is often more capable of providing a reality-check for proposed solutions than is the individual proposing the solution.

- *Acceptance*

  When all the stakeholders arerepresented in development activities, there is a better chance their interests will be accommodated in the solution.

- *Interest*

  Usually many members of an organization have a strong interest in organization design problems and their implications so it is appropriate to involve those people.

- *Synergy*

  People involved in creative problem solving processes often build on one another's ideas leveraging their different talents and knowledge. This synergy can lead to new, rich ideas that may not have otherwise occurred.

Unfortunately, such group work is seldom without its own set of problems. Most people working in groups have experienced the frustration of never-ending meetings that seem to have little focus and for which the outcomes are unclear (Nunamaker *et al.*, 1991). The 3M Management Institute reports that in the United

States alone there are over 11 million formal meetings per day, consuming 30-80% of managers' time. One Fortune-500 company reports losses in excess of $75 million per year due to poor meetings (Nunamaker *et al.* 1997).

Information and communication technologies (ICT) are becoming a key instrument to support effective communication between people within developing countries and between people in developing and developed countries (Odedra, 1993; Vogel and Qureshi, 1998). In particular groupware technologies are increasingly employed to target trouble spots in teamwork and group productivity. Groupware can radically affect the dynamics of team interactions by improving commu-nication, by structuring and focusing problem-solving efforts, and by establishing and maintaining a balance and alignment between personal and group goals (Post, 1993).

If we assume that electronic communication between people with various cultural backgrounds will become the norm in the next millennium, it is important to understand how supporting ICT can, and will, affect the way people communicate, and *vice versa*. The effects of employing ICT to support communication can be twofold (DeSanctis and Poole, 1994):

1). The technology may induce a change in the existing traditions regarding communication and collaboration. ICT have built-in cultural norms and values of the environment in which they were developed - often developed countries - (Watson *et al.* 1994). These norms and values are imposed on the new application environment.

2). Existing local communication and collaboration traditions in developing countries may set special requirements for supporting technologies to be successful. As a result, we may see the advent of specially tailored ICT to support communication in developing countries.

This paper presents a comparative study of Tanzania and South Africa where a particular type of groupware technology, Group Support Systems (GSS), was subjected to an in-depth analysis. The objective of the study was to explore the applicability of GSS in two socio-cultural environments that are very different from its Euro-American origin. The next section describes the origin and nature of GSS in more detail. The research design of the study is addressed in Section 3. Section 4 highlights the results from study, which are discussed in Section 5. The paper concludes with a summary of the most important findings, the study's limitations, and directions for future research.

ELECTRONIC MEETINGS AND GROUP SUPPORT SYSTEMS

What are GSS?

Group Support Systems (GSS) are employed to make creative group meetings more productive and effective. A GSS can be defined as a system consisting of computer software, computer hardware, meeting procedures, and facilitation that support groups engaged in intellectual collaborative work (Eden, 1995; Jessup and Valacich, 1993]. GSS are no new technology. By the late 70s the first GSS prototypes had been tested (Wagner, *et al.* 1993). The first commercial GSS entered the market in the mid 80s. GSS originate from the field of Decision Support Systems (DSS). In the beginning they were called Group DSS (GDSS). Later on, the "D" was dropped because in practice it turned out that these systems did not only support group decision making, but also more general meeting processes focused on exchanging information and developing joint insight.

A GSS meeting usually takes place in a fixed or mobile GSS facility, often called a Group Decision Room (GDR). A GDR consists of a meeting room with chairs, desks, and various presentation support tools such as white boards, slide projectors, and flipchats. Each work space is equipped with a computer that allows the participants to collaborate electronically using the GSS. Two examples of a GDR are depicted in figures 1(a) and 1(b). However, GSS can also

be employed in meetings that take place in different locations and/or asynchronously.

Figure 1(a): *A fixed Group Decision Room.*

Figure 1(b): *A mobile Group Decision Room.*

It is difficult to imagine how an electronic meeting takes place without participating oneself. In principle, an electronic meeting can be described as an "ideal" meeting: All participants can talk at the same time, yet everybody can hear each other. No ideas get lost. Each idea is judged only on its merit and not on the person that submitted it. A snapshot of an ongoing discussion in an electronic meeting is depicted in Figure 2.
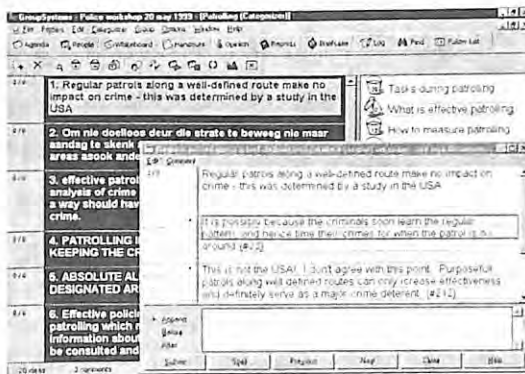

Figure 2: *Snapshot from an ongoing electronic discussion.*

Researchers and practitioners claim that GSS meeting are often more efficient and effective than "normal" meetings, and that participants are more satisfied with such meetings. Research usually subscribes these claims, see e.g. (Nunamaker *et al.*, 1997; Vogel and Vreede 1999). The following characteristics of GSS appear to bring about these positive experiences:

- *Anonymity:* Each contribution remains anonymous; submissions cannot be traced to individual participants. This prevents dominant meeting behavior. Moreover, it encourages a more critical attitude which has shown to result in better ideas.

- *Parallel communication:* Participants can submit ideas at the same time. So, each participant has the floor simultaneously, which results in higher productivity.

- *Group memory:* During normal meetings, results may get lost because of incomplete or poorly kept minutes and the limited memory of the participants. During a GSS meeting, all electronic contributions are saved automatically. When the GSS meeting is adjourned, the minutes with the generated ideas and decisions made can be printed out immediately.

GSS can be applied in many different areas. A number of examples are: the development and evaluation of policies, the evaluation of computer application prototypes, the identification of organizational problem areas, the execution of SWOT analyses, the development of new product concepts, expert consultations, the design and evaluation of project schedules, and the development of company strategies. Currently there are a number of commercially available GSS, the most well-known being Group Systems for Windows which was also used in the study reported in this paper.

GSS in Non-Western Cultures

The reported experiences with GSS are mainly

based on studies in Euro-American developed countries (Watson *et al.*, 1994). GSS researchers such as Ho *et al.*, (1989] and Watson *et al.*, (1994) argue that national culture may influence differences in GSS usage by groups. Still, comparatively, little GSS research data have been gathered on other cultures (Nunamaker *et al.*, 1997). Table 1 presents an overview of GSS research we know of in non Euro-American cultures.

The results from the studies in Table 1 indicate that group decision making appears to be strongly influenced by both the cultural and environmental norms surrounding the process. Culture and environment seem to affect the satisfaction and participation equity of groups from different cultures, primarily because they affect the perception levels of the participants. For example, Watson *et al.* (1994) found that Singaporean groups have higher pre-meeting consensus and less change in consensus than US groups. Mejias *et al.* (1997a) found that non-GSS groups obtained higher consensus than GSS-supported groups in Mexico, while it was different in the US. These examples indicate that GSS clearly function differently in different sociocultural environments. Or, the other way around: the setting in which GSS are used has a clear impact on the way a group uses it effectively.

It also appears that previous research has a strong experimental focus using student subjects to investigate a particular phenomenon. Field studies on GSS in different socio-cultural environments are rare. This is especially true in Africa where the exploration of GSS is still in its infancy and has been little studied. The first reported experiences with GSS in Africa involved three countries in East and Central Africa (Spleftstoesser and Spleftstoesser, 1998; Jones and Miller, 1997; Jones and Vreede, 1997): Tanzania, Malawi, and Zimbabwe:

- Jones and Miller (1997) report on World Bank projects in Malawi and Zimbabwe to collaboratively develop a Country Assistance

Strategy (CAS). In Malawi 120 stakeholders participated, while the Zimbabwe sessions involved 70 stakeholders. The meetings resulted in action plans of which a number had been implemented at the time the study was written up. Although for many it was the first time they used a computer, most participants appeared to be very satisfied. Over 97 percent said they would recommend this technology to other groups. The usefulness of the technology for this type of consultation was rated on the average at 4.2 out of 5, 5 being most positive.

- Jones and Vreede (1997) describe another GSS meeting in Malawi, where a two-day roundtable discussion with 50 stakeholders was organized to help develop an environmental strategy. In this project, the same high level of participant satisfaction was observed.

- Finally, Splettstoesser and Splettstoesser (1998) illustrate the application of GSS in environmental planning by Tanzanian marine conservationists. The authors themselves observe that the GSS technology assisted in enhancing group productivity and efficiency, while the decision making process became more transparent.

These first studies on GSS in Africa are worthwhile in that they describe real experiences and illustrate the potential usefulness of the technology. However, none explain the attitude of the participants towards the technology, nor the interplay between the technology and local meeting traditions.

Why Employ GSS in Africa?

Many approaches, such as surveys, interviews, or focus group meetings, have been tried to involve stakeholders or beneficiaries at various stages of a development assignment. While these methods have been beneficial, there are downsides (Jones and Miller, 1997):
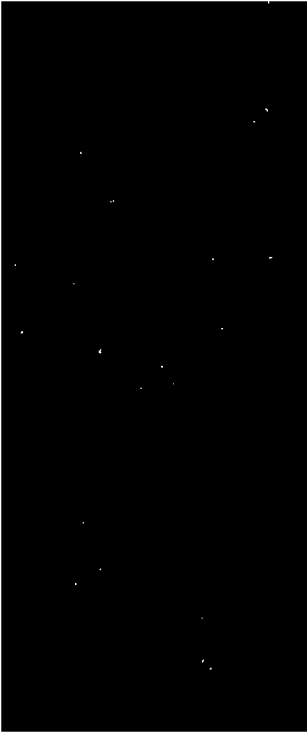
Reference	Country	Research type	Subjects	Research focus
Chung and Adams [1997]	Korea and US	Survey	Korean and US business firms	Comparison of group decision making
Davison [1995]	Hong Kong	Theoretical/Argumentative	-	Cultural and organizational implications for the implementation of GSS
Davison and Jordan [1996]	Country independent	Theoretical/Argumentative	-	Impacts of culture on the use and adoption of GSS
Davison and Jordan [1998]	Hong Kong	Theoretical/Argumentative	-	Barriers to Adoption of GSS in a cross-cultural setting
Griffith [1998]	Bulgaria and US	Experimental	Bulgarian and US students	The effect of power distance on the implementation of GSS
Ho et al. [1989]	Singapore and US	Experimental	Singaporean and US students	Cultural differences and their effect on the application of GSS
Mejias et al. [1997a]	Mexico and US	Experimental	Mexican and US students	The effects of culture on group consensus, perceptions of participation equity and satisfaction (with and without GSS)
Mejias et al. [1997b]	Mexico	Experimental	Mexican students	The impact of GSS on productivity, consensus, and participation equality in the Mexican culture
Morales et al. [1995]	Mexico and US	Field study	Mexican business and government employees	The use of GSS for regional development in Mexico
Niederman [1997]	Mexico and US	Survey	Mexican and US facilitators	Effect of Culture on Facilitating GSS meetings
Raman and Wei [1992]	Japan, Singapore, and Taiwan	Project overview	Various student and organizational groups	Cultural differences and implications for GDSS design
Robichaux and Cooper [1998]	Country Independent	Theoretical/Argumentative	-	The effect of culture on GSS participation
Splettstoesser [1995]	African developing countries	Theoretical/Argumentative	-	Use of GSS in Development Decision Centres
Splettstoesser & Splettstoesser [1998]	Tanzania	Field study	Tanzania Marine conservationists	Use of GSS in Environmental Planning
Tan et al. [1993]	Singapore, US and Finland	Theoretical/Argumentative	-	Understanding GSS application to improve meeting quality in various cultures
Tan et al. [1998]	Singapore and US	Experimental	Singaporean and US students	The use of Computer-Mediated Communication (CMC) to reduce status effects
Watson et al. [1994]	Singapore and US	Experimental	Singaporean and US students	Effect of culture on equality of participation and consensus

Table 1. Overview of some previous GSS research in non-Euro-American environments.

- Inadequate coverage. For example, in one African country where interviews were used to get stakeholder feedback, two weeks were required to conduct 19 interviews. Of these, only 11 were in-country stakeholders.

- A structure that cannot handle the target population's spontaneity. In one-on-one interviews, the interviewee may not speak freely, fearing retribution.

- A lag between when data are gathered and when they are available for analysis.

The deployment of GSS may help to overcome these obstacles. Although research shows that GSS are not an answer to every group problem, GSS meetings are often found to be more productive, more efficient, more effective, and more satisfying than non-GSS meetings, see e.g. (Nunamaker *et al.* 1997; Pervan, 1994). For example, in the situation mentioned above, GSS may provide considerable support. Instead of 19 separate interviews, stakeholders could be invited to a single one-day workshop where they would answer the questions electronically. Apart from time reductions, protected (anonymous) communication, and immediate electronic availability of the interview data, the advantage of this setting would be that it enables creative cross-fertilization: the interviewees could see and respond to each others' ideas.

RESEARCH DESIGN

This study follows an interpretivist philosophy, subjectively interpreting observations from reality. We focused on exploring GSS and its application in its natural environment. The overview of past cross-cultural GSS research showed that (field) studies on GSS in Africa are rare. Little is known about real groups in non-Euro-American cultures using GSS. Hence, our study is predominantly descriptive in nature. Below, we first describe the data sources and data collection instruments in more detail, followed by elaboration on the way in which the data were analyzed and the role of the researchers.

Data Sources and Instruments

During the period from April 1998 until August 1999, we studied 35 GSS meetings in Tanzania and South Africa. In order to build a rich understanding of the application of GSS in these settings, we collected data from a variety of sources, using different data collection instruments as follows.

Our study's primary data source concerned our own observations. During each meeting at least two researchers were present who kept notes facilitated by an observation instrument based on the research model presented below. Comparing researchers' observations resulted in additional insights. Also, combining the subjective interpretations of different observers may reduce researcher bias [Churchman 1971; Hartley 1994].

Open and semi-structured interviews were held with the meeting owner and various participants before and after each GSS meeting. These interviews addressed the interviewee's expectations, experiences with the technology, and perspectives on the particular meeting process and outcomes.

'Satisfaction questionnaires' were handed out immediately after each meeting. These questionnaires consisted of a number of open and five-point Likert scale questions.

'Electronic meeting logs' were studied to get a deeper understanding of the nature and content of the electronic collaboration.

Data Analysis

The collected data were analyzed using grounded theory techniques. We analyzed the collected data by coding it. All collected data were closely examined, broken into discrete parts, and labeled. The procedure used is similar to the process of *open coding* (Strauss and Corbin 1998). However, rather than identifying labels during the coding process, we used a predefined set of labels that were directly derived from the research model presented below.

The data analysis (and collection) process was guided by a research model on GSS

acceptance based on earlier GSS field research in Tanzania (Mgaya, 1999; Vreede *et al.*, 1998). This model (figure 3) suggests that the acceptance of GSS would be stimulated by computer literacy, top management endorsement, and satisfaction with use. The presence of referent power and a preference for verbal communication would discourage the acceptance of GSS. A description of each factor is presented in Table 2.
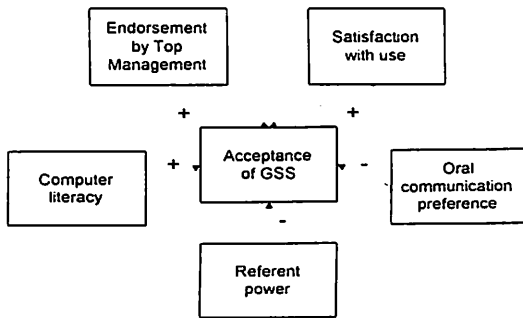

Fig. 3: *Factors Influencing the Acceptance of GSS in Africa (Mgaya 1999; Vreede et al. 1998].*

Table 2: *Description of main factors influencing the acceptance of GSS in Tanzania*

Factor	Description
Computer Literacy	The extend to which the participants in GSS sessions are capable of working with a computer. People who are familiar with using a computer are expected to adapt to the meeting technology and process more easily than people who lack basic computer skills.
Top Management Endorsement	The extend to which the top management in an organization stimulates the use of GSS. If the top management (or group leader) does not endorse the GSS technology, the subordinates would probably be reluctant to use it.
Satisfaction with use	The extend to which the participants appreciate the technology, the meeting processes, and the outcomes. Dissatisfied GSS meeting participants are less likely to accept the technology for future meetings.
Referent power	The extend to which people in organizations do not hold a position based on their skills but on their

Table 2: Continued...

Factor	Description
	contacts. In referent power situations people may be more focused on nurturing existing relationships than on exchanging anonymous task related information.
Oral communication preference	The extend to which oral communication is preferred over written communication. If GSS meeting participants have a strong preference for oral communication, the technology enforced written communication would not be appealing.

Role of the Researchers

The role of the researchers during the study was only that of a process facilitation. Interventions during GSS meetings were aimed at supporting the participants in achieving their meeting goals. In other words, no interventions were planned nor made from a research perspective.

RESULTS

The application of GSS in Tanzania and South Africa was explored through the in-depth analysis of 35 GSS meetings, 24 in Tanzania and 11 in South Africa. Some background information on these meetings is presented in tables 3 and 4. In total, 406 people participated in the GSS meetings, 328 in Tanzania and 78 in South Africa, from various backgrounds. The meeting topics were diverse, but had one characteristic in common: they addressed an issue that the meeting participants had a genuine interest in.

Table 3: *Overview of studied GSS meetings in Tanzania*

Organization	Nr.	Participants Type	Topic
NSWTI	10	Tutors & students	Integration of computers in the training course
TBS	15	Managers	Improvement of standards preparation and standards quality

Table 3: Continued...

WAMATA	22	Counselors	Creating a good counseling environment
UDSM	29	Students	Employment procedures for graduating students in TZ
NSWTI	10	Students	Sexual offences in Tanzania
UDSM	14	Students	Computerization problems in TZ
CBE	12	Tutors & students	CBE 21ˢᵗ Century Vision
CBE	17	Students	CBE 21ˢᵗ Century Vision
WAMATA	17	Unemployed youths	Improvement of WAMATA Youths Wing Services
BP Tanzania	12	Managers	Anticipation anxiety on retrenchment exercise
World Bank	15	Technical Advisory Committee	Nile Basin Vison for 10 member countries
TSJ	8	Department heads	Improvement of TSJ Management leadership
WAMATA	7	Councilors	Burn out causes for counselors
WAMATA	17	Youth	Causes for poor communication and relationships between youth
TSJ	4	Postgraduate students	Problems facing journalism in TZ
IFM	15	Students	Impact of the millennium problem in TZ
IFM	12	Management team	Computerization of administrative processes
MoEC	11	PS, Commissioners and Directors	Causes for shortage of teachers in TZ
NSWTI	11	Students	Government decision to license private firms to sell firearms
WAMATA	7	Housewives	Causes for poor communication and relationships between youths
IFM	8	Academic staff	Problems in higher learning

			instiutions in TZ in the next century
BP Tanzania	28	Managers	Upward feedback evaluation
CBE	10	Academic staff	CBE 21ˢᵗ Century Vision and Corporate Planning
CBE	17	Students	CBE 21ˢᵗ Century Vision and Corporate Planning

Table 4: *Overview of Studied GSS Meetings in South Africa*

Organization	Nr	Participants Type	Topic
Mikomtek	11	Mikomtek Management	Allocation of STEP funds
Mikomtek	6	Mikomtek main server users	Future use of servers for services
Mikomtek	7	Mikomtek staff	Defining printer standards
Mikomtek	6	Virtual Reality Group	Action plan for virtual reality projects
Mikomtek	6	CSIR staff	Brainstorming on possibilities of GSS
Mikomtek	4	CJS group	Prioritizing projects
MLA/ Mikomtek	6	Mikomtek experts and MLA Management	Defining criteria for tender evaluation
SAPS	12	Mikomtek, staff, SAPS management, shift members	Specification of simulation model
SAPS	7	Shift members	Data generation
SAPS	6	SAPS management, shift member	Alternative generation
SAPS	5	SAPS management, shift members	Deciding on changes within SAPS

The meetings in Tanzania almost all used the mobile GSS facility that was set up at the location that the group preferred. The meetings held in South African all took place at the fixed meeting room available at the Mikomtek Division of the CSIR, the largest research institution of South Africa. Staff from Mikomtek participated in

the first few meetings, addressing different projects and problems within Mikomtek. Four other meetings concerned a project carried out by Mikomtek for the South African Police Service (SAPS), during which participants from different hierarchical levels participated. In the following two subsection, the findings in both Tanzania and South Africa will be described in more detail.

Tanzania

Computer literacy

Generally, computer literacy in Tanzania is very low (Baker, 1993). We encountered diverse levels of computer literacy, both within and between groups. We recognized two separate aspects of computer literacy: computer operation skills and typing skills. As one participant said, "Speed and knowledge of computers is important to enhance effective participation in a GSS meeting." In general, we found that limited computer operation and typing skills affected the number of ideas generated at the beginning of the meeting. This, however, improved as the meeting progressed and most participants became more enthusiastic and fluent in operating the system. We describe both aspects of computer literacy in more detail below.

Computer Operation Skills

Some participants were not familiar with even the basic functions of a keyboard or a mouse. Occasionally, this proved to be an obstacle for meaningful participation. Said one participant: "I had many ideas and views about the issue but since I have no knowledge of computers I failed to analyze and present these views' However, in general, about 20 minutes of training proved to be sufficient for most participants to acquire the required computer skills. During the meeting, inexperienced participants were assisted whenever they had problems, sometimes by more experienced colleagues. As meetings progressed most participants were able to pick up speed and

enter more contributions. Interestingly, limited computer skills did not seem to temper enthusiasm. Some participants even indicated that they liked GSS mainly because it gave them an opportunity to learn to use a computer.

Experienced computer users were comparatively very productive. For example, in one session 50 contributions were generated within 10 minutes. The same levels of productivity could also be observed in follow-up sessions with participants who had gotten acquainted with GSS. Here, only a brief introduction was required to bring participants up to speed.

Typing Skills

Most participants had very limited typing skills, even participants with some computer experience. Many participants typed with one finger. Although some recognized the disadvantage of poor typing skills: "typing speed is an obstacle to the contribution of ideas." On the whole it never made participants refuse to participate or abandon the technology. Moreover, limited typing skills appeared to be counterbalanced by the formulation of ideas: short, very clear and very much to the point.

Top Management Endorsement

Many organizations in Tanzania have strong hierarchical lines of authority. To introduce GSS into an organization it is necessary to get support from top management. We encountered varied levels of endorsement. Many chief executives did not appear to be threatened by GSS; they were quite enthusiastic about the technology. They participated very seriously and were very tolerant even if there were some mishaps. For example, one meeting was immediately re-scheduled because the researchers arrived late due to transportation problems. Almost all managers who participated in GSS meetings requested additional meetings.

However, we also noted that GSS endorsement may prove to be difficult, as managers quite often tended to depend on advise from subordinates, particularly the

computer department personnel. For unclear reasons, most of the computer personnel who we worked with were very unsupportive regarding GSS. As a result, after initial interest some meetings never materialized. Also, some managers appeared to expect GSS to generate answers automatically as soon as they typed in their problem. This misunderstanding and the subsequent disappointment could be a reason not to endorse future use of the technology.

Referent Power

Referent power is rather common in African organizations (World Bank, 1996). Also our own experience suggests that decision making in Tanzania is often based on personal relations. In such an environment, people want to know who said what to whom, for example, to see who supports their ideas or who returns favors. This process may be hindered by the anonymity feature of GSS.

On the whole, our data suggest that participants appreciated the anonymity feature very much because it allowed them to contribute and react freely, irrespective of rank differences. We observed one case where a director proposed to lift anonymity to clarify some ideas. Although his intention was appeared to be indeed clarification, the participants were very reluctant. They feared that he was interested in the origin of ideas, not their exact meaning.

We did not observe any other events that could be attributed to the presence of referent power. This may imply that referent power is of no concern for the application of GSS. However, one may also argue that to study referent power one must understand the relationships between the participants in a meeting. For this, one must know the history of the group in more detail than could be achieved in the span of at most a few meetings. Hence, we feel we cannot present a grounded interpretation on the effect of referent power on GSS application.

In Tanzania two sessions were held were mainly managers participated. Some of them were reluctant to use anonymous communication, leading to withholding some

ideas because they feel that GSS may make it difficult for them to get credit for their contribution.

Oral Communication Preference

Communication in Tanzania is considered to be strongly focused on oral interaction [Mgaya 1999]. However, our data suggests that apart from a few exceptions most participants preferred written communication to oral communication. We often observed that during the entire meeting, participants did not really want to communicate orally about the subject. Most participants seemed to be satisfied with just communicating electronically, even when facilitators encouraged it.

One explanation is that quite some participants felt uncomfortable expressing themselves orally. Said one participant: "This is the right technology for us who cannot express ourselves well during verbal communication." It may also be a language issue. For example, in one session participants switched over from English to Kiswahili during oral interactions and the resulting participation in the discussion was quite high. Finally, a preference for written communication may originate from the composition of the group. In groups with various ranks, participants with lower ranks did not show any intention to communicate orally. Oral discussions were, in such cases, dominated by superiors.

Satisfaction With Use

Satisfaction is an important predictor of future collaborative technology use (Briggs and Vreede, 1997). In our study, we looked at four satisfaction measures: Interest accommodation, product value, process satisfaction, and product satisfaction (Briggs and Vreede, 19971). The data indicate that on the whole, the participants were very satisfied with the GSS meetings. They expressed high levels of satisfaction on all measures (see table 5).

Table 5: *Satisfaction Scores in the Tanzanian GSS meetings*

Nr.	Question	AVG	STD
1	Today, my interests were accommodated	4.2	0.3
2	The work we accomplished today was worth the effort	4.3	0.4
3	I was satisfied with the way we did things today to achieve our goals.	4.5	0.3
4	The outcome of today's meeting is satisfactory	4.3	0.3

N=300. All values on a scale of 1 to 5; 5= most positive

These quantitative results confirm the observations we made during the meetings and expost interviews. We noticed that most participants felt that the GSS meeting accommodated their interests; they got what they needed. Participants also considered the value of the meeting results to be high; they felt the results were worth the cost of resources committed to produce them.

Most participants and session owners were quite satisfied with the meeting results, as illustrated by one manager's comment, "the suggestions for improvements are really useful for me and I will definitely use them in my plans to improve the process." In another organization, the meeting results were used to make a top management decision within an hour from the meeting's conclusion. Follow-up on various sessions, informed us that the meeting results often had been implemented. However, some critical comments were also made when participants felt that the meeting results needed additional attention to raise the overall quality: "The ideas and comments were too shallow and needed more work to become better."

Finally, our data shows high levels of process satisfaction. As one participant noted: "management techniques are rather old-fashioned and stubborn. GSS can give a new impulse to those techniques." However, some processes were perceived less satisfactory. First, in some meetings there was not enough time

available to elaborate on certain ideas. Second, some more outspoken participants appeared to be dissatisfied because they could not steer the meeting as they traditionally normally would. Finally, it became clear that proper meeting preparation was key to assure a smooth process and high levels of process satisfaction.

South Africa

Computer Literacy

Between the two organizations studied in South Africa we could observe a clear difference in computer literacy. Within Mikomtek, all participants were very accustomed to typing while at the SAPS some participants hardly used a computer. We describe both aspects of computer literacy, computer operation skills and typing skills, in more detail below.

Computer Operation Skills

Most participants were very computer literate, especially at Mikomtek. At the SAPS, some participants were less used too computers. One of the participants said before the meeting: "I don't even know how to turn on a computer." During the meeting, his participation was not less than of other participants. During non of the meetings it was necessary to give training in how to operate a computer.

Typing Skills

Most participants worked with computers in their daily work situation. It was as such no problem to use a keyboard during the meeting. Still, some participants noted that computer literacy could be a problem. One of them said: "Computer experience is needed when using this system." Especially at the SAPS some participants were less accustomed to typing. Quite a few of SAPS participants typed with one or two fingers only and had to search for the keys. But also those participants indicated that this was not a major problem and that they liked using the system.

Top Management Endorsement

Mikomtek's top management was very enthusiastic about using GSS. They were curious to see what the system was like and what it could do. After participating in one of the sessions management usually indicated to be willing to have more GSS-supported meetings.

At the SAPS, top management at first hesitated to use GSS. The reason was the travel time for the police since the meetings could only be held in Pretoria. After participation in a first meeting, top management was so enthusiastic that they helped to great extend in arranging follow up meetings. The main advantage of GSS was, top management felt, that it enabled the meaningful participation of all participants across all hierarchical levels. In normal meetings input from lower ranked members was usually much more limited.

Referent Power

No observations were made suggesting that people held their position because of their contacts instead of their skills. Participants were very willing to share information and made decisions together. However, on a few occasions top management tried to influence the decision making process. A good example is a meeting were a prioritization between projects was made. After the first voting round top management said to be surprised that one project scored so low. In the second voting round this project was rated first. This may be an indication of referent power: the other participants may have decided to nurture their relationship with the top management by changing their opinion.

Oral Communication Preference

Most participants preferred the anonymous written communication slightly over oral communication. Especially for the hierarchically organized SAPS this was seen as a major benefit. Participant indicated to prefer written communication because of the more equal participation opportunities it offers. Also top management preferred using GSS, although they sometimes tried to influence other participants by oral statements. In other words, top management is charmed by the equal participation possibilities the written communication offers, but during decision making they sometimes try to be "more equal" than the others by influencing them orally.

Satisfaction With Use

In our study we used a questionnaire to get insight in the satisfaction of participants with the use of GSS. We looked at four satisfaction measures: Interest accommodation, product value, process satisfaction, and product satisfaction (Briggs and Vreede, 1997). The scores of the questionnaire indicate that the participants were satisfied with the use of GSS, see Table 6.

Table 6: *Satisfaction Scores in the South African GSS Meetings*

Nr.	Question	AVG	STD
1	Today, my interests were accommodated	4.0	0.3
2	The work we accomplished today was worth the effort	4.2	0.4
3	I was satisfied with the way we did things today to achieve our goals.	4.1	0.3
4	The outcome of today's meeting is satisfactory	4.0	0.3

The questionnaire scores match with observations we made during the meetings, and with results of ex-post interviews. During meetings, one could see that some participants really liked the GSS. Comments like: "We should use this facility more often" were heard numerous times. Also top management was very enthusiastic and was often interested in more meetings.

Some participants noted that although they think GSS is a time saving way of communication, they still would have liked more time for the meeting: "It is definitely a

time saving way of compiling ideas and communicating, but I would have preferred more time allocated." Meeting owners were generally very satisfied with the outcome of the meeting and used them often immediately.

DISCUSSION

In this section we look back on the results of the study. We begin by highlighting the observed key differences and similarities between the two countries. Next, we discuss the impact of the meeting technology on the meeting customs. Finally, we elaborate on a number of practical implications and recommendations that can be derived from our experiences.

Key Differences and Similarities

Computer Literacy

In Tanzania a meeting often started with an explanation of how to use a computer. In South Africa this was never required. Typing skills were varied but often limited in both countries. Using a computer for meetings was seen as simple, stimulating and challenging in both countries. It was observed that lower computer literacy does not seem to lead to less enthusiasm. However, it does result in less elaborate participation, especially during the beginning of the meetings.

Top Management Endorsement

Often advised by subordinates, top management in Tanzania sometimes blocked the use of GSS. However, when a meeting was held, top management usually came out with positive attitude towards GSS. In South Africa top management evaluated the use of GSS very positively, although some hesitated. Once introduced to GSS, top management were key in stimulating additional meetings. In both countries, top management appreciated the broad participation and resulting feedback in the GSS meetings.

Referent Power

We found some examples that hinted at symptoms of the presence of reference power. Having a meeting focused on the content of ideas, not on the contributor is usually perceived as a major advantage. The anonymity feature is key in this context. However, in both countries, we witnessed participants trying to bypass rational, anonymous communication.

Oral Communication Preference

In both countries we observed a preference for written communication, but for different reasons. In Tanzania, participants liked written communication, in particular because it enabled them to take their time to formulate their thoughts in English. In South Africa language was no issue. Here, especially lower ranked participants seem to prefer written communication because of its anonymity. This was also experienced in Tanzania.

Satisfaction With Use

We found high levels of satisfaction in both Tanzania and South Africa. In South Africa we found that in the less hierarchical organization the satisfaction was lower. Having a large power distance seems to result in a higher satisfaction since participants can relatively participate more meaningfully. Although the participants in both countries were very satisfied after the meetings, the Tanzanian participants conveyed significantly greater enthusiasm on issues such a meeting process, meeting outcomes, and the extent to which their personal interests had been accommodated.

GSS Impact on Local Meeting Customs

During the study we witnessed an interesting interplay between the use of GSS and local meeting customs. On the one hand, GSS had a clear impact on the decision making processes in both countries. Based on our observations and interactions with various participants, we can present the following insights:

Who Decides?

During the majority of meetings that we studied, it became clear that decisions made during the meeting were often made or at least strongly influenced by the group as a whole. In traditional decision making processes, the decision is usually made by one or a few individuals, outside the meeting room.

Distribution of Participation

The feedback from participants suggests that there was more equal participation during the meetings than is the case in traditional meetings.

Amount of Discussion

The amount of discussion that took place during the electronic interactions, was considerably higher than during the oral interactions (even when taking into account the ability to communicate in parallel). Without exceptions, participants were eager to contribute and react on each other. Traditional, oral interactions were much more restrained with a few people doing most of the talking.

Level of Focus in Discussions

The electronic discussions appeared to be much more focused on the issue at hand than the oral discussions. During oral discussions, participants often spoke elaborately, trying to package the message nicely. During electronic discussions, participants mostly came right to the point.

On the other hand, certain meeting customs and habits were clearly not affected by the introduction of GSS, e.g.: chairman's presence. In Tanzania, the chairman of a meeting does not come in until all other group members are in, because no one is allowed to enter after the chairman is in. The introduction of GSS did not change this practice, although in theory using a GSS, a group does not have to wait for the chairman, because late members would be able to pick up the thread of the electronic discussion. Similarly, the way in which oral

interactions following electronic discussions took place, did not seem to be affected by the GSS. Oral interactions remained careful, elaborate, and often indirect. Especially in Tanzania, oral interactions often took place through the facilitator, i.e. participants addressed each other by talking to the facilitator.

This was in sharp contrast to the direct manner in which participants addressed each other during the electronic discussions. Furthermorepowerful participants, e.g. chairman, managers, and elders, still were able to capitalize on their special position. Once they understood the nature of the meeting technology, they found ways to use their position to steer the meeting. An illustrative example: In one meeting, a group was getting ready to vote on a list of strategic issues. The chairman suggested to first delete two issues, because he "couldn't see how these two ideas addressed the issue." Apparently, he wanted to prevent the group from selecting them. Of course, nobody orally objected and the issues were deleted.

Meeting Ambition

The literature suggests that GSS may increase the amount of work that groups perform in a single meeting. However, the meeting owners that we worked with did not appear to adjust their meeting ambitions accordingly, even after repeated exposure to the technology. As a result, GSS meetings often were relaxed and finished ahead of schedule. GSS was not used to get more work done in the allocated meeting time.

In summary, the introduction of GSS does not replace existing meeting customs, but brings about new customs that co-exist with the traditional ones. There appears to be clear distinction between the electronic and the oral part of the meetings, each following their own customs.

Practical Implications and Recommendations

Given the insights presented above, it becomes clear that the issue is not whether GSS meetings

are better than traditional meetings or not. The issue is to understand the effects and impacts of introducing GSS into a certain environment, and to use this understanding to support meeting processes effectively. Based on our experiences, we describe a number of practical implications and recommendations for facilitators and development experts.

First, and foremost flexibility. In both countries, participants often come too late. Meeting owners often decide on a different agenda just before the start of the meeting. Planning and preparing meetings can be troublesome, since appointments are "flexible" and, in Tanzania, phone communication can not be counted upon. Particularly in Tanzania, the fluctuating availability of electricity requires extra attention: Do not count on continuous power, have manual methods prepared as well.

Second, be prepared to consult extensively. Due to the inexperience of most meeting owners regarding GSS, they entirely depend on the facilitator to plan and prepare the agenda, and facilitate meetings without much feedback.

Third, have lingual support available. If the facilitator is not native, it is recommendable to consider having a local co-facilitator present. Some participants may prefer a non-English language (Kiswahili in Tanzania, Afrikaans or one of the other ten official non-English languages in South Africa) for oral discussions during the meeting.

Finally, protect meeting owners. Given the different nature of electronic and oral communication processes, meeting owners may easily loose face. In one meeting, a meeting owner elaborately presented his particular plan to the group and then suggested to have an electronic discussion about it. He expected to receive support, because that happens normally after the chairman presents his ideas. Instead, he got very critical remarks. The meeting owner lost his face, which could have been prevented had the facilitator suggested a different meeting process, e.g. having the meeting owner present three different plans without stating which one was his. After receiving all the feedback he

would then have been able to shift his position without losing face.

CONCLUSION

Our findings illustrate that GSS can be successfully applied in both countries, but have a different impact on the way in which people meet and collaborate. In South Africa, the transition from traditional meetings to electronic meeting activities was rather smooth, sometimes even uneventful. In Tanzania, the difference between traditional and electronic meeting activities was very clear: Participants utilized the GSS's anonymity and parallel communication functionality to break through existing power structures realizing equal and full participation during electronic interactions. In both countries, participants did not hesitate to use GSS and had no (technical) problems using the technology. Although the participants in both countries were very satisfied after the meetings, the Tanzanian participants conveyed significantly greater enthusiasm on issues such a meeting process, meeting outcomes, and the extent to which their personal interests had been accommodated. Finally, in South Africa, top management displayed very open and non-conservative behavior towards the technology, while in Tanzania hesitance from top management can be expected to be the greatest hindrance for GSS acceptance and application. In neither country though, the meeting technology was perceived and employed as a replacement for existing meeting customs. Rather, new customs were added that gave new flavor and momentum to the projects in which GSS were employed.

The limitations of this study, are twofold. First, the sessions in South Africa originated from only two organizations. Hence, the collected data cannot be considered representative for the whole of South Africa. In fact, as a country, South Africa is so diverse that it will be difficult if not impossible to define 'the South African culture.' Second, during prior research in Tanzania, we found that participants were often reluctant to provide negative

feedback. Giving positive feedback was perceived to be polite. Therefore, we stressed and explained each time before handing out questionnaires or doing interviews, that we were interested in their real experiences and opinions. An analysis of our data suggested that more nuance was indeed collected for this study, but the tendency for politeness has to be taken into consideration when interpreting our Tanzanian findings.

We foresee future research efforts in three areas. First, we are planning to apply cultural theories like Hofstede's cultural dimensions (Hofstede, 1991) to further analyze our data to find other explanations for certain individual and group behavior. For example, the notion of 'power distance' appears to be important in the context of top management endorsement and oral communication preference. Second, we hope to carry out an in-depth analysis of effective and ineffective facilitator behavior to arrive at guidelines for facilitation in different sociocultural environments. Finally, we plan to perform a structured follow up inquiry to uncover and understand the lasting impact of GSS experiences, regarding both people's attitudes towards the technology, as well as the application of the meetings' outcomes.

REFERENCES

Baker, S. (1993)
The Survey of Information Technology in Tanzania. Dar es Salaam: Tanzania Commission of Science and Technology (Costech)

Briggs, R.O., Vreede G.J. De (1997)
"Measuring Satisfaction in GSS Meetings," *Proceedings Of The 18th International Conference On Information Systems,* 486-484

Chung, I.K., Adams, C.R. (1997)
"A Study on the Characteristics of Group Decision Making Behaviour: Cultural Difference Perspective of Korea Vs. U.S.," *Journal of Global Information Management,* Summer

Churchman, C.W. (1971)
The Design of Inquiring Systems: Basic Concepts of Systems and Organizations. New York: Basic Books.

Davison, R.M. (1995)
"Socio-Psychological Aspects of Group Processes," *Working Paper* 95/03, City University Hong Kong.

Davison, R.M., Jordan, E. (1996)
"Cultural Factors in the Adoption and Use of GSS," *Proceedings of the IFIP WG 8.4 Working Conference,* Tucson, April

Davison, R.M., Jordan, E. (1998)
"Group Support Systems: Barriers to Adoption in Cross-Cultural Setting," *Journal of Global Information Technology Management,* 1, 2, 37-50

Desanctis, G.; M.S. Poole (1994)
"Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory," *Organization Science,* Vol. 5, No. 2, 121-147

Eden, C. (1 995)
"On Evaluating the Performance of 'Wide-band' GDSS's, *European Journal of Operational Research,* 81, 1995, 302-31 1.

Griffith, T.l. (1998)
"Cross-cultural and Cognitive Issues in the Implementation of New Technology: Focus on Group Support Systems And Bulgaria, *Interacting With Computers,* 9, 431-447

Hartley, J.F. (1994)
"Case Studies in Organizational Research." in: Cassell, C., and Symon, G. (Eds.) *Qualitative Methods In Organizational Research - A Practical Guide.* London: Sage Publications

Ho, T.H.; Raman, K.S.; Watson, R.T.; (1989)
"Group Decision Support Systems: The Cultural Factor," Proceedings of the 10th Annual International Conference on Information Systems,

Hofstede, G. (1991)
Cultures and Organisations: Software of Mind. Mcgraw-Hill Book Company, Berkshire, England

Jessup, L.m., Valacich, J. (eds.) (1993)
Group Support Systems: New Perspectives, New York: Macmillan

Jones, A.N., Miller, L. (1997)
"Using Technology for Stakeholder Consultation: The World Bank's Use of Group Systems in Developing Countries." *Proceedings of the 30th Annual Hawaii International Conference on System Sciences,* 464-468

Jones, N., G.J. De Vreede, (1997)
"Using Collaborative Technology in Organizational Development," *Proceedings of the 1997 Ioda Conference,* Budapest, Hungary, September

Mejias, R.J., Shepherd, M.M., Vogel, D.R., Lazaneo, L. (1997a)
"Consensus and Perceived Satisfaction Levels: A Cross-cultural Comparison of GSS and Non-GSS Outcomes Within and Between the United States and Mexico," *Journal of Management Information Systems,* Winter 1996-1997

Mejias, R.J. Vogel, D.R., Nunamaker, J.F. Jr., Lazaneo, L. (1997b)
"Productivity, Consensus And Participation Equality In Mexico: A Field Study Comparison of GSS and Non-GSS Outcomes," *Journal of Information Management*

Mgaya, R.J.S. (1999)
"Adoption and Diffusion of Group Support Systems in Tanzania," Doctoral Dissertation, Delft University of Technology

Morales, B., Moreira, H., Vogel, D. R. (1 995)
"Group Support System for Regional Development in Mexico," *Proceedings of the 28h Annual Hawaiian International Conference on System Sciences*, Ieee Computer Society Press

Niederman, F. (1997)
"Facilitating Computer-supported Meetings: An Exploratory Comparison of US and Mexican Facilitators," *Journal of Global Information Management*, 5, 1

Nunamaker, J., Briggs, R., Mittleman, D., Vogel, D., Balthazard, P.A. (1997)
"Lessons From a Dozen Years of Group Support Systems Research: A Discussion of Lab and Field Findings," *Journal of Management Information Systems*, 13(3), 163-207

Nunamaker, J.F. JR., A.R. Dennis, J.S. Valacich, D.R. Vogel, J.F. George (1991)
"Electronic Meeting Systems to Support Group Work," *Communications of the ACM*, 34(7), 40-6

Odedra, M. (1993)
"IT Applications in the Commonwealth Developing Countries," in: Odedra, M., Madon, S. (eds), *Information Technology Policies and Applications in the Commonwealth Developing Countries*, London: Commonwealth Secretariat

Post, B.Q. (1993)
"A Business Case Framework for Group Support Technology," *Journal of Management Information Systems*, 9(3), 7-26

Raman, K.S., Wei, K.K., (1992)
"The GDSS Research Project," in Bostrom, R.P., Watson, R.T., Kinney, S.T. (eds.), *Computer Augmented Teamwork: A Guided Tour*, Van Nostrand Reinhold, New York

Robichaux, B., Cooper, R.B. (1998)
"GSS Participation: A Cultural Examination," *Information and Management*, 33, 287-300

Splettstoesser, D. (1995)
"Development Decision Centers: A Strategy to Improve Decision Making." *Proceedings of An Electronic Conference on IT in West Africa.*

Splettstoesser, D., Splettstoesser, M. (1998)
"GSS-based Environmental Planning in Tanzania," *Journal of Global Information Management*, 6, 2, 26-34

Strauss, A., Corbin, J. (1998)
Basics of Qualitative Research: Grounded Theory Procedures and Techniques - 2nd Edition, Newbury Park: Sage

Tan B., Watson, R., Wei, K., Raman, K., Kerola, P. (1993)
"National Culture and Group Support Systems: Examining the Situation Where Some People Are More Equal Than Others," *Proceedings of the 26th Annual Hawaiian International Conference on Systems Science*, Maui, 132-141.

Tan, B.C.Y., Wei, K., Watson, R.T., Walczuch, R.M. (1998)
"Reducing Status Effects With Computer-mediated Communication: Evidence From Two Distinct National Cultures," *Journal of Management Information Systems*, 15, 1, 119-141

Vogel, D.R., Qureshi, S. (1998)
"Tools: In Quest of Adequate Support." *Tele-cooperation Proceedings of the XV. IFIP World Computer Congress*, Vienna: Austrian Computer Society, 231-244

Vogel, D.R.; Vreede, G.J. De (1999)
"The Organizational Application of GSS: A Comparison Across Time and National Boundaries", Proceedings of the 10th Euro GDSS Workshop, Denmark, 123-136

Vreede, G.J. De; Jones, N.; Mgaya, R.J.S. (1998)
"Exploring the Application and Acceptance of Group Support Systems in Africa," *Journal of Management Information Systems*, 15 (3), 197-234

Wagner, G.R., Wynne, B.E., Mennecke, B.E. (1993)
"Group Support Systems Facilities and Software," in: Jessup, L.M., Valacich, J.S. (eds); *"Group Support Systems - New Perspectives"*, Macmillan Publishing Company, New York

Watson, R., Ho, T., Raman, K. (1994)
"Culture: A Fourth Dimension of Group Support Systems," *Communications of the ACM*, 37(10), 45-55

World Bank (1996)
Partnership for Capacity Building in Africa - Strategy and Program of Action, Washington

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