Developing a Tool to Assist Electronic Facilitation of Decision-Making Groups

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Abstract

One resource playing a critical role in electronically supported decision-making groups is the facilitator. Facilitation is a complex task, encompassing social abilities, pre-meeting planning of decision-making processes and supervising the technology usage during meetings. We found two problems with previous support to electronic facilitation: (1) limited support to planning activities; and (2) limited support to remote facilitation. The Facilitation Tool was developed to address these two issues. The tool was built around a comprehensive decision-making model, contributing with design patterns to planning activities. The Facilitation Tool also provides a set of techniques to support remote meetings, allowing facilitators to steer and focus group participants, analyse and understand issues, and moderate conflicting or chaotic situations.

1 Introduction

The physical dispersion of current organisations, escalating complexity of problems and poor productivity of traditional meetings has lead to the increasing technological support to group decision-making, by means of Group Decision Support Systems (GDSS).

One important resource playing a critical role in supporting electronic groups is the facilitator. Facilitation is a process in which a person who is acceptable to all members of the group intervenes to help improving the way it identifies and solves problems and makes decision [24]. Facilitation is one of the several third party processes studied in organisational behaviour [15], e.g. mediation, arbitration, inquisition or consultation.

In what concerns technology usage, one should make a distinction between the notions of chauffeur and electronic facilitator. The chauffeur configures and uses the technology guided by the group but does not affect the decision-making process [9], while the electronic facilitator extends this role with direct influence on the process with the objective of improving productivity and quality of results [7][16].

Electronic facilitation processes encompass different tasks related with the meeting life cycle [23]. First of all, in the pre-meeting phase, assisting the leader in agenda planning. Later, chairing the meeting, maintaining and updating the agenda. At this phase, the facilitator must also provide technical support to the group, by initiating and terminating specific software tools. Finally, at the post-meeting phase, the facilitator provides organisational continuity, generating reports and updating the organisational repository.

Besides this basic view, where the facilitator’s task is to help a group resolving one specific problem, one may consider additional processes, for instance developmental processes where the group uses the facilitator not only to help resolving a problem but also with the intent to improve its own performance [24]. The developmental processes are more complex and demanding since facilitators must be able to outline decision-making models, patterns and procedures, as well as transfer control to groups in a learning procedure.

A survey of 50 facilitators identified and measured the frequency of 16 different facilitative roles [5]. The results show that the most important roles are build rapport and relationships (14%), plan and design meetings (12%) and direct and manage meetings (10%).

Focussing on the pre-meeting phase, another study with 37 facilitators reports that a distinguished number of high-experienced facilitators (25%) mentioned having a good agenda as the critical factor of meeting success [19]. A follow-up of this study also revealed that facilitators are most likely to tailor a generic process than to invent a new one, which requires familiarity with a large range of circumstances [20].

During meetings, the key facilitation abilities identified are good communication/group process skills, understanding the group, egoless facilitation and flexibility [19].

To abbreviate, electronic facilitation is a very complex task requiring high experience on social dynamics and also a person knowledgeable of the GDSS technology. Third party interventions in decision-making processes must be carefully planned and managed, since they may affect negatively group performance. Furthermore, developmental processes also turn necessary opening the underlying design rationale to the group.

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This paper reports the implementation of an electronic facilitation tool dedicated to assist human facilitators managing GDSS. Emphasis has been put on two particular aspects: (1) pre-meeting planning, concerning the definition of the decision-making process; and (2) support to facilitators' interventions in remote sessions. The paper is organised in the following way. First, we overview related work concerning electronic facilitation. Next, we present the set of requirements, followed by implementation details of the tool we developed. Finally, we present conclusions and future work.

2 Related work

We overview the technological support to electronic facilitation in two categories. The first one considers GDSS and the mechanisms they embed to support facilitators' activities. In the second category we consider tools or systems that support some facilitators' activities but cannot be classified as GDSS.

2.1 GDSS electronic facilitation support

GroupSystems [21][22]. Provides an agenda tool, which allows the facilitator to organise multiple meetings in folders and, for each meeting, define the sequence of problem-solving methods to invoke (e.g. electronic brainstorming, categorizer, vote and so forth). The agenda also provides some additional facilitation aids, with elements such as *introduction*, *lunch* and *coffee break*. Using the agenda, the facilitator can also name and describe agenda topics, define time limits and select participants. During meetings, and maintaining our focus exclusively on electronic facilitation, *shift task* is the most useful GroupSystems' functionality. *Shift task* transfers data from one problem-solving method into another. One more functionality worth mentioning is the *opinion meter*. The *opinion meter* is a lightweight voting mechanism that allows fast decisions any time during meetings. Concerning post-meeting activities, GroupSystems provides meeting reports and logs.

SAMM [8]. Provides two classes of facilitation tools, an agenda with the possibility of defining sub-agendas, enter, view, modify and delete topics. And a set of basic utilities, such as log files and meeting minutes. These features are available to all members, since SAMM is user-driven (any participant may assume at any moment the role of facilitator [11]).

Meeting Works. Provides an agenda planner, where topics and tasks can be organised in a list. It has an interesting timer, which allows the facilitator to control tasks duration. Meeting Works separates the roles of agenda planner and meeting chauffeur. The later is responsible for matching agenda tasks with the problem-solving methods supported by the system. One notable characteristic of Meeting Works is that it provides a small set of pre-defined agendas: group development, checkpointing, new project, and strategic planning (we have recently received the latest version of GroupSystems Workgroup Edition 2.0, which also provides a small set of pre-defined agendas).

Distributed Facilitation System [10]. Research prototype addressing several facilitation functions during meetings, classified as recording (transcripts, snapshots and summary), monitoring and process (start/stop). Other facilitation functions include start-up (enrol participants) and wind-up (tracking accomplishments).

Expert System Planner [1]. It is a prototype expert system designed to support electronic facilitators during pre-meeting planning. The authors refer that various models of task characteristics, nature of the problem and other characteristics such as need for consensus are included in the system. Based on these models, the system makes tool recommendations to the facilitator.

The Matcher [2]. Designed to interconnect workflow and GDSS systems, The Matcher is responsible for the identification of situations where workflow systems cannot progress and informal decisions must be taken. The tool has a set of models that allow to select the type of decision-making process most adequate to the situation.

Group Work Environment [18]. One component of GWE is the consensus support prototype, dedicated to assist facilitators in analysing group status through preference elicitation and analysis of a set of alternatives. Preference data is analysed using two metrics, participants' consensus and agreement.

Expert Session Facilitator [1]. It is a prototype expert system designed to support GDSS facilitators during meetings. The system monitors the number of comments from each user and sends reminders to contribute more. When comments drop off, the system supplies an indication to the facilitator.

2.2 Other facilitation support systems and tools

Meeting scheduling systems as, for instance, Lotus Notes and Ms. Outlook provide pre-meeting support with a set of common characteristics: a calendar, and means to visualise others' agendas, invite meeting participants and automatically schedule sessions.

The following tools provide some computational support to facilitators during meetings:

- Consensus Response Keypad – An interactive tool which assures equal participation using question/ answer, inquiries, rankings and other games [28].
- Council2 – Allows gathering ideas fast and at any moment during a meeting [29].
- DataBack, Wireless ResponseSystem and Innovator – Multiple choice voting systems for teamwork.

- Facilitate.com (previously C.A. Facilitator) [30].

Other non-electronic systems can also be identified in this category:

- Facilicom – A facilitators' support kit, with a set of components which can be placed in chalkboards or flip charts during meetings [31].
- Graphic facilitation [27]. A toolbox of symbols, pictographs and ideographs, to visually organise meetings.
- Gameshow Pro 2 and Gameshow P.A.L. – Games oriented towards team learning and teambuilding [32].
- Thunderbolt Thinking – An activity package for group thinking [33].

2.3 Identification of problems

We have participated in multiple GDSS and non-GDSS meetings [3], both as participants and facilitators. From these experiments, we obtained valuable data concerning electronic facilitation. We will refer to pre-meeting support and technical support during meetings. Post-meeting support is discussed in another paper [6].

Agenda building, which can be described as assembling a list of tools to be orderly invoked during the meeting, is a pre-meeting functionality common to all GDSS overviewed. However, we have found limited support to pre-meeting activities. In particular, we experienced an enormous need for a planning tool that goes beyond agenda building and assists the facilitator with guidelines or design patterns; an observation that is made in the context of novice or moderately experienced facilitators.

We may consider three different alternatives to address this problem. The first alternative is supply pre-defined agendas, a solution adopted by GroupSystems and Meetings Works. In our view, this approach does not resolve the problem. The pre-defined agendas have limited reusability, their design rationale is not supplied and expertise with facilitation is required to adapt them to different contexts. The second alternative has the agenda builder integrated with an expert system that makes recommendations to the facilitator, an approach adopted by ESP and The Matcher. Although this is a viable solution to the problem, we argue that, again, the design rationale is not supplied to the facilitator, which makes it difficult to develop facilitators' skills or support developmental processes.

The final alternative integrates a generic model of the decision-making process in the agenda builder and makes it explicit to the facilitator. Although the system does not make automatic recommendations to the facilitator, it identifies viable patterns and guides the design process. Contrary to the previous solutions, this approach also supports developmental processes. This approach was not found in the reviewed systems.

We also found limited support to electronic facilitation of remote GDSS sessions. Besides allowing facilitators to be participants, which is not intended by definition, we can only find widespread support to chauffeur interventions, such as start and stop GDSS tools. Any other types of interventions by the facilitator are extremely limited due to media richness restrictions.

We reviewed some unusual mechanisms that allow two more types of remote interventions:

- Harvest preferences (GroupSystems' opinion meter and GWE's consensus and agreement).
- Monitor participation (ESF's frequency of contributions).

Other types of interventions that have not been considered comprise steering the group, managing conflicts or keeping the group focussed.

3 Objectives and requirements

We developed the Facilitation Tool (FT) with the objective of assisting human facilitators before and during GDSS sessions. The tool had to accomplish the following functional requirements:

- Assists the facilitator during the pre-meeting phase with guidelines and design patterns.
- Explicitly provide a model of the decision-making process.
- Support remote facilitation, with provision of mechanisms for steering the group, managing conflicts and keeping the group focussed.
- And be independent but easily integrated with GDSS, for instance GroupSystems and Meeting Works.

The final requirement came out to avoid developing yet another GDSS and contributed most to the actual architecture of the developed tool.

3.1 Definition of a model

We will avoid discussing here decision processes, their rationality and associated models, pointing the reader to several sources; e.g. [26], [25] and [17] on the foundations and rationality of decisions; [24] and [14] on human and social aspects; or [13] on computational support. Although overly generalised, we may characterise the model of a decision-making process as going through three major steps: (1) define the problem, (2) list alternatives, and (3) select one solution.

Since we were looking for a model capable to provide guidelines and design patterns to facilitators, which requires additional expressiveness, the following model was selected [14]:

- A problem may be divided in a set of more specific issues, each one requiring a decision-making process.

- Each issue is handled according to a sequence of zones. There are four different zones, which come in the following temporal order: divergent (search for information); groan (discuss issues); convergent (attempt to reduce the number of solutions); and closure (select one solution by consensus or voting).
- Each zone can consist of one or more strategies (decision patterns) for handling the issue. For instance, *exploring the territory*, *searching for alternatives* or *discussing difficult issues* are different strategies defined in the divergent zone.
- Finally, a strategy can consist of one or more activities. E.g., *who, what, when, where and how* characterise one sequence of activities (each activity identifies who is involved, what must be done and so forth) in the *explore the territory* strategy.

This model was adopted considering the following reasons. We found compelling the separation of concerns in multiple levels: issues, zones, strategies and activities. The different strategies, which are identified for each zone, create the opportunity for familiarity with a large range of situations. In fact, each different strategy mentioned by [14] is a very expressive and reusable pattern for handling a problem. Finally, the tasks are independent from tools particular to any GDSS, a good design practice well known in software development, where implementation options are delayed as much as possible in the product life cycle.

The above model was extended in order to embrace two new levels of abstraction: task level and tool level. Both levels are intended to smoothly approximate the high level decision-making planning towards the actual process instantiation. The task level borrows the [12] characterisation of computational methods in five categories, creative confrontation, polling of experts/participation, systematic structuring, simulation, implementing and controlling, but excludes simulation, given that such task is not addressed by the GDSS cited in this paper. The tool level directly maps tasks into GDSS tools such as brainstorming, topic commenter, categorizer, and so forth. This final level is the only one dependent from the specific GDSS used, while the other levels are qualified for reuse.

In Table 1 we present a table descriptive of the decision-making process model specified for FT.

3.2 Selection of remote facilitation techniques

Several interventions by facilitators in non-GDSS groups are described in [24] and [14]. Given that those interventions were designed for face-to-face interactions, not all can be adapted to remote situations characterised by low media richness. After careful consideration, we elected the following subset of techniques for implementation.

Interaction techniques, basically intended to **steer and focus** the group:

- Paraphrasing – The facilitator repeats what the participant said using own words.
- Mirroring – The facilitator repeats the participant's exact words.
- Balancing – The facilitator attempts to make silent participants to speak.
- Drawing people out – The facilitator asks one participant for more information.
- Encouraging – The facilitator encourages others to speak.

Control techniques, intended to **moderate conflicting or chaotic situations**:

- Stacking – The facilitator organises and schedules the participants' interventions: (1) asks for anyone to speak; (2) makes a list of candidates; (3) schedules candidates; and (4) asks if anyone else want to speak.

Analyse and understand techniques, dedicated to obtain feedback information from participants:

- Opinion meter – The participants are requested by the facilitator to vote one single question. The results are calculated and displayed to all.
- Criteria meter – The facilitator requests participants to distribute a number of points by a number of positions supported by arguments. The results are calculated using two criteria, degree of conviction and degree of consensus. These criteria were taken from [18] and [4].
- Listening for common ground – This techniques develops in four steps: (1) the facilitator says that is going to summarise; (2) makes a summary of divergences; (3) makes a summary of common views; and (4) asks if the participants agree with the list.
- Tracking – This techniques develops in three steps: (1) the facilitator says that is going to make a summary of the meeting; (2) identifies discussed topics; and (3) asks if the participants agree with the list.

Given that the above techniques impose a burden to the facilitator, we developed a set of standard messages, which the facilitator may select for automatic delivery. These messages are presented in Table 2.

3.3 Opinion and criteria meter

The functionality of the opinion meter is similar to the functionality provided by GroupSystems. The participants are requested to vote one single question using a voting alternative selected by the facilitator, which may be yes/no, agree/disagree or a scale of 5 points (from strongly disagree to strongly agree). The results are calculated into a concordance scale.

The criteria meter is somewhat more complex to use. First, the facilitator must identify an issue, a set of positions and arguments supporting those positions.

Zone	Strategy	Activity	Task	Tool	
				GS	MW
Divergent	Explore territory	Say point of view	CC	TC	GEN
		Specify requirements	SS	TC / CAT	GEN / ORG
		Who, what, when, where, how?	CC	TC	GEN
		Facts and opinions	CC	TC	GEN
		Initial positions	CC	BST	GEN
		Perspectives not represented	CC	BST	GEN
	Search for alternatives	Brainstorming	CC	BST	GEN
		Analogies	CC	BST	GEN
	Discuss difficult issues	Something not said?	CC	TC / CAT	GEN
		How does it affect me?	CC	TC / CAT	GEN
		3 complains	CC	TC / CAT	GEN
Groan	Create shared context	Learn others' perspectives	SS	CAT	ORG
		If I where in your place…	SS	CAT	ORG
		Solutions and needs	SS	GO	ORG
		Alternative futures	IC	GO	CROSS
Convergent	Reinforce good ideas	Clarify criteria	SS	GO	ORG
		Risks and consequences	SS	GO	ORG
		Who else needs to evaluate?	SS	GO	ORG
		Who does what when ?	SS	GO	ORG
	Explore principles	Case studies	IC	TC	CROSS
	Creative re-contextualisation	What cannot be changed?	IC	TC	CROSS
		Keywords	IC	TC	CROSS
		Revert assumptions	IC	TC	CROSS
		Remove restrictions	IC	TC	CROSS
		Catastrophising	IC	TC	CROSS
Closure	Voting	The Doyle and Straus Fallback	POLL	VOT	EVAL
		Vote to Vote	POLL	VOT	EVAL
		Kaner's Meta-Decision	POLL	VOT	EVAL
Key to task types: CC – Creative confrontation, SS – Systematic structuring, POLL – Polling of experts/participation, IC – Implementing and controlling. Key to GroupSystems' tools: BST – Brainstorming, TC – Topic commenter, CAT – Categorizer, GO – Group Outliner, VOT – Vote. Key to Meeting Works' tools: GEN – Generate, ORG – Organise, EVAL – Evaluate, CROSS – Cross impact.					

Table 1 - Decision-making process model

Type	Technique	Start text	End text	Receiver
Steer and focus	Paraphrasing	"I think you are saying" _______ "Let me see if I understood" _______ "It sounds like you are saying" _______	"Did I understood correctly?" "Is that right?" "Did I get it?"	One
	Mirroring	"You said" _______		One
	Balancing	"Does anyone else have a different opinion?" "Are there any different perspectives?" "Who else has an idea?" "What do others think?"		All
	Drawing people out	"Can you say more about that?" "What do you exactly mean by that?"		One
	Encouraging	"Does anyone have more ideas on that topic?" "Does anyone have problems with this issue?" "Are there any different views?" "Lets hear from someone who hasn't spoken"		All
Analyse and understand	Opinion meter	"Issue:" ______ "Details:" _______	"Vote" ______	All
	Criteria meter	"Issue:" ______ "Positions:" ______ "Arguments:" _______	"Points" ______	All
	Listening for common ground	"Wait, I'm going to summarise…" "You have presented the following differences:" _______ "You have presented the following common views:" ________	"Have I got it right?"	All
	Tracking	"Wait, I'm going to summarise the meeting…" "You have discussed the following topics:" ______	"Do you agree with this summary?"	All
Moderate situations	Stacking	"Do you wish to speak?" "Does anyone else want to speak?"		All

Table 2 – Standard messages delivered to participants

Then, participants are requested to distribute a number of points (defined by the facilitator) by the positions. Finally, the results are calculated into two values: degree of conviction and degree of consensus. The degree of conviction measures how a participant is convinced that one position is better than the others are, using a formula proposed in [4]. Conviction has a maximum when the user gives all points to a single position and a minimum when points are equally distributed. The group's conviction corresponds to the average of individual convictions, interpreted as "low", "good" or "high".

The degree of consensus measures how participants agree in their voting on a position, and has a maximum value when all participants give the same amount of points to the position [4]. The degree of consensus for each position is interpreted as "poor", "average" or "good". There is no single coefficient for group consensus but one for each position.

4 Implementation

4.1 Platform and system architecture

The FT has a client-server architecture, consisting of the Facilitation Server and Java Applets (clients) which can be downloaded through a WWW home page. There are two types of clients: the facilitator and participants of group activities. The system allows facilitators to be, at the same time, participants. The server mediates all communication between the facilitator and participants.

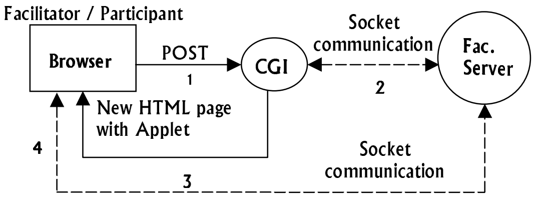


Figure 1 – Client initialisation

The initialisation of a new client is done if four steps illustrated in Figure 1. The new client accesses the FT main web page using a standard browser. After submitting a username and password (1), a CGI runs and establishes communication with the Facilitation Server (2). Communication uses TCP/IP sockets. The CGI generates a new HTML page and sends it back to the client (3). The page contains a Java Applet, which establishes contact with the Facilitation Server (4).

After initialisation, each client is running two threads, Applet and ClientProtocol, the former handling user interactions and the later handling messaging between facilitator and participants, mediated by the Facilitation Server. The server executes several threads: a main thread, one thread serving new client connections and one ServerProtocol for each new client to communicate with the companion ClientProtocol. The system architecture is illustrated in Figure 2.

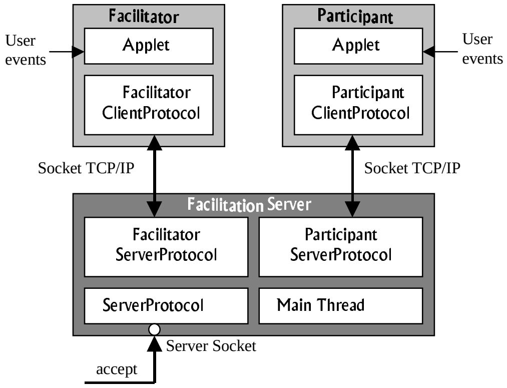


Figure 2 – Client and server threads

4.2 Software architecture and system

The FT is implemented with eight software packages (Figure 3): Communication, Events, GUI, Protocol, Server, Facilitator, Participant and CGI. Of these, we will describe the Facilitator and Protocol packages in more detail. We will also partially describe the GUI package with the help of screed dumps taken from the FT.

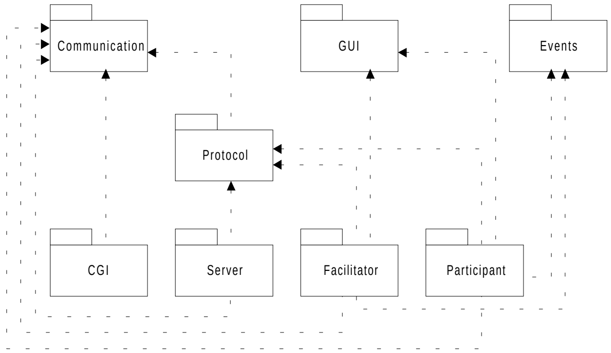


Figure 3 – Software architecture

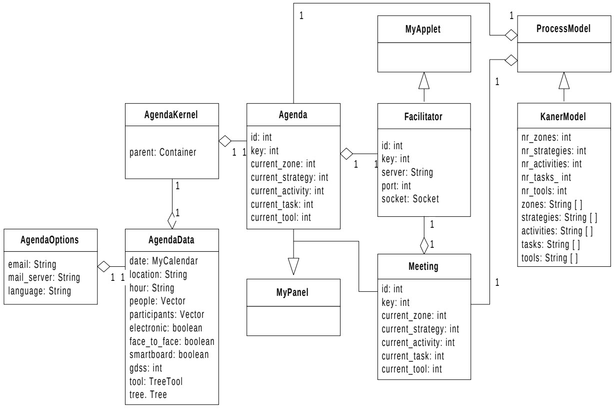


Figure 4 – Classes specified in the Facilitator package

The Facilitator package has several classes, which define the client side of the facilitator (Figure 4):

- Facilitator – Client Applet.
- Agenda – This class defines the pre-meeting functionality, with definition of issues (hierarchical structure), name, description, expected results and optional comments.
- AgendaKernel – Class that encapsulates the meeting agenda.
- AgendaData – Stores/recovers agenda data such as remote/face-to-face session and type of GDSS used (GroupSystems or Meeting Works).
- AgendaOptions – Other agenda configuration options.
- Meeting – Defines the meeting management functionality. It allows visualising previous issues, registering issue accomplishment and starting the facilitation techniques. The facilitation techniques are handled by the Protocol package described in the next section.
- ProcessModel – Abstract class that defines the decision-making process model.
- KanerModel – This class specifies the model summarised in Table 1.

The Protocol package (Figure 5) has a set of classes that define the behaviour of the ClientProtocol and ServerProtocol threads running in the system. There is an abstract class at the top, named Protocol, and two derived classes for server and client sides (ServerSideProtocol and ClientSideProtocol). These classes are further derived in facilitator and participant. There is also an additional ConnectionProtocol dedicated to handle new client connections. The package also includes several classes dedicated to monitoring (Java synchronisation) and data sharing (between threads running in the server), not shown in Figure 5.

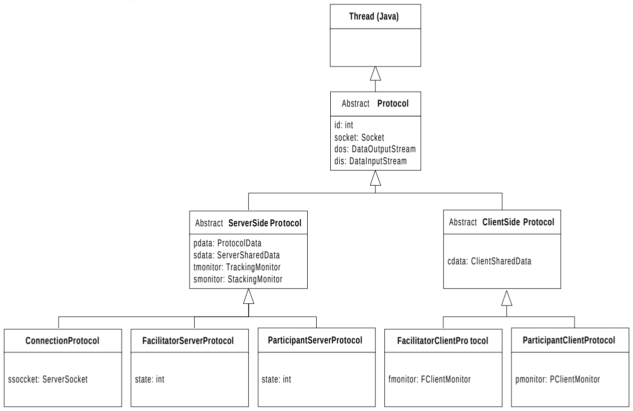


Figure 5 – Classes specified in the Protocol package

The implemented facilitation techniques are organised according to the protocol between facilitator and participants in three categories:

- No rounds – The facilitator only sends one message to the participants (either one or all of them). It includes balancing, drawing people out, encouraging, paraphrasing and mirroring.
- Two rounds – The facilitator sends a message to the group, waits for their responses and reports back to the group. This category includes listening for common ground, tracking, opinion and criteria meter.
- Multiple rounds – Similar to the previous situation but the facilitator reports back to selected individuals one by one. It includes the stacking intervention.

The following functionality is common to all protocols (Figure 6):

- The facilitator starts a technique by pressing the START button in the Applet. The Applet notifies the Protocol package that the technique started (SetTechnique).
- The FacilitatorClientProtocol sends a START message to the server.
- The FacilitatorServerProtocol checks for connected participants and responds with OK or ERROR (no participants).
- The FacilitatorClientProtocol receives the response and sends to the Applet an ERROR or EXECUTE TECHNIQUE message.
- The selected technique is then executed.
- The FacilitatorClientProtocol knows when the technique finishes and sends a STOP message to the Applet and to the server.

The functionality of the no-rounds protocol is detailed in Figure 6. Basically, after receiving an EXECUTE TECHNIQUE message, the Applet asks the facilitator to select the predefined message (or define a new one) and receiver. These parameters and delivered to the Protocol and then sent to the server (COMMAND message). On the server side, the FacilitatorProtocol verifies the parameters and notifies the participant. The participant's ClientProtocol notifies the respective Applet, which then executes the technique.

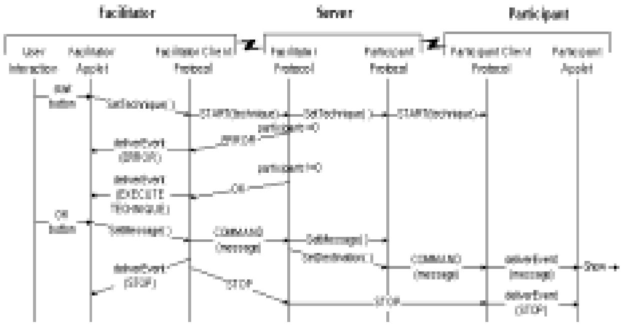
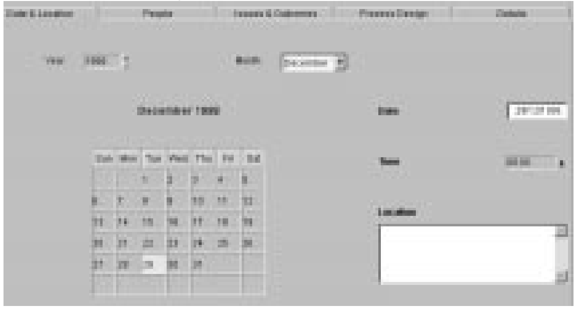


Figure 6 – No-rounds protocol

The GUI package contains a large set of classes that support interaction with users. We present several screen dumps that illustrate their overall functionality. Figures 7 and 8 present two pre-meeting functions, calendar setting and definition of meeting details.

Still concerning the pre-meeting functionality, Figure 9 shows how the facilitator can design decision-making processes aided by the decision-making model. At the top left, the facilitator can break down the problem hierarchically into issues. At the centre of the window, the facilitator can select zones and corresponding strategies. To the right of the window, the facilitator finds a table for the selection of activities, tasks and tools. Finally, the bottom left window shows the process steps assembled by the facilitator, in the form of summary lines with the selected zones, tasks and tools. The facilitator may add or delete these summary lines.



Year 1999

Month December

December 1999

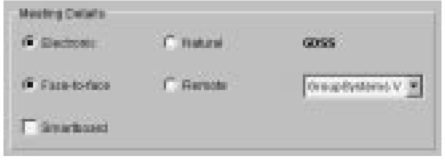
Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Date 29/12/99

Time 00:00

Location

Figure 7 – Calendar



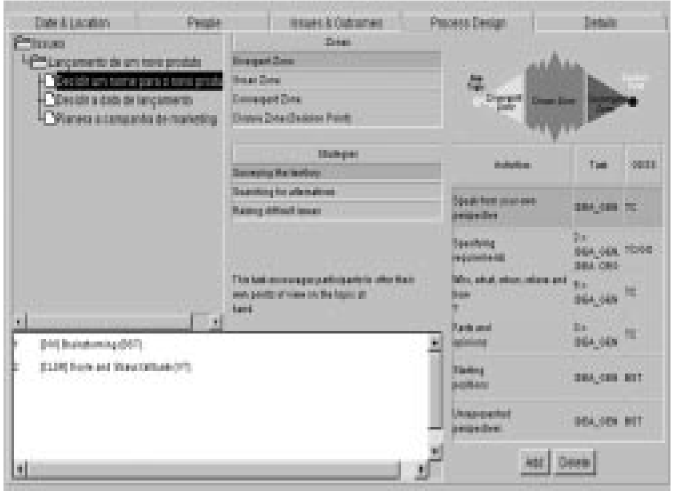
Meeting Details

● Electronic ○ Natural GDSS

● Face-to-face ○ Remote GroupSystems V

□ Smartboard

Figure 8 – Meeting details



Issues
Lançamento de um novo produto
Decidir um nome para o novo produ
Decidir a data de lançamento
Planear a campanha de marketing

Zones
Divergent Zone
Groan Zone
Convergent Zone
Closure Zone (Decision Point)

Strategies
Surveying the territory
Searching for alternatives
Raising difficult issues

This task encourages participants to offer their own points of view on the topic at hand.

1 [DIV] Brainstorming (GST)
2 [CLDR] Facts and Values (attitude) (TC)

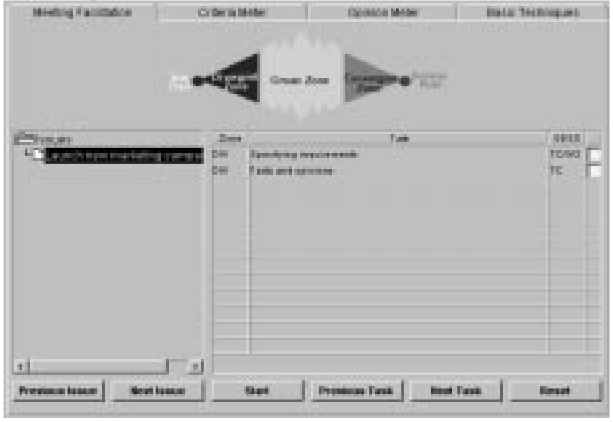
Activities	Task	GDSS
Speak from your own perspective	DGA_GEN	TC
Specifying requirements	D: DGA_GEN, DGA_ORG	TC/GO
Who, what, when, where and how ?	D: DGA_GEN	TC
Facts and opinions	D: DGA_GEN	TC
Stating positions	DGA_GEN	BST
Unsupported perspectives	DGA_GEN	BST

Figure 9 – Process design window

Figure 10 shows the main window which facilitators interact with during meetings. It displays the hierarchy of issues, process specification and status. The facilitator must tick the check boxes corresponding to finished tasks. From this window, the facilitator may also start the facilitation techniques.

Figures 11 to 14 present windows corresponding to the encouraging and drawing people out techniques. Note that the facilitators' window allows selecting the target participant, pre-defined messages, and editing any contextual information.

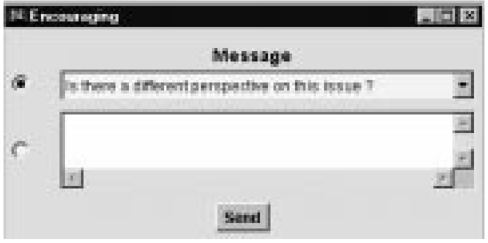
Figures 15 to 17 present the opinion meter windows. The facilitator selected a 5-point voting scheme. Figures 18 to 20 present the criteria meter.



Issues
Launch new marketing campa

Zone	Task	GDSS
DIV	Specifying requirements	TC/GO □
DIV	Facts and opinions	TC □

Figure 10 – FT window during meetings

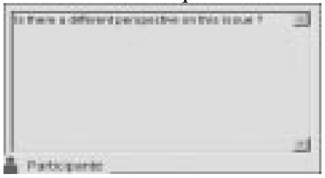


Message

● Is there a different perspective on this issue ?

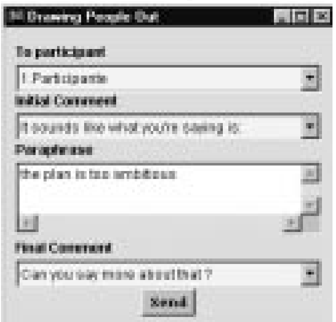
○

Figure 11 - Facilitator's window for the encouraging technique



Is there a different perspective on this issue ?

Figure 12 - Participants' window for the encouraging technique



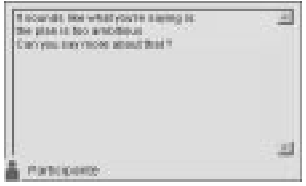
To participant: 1 Participante

Initial Comment: It sounds like what you're saying is

Paraphrase: the plan is too ambitious

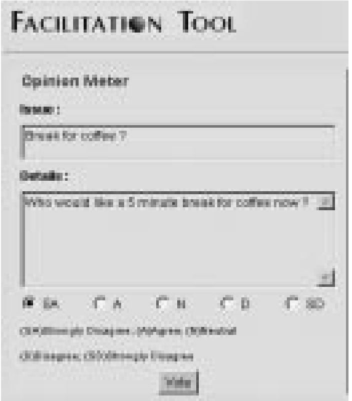
Final Comment: Can you say more about that ?

Figure 13 – Facilitator's window for the drawing people out technique



It sounds like what you're saying is
the plan is too ambitious
Can you say more about that ?

Figure 14 – Participants' window for the drawing people out technique



FACILITATION TOOL

Opinion Meter

Issue :

Break for coffee ?

Details :

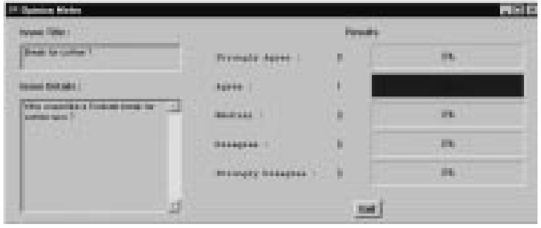
Who would like a 5 minute break for coffee now ?

● SA ○ A ○ N ○ D ○ SD

(SA)Strongly Disagree, (A)Agree, (N)Neutral

(D)Disagree, (SD)Strongly Disagree

Figure 15 – Participants' window for the opinion meter



Opinion Meter

Issue Title :

Break for coffee ?

Issue Details :

Who would like a 5 minute break for coffee now ?

Results

Strongly Agree : 0 0%

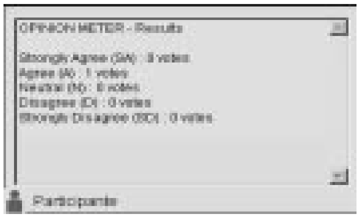
Agree : 1

Neutral : 0 0%

Disagree : 0 0%

Strongly Disagree : 0 0%

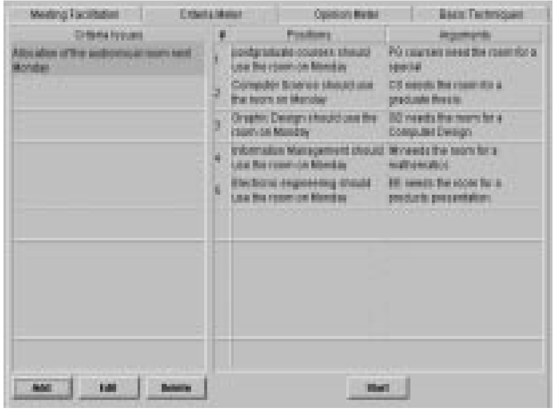
Figure 16 - Facilitator's results window for the opinion meter



OPINION METER - Results

Strongly Agree (SA) : 0 votes
Agree (A) : 1 votes
Neutral (N) : 0 votes
Disagree (D) : 0 votes
Strongly Disagree (SD) : 0 votes

Figure 17 - Participants' results window for the opinion meter



Criteria Issues

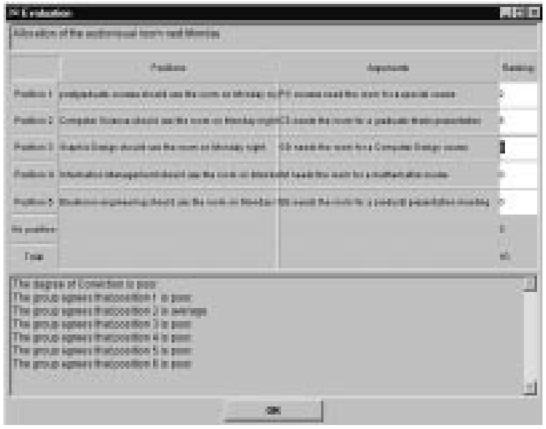
Allocation of the audiovisual room next Monday

#	Positions	Arguments
1	Postgraduate courses should use the room on Monday	PG courses need the room for a special
2	Computer Science should use the room on Monday	CS needs the room for a graduate thesis
3	Graphic Design should use the room on Monday	GD needs the room for a Computer Design
4	Information Management should use the room on Monday	IM needs the room for a mathematics
5	Electronic engineering should use the room on Monday	EE needs the room for a products presentation

Figure 18 - Facilitator's preparation window for the criteria meter

5 Conclusions and future work

This paper describes the Facilitation Tool, a tool that supports electronic facilitators managing GDSS. Two design issues were of particular consideration. The first one is that facilitators must carefully plan decision-making processes in advance, a task that requires either past experience or some degree of conceptual understanding of the process. The second subject concerns remote facilitation, a problematic situation limiting facilitators' interventions caused by the low level of media richness.



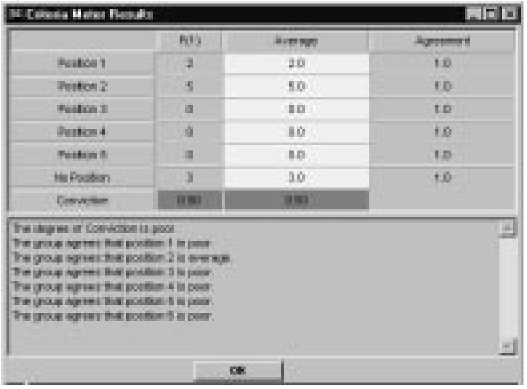
Evaluation

Allocation of the audiovisual room next Monday

	Positions	Arguments	Ranking
Position 1	[illegible]	[illegible]	[illegible]
Position 2	[illegible]	[illegible]	[illegible]
Position 3	[illegible]	[illegible]	[illegible]
Position 4	[illegible]	[illegible]	[illegible]
Position 5	[illegible]	[illegible]	[illegible]
No position			[illegible]
Total			[illegible]

The degree of Conviction is poor
The group agrees thatposition 1 is poor
The group agrees thatposition 2 is average
The group agrees thatposition 3 is poor
The group agrees thatposition 4 is poor
The group agrees thatposition 5 is poor
The group agrees thatposition 6 is poor

Figure 19 - Participants' window for the criteria meter



Criteria Meter Results

	R(1)	Average	Agreement
Position 1	2	2.0	1.0
Position 2	5	5.0	1.0
Position 3	0	0.0	1.0
Position 4	0	0.0	1.0
Position 5	0	0.0	1.0
No Position	3	3.0	1.0
Conviction	[illegible]	[illegible]	

The degree of Conviction is poor
The group agrees that position 1 is poor
The group agrees that position 2 is average
The group agrees that position 3 is poor
The group agrees that position 4 is poor
The group agrees that position 5 is poor
The group agrees that position 5 is poor

Figure 20 - Facilitator's results window for the criteria meter

The Facilitation Tool is based on a comprehensive model of the decision-making process, which guides the whole planning activities starting from a high-level perspective down to the selection and configuration of specific GDSS tools that best fit the problem at hand.

Concerning remote facilitation, the Facilitation Tool implements a large set of techniques covering three types of interventions in the decision-making process: steer and focus group participants, analyse and understand issues, and moderate conflicting or chaotic situations.

Currently, we have tested the planning functionality with a set of four facilitators and two decision problems. A comparison with GroupSystems' agenda has been made but is not yet conclusive. As expected, given the underlying decision-making model, subjects produced meeting agendas that significantly differ from the GroupSystems' agendas. In particular, the Facilitation Tool seems to generate a greater number of tasks for the same problem. However, to understand if more complex agendas imply better agendas, and if better agendas lead to better process results, requires careful analysis.

Regarding future work, our intention is to further develop the pre-meeting assistance provided by the Facilitation Tool, integrating a set of decision cases with the decision-making model, serving as examples of best practice. Also, our intention is to open the decision-making model to the participants, as a way of accomplishing developmental facilitation. Remote facilitation has not yet been subject of controlled experiments, although a comparison with audio/ videoconferencing is being prepared.

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