Proposing a new EMS based in the Interactive Process Analysis System

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Abstract - A major problem with meetings is that too often they are boring and a considerable waste of time. But supposing that a meeting is interesting, there are still problems. In order to solve some of those problems, several software systems were developed, among those systems EMS (Electronic Meeting Systems) are the most relevant. The way of overpass this limitation is improving the capacity of participating as well as giving the possibility of clarifying interventions. In this context, it is proposed here the use of IPA system. Another aspect is giving tools that enhance traditional face-to-face meeting instead of limiting those meeting, what may be reached through multimedia support.

Key Words: Group support systems, CSCW, Interactive Process Analysis

1. Introduction

A major problem with meetings is that too often they are boring and a considerable waste of time [14]. We can not do much to cure that. But, supposing that a meeting is interesting and important, there are still problems. In a general level, we may verify that meetings are disruptive, expensive, and require considerable effort to plan, organize, and execute. When meeting session starts, it is possible that conversation may digress, or degenerate into fragmented aggressive phrases [22]. It is often difficult to strike a balance between order and spontaneity [23]. Then, it is also important identifying the meeting's results [20].

People do not have enough spare time to both take detailed notes and actively participate in a meeting. Meetings share a great body of corporate knowledge, culture, and decisions, yet, little of it is recorded, and even if it is, existing formats (such as notes, audiocassettes, and videotapes) constrain convenient access. People have poor post-meeting recall of the transpired events. This can lead to misunderstanding, disagreement, and uncoordinated activity. In spite of a stated agenda, dominant items reoccur multiple times, often without the participants noticing. It is difficult to trace the chain of ideas that lead to crucial decisions, especially if it extends over many meetings over time.

In order to solve some of the problems presented, several software systems were developed (e.g. [18], [8]). In fact, the support to meetings is a subject of interest either for researchers and practitioners, as it is analyzed in the following section. But as it is shown in the third section of the paper, those systems still have limitations. In order to overpass those limitations we proposed several objectives to be followed in the development of a new system. The IPA (Interactive Process Analysis) system was also incorporated in this software system.

2. State of the Art

In opposition to the conference systems (e.g. Netmeeting), used in distributed have not adequate support to meetings In order to solve some of the problems, several researchers developed systems (Figure 1).

In order to implement concept mapping and pattern matching [21], it was developed the Concept System. This is a proprietary group process, decision support and performance management software package that takes large numbers of ideas collected from a group of people. It processes these ideas using statistical algorithms integrated into the software, and generates a group road map for action. The Applications tools guide the action from project management through performance measurement and decision making.

The software synthesizes ideas and opinions gathered in the early planning stages, subsequently enabling the group to evaluate recommendations and results objectively against stated goals and expectations.
The entire family of software consists of the following components: Core Program, CS Global, CS Applications Suite, The Decision-Maker and The Reporter.

**Decision Explorer** was born with the name of SODA (Strategic Options Development and Analysis) and was originally developed at the University of Strathclyde [9]. This system is an idea-mapping tool, used to capture and structure ideas. Ideas are "brainstormed" and entered into the software, where they can be edited, structured, re-structured and analyzed. Questioning and expressing the relationships between ideas helps a group/individual to develop new insights into critical issues. This system also has a range of interface facilities to make it user-friendly with presentation of maps.

**GroupSystems** was originally developed at the University of Arizona [7]. This system offers facilitators a suite of software tools that support virtually any facilitation style and can encourage full participation, promote mutual understanding, and foster creative and inclusive decisions, through anonymous and parallel participation. With this system installed in a LAN, a facilitator may develop and use a meeting agenda. This agenda is composed of activities, supported by the GroupSystems Tools: Categorizer, Electronic Brainstorming, Group Outliner, Topic Commenter and Vote. The facilitator also has the following supplementary resources: People, Whiteboard, Handouts, Opinion Meter, Briefcase and Event Monitor.

Although not being connected to a specific concept, Group systems support the rational decision process, and the tools are related to the group activities stated by McGath [16]. Meetingworks is a system very similar to this one.

**Meetingworks** was developed at the Western Washington University [15]. This system is an electronic meeting software package that enhances collaboration, decision-making, and productivity in facilitated meetings. Like in the GroupSystems, participants use PC's connected by LAN or Internet to brainstorm, prioritize, and reach consensus in an enjoyable meeting environment – whether face-to-face, or in different locations anywhere in the world. Tools are very similar to the ones of the GroupSystems. For example, Generate corresponds to the Electronic Brainstorming tool, Evaluate corresponds to Vote and Organize is similar to Categorize.

**QuestMap** for Windows is a graphical group communication and problem-solving tool that allows teams to make better and faster decisions in fewer meetings. Team members link questions, ideas and information, creating a map that is easy to read and understand. Groups learn to work out wicked problems, difficult situations with no readily apparent answers. This system implements Ibis concepts [5]. In order to support this process, several argumentative approaches were developed, being the IBIS the most widely used. To Support this approach it several systems were developed, like the gIBIS [5] and QuestMap [4]. Imai et al., [13] also presented a systems based in this approach. This system has the advantage of allowing audio recording, but have the disadvantage of not recording video.

**Expert Choice 2000 Enterprise** is a decision-support system that intend to leverages the comprehensive expertise of an organization to enhance decision-making. Expert Choice 2000 Enterprise provides a structured process for prioritization and synthesis of organizational goals and decision alternatives. Based on the popular Analytic Hierarchy Process (AHP) decision-making methodology [19], the Enterprise version enables organizations to provide users (typically managers at all levels) with a weighted set of goals and objectives.

All those systems were born in universities environment. But there are also other systems that were developed in a commercial context. For example, the M-Path was developed as a tool related to the Smartboard, a product from Smart Technologies, Inc. (http://smarttech.com).

<table>
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<tr>
<th>Products</th>
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<td>Cognitive mapping</td>
<td>Fran Ackermann, Colin Eden Management Science University of Strathclyde</td>
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<td>MeetingWork [17]</td>
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<td>QuestMap [11]</td>
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<td>Expert Choice 2000 Enterprise [10]</td>
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**Figure 1 - Electronic Meeting Systems - a Brief Picture**

After this brief literature review it is possible to conclude that some systems give a very tiny multimedia support to meeting (e.g. GroupSystems). Other systems give multimedia support but almost forget meeting support (e.g. Jabber). Almost all systems tend to analyze meeting only in the group perspective, what make participants distrust. So there is the need to support either groups or individuals. In fact, it is important that systems have a number of features adequate to support meeting tasks and the
meeting team. But, it is also important that they support individuals, by giving the capacity to the participants of intervening using several media, classifying his own interventions or sharing his skill information.

3. Strength and Weaknesses of EMS and clues for a solution

We used some of the EMS presented here (especially GroupSystems, Meetingworks, and Decision Explorer) in different contexts. In what concerns business context we used those systems to support several type of meeting like strategy definition meetings, marketing meetings, brand name brainstorming meetings, slogan definition meeting, briefing meeting, SWOT analysis meeting. This was useful to identify some of its strength and weaknesses. Electronic meeting systems seems to be useful for the following meetings:
- meetings related to consulting methodologies, like TQM, quality improvement or certification.
- workshops for strategy definition;
- specific task for generating ideas (like brand names)

In what concerns ordinary meetings (like Briefings) we found that those systems were not adequate. And we found that:
- The discussion is very important, and those tools do not support this task satisfactorily;
- The parallel contribution is not so important in some context;
- There is a need of additional ways of classifying interventions;
- The use of text and keyboard as main way of inputting data is not the most adequate;
- The use of anonymous voting as normal way of decision is not the most adequate to those day-to-day meetings.

It was verified that the anonymous voting is not the most adequate. It seems to be the way of being more democratic, but in fact it has very important side effects. Often, the anonymous voting is a way a subordinated not being committed to action. When majority decides a task, the person that should perform it may feel that he was not committed to perform a task. On the other hand, a manager may use a meeting to transfer responsibilities to the group. Unanimity may be a way of partially solving the problem, but it is not economical as long as reaching unanimity generally takes long time.

One of the most important limitations is the suspicion that those systems cause in the users. The way of overpass this limitation is improving the capacity of participating as well as giving the possibility of clarifying interventions. Another aspect is giving tools that enhance traditional face-to-face meeting instead of limiting those meeting.

Generally, systems emphasize the cooperation between participants in the meeting and specially the support to the meeting tasks. This perspective may be decomposed into share of information (e.g. using a Smartboard) or supporting the communication between team members (e.g. using a GroupSystems in a network). Some systems, like the ones that support IBIS may help specifically the participants. In fact, often, participants think that the system does not help in the process of group communication. Sometimes, interventions have a different meeting, compared to the one that was in the specific context of meeting. The use of a typology of participation classification could help this process.

The use of classification systems based in IPA (Interactive Process Analysis) system, may be a way of improving clarification of intervention by the participant. This typology may also be used to integrate data from meetings and analyze the discussion flow of the meeting.

According to Bales [1][2], there are twelve categories that may be used to view the functions and patterns of communication. There are three positive (and mix actions): (1) seem friendly, (2) dramatize, (3) agree. Three categories correspond to attempted answers (4) give suggestions, (5) give opinion, (6) give information. There are also questions like (7) ask for information, (8) ask for opinion and (9) ask for suggestions. And finally, the system has three categories that correspond to negative (and mixed) actions: (10) disagree, (11) show tension, (12) seam unfriendly. The categories are also organized in reciprocal or opposite pairs, like (1) seem friendly and (12) seam unfriendly, (2) and (11), (3) and (10), (4) and (9), (5) and (8) and finally (6) and (7).

At the end of this section, we identified strength and weaknesses of EMS. The identification of the weaknesses also leaded us to the identification of some possible solutions.

4. System design

In order to solve the problem of supporting meetings, the following purposes where identified:
- Supporting knowledge creation, by improving the quality of interaction during the meeting.
- Capture, structure and store information according meeting interaction and improving information retrieval.

The video is captured and archived as well as sound streams produced by meeting participants. The
data is stored in digital format and automatically-indexed according to intended agenda, type of interaction, subject and media used.

It is our purpose providing a means for building-multimedia-meeting minutes, and tracing the rationale behind organizational decisions.

We also have the purpose of creating conditions to develop modules of speech recognition to extract spoken words from the audio streams. Optionally record interaction events of shared applications, i.e. group editing, electronic whiteboard. Monitors the meeting live, and presents a visual summary of progress and digression. Presents an integrated browsing/querying interface for reviewing the contents after the meeting has concluded.

**Figure 2 - System Model**

A major purpose of the meeting is the support to knowledge creation. Related to this issue is the identification of the forms of intervention and interaction during the meeting. In fact, the intervention in a meeting may be analyzed in the perspective of the meeting control, in the meeting and team perspective or in the individual perspective.

The meeting control perspective is the perspective of the facilitation.

Another perspective is the group perspective. This perspective is sometimes interconnected to the control perspective. In fact, typically it is considered that the facilitator plays a role in order to improve the performance of the meeting. It is also in this perspective, that several tasks are identified (McGrath, 1984).

There is another perspective - the individual perspective. In fact, individuals have specific interests, skills and power that influence the way they participate in a meeting. So in order to improve the possibilities of intervening in a meeting, systems need to have additional tools to support not only groups but also participants. In order to improve this dimension of the meeting several functionalities must be added:

- give the possibility to the participant of choosing the form of intervening in what concerns the media (audio, text or video);

- give the possibility to the participant of classifying his intervention (using a typology based in the Bales, 1950 or Bales, 1955).

A skill list may also be useful to improve meeting interaction.

**Figure 3 - System Class Diagram**

The agenda is a list of tasks, that may used before the meeting to support the planning of the meeting, during the meeting to direct and control the meeting and after the meeting to support meeting indexing.

Participants' interfaces are also especially important. So the main elements of the interface are:

- Task description;
- Task data (including data from the other participants in the meeting);
- Forms (or media) of intervention;
- Types of intervention.

**Figure 4 - Participant Interface**
Bounded by the task type, the participants have the possibility of selecting intervention type and media (form of intervention). It means that a participant may classify his intervention as an "agreement" and using the oral media of intervention.

5. Conclusion

In order to improve quality of meetings a great number of software systems were developed. Incorporating conceptual frameworks and being originally developed in universities they entered in the market and some of them are now market leaders in the groupware area. On the other hand there are several researchers more interested in multimedia and groupware that in decision, that developed systems that may also support groups meeting.

Having especially in mind the electronic meeting systems, we used those systems and identified several weaknesses. Having in mind those weaknesses we identified features that could improve Electronic Meeting Systems. Several characteristics related to multimedia capacities, possibility of entering data using other means that text, were just some of the dimensions considered. The lack of capacity for clarifying participants' interventions is another weakness of those systems.

In order to solve some of these problems, we propose here a new electronic meeting system.

The most important feature is the possibility of the user characterizing his intervention according to a typology based in the "interaction process analysis system".

In the system presented here the participants have the advantage of choosing the media of participating. The participants also have the possibility of choosing the type of intervention. With this functionalities it is possible to improve the capacity of intervening

References
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