

# EMS/PDA: Connecting Meetings with People in Organisations

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**Abstract.** This paper describes the integration of two different types of support to the coordination of organisational activities. On the one hand, we find Personal Digital Assistants (PDA), offering tools such as calendaring and “to do” lists, which play a substantial role in the support to the individual effort to coordinate. On the other hand, network-based Electronic Meeting Systems (EMS) support a co-operative coordination effort. Considering that organizational efficiency requires a high level of fluidity between individual and co-operative coordination efforts, the problem then is how to bring together EMS and PDA. The paper proposes a framework to analyse this problem based on the concept of communication genre. Then, we describe a software system we developed to link EMS and PDA. This system was experimented in an organisational environment. Preliminary results reveal the users’ enthusiasm with the combination of “team meeting data” and “personal data,” and propose some further enhancements to the integration of EMS and PDA.

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# Introduction

Substantial effort has been invested to increase team performance, encompassing many different techniques, methodologies, human facilitation and training, and computational support tools as well. Some emphasis has been put on the group process, especially concerning issues such as planning, task characteristics, decision making, group characteristics and their impact on team performance (Nunamaker et al., 1997, Pinsonneault & Kraemer, 1989, Tung & Turban, 1998).

Another critical issue to team performance is lack of coordination. According to some authors, coordination can be classified as impersonal or by feedback (Van de Ven & Delbecq, 1976). Impersonal coordination is exemplified by the use of plans, schedules, procedures and established workflows. Coordination by feedback is illustrated by two significant examples: one-to-one communication and group meetings.

We have seen the computational support to coordination applied at several levels, starting with asynchronous communication up to shared data stores, scheduling, workflow and project management (Nunamaker et al., 1997). Among this category of tools, PDA are becoming important tools in the support to impersonal coordination within organizations (Lewis, 1997), focussing on the support to organizational information such as “to do” lists and schedules, possibly the most widely used PDA tools.

More recently, we have seen some research projects bringing PDA to support coordination by feedback. Among these projects, it is important to mention the Pebbles project developed by a team of the Carnegie Mellon University (<http://www.cs.cmu.edu/~pebbles/>, Myers, 2000, Myers et. al., 2000a). This project explores the connection between two PDA devices in real-time (Myers et. al., 2000b).

In the situation discussed in this paper we bring PDA to support coordination by feedback but focussing on group meetings rather than one-to-one communication. Thus, our main scenario is a meeting room where people meet face-to-face, use any desktop computers available in the room and bring their own PDA as well. This scenario emphasises the importance of the link between PDA and the EMS installed in the room.

The EMS/PDA link presents an important problem: the exchanged information must have the right purpose and shape to be understood by the agents using both systems. Currently, EMS lack the necessary mechanisms to make “team meeting data” easily converted in “personal data” and vice versa.

In this paper we propose a framework to analyse this problem and describe our implementation of a system linking EMS and PDA in the scenario broadly described above. The system was experimented by an organization, thus drawing some preliminary results also presented here.

# Overview

EMS have been characterized as a combination of tools allowing users to communicate, deliberate and manage common information in a concerted group effort (Nunamaker et al., 1997). Of course, as we mentioned in the introduction, our focus in this paper is the analysis of mechanisms that convert “team meeting data” and “personal data.” This means that we are more interested in reviewing the EMS interface than taking an inner view of the EMS functionality.

The EMS interface can be regarded in two different aspects: information and control. The information that leaves out meetings can be further divided in two different categories (the same categories can be applied to the information that gets into meetings):

- The intangible things – The contribution of EMS to organizational objectives, such as reconcile conflicts, make decisions, solve problems, plan actions, etc.
- The tangible things – Physical testimonials that report and preserve the intangible things that have been constructed during meetings. Examples are meeting minutes, action plans or meeting transcripts (e.g., Ramage, 1982, The 3M Meeting Management Team, 1994). Many organizations are legally required to document this way some particular meetings, such as stakeholder meetings.

The notion of control considers the transition of meeting outcomes to the organization. Many times, the tangible things are triggers for post-meeting activities related to the decisions taken in meeting sessions. For instance, if it was decided that somebody would execute a task, so this person is informed and instructed. The control coming out from the intangible things is much more difficult to analyse and we will not attempt to address it.

Most prevailing EMS, like GroupSystems (<http://www.groupsystems.com>) and Meeting Works (<http://www.meetingworks.com>), can compile the tangible things in an automatic way, producing transcripts from the information introduced by users during the co-operative process. This approach highlights several weaknesses in the EMS interface:

- Some EMS write down all data produced during meetings, thus making it difficult to convey useful information to users in a concise way. This is a particularly important problem when considering PDA integration, since PDA will have difficulties managing all that data.
- On the contrary, some of the EMS reports we have seen are very opaque, with very few elements such as agenda items, decisions and future actions but no contextual cues or explaining factors. Although the format is adequate to PDA integration, the problem then is how to preserve important information and context.

- It is assumed that the EMS report is a stiff and final product, just for the record. This situation benefits the producers but neglects any particular needs of the eventual recipients. A more flexible approach affords creating different views of the tangible things, adjusted to specific targets (a process, department, agent or tool).

A common approach to overcome these problems relies on human intervention – the meeting facilitator – in order to remove redundant data or add contextual cues. This approach makes the meeting facilitator a critical resource in EMS (Antunes & Ho, 2001). This approach benefits the meeting process and outcomes but, unfortunately, also causes significant problems to EMS. In particular, it has been recently suggested that the human facilitator causes EMS to be self-extinguishing (Briggs et al., 2001).

Several researchers proposed automated solutions to overcome these problems. One possibility is using Report Browsers that allow people to parameterise their views over the meeting results. For instance, GroupSystems provides a tool designated Semantic Graphics Browser that enables the user to move through the meeting data and “zoom-in” on specific areas to view details, “zoom-out” to obtain a high-level view, or “explode” a view to display detailed information (Nunamaker et al., 1997). This kind of tools also explores the collaborative development of organizational memory (Nunamaker et al., 1990, Van de Ven & Delbecq, 1976).

Another possibility to ponder is “tailoring” the meeting reports before reaching the end of the meeting. Of course, the approach requires more effort from the meeting participants who, to some extent, have to produce the report in such a way that it becomes more useful to a future audience. One example of this approach is the Expert Session Analyser, an expert system that guides meeting participants structuring the meeting outcomes and making summary reports (Aiken et al. 1990).

Considering our goal, this last approach seems to us better suited to integrate EMS and PDA, fundamentally because it requires less PDA functionality and avoids facilitators’ interventions.

## Framework

Having in mind the considerations done in the last section, we will now delineate a framework to tailor meeting reports during meetings and integrate them with PDA. The approach is based on the concept of genre.

The concept of genre was imported from the literature and recently generalised to the organisational context (Orlikowski & Yates, 1994, Orlikowski & Yates, 1998, Nunamaker et al., 1997) and the Internet infrastructure (Crowston & Williams, 1999). A genre of organisational communication is an institutionalised communicative action (e.g. memo, report, resume, enquiry, letter, meeting, announcement, expense form,

training seminar). A genre has a particular social purpose – not a private motive – and a recognizable form, entailing recognition and action.

Associated to genres we find the notion of genre system. Genre systems are the glue linking several genres together and giving insight over the way communities of practice communicate and structure work. This view over work structures is very different from other approaches, e.g. enterprise modelling, which emphasise work procedures and processes. Fundamentally, the former highlights emergent work structures while the later describes formal structures and regulated workflows.

Now, we start by restating our problem in the way described in Figure 1: the EMS/PDA problem consists in linking, in a mutually intelligible way, two communication artefacts produced by different tools. In Figure 1 those artefacts are generically called  $C_t$  and  $C_{t+1}$ .



Figure 1 – Problem

In Figure 2 we add communication genres to the problem representation. The communication genres appear as the root causes – or templates, if we give more importance to form rather than purpose – for relating communication artefacts  $C_t$  and  $C_{t+1}$ . The communication genre  $G_t$  is the root cause and template for communication artefact  $C_t$ . Genres  $G_t$  and  $G_{t+1}$  are the root causes for communication artefact  $C_{t+1}$ , while genre  $G_{t+1}$  is the template for  $C_{t+1}$ .

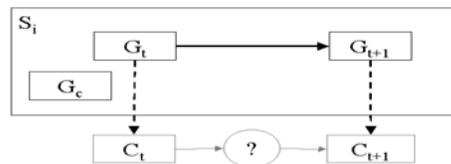


Figure 2 - Communication genres perspective

The genres  $G_t$  and  $G_{t+1}$  are related in the context of the genre system  $S_i$ , which explains why (when, how, who) genres  $G_t$  and  $G_{t+1}$  come together. The genre system  $S_i$  may include other genres, for example  $G_c$ .

We can finally discuss how communication genres help us integrate EMS and PDA (Figure 3). In fact, the information associated with genre systems may contribute to create a “translator” between different communication artefacts such as the ones managed by EMS and PDA. Each genre system supplies a set of clues explaining the linkage between  $C_t$  and  $C_{t+1}$ . Associated to each genre there are a specific purpose, a

specific form, a place and time where the genre may occur, as well as specific people that participate in that genre (Orlikowski & Yates, 1998).

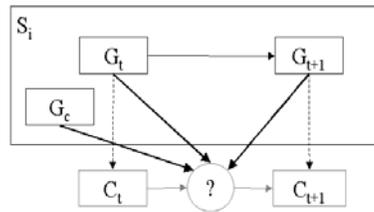


Figure 3 - Proposed solution

In conclusion, our goal is to translate useful information from one artefact to another. The translation process can be tailored to the specific context and user needs because there is additional information behind, provided by genres. Of course, this approach has one important implication: it requires a careful study of the community of people using the communication artefacts, to elicit the genres and genres systems they practice. This approach may thus require the use of ethnographic techniques to observe patterns of work for a long period of time. Second important implication: the solution depends on genre analysis and thus may not be generalised beyond the specific context where it occurs.

## Using the Framework

In this section we describe a practical application of the proposed framework. The target organization was a small financial consulting and accountancy company. Both the type of structure (small, flat) and core business (independent consultancy) of this company stresses the role of meetings as primary coordination mechanisms.

The target organization was already accustomed with several technologies to support coordination:

- Web Chat, Net-Meeting and e-mail are frequently used to support one-to-one coordination.
- GroupSystems was used on an experimental basis to coordinate the group. However, some cultural factors contributed to an unenthusiastic view of this technology. In fact, the employees, especially accountants and consultants considered that the technology imposed too many boundaries to meetings, in particular to planning meetings. Resistance to change was also a very important factor to explain that view.

- The target organization also assessed the possibility of using workflow tools for coordination. However, the restrictions imposed by this technology to a small and informal structure, and the necessary investment, led the organization to continue with the same situation.

The genre analysis of this target organization was done cooperatively with several employees. Among several situations that were discussed with them, the following meeting genre systems were elicited and discussed in detail:

**Process definition meeting.** The purpose of the process definition meeting is to analyse the explicit organisational processes in an informal way, clarifying and improving the organizational manoeuvre. There are several implicit processes, but they are not analysed because it is supposed that everybody knows them. Usually, these meetings produce informal process descriptions and timetables.

**Planning meeting.** The purpose of the planning meeting is scheduling processes. This results in individual tasks being committed, usually through personal “to do” lists carried out by meeting participants.

**Briefing.** Every week this organization has at least one meeting where the state of each committed task is analysed. The meeting participants assess which tasks were not accomplished and discuss the reasons why. Other comments may also be produced during these meetings, since new commitments, schedules or resources may have to be negotiated. In the end, the meeting produces calendaring information.

After identifying the above genres, the related genre systems were analysed in detail, identifying the purpose, expected outcomes, participants, structure, format and media used. Figure 4 and Figure 5 show the results that were obtained for the process definition meeting and planning meeting respectively.

The process definition meeting typically has two phases: the first one where task names are generated; and the second one where tasks are organised. Besides the meeting itself, the other genres institutionalised by the participants are: the process description, a list of task names, glossary and task syntax. Figure 4 exemplifies the form of the process description, where <t> denotes tasks, <r> resources, <p> people and <xx/xx/xx> corresponds to a date. The glossary collects words meaningful to the organization, such as tasks, roles, etc. The syntactical information allows describing the process in a very rudimentary way.

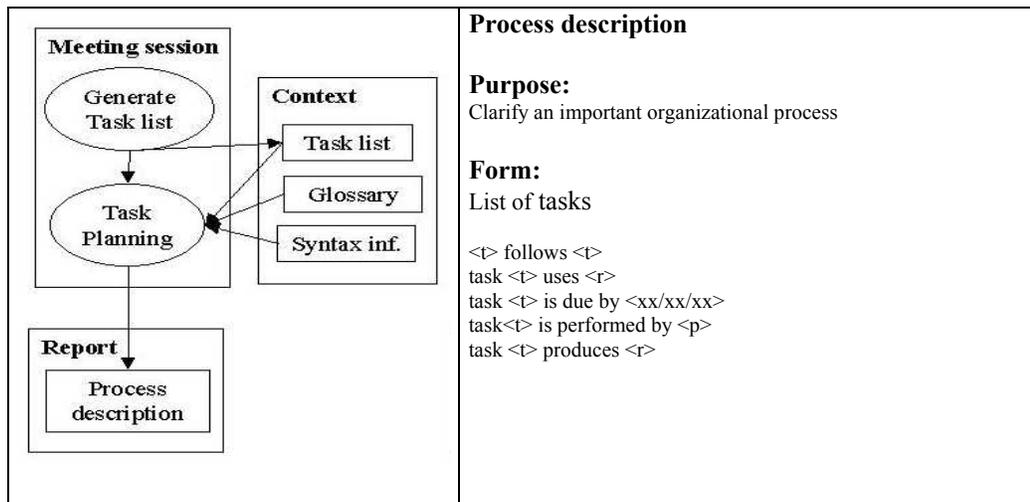


Figure 4 - Process definition meeting

The planning meeting (Figure 5) uses process descriptions, the glossary and syntactical information to produce calendars. The form of the calendar genre uses sentences composed by date (<xx/xx/xx>), task (<t>), priority (<pr>) and also a degree of conclusion (<%>) and assigned person (<p>).

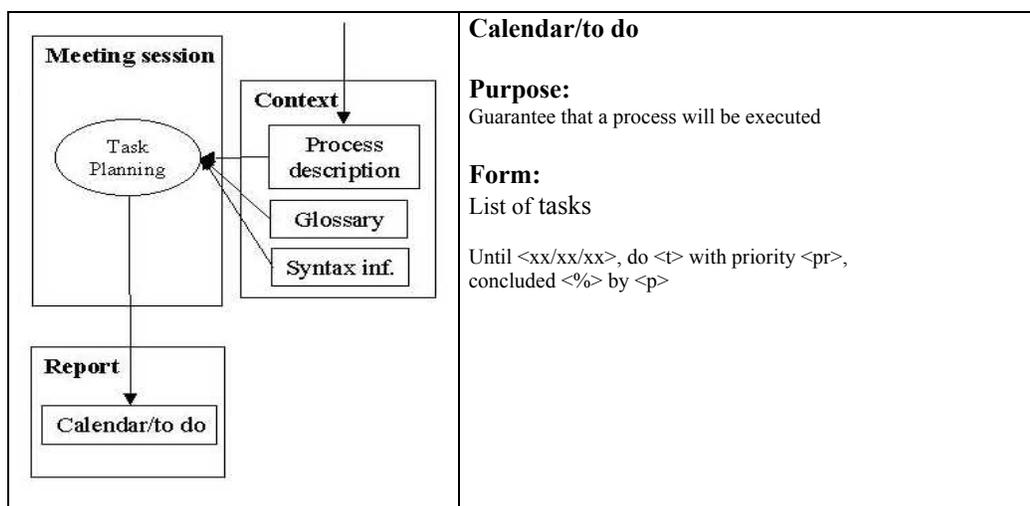


Figure 5 - Planning meeting

In a briefing, each task in the calendar is assessed for completion and discussed. The form of this genre is a new calendar and to do list.

# Design and Implementation

This section describes the design and implementation of a system with the following requirements:

- Works in the scenario described in the introduction, where people meet face-to-face, use desktop computers to manage team meeting data and bring their own PDA to manage personal data;
- Converts team meeting data into personal data and vice versa;
- Bases the conversion process on the notion of genre;
- Is targeted at the specific community of users described in the previous section, thus using the information obtained from genre analysis to implement communication artefacts that are meaningful to those users;
- The support to personal data is offered by the Palm Pilot PDA (<http://www.palm.com>).
- The support to team meeting data is offered by our own EMS prototype. The EMS prototype was based on the genre concept described in this paper and supports the users activities necessary to generate communication artefacts.

The whole system functionality is depicted in Figure 6. Regarding this figure, it should be clear that the conversion of team meeting data into personal data and vice versa correspond to the three arrows represented between EMS and PDA artefacts.

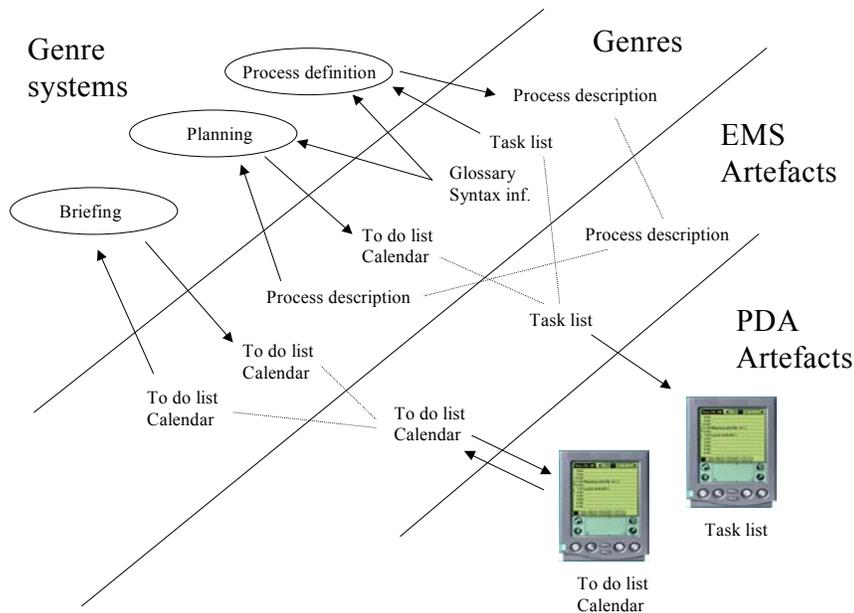


Figure 6 - System functionality

## 1.1 Implementation Details

Figure 7 shows the class diagram corresponding to the EMS prototype. The EMS is implemented using Internet technology (HTML files, CGI and Perl scripts) and a relational database. The EMS user interface provides a genre system view to users and is presented in Figure 8.

The PDA software implementation uses the Jfile database system (<http://www.land-i.com>) and the built-in Date Book. Several databases were created with Jfile, although the most important is the Task Table. The Task Table is a database, similar to the To Do built-in application supplied with the Palm Pilot, having the following fields: Task, Due Date, Fixed Date, Complete, State, Notes, Responsible.

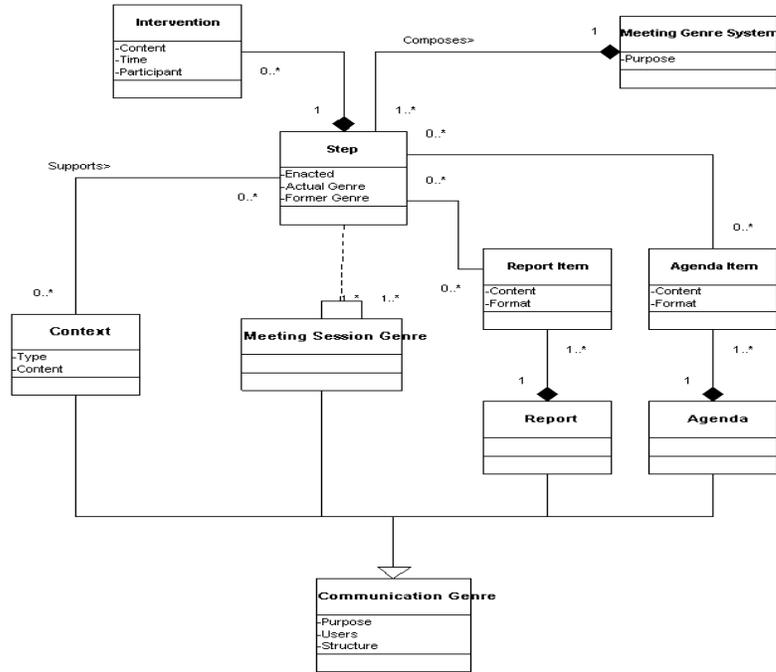


Figure 7 – EMS Class Diagram

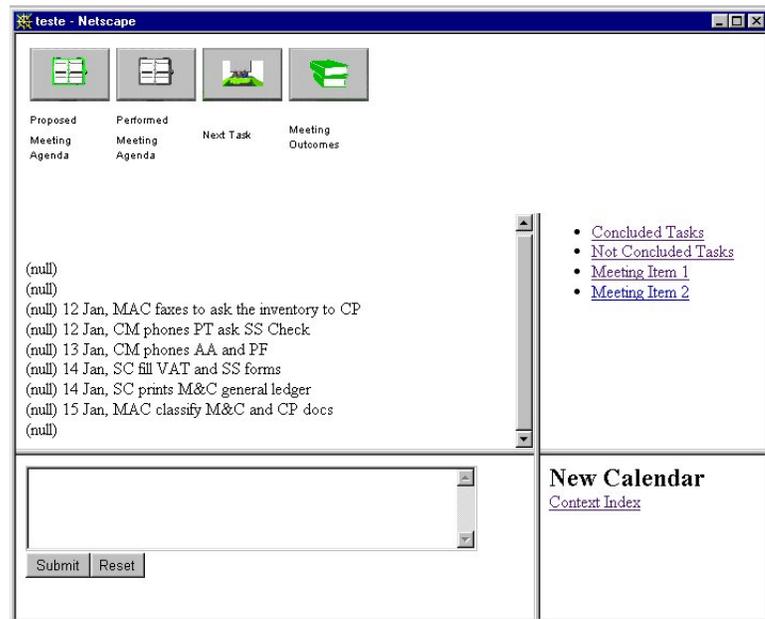


Figure 8 – EMS user interface

A Perl script performing the following tasks implements the EMS/PDA data conversion:

- Identification of the context, i.e. if the genre system is a process definition, planning or briefing;
- Identification of the corresponding genre, its expected purpose and form;
- Choice of the parsing mechanism, according to the genre and context;
- Conversion of data to the appropriate PDA file type: Task Table or Date Book.

The opposite process is significantly easier. It consists in the conversion of the Jfile database information into human readable text.

Figure 9 illustrates two different EMS/PDA conversions. For each situation we show the EMS user interface, a schematic representation of the parsing mechanism and, finally, the Palm Pilot screen after data conversion. From left to right, the Palm Pilot displays the task list and calendar artefacts, implemented with the Task Table database and built-in Date Book respectively. On the left, an EMS sentence is converted into a task, while on the right the EMS sentence is converted into an event.

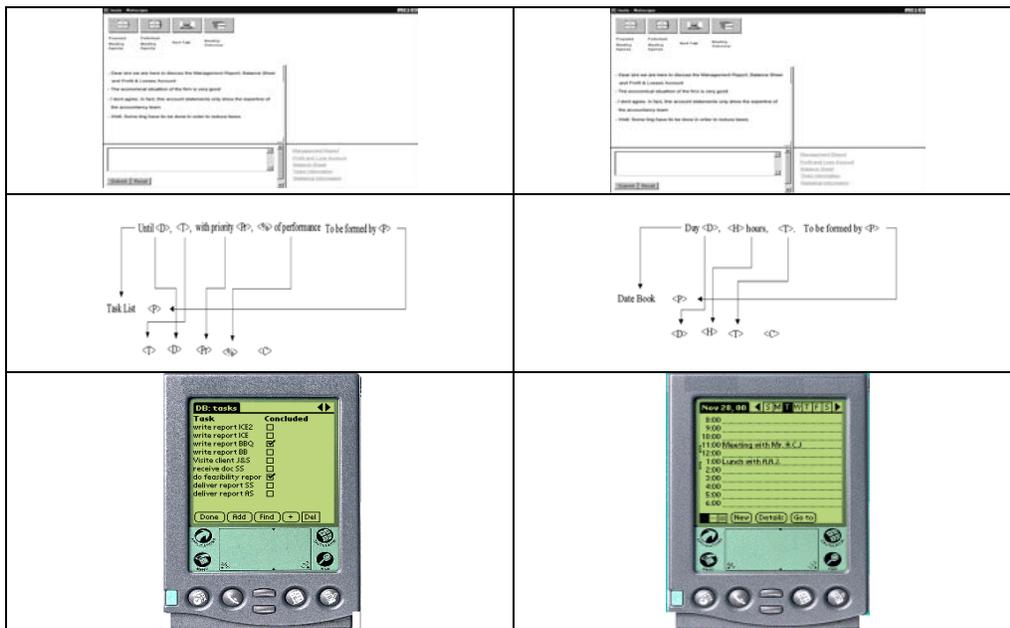


Figure 9 - Conversion process

# Preliminary Evaluation

As described in the paper, this research work had significant input from the target organization. Several members of the target organization met with us in several occasions and selected the meeting genres that were most important to them, helped in the process of analysing genre systems and validated the final description we made. Finally, when the prototype was ready, the same persons that had the opportunity to contribute to the system analysis and design could experiment and share their impressions about the prototype. Although these impressions do not result from a formal evaluation, we would like to report some of the feedback that we obtained so far.

First of all, we noticed that the organizational attitude towards EMS and PDA changed along with the project. In fact, the initial attitudes toward these technologies were very different. PDA had good acceptance but, when the project started, its use in meetings was declining. Prior experiments with EMS generated strong resistance. The experience with the EMS prototype during the project allowed a rebirth of the enthusiasm toward the PDA and reduced the resistance towards EMS.

Considering the framework presented in this paper, the concepts of communication genre and genre system allowed us to use a language close to the user, necessary to the participatory genre analysis process. The users adopted the genre view and even discussed the possibility of applying the concept to other software tools. In fact, some more enthusiastic users suggested using genres to categorise chat data and e-mail folders.

The users thought that the simplicity of the EMS/PDA conversion mechanism is adequate to the expectations they have when using PDA. Some users even recommended that the syntax be kept as simple as it is.

Finally, the users suggested the use of PDA during meetings in order to support some particular tasks. One task that was pointed out was voting (the target organization has to vote on some occasions). However, to what concerns other activities that require text editing, the use of the PDA was considered not useful.

## 7 Conclusion

This paper brings together EMS and PDA, thus bridging the gap between different organizational coordination mechanisms, in particular impersonal coordination and group meetings. PDA have an important role in the support to individual plans and schedules, but its link with team meeting data is still reduced.

The framework proposed in this paper is based on the genre concept. The genre perspective, originally employed to index literary work, has been adapted to the

organizational context to analyse organizational communication, work patterns and structures. We used genres to add context and insight to the artefacts exchanged by EMS and PDA. Associated with genres, we find purposes, people involved, work patterns and structures. These attributes afford tailoring the EMS/PDA data conversion mechanisms to the specific users' needs and expectations.

The paper describes the application of the EMS/PDA conversion mechanism to an organization in the accountancy field. The proposed approach requires the elicitation of the unique genres and genres systems institutionalised and practiced by the organization. This work was accomplished with the help of several employees of the organization. The employees had also the opportunity to experiment the developed prototype. Considering the project results, the project increased the users' enthusiasm towards PDA usage and reduced the prior resistance towards EMS usage.

## Acknowledgements

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