COORDINATION OF WORK BY USING TO-DO LISTS: PRACTICES AND REQUIREMENTS

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Abstract: This paper shows a study and analysis of coordination practices, and introduces a prototype to improve coordination processes arranged around to-do lists. After describing a real work setting from ethnographic studies, the coordination problem between distributed teams are illustrated. The prototype developed tries to show a solution to this problem by offering a common and a private space for project members. The paper addresses several issues like awareness about the work of others, automatic update of the common to-do lists due to modifications in individual to-do items, trust and mutual support between project members, support for articulation work, necessity of history tracking of to-do items, and finally, requirements derived from these aspects. The paper ends with a conclusion including future work.

Key words: coordination support, awareness, to-do lists, issue lists, ethnography.

1. INTRODUCTION

Any type of cooperation can only be managed by coordination mechanisms. Without coordination, interdependencies between activities, like flow and fit dependencies, or sharing resources (Malone and Crowston, 1994) cannot be managed. Not only the cooperative work, but also the individual work needs to be coordinated to avoid problems in the flow of work, to provide fluent work transition between people working together, to protect work arrangements from temporal and logical gaps, and of course, to maintain an efficient flow of work between groups and group members. Coordination can be made transparent to everyone cooperating, or can be the issue only of one person like a project manager. In any case, there is
always a need for meetings. For instance, regular meetings are usually seen as an arena for exchange, articulation, and clarification (Schümmert et al., 2009). They help to reach a shared understanding of the project’s status. Such meetings are used to create strategies and commitments for future steps.

How can cooperative work be coordinated in work groups? There are several approaches. Coordination can be facilitated by different mechanisms: during regular or ad-hoc meetings, around common information spaces including version controlling and history tracking, by using to-do lists managed centrally or workflows implemented to support enterprise resource planning and execution. All these approaches can be partly moderated by human, or certain activities or tasks can be triggered by the system used.

This paper focuses on the use of to-do (issue) lists to coordinate cooperative work. To-do lists host tasks assigned to persons and deadlines building the central data for coordination. After introducing the related state of the art of coordination by means of to-do lists, work practices with such tools are illustrated. A case study carried out in an European research project called MAPPER (FP6-IST-016527-MAPPER – Model-based Adaptive Product and Process Engineering)\(^1\) is presented to demonstrate how regular project meetings are arranged, how work practices are carried out between the meetings, what type of tools are used to support the coordination in all phases of a project. The current practice shows a lot of problems. A prototype is developed and presented in this paper to offer a solution to these problems. Requirements to such supporting tools are discussed before the conclusion.

### 2. COORDINATION WORK

Coordination is about managing dependencies between activities (Malone and Crowston, 1994). Activities are carried out by several people with different work habits and practices. The work progress needs to be made transparent and updated regularly to avoid problems in distribution of work and to rearrange the coordination issues within the work groups. The research field Computer Supported Coordinated Work (CSCW) was dealing with cooperation and coordination issues for a long time. Researchers in CSCW studied coordination settings (Schmidt and Simone, 1996; Schmidt and Wagner, 2002, 2004) and tried to provide systems to support coordination activities (Tellioğlu, 2006, 2007). There were several coordination mechanisms on organizational level using standardization, direct supervision, mutual adjustment (Mintzberg, 1979), or on technical level using locking or time stamping in databases for concurrent access on shared data without interferences (Bernstein and Goodman, 1981), using protocols to ensure the reliability of transactions on different processors (Kohler, 1981), dividing parallel programs into units (Carriero and Gelernter, 1989), or applying rules to determine the dependencies between tasks (Tellioğlu, 2004).

\(^{1}\) [http://mapper.eu.org/](http://mapper.eu.org/)
Dependencies between distributed activities make coordination essential for cooperative work. Combined with assigning the right people to tasks and planning the time and output of tasks, project management has to deal with the problem of coordination. The approach how to setup the coordination environment in a work group can be top down or bottom up. In a top down approach, the processes can be optimized, e.g., by means of a workflow system, dependencies are minimized as long as it is possible, cooperating actors are not really involved in decisions about how to coordinate and (re)arrange activities regarding coordination. On the other hand, in a bottom up approach, people cooperating are more motivated and enthusiastic if they are in charge of the coordination of their own work with others in the group. The challenge is how to balance between efficiency and flexibility in a complex cooperative work setting.

In both approaches, an overview of all tasks is needed to be able to coordinate. This happens both on planning and execution level. Project management must be aware of all necessary activities including non-productive ones like communication between project members for clarification, recherché on certain topics to prepare a base and an understanding of solutions and technologies of work to legitimize individual or group work, to stress the current problems and to ask for solutions or advise for solutions.

Overview of tasks to do can be provided by a list. Lists are flexible. They can be updated easily. Usually spreadsheets are used to create and maintain lists. Enhancing the columns and rows, changing the content and format of single cells in the table-like lists are easy and well established among users.

In the next section, we describe our case, in which we show how lists in form of spreadsheets are used for coordination purposes and what problems occurred between distributed teams.

3. THE CASE CARPART AND THE PROTOTYPE

Our case study has been carried out at Carpart in the scope of the research project MAPPER. Carpart is a company that produces car parts like gearshifts, head strains, and seat heating for automotive industry. It has several branches all over the world. The projects are multinational. The geographically distributed way of project organization made computer-supported communication and collaboration necessary. Meetings were arranged regularly to overcome the distance between distributed project members. We could observe several meetings and carry out in-depth interviews with some of the key actors during four visits between 2005 and 2008. In the following we describe one of the cooperation settings we could observe in 2005.

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2 The name of the company is changed.
3 The project team consisted of Hilda Tellioğlu, Gianni Jacucci, Ina Wagner and Gianmarco Campagnolo.
3.1 Use of to-do lists at Carpart: the case

Project members of all sites were used to participate regular and ad-hoc meetings. By means of teleconferencing facilities and sometimes screen sharing, single open issues in to-do lists were discussed by asking responsible persons the work progress. In some meetings, suppliers or customers were present. The main artifact used in all kinds of meetings was a to-do list owned by the project manager acting as the moderator of the meetings.

One of the projects we could observe (Fig. 1) was about distributed production of certain car parts. In concrete, it was collaboration between Swedish and Polish branches. The branch in Poland was supposed to use the old machines from Sweden. There was a to-do list (Fig. 2), in which all related activities were listed. This list was used in the meetings to discuss the work, first, to introduce the old machines into the productions, and then, to produce by using them. Obviously, there was additional knowhow needed to control these machines. This knowhow was not written and could not be handed over to the Polish colleagues because it was very old and no one had the manuals, tutorials, exact instructions of usage and repair, or how-to’s. The only resource to know what to do and more importantly what not to do was to ask the knowledge workers who have been using these machines for a long period of time in production in Sweden. Unfortunately the most of these guys were retired and not available for knowledge transfer. There was only one person sitting in the meetings and trying to answer the questions of the Polish team. Not everything could be answered. That means that not even in Sweden the knowledge how to use these machines in all cases was present, that is why it was partly very difficult to tell the Polish team what to do and how to proceed to solve the problems they met.

Besides the knowledge missing, there were barriers of delegation and distribution of work. The Polish team was very angry getting old “useless” machines. We had the impression that they thought but not articulated during the meeting that the reason getting old machines that were not acceptable anymore in Sweden was partly based on their being from Poland. Their machines were even older. Engineers in Poland must be happy with a newer version of the machines. Knowing but not expressing this emotional level of the work, the to-do lists were applied to try to
objectify the work-to-do, to manage the assignments, and to coordinate the assigned work. The to-do lists helped to suppress and exclude certain types of discussions, which would be unpleasant for most of the participants. They helped to hold back the issue of hierarchy in the organization between the teams. The list was linear, with no additional information to the single issue items, everyone got his or her assignment at the same detail level, the deadlines were equally strong and given for everyone, only priorities of some issues were higher than the others, independently for which team, just only defined by the type of work to be done.

This was the first perception based on the representation of the work in the common to-do list projected onto the wall. In fact, there was more information in this list. The hierarchy and power relations were hidden in the issues composing the to-do list. The type of work to be done, the time slot that one had to carry out the assignment, the quality and quantity of the results expected by each person, etc. could differ between people or groups of people. For instance, in Poland the performance of the production was expected to be higher than in Sweden, even if they had the older machines and did not really know how to use them effectively. One of the important reasons to move the production to Poland was to produce cheaper and preferably faster, of course, without loosing quality of products. These issues were not mentioned explicitly during the meeting, but only in the negotiation of alternatives and ways of doing things differently, in the argumentation why certain things could not be changed and must be done in a certain way, and in the articulation of problems occurred and expectations to meet.

3.2 Coordinating role of the to-do lists

As described so far, one of the problems we could observe was the degree of detail of the issue items in the to-do list. There were organizational, technical, cultural, and economic constraints connected to the single issue items, which could not be seen directly in the representation of the items. They did not show the background information to their definition and their properties defined by these factors. Prohibiting awareness in this sense, these lists put the meeting participants into a challenging context: they had to protect their work processes by trying to be cooperative and willing to adapt and improvise. The meeting looked like an arena for discussions and negotiations. But the role of the to-do lists was central. They documented at the end what really to do by all participants and especially what the deadlines were. This was a strict constraint and was hard to agree on.

We can see different problems in Carpart around the coordination of work: The main problem was the lack of information exchange between team members, especially between the meetings. Second, there was the lack of awareness about tasks single persons or distributed groups were carrying out. In meetings project managers tried to assess the progress of the project work, to clarify uncertainties in tasks and work flows, to define or redefine responsibilities, to set and reset deadlines, to negotiate objectives or the distribution of work, and to define new tasks if
necessary. The main tool for arranging the setting was a to-do list (Fig. 2): “As a project manager you are not anyone’s boss, you cannot give orders, to-do’s are a way of giving indirect orders, setting responsibilities and deadlines”, and of course by doing so a way of coordinating the project. The to-do lists were used as meeting agendas. They were stored as spreadsheets. Each line contained an (open) issue, the so called to-do, in the example above consisting of the project name, RFQ number, issue description, issue comments, target date, responsible person, and the status. Some projects had more than one issue listed. The single issues of a project could be assigned to different persons.

![Image of ISSUE LIST (Project Manager)](image)

*Fig. 2. The common to-do list used in Carpart, projected to the wall during meetings and shared by remote teams through desktop sharing facilities. In the prototype this is implemented as commonToDoList. It is the list of the project manager, including different to-do’s to be carried out by different project members like AWA or IB (shown in “Resp” column).*

Besides the problem participants had with the project manager’s to-do list that they were not informed about the content and changes of these lists between the meetings, project members needed a space where they could manage their own work. They wanted to organize, document, revise, and articulate their individual work between two meetings, which was assigned to them. In some cases they had to communicate with other colleagues to answer questions. They did not want to be monitored in all their actions, but still they wanted to be coordinated and organized in the project group.

To solve this problem, we developed a prototype by using spreadsheets provided in Microsoft Excel™, as the main tool used in Carpart for purposes of project management and coordination. We introduced two spaces for different people: the common space (Fig. 2) and the individual space (Fig. 3). Project managers owned the common space, which was provided in each project, and each

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4 The project group consisted of Hilda Tellioğlu, Gianni Jacucci, and Ina Wagner.
project member had his or her individual space in each project. The spaces were arranged around the to-do’s. The individual spaces had additionally room for discussion and exchange with others, one area dedicated for sharing with the project manager, and another one was a public space where everyone in the project group could access to communicate certain open issues.

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<tr>
<th>ISSUE LIST (CC)</th>
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<tbody>
<tr>
<td>Meeting date</td>
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Fig. 3. The individual to-do lists used in Carpart. In the prototype this is implemented as myToDoList for each project member. The list left belongs AWA, and the list right to IB.

Each team member owns a myToDoList, in which he or she can update the existing items, add new ones, and add descriptions or comments. For instance, if there are questions or problems occurred in Poland, these could be stated in the public space of the myToDoList to share it with others. This could enable to communicate the current state of the work in progress before meetings and especially when they occurred. Apart being aware of the status of the project, knowledgeable workers from Sweden could react to these occurrences, also in between the meetings.

The owner of the commonToDoList is the project manager, who is the only person having access to this list during the project. commonToDoList is regularly updated by several myToDoLists, especially before the regular project meetings or in case there are modifications to the single myToDoLists.

So, all to-do lists were linked to each other to provide update manually or automatically if configured so. This would inform the project manager in Carpart early enough to give him time to think about possible solutions until the meeting.
The data in all to-do lists is saved centrally, but accessed only by its creator, at least for a certain period of time, which is between the assignment of the task to the person and the time when the task is finished. The owner of the data has the control of the access onto his or her data. If Polish engineers did not want to share certain information about their work, they could protect this information in their own space. But if they wanted to share, they had the possibility to do so.

4. DISCUSSION OF THE RESULTS

As studied in Carpart, to-do lists have an important role in coordinating activities in collaborative settings. They offer a mechanism to define tasks with temporal and logical constraints by enabling assignment of human and non-human resources.

The structure of to-do lists can be adapted in projects depending of the type of information created or relevant for the specific project. In Carpart some to-do lists consisted only of data about when, what, who, and in some lists also a description field for each item. If there is limited data in the list, it can mean, on the one hand, that not everything related to the project work is communicated in the group. Project members protect their own workspace and filter certain information about work in progress. This can be caused by organizational structures and culture, like competition or power relations between single persons or work groups. The reason can also be that the work to do is very specific, can only be carried out by specialists in that area, as well as any detail information about it is not feasible and understandable by others - by people not being knowledgeable in that specific area. As long as the work is on schedule, it is not necessary to share it with others.

On the other hand, if the data in to-do lists are limited, it can mean that there is still additional information connected to the list items, but it is exchanged between project members only informally. In such situations, it is important to establish the appropriate communication channels between project members in right format.

Using our prototype (Fig. 2 and 3), we could see differences in coordination practices in work groups:

The to-do lists become livelier, especially if they are used not only by project managers, but also by all project members of the project. If to-do lists are used lively they become the meeting agenda and then the meeting minutes. This makes to-do lists central documents for project management and cooperation in distributed work groups. Additionally, there must be enough space to add information and to link other documents to the issues.

Live to-do lists activate membership by motivating members to participate not only in carrying out work they are assigned to, but also in coordinating their work with others, in being aware of work-related needs of others and offering help to overcome complexities, especially when they are originated by interdependencies between tasks distributed among project members. Members of a project are then
encouraged to work in between meetings, which can avoid gaps of communication
and support openness between cooperating members.

Having shared spaces in to-do lists invite members to communicate and
comment on each other’s work. This helps promote trust relations and mutual support
among them. The participation between managers and members are facilitated.
Managers care to know immediately modifications to the to-do items by each
member. They are better informed and can react immediately if there is impact of
one’s work to another. The so established openness in informing the others about
work progress and especially in changes by doing so help to avoid wrong decisions,
double work others would carry out, incompatibilities in interfaces, etc., depending
on the type of work.

All these help to represent and articulate the work of members. Members can
publish their new findings to all with accord of project managers. At the same time,
this makes to-do lists to central documents of projects by relating relevant data to
each other and creating the project context.

It is important to keep track of all steps that are taken to single to-do items.
Sometimes it is crucial why certain things have been done. Keeping history about to-
do items enable scrolling back in versions if a clarification is needed or certain work
activities need to be explained and articulated. Team members may need to explain
the project manager or other project members, why they have decided for a certain
step (regarding technology, action, or something else in the course of project work) at
a certain point of time between two meetings. A description of the situation, of the
dependencies with other tasks or components, or of relevant circumstances can help
to clarify and legitimize the actions taken. This type of information can also be used
for knowledge capturing in the project. Especially, in future projects it can be helpful
not to do the same mistakes. This can only happen, if this type of detail information
in the history of actions of all project members are saved and available for all later
on. The prototype does not implement this feature, but it considers this as an
important issue.

5. CONCLUSION

This paper is about studying coordination in work groups and suggesting a
solution by means of to-do lists. Based on theories of coordination and ethnographic
studies in coordinative work environments described as in the case of Carpart, lacks
of coordination are identified; a solution is provided by illustrating the necessary
functionalities in a prototype. The focus of this investigation was the use of to-do lists
for coordination purposes. The analysis considered also the different perspectives of
actors working in a cooperative project.

Factors mentioned above have impact on coordinated work practices. To
provide such an environment determines requirements to the system used. Here are

5 Authors of this paper have been working on this knowledge management issue in another publication (Tellioğlu,
2009).
some features listed, which are expected from applications hosting to-do lists. These features are considered as design implications for future work:

- Automatic capturing of staff efforts including time records.
- Automatic comparison of captured values with planned estimated values.
- Automatic or manual update of data originated in myToDoLists in commonToDoList, as well as a configuration interface for users.
- Notification of the person about status and certain stages of to-do items, like finished, reached and greater than estimated planned value, waiting for results from other tasks, probably carried out by others, etc.
- Providing a protected area for team members to manage their individual work without necessarily articulating it to others. This would give single team members a space to work, which is not transparent to others and supports his or her privacy in carrying out the work assigned to him or her.

REFERENCES


