An Integrated Tool-Support for Small Team Meetings: Lessons from Observations of Team Meetings in Organisations

Virallikattur S Dhenesh
University of South Australia

Elena Sitnikova
University of South Australia

Jill Slay
University of South Australia

ABSTRACT
Teams collaborate in different contexts within organisations to share information with its members in achieving their targets. Collaborations with face-to-face meetings are prevalent despite the emergence of numerous tools to support distributed team collaborations. However, the nature of tool-support for team collaborations in the last decade was focused on supporting distributed and web-mediated meetings. Furthermore the tools were either not designed to support all the processes within team collaboration or not readily adopted by users. Literature on developing an integrated tool-support that includes all the potential processes within a meeting, and learning lessons whilst designing tools to improve the state of their adoption is largely unexplored. This paper reports on a qualitative study that observed twenty team meetings from five organisations in South Australia and analysed the data using a grounded theory approach to generate stories on team activities. The stories were used to develop a tool-kit framework and lessons on providing a tool support for team meetings.

General Terms
Teams, *organisations,* Meetings.

Keywords
Team meetings, tool-support, team collaboration, tool-kit.

1. INTRODUCTION
Team are ubiquitous in organisations and collaborate in different contexts to accomplish their targets by sharing information within its members. The contexts of team collaborations range from face-to-face meeting to distributed online meetings depending on its purpose and availability of participants. Although distributed meetings, assisted by numerous online tools in the market are emerging as a substitute for participants to collaborate at their convenience, face-to-face meetings are still prevalent in organisations and contribute towards team collaborations. However, tool-support for face-to-face meetings remains largely unexplored as the focus of system designers in the past decade has been primarily towards supporting distributed and web-mediated meetings. Tools introduced since the late 80's to support team collaborations like Computer Supported Cooperative Work (CSCW) tools [1] , Electronic Meeting Systems (EMS) [2] or online tools such as Adobe Connect and SharePoint [3, 4] for distributed communications were not readily adopted by users in organisations. Research efforts in understanding the reasons for such low rates of adoption and increasing their appropriation are largely unexplored [5]. Most of the studies were based on providing support for web-mediated collaborations based on web 2.0 or social networks by taking advantage of the emergence of numerous online tools, whilst teams within organisations still prefer to use face-to-face meetings for their collaborations.

Based on the insights from an earlier study on simulated meetings that generated a tool-kit framework, this qualitative study observed twenty team meetings within three organisations. The study was used to refine the framework with tools that would support all the potential processes that occur within a team meeting whilst learning lessons on providing a tool-support for team meetings. The lesson learned from the study were analysed in three aspects of tool-support namely the people, process and technology to provide insights for system designers in developing adoptable tools.

The paper is organised as follows: Section 2 reviews the existing tool-support for team collaborations and a brief overview of an earlier work related to this study; Section 3 explains the nature of the meetings and the method used for the study; Section 4 illustrates the tool-kit framework generated from meeting observations; Section 5 describes the lessons learned from the study on tool-support; Section 6 compares the results with the outcome of the earlier study while limitations and scope for future work of this study are included in the final sections of the paper.

2. EXISTING TOOL-SUPPORT AND RELATED WORK
Teams form an integral part of any organisational structure and team setting – with necessary technology support, are critical in bringing people together to collaborate towards their team goals. A widely cited classification of the context of team collaborations based on a time-space matrix, first proposed by Johansen [6] and later in Ellis space-time matrix [7] illustrates that teams collaborate in different contexts based on their need; availability of participants and tools for collaboration, that range from synchronous co-located context to asynchronous distributed context. The scope of this study was confined to synchronous co-located collaboration, for example, face-to-face meetings that occur at same time, within a meeting room. However, the review of existing tool-support for team collaborations in the next section includes tools from different contexts – from synchronously co-located to asynchronously distributed, as the existing literature includes observations by researchers on tool-support in these different contexts.

Numerous tools emerged in the market to support team collaborations that include CSCW tools, EMS and tools to support online or distributed collaborations. Firstly, CSCW is defined as contexts in which technology is used to mediate communication, coordination, cooperation that makes interactions within participants accessible and cheaper [1] and

with an objective of articulating cooperative work, sharing information space and adapting the developed technology by the organisation and vice versa. CSCW tools have not been successful since their introduction in 1980's, as a study by Grudin [8] identified factors namely i) a widening gap between those who benefit from using these systems and those who perform additional work to support the application, ii) decision maker's choice to put their self benefits first at the cost of the actual users of the applications, and iii) difficulty in evaluating the benefits and costs of these applications, that contributed to the failure of the CSCW systems. The lack of support and issues with CSCW is notable in a citation analysis of literature review [9], where the second most cited article was that of Grudin's article [8] that focused on investigating 'why CSCW applications fail?'.

The progress of CSCW since the last decade was largely focused on collaborations that are remotely located and web mediated. In a extensive literature review on the CSCW domain, Shumarova and Swatman [5] find little evidence on the progress of the tools that addresses the three issues of CSCW identified by Grudin. It is also evident from their study, that the diffusion of developed CSCW applications from research labs to organisational use has been minimal, except for Lotus Notes and NetMeeting. Their finding is not unique as identified by Lewis and et al. [10] on their investigations on the lack of adoption of synchronous collaborative applications and by Blackburn [11] who acknowledges the findings in his extensive literature review. Matushkina and Nevalennaya [1] upheld Grudin's observations on the lack of the impact of CSCW tools and argues that a lack of motivation among employees as a potential reason for the limited impact. However, literature on exploring the reasons for their failure and making them more adoptable are largely unexplored.

Secondly, EMS were developed to provide a set of tools that support processes within a collaborating group [2]. The tools were used for brainstorming, voting, discussions, agenda preparations and recording automatic minutes. EMS tools focused on producing results that involves the responsibility of the whole group. Investigations on the adoption of these tools into organisations across the globe by different research groups [12-16] reveal that these tools were not successfully adopted. As Blackburn and Hodges argue, [11, 17] EMS tools have been in existence for the past twenty years but they were not readily adopted by organisations.

Thirdly, numerous online tools [3, 4] have emerged in the market to support distributed collaborations. An evaluation study on distributed collaboration tools by Christian and Rotenstreich [18] lists a number of distributed tools that can also be used within synchronous collaborative workspaces namely: Aceproject, Adobe Connect, Atlasian, Base Camp, Central Desktop, Clearspace, Coefficient, Dimdim, Google Docs, Group office, Lotus notes, Open Exchange, SharePoint, Teamwork, Yahoo groups and Zimbra. However, Christian and Rotenstreich find little evidence from the literature on the successful adoption of these tools within organisations.

More insights are required for system designers on the reasons for the unsuccessful adoption of these tools used in team collaborations and exploring the lessons in understanding why the tools were not appropriated by users and where these tools developed with the capabilities to support all the potential process that could occur within a specific team meeting?

Related Work

By confining to a specific context of team collaboration (small face-to-face team meetings), an earlier observational study [19] on a series of simulated team meetings, developed a tool-kit framework (refer to Figure 1) to support team meetings and enabled to learn lessons in the process of developing a tool-support. The framework includes two sections of potential tools for the tool-kit namely the components required in a software and hardware tools required to assist team meetings. The potential areas as identified by the lessons from the study includes the people that use the tools, processes within a meeting setting that require tool-support and the technology that would be required to assist the meetings. Since the study was based on simulated meetings, the framework and lessons required to be validated against real team meetings that occur within organisations.

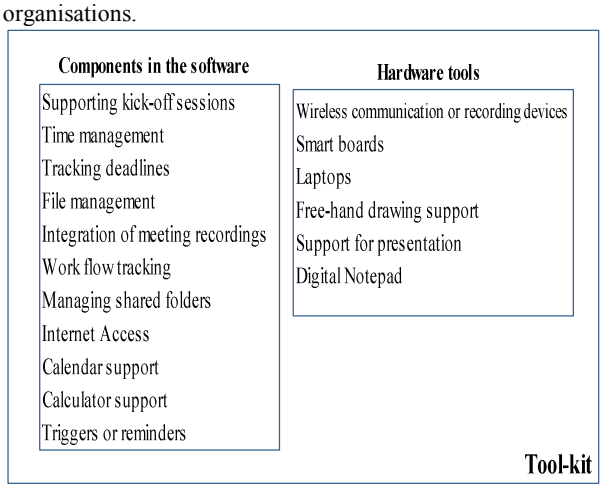

Figure 1: A tool-kit framework (based on simulated meetings)

3. METHOD OF THE STUDY

The study employed a qualitative approach and a researcher participated in the meetings as a passive observer to collect data from four consecutive sittings each of five team meetings (twenty meetings in total) within three organisations in South Australia. Data were recorded in the form of i) field notes that include written notes and memos on the meeting processes and artefacts used during team activities and ii) audio transcripts of meetings. The participants had specific roles and artefacts used within the meeting include laptops, notepads, white boards used for deliberations, and screens for power point presentations. The data were analysed using a Grounded Theory (GT) approach [20] as illustrated below to generate stories on team activities. Although it is conventional to use GT to generate theories, GT have been commonly used in Information Systems (IS) to generate concepts as against theories [21]. A content analysis survey [22] of thirty two IS studies between 1996 and 2005 that used GT indicate that only 11 papers used a conventional GT approach whilst an equal number of papers used it to generate concepts. Consequently, GT was used in the context of this study not to generate theories but to group categories to generate stories on team activities.

The audio transcripts from a team meeting were broken down into discrete observations in a spread sheet and were compared with field notes. Observations that are conceptually similar were grouped and labelled as concepts. Concepts that explain similar event, action or process within a team activity

were grouped as categories. Concepts that cannot be grouped were not included initially in grouping. The ungrouped concepts were discarded if they are discrete. The steps were repeated until all the concepts were grouped as categories. This process is referred as open coding in GT approach. The coding process is exhausted when there are no more concepts that can be grouped into a category. Similar categories derived from the data are grouped to generate a story on the team activity, using an axial coding scheme. Similar coding process was repeated with data from other team activities within a meeting to generate stories on team meetings that were based on providing a tool-support for participants. The same coding process was repeated for analysing data from other team meetings.

4. TOOL-KIT STRUCTURE

A tool-kit framework (refer to Figure 2) derived from the observations of team meetings consist of two sections of tool-support namely components required in a software and the hardware tools required in the tool-kit.

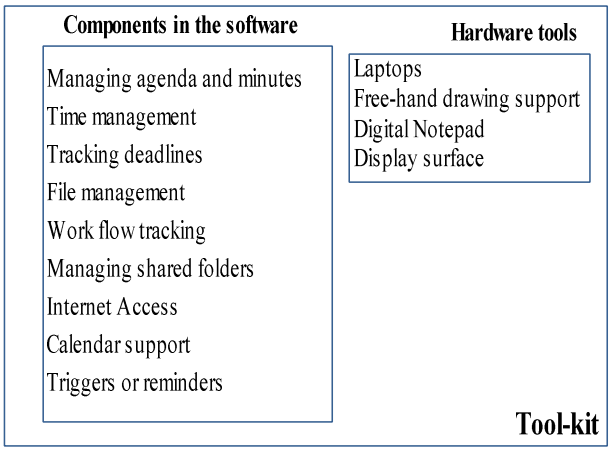

Figure 2: Proposed tool-kit framework

The components in the software include support for team leaders to manage the meeting minutes and team agenda; module to assist team leaders in managing time effectively within meetings; assist participants to keep track of the deadlines of items; manage and share necessary files using shared spaces; manage workflow, instant access to internet to get necessary online data; assist participants with support to manage calendars and necessary reminders or triggers on the status of workflow or deadlines of items. The hardware tools that could be introduced to assist participants within meetings include laptops installed with the tool-kit software; assist ad-hoc demonstrations of participants with a free-hand drawing surface; a digital notepad to assist with extensive notes taking within meetings; introduce a display surface to illuminate and increase visibility of objects displayed during discussions and provide necessary integration of these tools wherever necessary.

5. COMPARISON OF SIMULATED AND REAL MEETING STUDIES

The results from the real meeting observations were compared with the results from observing simulated meetings (compare Figure 1 and Figure 2 for discussions here). Most of the tools derived from simulated meetings are identical to those proposed in the framework shown in Figure 2. However, few of the tools were unique to each study as not all tools were required to support the type of processes observed with the two different types of meetings. For instance, a software component to support and manage agenda and minutes, support to perform basic mathematical functions and introduce a hardware tool like a display surface to increase visibility and projection of small diagrams were derived only during real team meeting observations. The processes within a simulated meeting don't involve a designated recorder to keep track of the meeting and record its minutes. But, a participant can be observed to be recording minutes using a Microsoft word application to record the notes in few real meetings. Similarly, despite the fact that simulated meetings followed an orderly workflow within their meetings, they have not used an agenda or action list. However, every team meeting within organisation had a hard copy of agenda or an action list and their processes were based on the agenda. Further, simulated meetings activities were not hampered by the lack of any projection surface to illuminate smaller objects or documents used in discussions. Hence, it would be useful to introduce a software component to support and manage meeting minutes and agenda and a display surface in the proposed tool-kit and identify from focus group inputs (refer to future work in section 9), if the team members would prefer them.

Similarly, introducing software components such as the support for kick-off sessions, integration of recordings of different meetings and initiating less distractive triggers or reminders and support for performing manual calculations were exclusive to simulated meeting observations. Firstly, it could be argued that the team leaders in real meetings were not requiring a support for kick-off sessions as the meetings observed were not the first meeting for the team and the participants were known to each other and required no introduction about them. However, the support could be useful for a team leader who kicks off a first meeting of a new team and when the participants are new and are unfamiliar to each other. Secondly, despite any observation of explicit difficulties for participants with the lack of integrated minutes of different meetings, it would be useful for them to have a copy of integrated minutes when a participant wishes to compare minutes of different meetings. Thirdly, observations of triggers and reminders within meetings and distraction by their sound were not observed in real meetings as most of the teams haven't used reminders. However, in the event of introducing a component to initiate triggers and reminders, it would be necessary to make them less distractive as the distractive reminders affected the workflow of participants in simulated meetings. Further, calculators can be introduced to perform mathematical calculations related to a team activity which may be inaccurate when done otherwise. Hence, a support for kick-off sessions, integration of meeting minutes, less distractive reminders and a desktop calculator can be a part of a tool-kit framework and their presence in the tool-kit can be subject to focus group evaluations.

Focusing on the hardware tools, wireless communication and recording devices, smart boards and support for presentations were exclusive to simulated meeting. Firstly, although participants in real meetings were not using headsets, microphones or any recording device to record the meetings, it could be useful for the team to record the meetings and use them as a repository to refer them in the future. Secondly, smart boards were not used within real meetings, but white boards were used in few meetings for a purpose similar to that of smart boards used in simulated meetings. For instance, white boards were used to illustrate concepts and list web addresses used for deliberations. One of the teams used a white board for a brain storming session and a participant took print out of the brain storming concepts displayed on the

white board. Hence, there is a potential to use smart boards in the place of white boards, for example as in this case, the participant can use smart boards to store the brain storming concepts or share them with other participants without taking a print out or using hard copies. Thirdly, apart from one presentation in a team meeting, most of the teams were not observed to be using any presentations. However, it would be useful for the teams to have an option of using assistance for presentations viz, support for preparing slides, or organising their hand notes, whenever the team requires such support. Hence, a support for recording meetings, introducing smart boards and providing support for presentation can be a part of the tool-kit framework subject to validation from focus group inputs. Given the tools required to support simulated and real meetings are different for few processes, both the frameworks (in Figure 1 & 2) can be taken to focus group discussions. However, when the tools are developed based on a validated framework, the teams can be provided with an option to select tools for their respective teams, from a list of tools from the tool-kit.

6. LESSONS ON TOOL-SUPPORT

The following lessons derived from the analysis of data from meeting recordings were focused on three aspects of tool-support namely the participants of the meetings, process that occur within the meeting and the technology support to assist the participants.

Participation Idle

Few team members were observed to be contributing less towards their team collaborations. Three participants in different team meetings were observed to be idle for most of the meeting duration. It is not clear why they were idle? and lessons need to be learned from focus group inputs on possibilities or ways to maximize their participation using some form of technology support.

Participant's late for meetings

A common observation from the team meetings was the delay in kicking off meetings because of the late arrival of participants or a delay in occupying the meeting rooms. Two meetings of a team were kicked off late either due to a delay in vacating the meeting room by another team and (or) all team members were not present. Another team meeting kicked off late by thirty minutes as two team members (external participants, who are clients of the organisation) arrived late and a team member was observed to be communicating the delay to each member of the team. One team member arrived only in the second half of a team meeting, but the team continued with its workflow as it was informed of the late arrival of the team member in advance. These observations inform on the need to understand (through focus group inputs) the reasons behind the late arrival of participants and how could some form of technology support like reminders or desktop alerts minimize the late arrivals and assist teams to kick off meetings on time.

Support for situated actions

Workflow within team meetings were influenced by emergent activities that occur on the flow of meetings. The actions are situated and were consistent with the observations of situated action theory [23] which characterised teamwork as having emergent properties and stated that tasks in teamwork are performed differently in each instance of their execution. Having stated that, it was also observed that processes performed with the team meetings consists of repeatable activities that were similar in nature but different in execution. For instance, the processes of kick starting weekly meetings were similar in nature but each team leader used a different form of introduction. Hence, the tool-support should be based on supporting both the repeatable task and situated actions.

It is possible to introduce tools to support repeatable tasks within team meetings by observing the repeatable activities like kicking off or closing meetings, preparing agenda or action list or support for team members in recording notes. However, the support for situated actions is difficult to design as they may be executed differently in each instance. However, it is possible to observe those situated actions and generalise them to accommodate potential tools to provide the closest or best possible support for them. The lessons learned on supporting such actions in each instance can then be used to refine the tool-support to enhance its applicability for the next occurrence of such activity executed in a different form. Few scenarios of situated actions that were observed from one of the team meetings and possible tool-support are illustrated below:

i. An intruder gave a note (a message on a piece of paper) to a recorder who was recording minutes of the meeting. The workflow was interrupted and the team leader asked if the recorder can continue recording? or should she respond to the note?. Although the recorder continues to collaborate with the team, she lost her way in thinking about the note and was directed by another team member to continue the recording.

ii. A team member (occasional participant[1],) was expected to participate in the meeting after a specific time. As he is involved only with a specific item in the project he usually joins the team meeting on a specific time slot. In one of the meetings, the team completed its workflow prior to the time slot of the occasional participant and have to wait for him to join the meeting. Another participant was directed to call the participant to join the meeting. In another meeting, the occasional participant arrives on his time slot only to find the team having not completed its workflow and the team have to abort its discussion on an item to accommodate discussion on the item that involves the occasional participant. As he was made aware of the situation he said that he would have delayed his arrival if he was informed of the emerging situation.

iii. One of the team member's activities was interrupted by an intruder and he went out of the meeting room. The team leader has to repeat the discussions as he re-joined the meeting.

These scenarios are examples of situated actions that could be supported with potential tools from the tool-kit. One possible solution would be to use a dash board in the tool-kit framework where people external to the meeting can be allowed to communicate either with the team or an individual participant. Team members can then respond to the message on the dash board without affecting or disturbing the workflow of the team. Similarly the team can communicate with an occasional participant who is expected to participate in the team meeting based on the progress of the team's workflow at a given instance. For instance, the occasional participant can use the dash board to view the status of the

[1] An occasional participant refers to a participant who is not a part of the team but is invited to be part of its meeting where his/her expertise is required for discussion on a specific item in the meeting agenda.

meeting and the current item being discussed and attend the meeting accordingly.

The scenarios illustrated above were specific to a particular team meeting and similar strategies could be adopted in generalising or grouping similar situated actions from other team meetings in providing a best possible tool-support for situated actions.

Use of personal artefacts

Another common observation revealed that the workflow in most of the team meetings was affected by the use of personal artefacts like cell phones or laptops by team members within the meetings. Few examples on the use of cell phones observed from each team's meeting are discussed below (Teams A to E refers to the five teams used in the study):

i. A team leader (team A) was distracted by the remainders from his cell phone on two occasions. Another team member resisted his incoming calls twice but finally answered his call prompting a temporary break in the workflow. Other team members were observed to be idle and waiting for him to continue the activity.

ii. Another team leader (team B) was using his cell phone to text messages during the meeting. In another meeting a team member was interrupted by a call and he moved out of the meeting room. He re-joined the team after few minutes. Although the team activities were not interrupted by his absence, he missed some important discussions in the meeting. In another case, one of the team member's phone was ringing thrice during a meeting eventually disturbing the workflow, prompting him to attend the call.

iii. In the first meeting of team C, a participant was using his cell phone (in silent mode) to read messages on two occasions. In the second meeting, the same participant was using his cell phone twice in the meetings and the ring tone from the device interrupted the team's workflow. Similarly in the third meeting, team members were interrupted by the loud noise from the cell phone and later he turns it off. Two other participants were using their cell phones, but only for few seconds. On the other hand, one of the participants used it to perform few calculations using the calculator tool.

iv. Mostly cell phones were not used within meetings of team D and E, expect for one occasion when a team member used it to read few messages but he immediately re-joined the team's discussions.

In general, there was a break in workflow whenever the cell phones were used by team members. Potentially, there are two ways of approaching this issue namely to use team protocols for a restricted use of cell phones or introduce a form of technology support (diverting incoming calls to laptops used in meetings) to allow access to cell phones without affecting the workflow. However, this story and its potential intervention have to be verified with inputs from the focus groups.

Other potential support

The following scenarios informed the study in providing additional technology support to enhance the team's collaborations:

i. In three of their team meetings participants of a team struggled to recollect the items to be explained during their turn in a round-robin discussion session. They have to interrupt the next member's talk to complete the discussions on the items that they forgot during their turn. Further, team members were observed to be struggling to prioritize their ideas they shared during their turn. A component to list and prioritize their dot points of discussions would minimize the interruptions.

ii. One team member interrupted a discussion to adjust the temperature levels of the meeting room by adjusting the air conditioner controls. An integrated tool-support that includes control for the external artefacts (like air conditioner, lights, and projectors) can be introduced. More lessons need to be learned from focus groups on this aspect.

iii. In one of the team meeting, the meeting room was locked and could not be accessed to hold the meeting. The team decided not to waste time in finding ways to get access to the meeting room but to conduct the meeting in an informal work space within the building. Hence, lessons need to be learned in providing tool-support that is independent of the meeting rooms, to manage such contingent situations.

7. DISCUSSION

The results from the study are discussed in four fold namely: the tool-kit framework and the potential use of the lessons on tool-support, functionality of the proposed tool-kit v/s existing tools, insights from the comparative study on two types of meetings and the use of observation as a data gathering tool.

Firstly, the artefacts from this study include the components of the proposed tool-kit framework and the lesson on three factors namely the people, process and technology. The study indicates that system designers whilst developing a tool-support are required to consider not just the user requirements but a wide range of other potential factors that may influence the decision of tool-support design viz. the organizational structures, expertise of participants, processes within tool-support domain and required technology substitution in order to increase the chances of tool adoption. It should not be the case that often the practitioners are forced to ignore the hard-won lessons for design to accommodate 'cutting edge' design solutions as observed by [24] and potentially affect their adoption rates.

Secondly, by comparing the proposed tool-kit framework with the existing tools namely the CSCW tools, EMS and online tools used in team collaborations, it is clear that the tools were not designed to support all the potential process that could occur within a team meeting. For example, by comparing the proposed tool-kit framework (in Figure 2) with the functionalities of an EMS discussed in Section 2, tool-support for reminders, calendar access and potential support for situated actions are not a part of the EMS tools whilst potential hardware support is not included as an integral part of a tool-support. However, many components namely support for agenda preparation, managing minutes, recording meetings and discussion support were present in both cases. This observation raises an interesting question as to then, if the functionalities of both type of tool-support (proposed tool-kit and EMS) are mostly similar, then what were the other factors that would have diminished the chances of EMS tools being adopted?

Thirdly, with the comparative study of the two tool-kit frameworks, it is clear that most of the tools that were required to support the activities of a simulated team were required for real meetings within organizations. Simulation of a team setting emerges to be a valuable tool to carry out pilot studies and learn lessons before implementing them on the actual environment. The outcome of this study with a proposed tool-kit framework and lessons on tool-support were

attributed to the earlier study for providing insights on the avenues of team processes and the use of artefacts within meetings that need to be focused during the observations of real meetings.

Finally, a rich set of data that covers a wide range of potential issues within a requirement elicitation process were uncovered by using observation as a data collection tool. For example, the potential to introduce a support for participants' processes that were manually done were identified only by observing their activities within the meeting. Difficulty with the use of artefacts were uncovered by observations which otherwise would have not been discovered unless the participant reveals them – which he may not, fearing the repercussions if he is identified to be struggling to use or unable to use a particular artefact. So, system designers can use ethnography or observation as a data collection tool to uncover hidden user requirements.

8. LIMITATIONS OF THE STUDY

The study on team meetings within organizations had the following limitations:

i. As mentioned earlier, ten organizations were initially approached for data collection but only three of them agreed to participate and results were based on observations of team meetings from only these three organizations. The results can be refined with participation from more organizations.

ii. Following the number of meetings used in the earlier study (four sittings of each team were used for data collection in simulated meeting study), the study on real meetings was also confined to four consecutive meetings of each team. The four meetings used in simulated meetings include a kick-off and closing meeting. However, the first of the four team meetings observed from each team for this study were not necessarily the kick-off meeting and the fourth meeting was not necessarily the closing meeting for the team. Hence, the observations and data from these real team meetings may vary, when the teams were given a project and were constrained to just four meetings to complete their task, as in the case of simulated meetings.

iii. Initially the proposed data collection procedures for this study included both audio and video recordings of the team meetings. However, video of the team meetings were not recorded as the participants were not willing to participate when their meetings were video taped. Hence, only audio recordings were available for data analysis to compare the field notes unlike the study on simulated meetings that used both audio and video recordings in comparing the field notes. More insights on participant behavior, artefact usage and processes within team meetings would have been obtained if video recordings were available to compare field notes.

iv. The study was based on a non-obtrusive data gathering method namely passive observation of team meetings. The consistency of results is subject to verification of the outcome of the study with obtrusive data gathering methods like focus groups or structured interviews.

9. CONCLUSION & FUTURE WORK

This study was carried out with twenty team meetings of five teams spread across three organizations in South Australia with an objective of refining a tool-kit framework and learning lessons on providing tool-support as informed by an earlier study on simulated meetings. The data were collected in the form of i) audio recordings of meeting transcripts and ii) field notes of the team activities by passive observation of the meetings. Data were analyzed using a grounded theory approach in deriving stories on team activities. The proposed tool-kit framework generated from the stories includes software components and hardware tools that could be introduced within meetings to assist participants. The framework of the tool-kit derived from the study was similar to those derived from the earlier study as most of the tools were identical. Lessons were learned on finding ways to maximize user's participation, assisting participants to minimize late arrivals, support for situated actions, factors that could interrupt the team processes like the use of cell phones and other potential support within meeting rooms.

To conclude, the study shows that system designers whilst developing a tool-support are required to consider not just the user requirements but a wide range of other potential factors that may influence the decision of tools design such as the organizational structures, expertise of end users, processes within tool-support domain and required technology substitution in order to increase the chances of tool adoption. Other potential factors like work environment, management practices or aspects of cultural diversity of meeting participants have not been considered in the study. The results were confined to few organizational team meetings and their accuracy is subject to a broader data set and validation of observational data from obtrusive data gathering techniques.

In a future study, the tool-kit framework and lessons learned on tool-support will be used as a foundation in generating concepts to initiate focus group discussions on tool-support with participants of team meetings. The outcome of the study would enable the framework and lessons learned to be refined and used as informants by system designers in developing a tool-support for small team meetings.

10. REFERENCES

[1] Matushkina, E. and A. Nevalennaya, *Motivating contributions to Commute Greener!-Nature of motivation and motivation loss.* rapport nr.: Report/Department of Applied Information Technology 2010: 117, 2011.

[2] Nunamaker, J., et al., *Electronic meeting systems.* Communications of the ACM, 1991. **34**(7): p. 40-61.

[3] Lundström, J., *meetLink-An application for supporting meetings*, in *Department of Computing Science*2010, UMEA University: Sweden.

[4] Gregory, A. *17 online meeting tools that facilitate collaboration*. 2009 2010-04-08]; Available from: http://www.sitepoint.com/online-meeting-tools/.

[5] Shumarova, E. and P. Swatman, *Informal eCollaboration Channels: Shedding Light on "Shadow CIT"*, in *21st Bled eConference ECollaboration: Overcoming Boundaries Through Multi-Channel Interaction*2008: Bled, Slovenia.

[6] Johansen, R., *Groupware: Computer support for business teams*1988, NY,USA: The Free Press.

[7] Ellis, C.A., S.J. Gibbs, and G. Rein, *Groupware: some issues and experiences.* Communications of the ACM, 1991. **34**(1): p. 39-58.

[8] Grudin, J. *Why CSCW applications fail: problems in the design and evaluation of organizational interfaces*. in *ACM conference on Computer-supported cooperative work,1988*. 1988. New York: ACM

[9] Jacovi, M., et al. *The chasms of CSCW: a citation graph analysis of the CSCW conference*. in *20th anniversary conference on Computer supported cooperative work, 2006*. 2006. New York, USA: ACM

[10] Lewis, L., et al., *A Cross-Regional Exploration of Barriers to the Adoption and Use of Electronic Meeting Systems.* Group Decision and Negotiation, 2007. **16**(4): p. 381-398.

[11] Blackburn, T., *A Framework for Understanding and Supporting Human Actions in Small Team Interactions*, in *Advanced Computing Research Centre, School of Computer and Information Science,* 2009, University of South Australia,Adelaide,Australia.

[12] Bajwa, D.S. and L. Floyd Lewis. *Current status of information technologies used in support of task-oriented collaboration*. in *35th Annual Hawaii International Conference onSystem Sciences, 2002* 2002. Hawaii: IEEE.

[13] Pervan, G., L. Lewis, and D. Bajwa, *Adoption and use of electronic meeting systems in large Australian and New Zealand organizations.* Group Decision and Negotiation, 2004. **13**(5): p. 403-414.

[14] Bajwa, D., et al. *Organizational Assimilation of Collaborative Information Technologies: Global Comparisons*. in *40th Annual Hawaii International Conference on System Sciences, 2007* 2007. Hawaii: IEEE.

[15] Bandyopadhyay, K. and S. Paul. *User Acceptance of Group Support Systems*. in *International Conference on Decision Support Systems (ICDSS 2007)*. 2007. Kolkata,India: AIS Electronic Library.

[16] Tan, Y.L. and L. Macaulay. *Factors Affecting Regional SMEs Progression to Digital Business Ecosystems*. in *Seventh AMCIS, 2011*. 2011. Detroit: AIS Electronic Library.

[17] Hodges, S.L., *Electronic meeting systems–what they are and how they could benefit Australian government organisations*, in *ANU-Digital Collections:* 2011, Australian National University.

[18] Christian, D. and S. Rotenstreich. *An Evaluation Framework For Distributed Collaboration Tools*. in *Seventh International Conference on Information Technology, 2010*. 2010. Las Vegas,NV: IEEE.

[19] Dhenesh, V.S. and E. Sitnikova. *Towards an Integrated tool-support for Team meetings : An Observational study on simulated meetings*. in *3rd International Conference on Information Management and Evaluation (ICIME 2012)*. 2012. Ankara, Turkey.

[20] Strauss, A. and J. Corbin, *Basics of qualitative research*1990: Sage Publications Thousand Oaks.

[21] Bryant, A. and K. Charmaz, *The Sage handbook of grounded theory*2010: Sage Publications Ltd.

[22] Urquhart, C., H. Lehmann, and M.D. Myers, *Putting the 'theory'back into grounded theory: guidelines for grounded theory studies in information systems.* Information Systems Journal, 2010. **20**(4): p. 357-381.

[23] Suchman, L., *Plans and situated actions: The problem of human-machine communication*1994: Cambridge University Press.

[24] Randall, D. and P. Salembier, *From CSCW to Web 2.0: European Developments in Collaborative Design*2010, DE: Springer.