Lessons towards Developing an Integrated Tool-support for small Team meetings

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Abstract — Teams within organisations meet regularly to review their progress and engage in collaborative activities within a team setting. However, the uptake of tools to support their activities within team meetings is limited. Research efforts on understanding the reasons for low rates of tool adoption and learning lessons in developing tools that could be readily adopted by team members within team meetings are largely unexplored. This qualitative study focuses on learning lessons towards developing an integrated tool-support for small team meetings within organisations using focus groups. Discussions were based on a tool-kit framework generated by observing their team meetings in an earlier study. The discussions were recorded and the transcripts were analysed using grounded theory approach to generate stories on team processes and potential tools that could assist team members during each process. The lessons derived from the study were based on three aspects of tool-support namely the potential users of the proposed tool-kit, processes within the team meetings that would be influenced by the introduction of the tool-kit and the technological aspects of the tool-kit.

Index Terms — Teams, tool-support, team meetings, tool-kit.

I. INTRODUCTION

Teams 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.

This study used focus groups to generate lessons in developing a potentially adoptable,

integrated tool-kit for team meetings based on the insights from earlier studies (discussed in detail in Section 2) that observed team meetings. The focus groups consist of participants who are part of small teams within seven organisations that meet regularly to review their teamwork. The participants include team members of four teams whose meetings were observed in the earlier study and team members from four new teams that agreed to participate in the study. The focus group discussions were facilitated with three major concepts namely the potential components required in a tool-kit's software, technology support required in a meeting room and the factors that would influence the adoption of the developed tools. The lessons from the study were confined to three aspects of tool-support namely people, processes and technology based on numerous studies in literature [6] [7] [8] [9] [10] [11] [12] [13] that focused on these three factors as the corner stones of system design and evaluation.The paper is organised as follows: Section 2 reviews the existing state of tool-support for team collaborations; Section 3 focuses on the previous work carried out by authors that are related to this study; Section 4 describes the nature of the focus groups and method used in analyzing the data; Section 5 explains the lessons derived from the study; limitations of the study, conclusions and future work are discussed in the final sections of the paper.

II. BACKGROUND

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 [14] and later in Ellis space-time matrix [15]

illustrates that team 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. CSCW tools have not been successful since their introduction in 1980's, as a study by Grudin [16] 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 [17], where the second most cited article was that of Grudin's article [16] 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, Bajwa, Pervan, King, Munkvold [18] on their investigations on the lack of adoption of synchronous collaborative applications and by Blackburn [19] 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 [18, 20-23] reveal that these tools were not successfully adopted. As Blackburn and Hodges [19, 24] argue, 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 [25] 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 Information Systems (IS) community on the reasons for the unsuccessful adoption of these tools used in team collaborations by exploring the understandings on why the tools were not appropriated by users and what factors are required to be considered that would potentially be useful in encouraging the adoption of these tools.

III. RELATED WORK

The study discussed in this paper is a part of an overarching project that focused on developing an integrated tool-kit for small team meetings. Three different studies of the project that are related to this study are listed below:

i) A pilot study [26] in observing a simulated meeting recording from a meeting corpus [27] was conducted. The study was used in identifying processes within a team meeting that would require tool-support and the activities that can be supported by some form of technology.

ii) The lessons identified from the pilot study were used in a follow-up study [28] that observed a series of simulated team meetings in developing a tool-kit framework to be used as a base in designing an integrated tool-support for team meetings.

iii) The lessons from the follow-up study and the framework were refined using another study [29] that observed a series of real team meetings within organisations in South Australia. The study was used to identify if the tools required within a simulated meeting would be warranted for real meeting environments and vice versa.

The refined tool-kit framework [29] was used

as a foundation to generate concepts that were used within the study discussed in this paper to initiate discussions and generate lessons on tool-support using focus groups.

IV. RESEARCH METHOD

The focus groups consist of participants from seven organisations within South Australia. The participants include team members of four teams whose meetings were observed in the earlier study and team members from four new teams that agreed to participate in the study. Each of the eight focus group sessions consisting of five to seven participants were facilitated by a researcher. The concepts used in focus groups were derived from the refined tool-kit framework–derived from an earlier study. The identity of the participants and any information during their discussions that would reveal the identity of the team or the organisation were concealed to maintain confidentiality, as agreed with the participants before the study. Each team was informed that their discussions would be audio-taped. The transcripts of the discussions were recorded using two audio recorders. The audio transcripts collected from focus group sessions were analyzed using 'Digital Voice Editor' software to generate transcribed data. The data analysis method used in examining the focus group transcripts were based on a Grounded Theory approach proposed by Strauss and Corbin [30]. The data were broken down into primitive level comments. The comments from each focus group were listed in a spread sheet. The same process was repeated for other groups. Each comment was manually read repeatedly in order to group similar comments to generate concepts, which were then grouped in a similar method to generate categories. Grouping similar categories resulted in a collection of stories. The generated stories were confined to three aspects of tool-support namely people, process and technology for the reasons stated in the introduction and generating lessons on developing an integrated tool-support.

V. LESSONS ON TOOL-SUPPORT

The following section summarizes the lessons that were derived towards developing a tool-support on three aspects namely the potential users of the proposed tool-kit, process within the team meetings that would be influenced by the introduction of the tool-kit and the technological aspects of the tool-kit.

5.1 People

Team members were concerned that their privacy would be compromised with the use of technologies within meetings. For instance, team members argued that the personal notes that were written by a participant, associated with an item on a meeting agenda should not be displayed on the screen if the agenda is shared with others on a display screen. Further, participants prefer to share calendars with the team only when their personal appointments or entries on the calendar were hidden. Similarly when a participant is late, they prefer to use a positioning or tracking device to enable the team leader to track them, but only if their privacy was not compromised. Further, team members are reluctant to have their meeting recorded which was evident from an earlier study where participants were not willing to participate if their meeting were videotaped. Apart from being concerned that every word of their discussions would be recorded, they also argued that participants may not feel comfortable to discuss their ideas once they are aware of the recording setup. Hence, privacy issues need to be addressed when new technology is introduced.

Organisations need to be aware of the need to make regular assessments of the new tools that were introduced to ascertain if the workforce continues to use them effectively. For instance, tools that were used for sharing documents

namely I-drive and share point were used initially by team members of two teams of an organisations only to be abandoned after a period of time citing issues in their portability and user interaction. Had they conducted a recurring appraisal of the uptake of the tools by its people, the organisations could have identified the issue earlier. Hence, organisations need to conduct regular appraisals on the state of adoption of tools that were introduced within the workforce.

Organisations should be more effective in supporting the team members with necessary set-up within the working environment to use the tools and henceforth enhance the chances of their adoption. For instance, one group was very critical of the lack of infrastructure within the meeting rooms that lacks wireless connection and has unreliable internet access points. Another group was very critical on the policy makers who have decided that their employees will not be allowed to access the company's data outside the organisation or during non-working hours. A third group had to wait for a longer time on a decision from their senior managers on the chances of purchasing new iPad or tablets for the team members. In all these instances, the team members were willing to embrace the introduction of new technologies within the meeting environment. With more proactive organisational decision from the senior managers the team members would be encouraged to use new tools or technologies. Hence, senior management has a critical role in making timely decisions in procuring/introducing new tools or infrastructure and hence forth encouraging the workforce to use them.

5.2 Process

Most of the teams prefer to replicate the conventional manual processes or include existing fragmented tools that are being currently used by the team, in the proposed tool-kit. For instance, groups prefer to use Microsoft outlook for initiating reminders and accessing calendars as outlook is currently used by most of the teams. Further, one of the groups is using a shared database where the teams upload all the relevant documents – accessible to their senior mangers and the group prefers to incorporate the database within the proposed tool-kit. Another group was using a stand-alone system to manage their meeting room bookings and prefer to integrate them with the proposed tool-kit. Hence, team members prefer to include the functionalities or fragments of the existing tools within the proposed tool-kit. Hence, replicating their manual process and including fragments of the existing tools would be an essential factor in encouraging the team members to use any new tool-kit.

Using a shared workspace or a shared folder for the team meetings enables the team to reduce their work and effort. For instance, sending individual mails to participants on updates of meeting documents, amendments on agenda items or eleventh hour changes to meeting documents and errors in multiple handling of the documents can be avoided when the participants are provided access to their meeting documents through a common shared workspace. With the shared workspace the responsibility of accessing documents lies with every participant of the team unlike the conventional mailing process where the team manager or the facilitator is required to take responsibility in ensuring that the updates are being emailed to all the team members in the mailing list. Hence, the team members prefer to have a centralized access point for the team documents and it reduces their effort and time.

In general, participants prefer the proposed tool-kit to be capable of supporting two major aspects of team collaboration namely support for information sharing (like sharing meeting documents) and support for team processes or activities (like accessing online data) within the meetings. For a tool-kit to be embraced

successfully, tool design is required to address these two aspects with a well-marked differentiation of these aspects for each tool in the tool-kit to cater to the needs of the team members.

Each team's meeting is different to other in their form and collaboration and hence the need for a tool-support for each team may differ. Hence, the assimilation of the tools form the tool-kit would largely depend on the activities within each team and the level of information sharing the team prefers to use. Hence, when the proposed tool-kit is designed each team should be capable of selecting their own tools from the tool-kit, namely with three different versions of tool-kit viz., beginners, intermediate and advanced versions. For instance, one team might choose not to have a recording of their meeting conversations whilst another team might choose not have access to online data. When the proposed tool-kit is designed, the choice of selecting the necessary tools to be placed in the tool-kit should be provided.

5.3 Technology

Participants prefer to choose technology to support and enhance their processes within their meetings. Most of the process within the meetings requires some form of tool-support as it reduces their work and effort considerably. As one group pointed out, the introduction of technology would cut the workforce, prevents double handling of data by retyping the hand-written meeting notes, reduces the meeting duration and hence increases the productivity within the organisations. Introduction of technology is likely to enhance team processes within organisations. A team within an organisation that doesn't embrace the emerging tools increases the chances of its isolation from teams that introduce latest technology into their work practice. The quality of deliverables from a team that hasn't embraced the technology falls short of the other teams and as one group puts it, they were isolated for not having adopted the state-of-art technology. Hence, teams are willing to embrace new tools at least to prevent their isolation within the organisation.

Team members are comfortable in embracing new forms of technology at home and prefer to use them in their work environments. For instance, they prefer to use a touch screen type of display for the user interface of the tool-kit, scrolling type of display panels in the screen and noise free keyboards for typing inputs. Further, team members prefer to use the tool-kit in iPad or tablets instead of laptops. So, team members are willing to embrace new technology and replace the existing gadgets with advanced tools.

Participants agreed that visualization is better than text displays. Teams were not using visual representations only because of the non-availability of visualization tools within meetings. They argued that it is much easier, reachable and convenient to use visual representations of ideas within a team discussion than the conventional form of text and oral presentations. For instance, participants prefer to use a visual representation of tracking their workflow namely using a traffic-light system based workflow tracker that uses red, green and amber colors in flagging items. Hence, teams are willing to use visual form of interactions, if tools and necessary support are available to them.

Digital copies are preferred to the hard copies of meeting documents like meeting agenda, action list, supplementary documents and other hand outs that were circulated within the team members before or during the meeting. Team members are more specific in using soft copies because of its convenience in making required changes even at the eleventh hour of the meeting and centralized document access capabilities. Further, the use of soft copies reduces the cost of printing and stationeries. Hence, use of tools to support team documentation is likely to reduce organisation costs.

Team members prefer to include or integrate their personal communication devices into the proposed tool-kit wherever it is possible and effective. For instance, participants prefer to receive meeting alerts, scrolling texts, flash messages or recurring reminders through their personal communication devices like mobile phones, tablets or laptops apart from receiving alerts on their desktops. Further, they prefer to bring their personal laptops or tablets for meetings to enable them to store and access the data even after their working hours. Hence, wherever possible personal communication devices can be introduced as an alternate for the existing tools to potentially encourage user participation and tool-kit assimilation.

Participants raised concerns on the potential of the proposed tool-kit to affect their face-to-face interactions. They argued that the tool-kit should assist the team whilst not acting as a control switch in managing the activities of the participants. For instance, participants prefer to mount laptops under the discussion table rather than being placed in front of them, and potentially affecting the face-to-face interactions. The tool-kit shouldn't act as a centralized controller in managing the participants but the use of tools can be orchestrated by a facilitator or a team leader. Hence, the tool-kit should acts as a meeting assistant rather than a meeting controller.

Introduction of new tools and latest technology might be perceived in different forms based on the age of the team members. Participants agreed that younger team members would embrace the new tools much easier than the older team members as the younger generation has a hands-on experience on the latest tools unlike their senior counterparts that have to learn how to use the new tools. For instance, the introduction of iPad or tablets in meetings and their use would be much easier for the younger team members as most of them are more likely to have used tablets or iPad outside the work environment unlike their senior colleagues. However, senior participants in the focus groups argued that with proper training introduction of new tools would provide them with an opportunity to learn new skills and would be a motivating factor to embrace the new tools. Hence, the introduction of new tools within a meeting environment with appropriate training is more likely to encourage their adoption.

Technology cannot always be useful and without appropriate hierarchical controls the introduction to tools would be distractive and misleading to the team meetings. For instance, team leaders are very skeptical of the introduction of internet in meetings to access online data. They observe that internet access can be misused by participants whenever they are less interested in the team activities and will be tempted to access webpages that are out of scope of the meeting or use other system applications like computer games. Any misconceptions with the use of webpages are more likely to create mistrust, where trust is very essential. Hence, the introduction of tools and supporting technology should be bound to a set of team protocols with a controlled access to tools and technology based on their roles in a team meeting.

Participants prefer the proposed tool-kit to be portable enabling them to use the tools in different gadgets and platforms. For instance, the tool-kit should be accessible with their desktops or laptops in their workplace and should be accessible with their iPad or tablets elsewhere. However, the tools may not be successfully embraced if they are less portable, as in the case of a shareware used within a group that has issues in using the tool outside its work place. Eventually the shareware was not used by the team members even within the workplace. Hence, portability of the tool-kit under different platforms and gadgets is essential in enhancing the chances of the adoption of the tool-kit.

Participants envisage that with the emergence of numerous tools and a paradigm shift towards the ubiquitous presence of technologies, team

collaborations would eventually become more distributed. Hence, the tool design is required to be adaptive to be used on the run with iPhone or iPad as gadgets in the near future.

Most of the groups discussed of the use of Outlook for initiating reminders for their meetings. Further, participants discussed on the use of calendar in Outlook for accessing their appointments. A third party shareware was used by two teams of an organisation for sharing their documents but with limited assimilation. No other collaborative tools apart from Microsoft outlook has been used by the eight teams from seven organisations that participated in the study. The finding endorses the observation of researchers [5, 19, 31] who identified that not many collaborative tools were successfully adopted by organisations except Outlook, Lotus notes or Wikis.

The following table summarizes the lessons on tool-support based on the focus group inputs.

Technology
• Team members are willing to embrace new technology and replace the existing gadgets
• Teams are willing to use visual forms of interaction if necessary tool-support is available
• Use of tools to support team documentations are likely to reduce organisation's costs
• Wherever possible personal communication devices can be introduced as an alternate for the available tools to potentially encourage user participation
• The proposed new tools should acts as a meeting assistant rather than a meeting controller
• Introduction of new tools with appropriate user training is likely to encourage their adoption
• Introduction of tools and supporting technology within meetings to be bound to a set of hierarchical controls for different team members to prevent misuse and distractions
• Identifying avenues to integrate the existing tools with the proposed tool-kit would be necessary for a successful adoption of the tool-kit
• Portability of the proposed new tool-kit would

enhance the chances of its adoption by team members
• Proposed new tool-kit is required to be adaptive and used as a gadget
Process
• Introduction of technology is likely to enhance team processes within organisations
• Teams are willing to use new tools at least to prevent their isolation within organisations
• Replicating the existing manual team processes and including fragments of the existing tools with proposed new tool-kit are key factors in encouraging team members to use the tool-kit
• Team members prefer to access their document from a centralised work space and potentially reduce their time and effort
• Proposed tool-kit should be capable of supporting two aspects of team collaboration namely information sharing and assisting team processes
• Team members be given a choice of selecting necessary tools for their tool-kit from a pool of developed tools
People
• Privacy should not be compromised with the introduction of technology
• Undertake regular appraisals of the status of uptake of new tools introduced within the organisations
• Senior management has a critical role in making timely decisions on procurement and introduction of new tools and latest technology and henceforth encourage the use of new tools

Table 1. Summary of Lessons on tool-support

VI. DISCUSSION

To summarize the findings, the process of developing an integrated tool-support for team meetings is just not based on eliciting requirements and designing tools based on them. The IS developers are required to consider a wide range of potential factors within the spectrum of three essential attributes namely the people who use the tools, processes that occur within the tool-support environment and the technology that

is required to create support for the team activities. The people factors include addressing the privacy issues whilst introducing new tools; conducting regular appraisals on the uptake of newly introduced tools and the need for organisations to introduce necessary setups within the working environment to encourage the use of tools. The process factors include the need to replicate the existing manual processes; including fragments of existing tools within any proposed new system; reducing the time and effort of the team members by ensuring the new tool has a centralized access point and the new tools should address both the information sharing and activity-support aspects within team meetings. The preferences of participants in technology aspects were i) willingness to include and embrace technology to enhance their team processes and to avoid being isolated from teams that have already embraced new tools, ii) to use visual forms of interactions wherever possible within meetings, iii) to reduce organisational cost by using new tools to support team documentation, iv) to include personal communication devices and encourage user participation v) to include necessary training for new tools vi) controlled access to new tools used in meetings to avoid distractions and their misuse and vii) tools to be portable and adaptive within different platforms and gadgets. These insights could be used by IS development community to potentially increase the adoption rates of any newly developed collaborative tool within organisations.

VII. LIMITATIONS

The focus group study had the following limitations:

i) Focus groups consist of team members from eight teams within seven organisations within South Australia. The results would have been improved if more teams were willing to participate in the discussions.

ii) Participants of each focus group include a team leader and the team members who were assigned different roles within the team. However, inputs of the focus groups would have been refined if each group consist of all the potential stakeholders of the proposed tool-kit. The potential stakeholders include representatives from the respective management board of the client organisations, technology experts and potential system designers of the tool-kit.

iii) The focus group data were analyzed for stories based only on three aspects of tool-support namely people, process and technology. The other potential factors that could influence the use of tool-kit namely work environment, organisational policies on tool usage/procurement or aspects of cultural diversity of team members were not considered in this study.

VIII. CONCLUSIONS & FUTURE WORK

The study was conducted with eight focus groups consisting of participants from eight teams, spread across seven organisations that meet regularly to review their progress. Each group was provided with a set of concepts to discuss on the potential tools that could be included within the tool-kit framework that supports activities within their team meetings. The concepts include the potential components for the tool-kit's software, hardware tools to be included in the tool-kit and the factors that would influence the adoption of the tools within organisations. The discussions were audio taped and the transcripts were analyzed using a Grounded Theory approach to generate stories on tool-support. Lessons from the study were focused on three major aspects of the tool-support namely the team members who would be using the tools, processes within the team meetings that would require assistance and the technology substitution required to provide

necessary support within the meetings.

To conclude, the study shows that collaborative system developers 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. The factors include organisational structures, expertise of end users, processes within tool-support domain and required technology substitution in order to increase the chances of tool adoption. Other factors like work environment, organisational policies or aspects of cultural diversity of team members have not been considered for discussions. The results were confined to team members from few organisations and the composition of each focus group does not include all potential stakeholders of the proposed tool-kit. Accuracy of the results is subject to validation with a broader set of stakeholders.

In a future study, the lessons would be subject to a scenario based validation with the team members. Each team would be provided with a set of scenarios consisting of team activities and potential intervention strategies with tools from the proposed tool-kit. The outcome of the validation would provide more insights on the stakeholder's perspective of the tool-kit whilst the lessons learned would act as informants for IS community who are engaged in developing tools that support collaborative work domains.

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