Facilitating mobile groups - experiences and requirements

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1 Introduction

While small groups an informal communities can structure their collaboration on the fly larger teams need facilitation to achieve a tangible outcome. In the last decade, there have been numerous papers establishing this understanding (see Schwabe, 1995) and proposed approaches and frameworks for planning and facilitating collaboration (de Vreede et al., 2002; Beranek et al., 1993; Bostrom et al., 1991, 1993). A smaller number of authors have reported their experiences with facilitating distributed collaboration (Dubs and Hayne, 1992; Niederman et al., 1993; McQuaid et al., 2000; Zhao et al., 2002). They stress both the necessity and difficulties of guiding over distance. Our paper will go one step beyond and report on our concept to facilitate mobile groups. We will first discuss the specialities of collaboration of mobile groups compared with distributed groups. Then we will introduce the case study mExplorer for mobile collaboration. Drawn from the case study we will formulate key challenges of facilitation for mobile groups. The paper will close with the proposition of a framework for mobile facilitation.

2 Distributed Groups

In a common distributed setting of collaboration, the group members are sitting fix in front of a desktop PC at different places, not moving away from it. Collaborative sessions are scheduled and agreed, so all group members participate reliably in the session as demanded. All concentration is focused on the collaborative session. In a well prepared session, all members are well orientated and there is consensus about what to do and how to do it. Roles as moderator, time manager, content manager and so on are fix distributed among participants. Thus all members are acting within a common and shared context. Technology is basically supposed to bridge the gap of distance and to provide an environment, which orientates as much as possible as much as possible.

3 Mobile Groups

Mobile collaboration is further apart from co-located meetings than pure physical distribution. It is not set in one or more meeting rooms but rather situated in a physical environment that may be beyond the control of the facilitator. Mobile collaboration is not purely a cognitive process of data, but integrates physical action and experiences. Mobile groups are for example moderated groups of fresh students exploring the university campus. Mobile groups should not be misunderstood as simply being distributed groups with mobile devices replacing desktop computers. In contrary context, purpose, and dynamics do change for mobile groups. The environment of mobile groups does not provide the rich set of devices and tools meeting participants have become used to from meeting rooms. Instead the environment itself becomes interface. Mobile collaboration is not necessarily scheduled, but could be started spontaneously as all members are reachable anytime and anywhere. Mobile collaborators can not exclusively focus the ongoing collaboration, but need to share their attention with their current environment. They may be distracted by their current environment, but they may also use it as a resource. For instance a person collaborating from the university library might simultaneously be busy searching for a book. And any book in a shelf might give inspiration for the collaboration task. The reliability for permanent participation of mobile members is reduced. People could be cut off the collaboration sessions for technical reasons (e.g. entering a campus building without network coverage). Discontinuity in participation might also result from the nature of multi-focusing, if any other issue gets a higher priority (e.g. a closing office where a student needs to register in order to keep a deadline). If the risk of discontinuous participation is high, there can not be a fixed distribution of roles. That means if the moderator of the ongoing collaboration is cut off, another member needs to take over and replace him. In an extreme case of mobile collaboration, members are frequently leaving and joining the session and thus a lot of effort is needed to provide continuously a shared context.

4 Case Study mExplorer

As part of the Mobilearn project [1] we studied mobile collaboration through the location based game mExplorer. mExplorer familiarizes newcomers with a new environment allowing them to study its geographical setup and the social, organizational and informational rules. mExplorer has been extensively tested in the University environment (Göth et al., 2004; Schwabe et al., 2005; Schwabe and Göth, 2005), but also in the tourism sector (Göth and Lueg, 2006). mExplorer included location based navigation tasks (finding a specific location), knowledge tasks (e.g. how to find a book in the library), and creative tasks (e.g. make campus art more interesting) which groups with 10–20 members have to solve in a mixture of collaboration and competition. The paper reflects on our experiences in facilitating four trials of the mExplorer. These trials

[1] http://www.mobilearn.org

were run from 2004–2006. Two trials are documented in prior publications (Göth et al., 2004; Schwabe et al., 2005; Schwabe and Göth, 2005). Specific data will be provided for our most recent trial (January 2006). The trial consisted of a series of small self-contained tasks (lasting between 10 minutes and 30 minutes). The purpose of the tasks was twofold: 1) The participants should learn about the University campus and enrich it electronically 2) the participants should get acquainted systematically with twelve mobile collaborative tools (such as chatting, navigation history (red line showing the past movements), zoom, even chasing one another and evaluate each functionality's impact on motivation, orientation, learning, group-building, and confidence. There was an individual phase for each of the twelve functionalities containing a short introduction to the functionality, some time to try out the functionality fulfilling a specific assignment (e.g. "solve all tasks as fast as possible", "catch as many other teams as you can", "annotate each point of interest" and so on), and a phase of reflection to fill in a questionnaire.

5 Challenges in Facilitating Mobile Groups

Facilitating is a key success factor of collaboration. Facilitation of mobile groups can build on established frameworks, but the steps have to be augmented for the specific requirements of mobility. The specific nature and dynamics of mobile groups lead to a number of specific challenges for mobile facilitation. Those are:

- **Providing monitoring means:** Having transparency about what is going on in the collaboration activities is key for good facilitation. Thus a facilitator needs powerful monitoring means to be oriented about the groups' activities. MExplorer displays all teams' current locations and their digital activities. Those can be interpreted by the facilitator and lead to aimed supportive action.
- **Facilitating participation:** Participation of group members is discontinuous, which causes irritation, disorientation, complicated coordination and efficiency losses when refreshing the context of joining members. Some facilitation of participation can be provided by awareness functionalities. A system needs to provide awareness about passed, current and future presence and availability of group members. MExplorer provides location information and online status of group members.
- **Facilitating multitasking members:** Multitasking is a typical phenomenon for mobile groups as their current context is manifold. Thus the cognitive load of group members is generally high. With mExplorer, there are always two players sharing one device and thus sharing cognitive load. Performance and confidence of the players is much higher, when they are running in pairs (Schwabe and Göth, 2005).
- **Facilitating permanently alternating roles:** Because of discontinuous participation, roles among group members must be switched, if the process must not be interrupted by absence of a key group member as the moderator. A system needs to be able to handle spontaneous role switches and provide group members with awareness about each other's role. For reduced complexity players in mExplorer

are not supposed to be discontinuous yet, so it is an open issue. But mExplorer supports different roles as player (prey and hunter), facilitator, and audience. The computer system takes participatory over some tasks of a moderator, as it coordinates people with tasks and supports self-moderation providing location awareness about who is where. Thus players can decide explicitly to cooperate and meet other groups or compete and explicitly not meet other groups or compete and hunt other groups for getting points.

- **Facilitating shared and distributed focus:** Collaboration always contains divergent and convergent episodes of activity. Thus the focus of group members needs sometimes to be shared and sometimes to be distributed. Under mobile circumstances it is extremely difficult or ineffective to schedule strictly the begin and end of convergent phases. Furthermore there are no natural means for the facilitator to regain focus of the group, once it got lost. To support the facilitation of mobile collaboration a system can provide means to regain focus and thus synchronise activities. MExplorer allows the facilitator centrally to start and stop sessions on clients. The stop of a session makes players coming back to a designated location. This function is a very radical one. Other available means are sending SMS to all group members or using a notification functionality. It is important to separate strictly media channel of moderation from other communication channels.
- **Facilitating process and evolutionary planning:** An agenda is typically a document to give orientation and steer a process. For mobile groups an agenda must be much richer, more powerful, and much more flexible. It becomes the most sufficient center of focus and attention. A common agenda contains the sequence of activities, associated times and owners. A mobile agenda should additionally contain associated links to tools and documents. It needs furthermore a space for awareness about the current status of work and group members. As a mobile process can hardly be fully planned and determined in advance, a mobile agenda must be very flexible. Discontinuous participation requires low restrictions for edition by various group members. As the process is an issue of consent, there must be room for annotations in order to discuss, rate and vote for single entries. MExplorer does not contain any agenda functionality yet. For this reason the design of mExplorer trusts still very much on physical control within a limited area in a synchronous setting with collocated phases. But mExplorer provides process support in sequencing algorithm for locations, activities and tasks.
- **Facilitating shared and mixed representations:** Due to the limitation of screen size and computational power of mobile devices, representation of communication and material becomes a challenge of structuring them. MExplorer concentrates all relevant activities on one window with only little need to switch to other windows. We found it meaningful to make use of different devices for different purposes, like PDA for orientation and mobile phone for communication. Furthermore the whole physical context must be seen as interface.
- **Mapping of digital and physical world:** Collaboration of mobile groups is not supposed to be barely digital, but takes place in their real environment. The

physical context can be enriched by digital means, if there is a mapping functionality. MExplorer's main screen is based on a map of the physical area.

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