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Teaching in Interactive Spaces: Considering a groups' experience

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Abstract

In an exploratory study we experimented with several available collaboration tools and techniques to support group interaction in presence situations. The room is equipped with an interactive large screen and various kinds of mobile devices were used. We present results within two domains. On the one hand, we report on the benefits and drawbacks of blended interaction with small and large devices during the course setting. On the other hand, we identify those aspects which influence the groups experience in such settings.

1 Introduction

Applications of large interactive touch walls profit - like many other innovative technologies - from curiosity of users. Therefore an initially raised motivation for usage can be observed. Furthermore, it is known that the user experience with such technologies includes a social facet. Creating a setting, which considers group development and social interaction when using the technology, we found especially important to consider the groups' experience, as a specific flavor of the current notion of user experience (Battarbee 2005, Norman 2004), where the social aspect of experience is usually only related to a single user. The social interaction, which can be fostered in several ways, can create changes in several aspects of personal and groups' perceptions and emotions during the usage of technology.

Within a co-located course on "Groupware and Knowledge Management" with IS-students we explored the relevance of group interaction for the perception of technology as well as ways to foster group development and interaction. For this, we used an interactive large screen and small devices like tablets with various applications to support collaboration. The goal was that students could use common groupware and online tools to (a) get a higher involvement during the lectures and (b) reflect on the software and their usage with respect to the topic of the course.

The course took place in the facilitation laboratory (ModLab) at the University in Bochum. The ModLab is a regular course room with an interactive (based on infrared-camera-technology) large screen of 1.2m x 4.8m size. The rear projection displays are connected to standard PC hardware and are used for presentations, research and web browsing. In addi-

tion, 12 tablets are available. The students are also encouraged to use their own devices like laptops, tablets and smartphones, all having access to the WIFI network. During the course, various kinds of applications were used. The course took place weekly for one semester as a 2.5 hour session including slots of lecturing as well as interactive sessions as described below. Files, links and organizational content were organized in a Moodle based learning management platform.

2 Methodology

The course was observed by a researcher who took notes on technology usage and on when and how many of the students actively participated in the task performance and discussions. In addition she noted occurrences of problems and comments on technology usage as well as other relevant observations. Furthermore, to get feedback on the impact of application usage on the perceived quality of the setting and course, the students filled in a questionnaire at three points of time during the course. The questionnaire gathered personal perceptions of the software usage. It was based on Hassenzahls' AttrakDiff[1] and incorporated several topics to evaluate the qualities of group interaction during the course. E.g. the question "How did you perceive today's technology usage during the course" was collected with 20 pairs of words like "structured – chaotic", "helpful – disturbing", "unfair – fair" or "surprising – boring".

3 Applications used in the course

To support group work and exchange between students and the lecturer, we used several – mainly web-based – tools during the course and tried to take advantage of the large screen as a means to display a diverse number of different kinds of information as well as tablets and other mobile devices used by the students. The applied software tools are presented in the following categories based on the devices regularly involved:

[1] http://www.attrakdiff.de/en/AttrakDiff/ last access at 10.07.2013

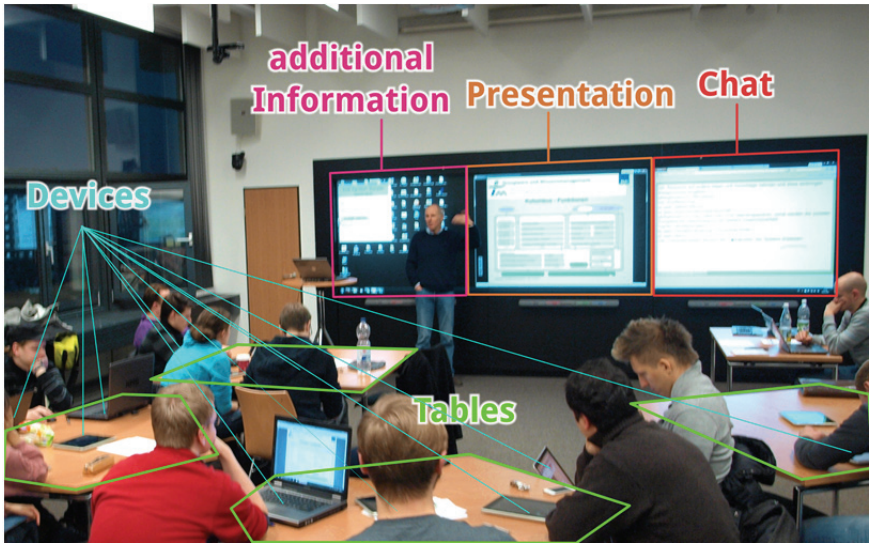

Figure 1: Setting at the ModLab

3.1 Large display centered tools

These tools were presented on the large screen and used by the lecturer; communication occurred unidirectionally, mostly from the facilitator to the whole group or during short conversations between the facilitator and one participant. It was used for the presentation of slides, websites, models, mind maps and videos, mainly fostering multi-media presentations. In addition we used a web-based tool to randomize between who should contribute something next, thus to foster involvement of those students who were waiting whether others wanted to be active and to bring in random interactivity. The large screen was also central for modeling sessions to develop large process models collaboratively with the students, in order to collect and achieve transparent co-creation of content.

The screen was a shared focus and reference for the group. When the current status or next steps were not clear to a participant, she was able to search for clues on the display.

3.2 From small devices to large screen

Participants were regularly asked to either perform tasks on their mobile devices or use an application to send the results to the front, where they became visible to all users. We therefore introduced a brainstorming tool to enter short notes with their (mobile) devices which were clustered, discussed and reused afterwards on the large screen. In another lecture, after the facilitated collaborative modeling of groupware applications, groups of students commented on a model via a web interface and the commented models were presented on the large screen to refine them. We also used a web mind-mapping tool to create knowledge maps. Similar to commenting of a model, this was first done in small groups on small devices and presented afterwards for discussion with the whole group.

3.3 Parallel usage of small devices

The third interaction mode included parallel usage of the small devices during lecture sequences. The students used a small web based voting tool to constantly give feedback on the lecture, e.g. by answering questions like “the lecturer is talking to quick” or “there are too few examples”. The aggregated answers were displayed as traffic lights (red, yellow, green) on the lecturer’s display. During several lectures students were asked to use chat in parallel to the lecture, e.g. to answer questions or in one case to find intentionally included misconceptions in the slides. While the chat was also visible on the large screen, an assistant followed the chat to support the lecturer in analyzing them and interrupt if a relevant message was posted.

Nevertheless at some points during the sessions, using technology was not possible since there were no adequate replacements, e.g. when creating group posters via flip-charts or pen and paper or designing pen-and-paper games.

4 Observations

There are various kinds of interactions observed which were made during the course. With respect to the workshop topic, the following might be relevant.

Participation: It was quite obvious that participation was increased in the course by the employed technological means. With respect to the face-to-face discussions, there was a stable group of students who participated intensely in nearly all discussions. Nevertheless, the more reluctant students were yet participating actively in those tasks done in small groups or individually with their devices, when the whole group was addressed, e.g. if brainstorming was used to collect aspects to a specific question. Furthermore, it was observable that students could become involved in other ways, which caused less (personal) stress than being directly asked in public to contribute. Reasons may be the way of contributing anonymously, or a better match between personality and a way of participation.

Although most students were not familiar to each other before the course, groups of four formed quite fast and stayed constant throughout the whole course. Although we changed the table and chair layout several times, the seating formed the same stable groups. Nevertheless, some students were less integrated into a group and switched once in a while since not all students were present in every session.

Tasks being individually performed (e.g. brainstorming) on the small devices, led to separated phases of work in solitude. They were followed by discussions between one participant and the lecturer. Or when these tasks were embedded into a larger group task (like collecting information and creating a presentation) the group interaction was quite high and discussions were more open.

Technical Drawbacks: During every session, there were technical issues hindering flawless interactions: may be the students forgot the WIFI password or just errors caused restarts of applications. While we thought this might break the experience, it became more tolerated when it was explained, reflected and discussed. For the presenter, the availability of an assis-

tant is important to deal with technical problems or reviewing simultaneously created content, e.g. with chat.

We found some aspects of experience design in face-to-face situations where the group perspective became visible:

Anonymity influences participation and involvement: Not all but some of the tools allowed anonymous usage like brainstorming and chats. While in verbal discussions only about three students participated, in the virtual parallel discussion around six posted a message, some also refusing to disclose their identity if their messages were picked up in the group. Since anonymity cannot be guaranteed in co-located situations, offering the possibility of parallel, virtual contributions seem to allow more people to participate. Nevertheless, there is still one group not engaged at all and just waiting for every session to finally come to an end.

Enjoyment: Fun (Blythe et. Al. 2004) is an important aspect of user experience. We found a simple example of impacts on group use on fun aspects. Relevant aspects of causing fun are to give room to the contingency of human behavior or to challenge social pressure to defend their perspective or opinion on a certain issue. Of course, challenging has to be applied with care because social strain may also make individuals reluctant.

Results from questionnaires: We asked students to fill in the questionnaire at three times, as explained above, with 13 participants. Some tendencies become apparent about how students perceived the situation. In general, the feedback on the group experience was positive. The technology was perceived as more supportive than burdening, more effective than useless, and – with a weak tendency – more efficient than wasting time. The interaction with the technology was seen clearly as promoting the group-interactivity, more structured than chaotic, more integrating than excluding and most notably very fair. Less positive than expected were the answers on the cold vs. warm and surprising vs. boring questions where the direction was not clearly visible in the data.

5 Lessons learnt and Conclusions

Besides technological hindrances we draw the following conclusions: not surprisingly the familiarity is important and therefore one has to **limit the number of (new) applications** per session and introduce them carefully. More than about three different applications per session seem to be problematic. Independently from how the tools are used (constantly or just for a few minutes), we recognized a lack of interest when we introduced the fourth or fifth tool in a single session. Regardless whether they already knew it, the curiosity coming from novelty decreased rapidly. In addition, the patience of the participants for another set-up time (grabbing the device, finding the right app, orientation on the interface etc.) decreased rapidly the more applications were introduced.

One should plan for **active appropriation** of the tools if no rules are set from a facilitator or if there are no rules set from other practices. Employing technology, especially when a group should make sense of it for their own needs, requires extra effort to negotiate the collaborative use (Schmidth & Bannon 1992). This aspect may reduce over time, when practice is created in multiple instances of similar courses.

Direct Group Manipulation - an easy way to participate: As described above we used a collaborative mind-mapping tool to sort and discuss content about the topic of knowledge management. While the knowledge construction mainly took place in face-to-face group discussion that led to modifications finally performed by the lecturer, we observed some participants making continuously slight changes in the background like correcting typos and moving objects to other categories of the mind map without changing meaning. Here the technology offered options to participate also to those that do not actively engage in discussions by providing a side channel. Similar to *legitimated peripheral participation (LPP)* (Lave & Wanger 1991) encouraging this kind of action can lower the barriers for those not actively participating in discussions to still take part in knowledge building.

The blend between presentations in the front, small group interaction and individual work was thought to change the group experience of a regular university course. By integrating different tools in a single session we wanted to foster interaction and discussion, having in mind that knowledge building is easier in those activating situations. In general the tool usage was regarded as helpful and integrative by the students, nevertheless there were some drawbacks due to technical as well as organizational issues like the force to stick to known procedures which make it easier to fulfill reciprocal expectations in such a regulated and common form as a university course. In this initial, very explorative setting we could also identify some aspects of the employed tools that where beneficial to the group as a whole. In future work we want to focus on these aspects and develop supportive technologies that take the special requirements of synchronous co-located interaction also into account.

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