Personal and Private Calendar Interfaces support Private Patterns: e.g. Diaries, Relations, Emotional Expressions

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ABSTRACT

This paper yields new insights into the emotional value of personal calendars for their users and explores their habits. Using an ethnographic approach we collected data about personal scheduling and revealed highly interesting aspects that are particular valid for private calendars. Interestingly, we found that users still prefer paper calendars although they have access to PDAs and desktop interfaces. One of the main reasons for this is that the calendar represents an integrated all-in-one tool, and the properties of paper support this functionality more efficient than rigid digital calendars. We further observed that calendars have an important emotional value to their users, recording states of relations and emotional expressions like diaries. Based on our results we raise broad issues for the design of calendars that exploit the potential of advanced technology.

Author Keywords

Private calendars, personal scheduling, emotional, diaries.

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION

Calendars as personal supportive artifacts have a long tradition and represent a promising field of research, promoted mainly by the development of digital calendars. Payne conducted an early study of calendar use and noted that digital calendars at that time comprised only some advantages of paper calendars, which resulted in continued use of paper calendars in highly computerized environments [7]. A few years later Kincaid and Dupont presented a survey of office workers that examined the use of paper and digital calendars within a large organization [3]. Their survey revealed similar results providing a basis

for recommendations for electronic calendaring systems. Palen further investigated the use of calendars in shared workspaces and developed different models of calendar use [6]. Crabtree et al. argued that there is a similar need for groupware calendar systems in domestic life and conducted a number of ethnographic studies to inform the design of such systems [2]. Neustaedter and Brush recently defined further design principles for family calendars and developed a prototype application using a participatory design process involving twenty mothers [4]. Their prototype strongly emphasizes the potential that emerges from recent advantages in technology. Pervasive computing technologies and ubiquitous computing concepts give us the possibility to add digital features to existing physical artifacts and hence sustaining work flows and social affordances of materials. We therefore believe that it is important to reconceive design decisions that led to existing applications and to further investigate current patterns of use and the meanings of artifacts, such as calendars, to their users, not only in a functional and social sense, but also concerning their personal and emotional values.

RESEARCH GOAL

Previous studies focused on investigating calendar use in the context of early digital calendars [7], surveys of the application of calendaring systems in organizations [3], and on calendars for intra-family coordination [2,4]. The goal of the research work presented in this paper is to investigate the use of personal calendars, which we define as calendars that are not primarily used for work or family coordination. We wanted to investigate the calendar as emotional and very intimate artifact, which is not only used for scheduling but also as a personal object. Office workers mainly rely on their calendar for scheduling meetings and appointments and therefore use them as functional objects, which primarily have to be efficient, reliable, and effective.

Specifically we investigated the following questions:

- What types of calendars are currently used for personal scheduling within a user group who has easy access to state-of-the-art PDAs und desktop IT?

- Which data is recorded in these personal calendars?

- Do people use reminders for events?

- Are people really concerned about privacy aspects?

METHOD

We used an ethnographic approach that involved several interviews and observations at spots of time over a total period of four months. In the beginning we had informal interviews with 36 people, who used a calendar for personal scheduling. We subsequently selected eight (5 female, 3 male, aged between 19 and 26 years) of them to take part in the more detailed study described in this paper. The selection was based on their willingness to participate and on their availability during a specified time period. All of the selected participants were students from different faculties (college for tourism, business education, computer science management, electrical engineering, telematics (2), metallurgy, and roman languages). Five of them also had a professional side job (less than 20 hours per week). All participants were colleagues or friends of colleagues, which was useful at that stage of investigation, since personal calendars represent a very intimate object. Thus, a certain degree of trust and familiarity between the participants and the investigators already existed.

We conducted an initial structured interview with each participant. We decided to use a structured interview to avoid influencing the participants' usage patterns of their calendars. We also took a picture or screenshot of each participant's calendar(s) and raised questions about the entries in form of a semi-structured interview. This procedure was repeated every week over a total period of eight weeks. After the last session we conducted a semi-structured post-interview, including questions about expected features of a digital calendar. We are aware that results might be biased by the fact that the participants knew that we would come to see their calendar once a week. To address this, we asked a set of questions in the beginning and after the study to see if the interviews and observations had any influence on their calendar use. Analysis of the collected data showed no significant differences.

RESULTS AND DISCUSSION

We received many results that confirm findings from previous calendar studies. These issues are only discussed briefly and complemented by the according references. However, the study also revealed some new aspects of personal calendars that will be shown below in detail.

Paper still rules

Five participants used paper calendars, one of them using additionally her mobile phone as secondary calendar. Two participants used only digital calendars (Microsoft Outlook and a combination of Microsoft Outlook and a PDA), and one participant used a patchwork of different calendars (wall calendar, print-outs of a digital calendar supplemented with handwritten notes, and a notebook). The sample is too small to draw general conclusions from the data, but the goal of this study was not to gain statistical representative results, but rather to collect qualitative data in an ethnographic sense.

The participants who used digital calendars both studied telematics. They also had the most demanding side jobs of the entire group. Furthermore we learned during the interviews that two of our participants had used a PDA as their primary calendar before. Sandra was very enthusiastic about her new PDA, a present from her boyfriend, but soon she missed the possibility to browse through pages, which also supports prospective reminding [7], and returned to her paper calendar. Christian used his PDA exhaustively and reported that he was very satisfied with this calendar until it was stolen. The fact that he lost all his data and calendar entries through this incident changed his opinion so dramatically that he decided to use a paper calendar again. This is obviously a concern of reliability, an important aspect of digital devices.

Another participant decided after the study to try a digital calendar. Since she did not have a PDA, she chose a calendar application for her desktop computer, but stopped using it soon. She later told us that she just did not enjoy using the electronic calendar, since it was not always at hand when needed and because she missed the possibility to use different colors and visual styles for highlighting particular entries. Her comment was that "it just wasn't fun and in the end [she] couldn't see any advantage in using it."

Calendars as Temporal Maps

Personal calendars of our participants contained *scheduled events*, *tentative events*, *subsequent events*, *pro forma entries*, *informative entries*, and other entries that are not necessarily structured according to time (discussed below). Scheduled events have a fixed date. They represent events the user really has to attend. Tentative events [3] also have a date, which however is not fixed in the moment the entry is generated. These entries might still move to other days or time slots. Subsequent events are entries that depend on a previous event. These entries therefore do not feature a specific time since they start as soon as the previous event on that day is finished. Pro forma entries are events, which are so important or ubiquitous to the user that he or she would not forget about them anyway. When asked about the least important entry in week two, Anna, one of our participants, stated, "Saturday, 2 pm – it's a meeting with my sister. Since we phone regularly and have been talking about it for a while, I already memorized this appointment and the entry was only a matter of form." A very interesting result was that one participant also kept events in his calendar, which he would for sure not be able to attend. He stated that he did this for "informative" reasons.

Most of the participants who used paper calendars further stated, that they inserted events that were fixed, such as birthdays, as soon as they started a new calendar. Some of them also inserted holidays and highlighted them in a specific scheme. Colors were in general used by most of them to highlight specific aspects of calendar entries. Derived from these results we can see that personal calendars represent temporal maps [2] that are constructed by users. Spots on these maps have different characters and

meanings to the users, coded both by visual appearance and invisible relations between them and the users. The general scale unit in this map is time, structured into days, weeks, months, or years. But users can also create further dimensions of navigation that emphasize the value of an entry. For example, Ingrid used a countdown, which was a number that she inserted on every day, counting down from five to advertise a special event. Sandra used paper clips as bookmarks to access specific areas in her temporal map.

Calendars as Emotional Awareness Artifacts

Studies about family calendars have already acknowledged the importance of the calendar as an awareness artifact [2,4]. We observed that calendars used for personal scheduling also contain entries for other close persons to provide an awareness of their activities and time schedules. For example, Sandra stated, that she sometimes included entries for her boyfriend and her mother in her calendar. In contrast, Anna wants to give her mother the possibility to stay aware of her schedule. But since she does not want her to see all the data from her calendar, she copies entries that might be interesting for her mother onto a tabletop calendar, which provides a restricted access to her personal calendar.

Calendars as Personal Information Management Tools

Data from our study strongly confirms the observation that calendars are used as information management tools [1]. One of the participants included to-do lists in her calendar. Three other participants regularly wrote down lists of tasks they had to accomplish during a day and used check marks to highlight finished tasks (Figure 1). Lists in general were kept on specific days to sustain the contextual dependencies between lists and calendar entries. For example one calendar showed a list of things to pack for vacation, which was inserted on the first day of vacation. Another participant also added contact details of a lecturer next to the entry for the lecture. All participants who used paper calendars also kept further sheets of papers, containing additional information, in their calendar and also mentioned this as one of the advantages over a digital calendar. – This fact was also observed for household scheduling [4].

Calendars as Handheld Tools:portable, available, robust

According to our participants, an important advantage of paper calendars over traditional digital calendars is their "compact portable" nature, making it comfortable to take them along. Anna stated that she uses her mobile phone for calendar entries only in case of forgetting her paper calendar. When back at home, she copies these entries into the paper calendar without synchronizing both calendars. Several participants listed disadvantages of existing portable digital calendar solutions. One problem of a mobile phone solution is that it is difficult to enter data while talking on the phone. Most of the participants would be highly concerned about losing their digital device, such as a PDA, and consequently all of their data. These results suggest that users trust more in physical artifacts than in digital devices.

Figure 1. One of the participants' calendar showing different patterns of emotional expressions.

An important issue of calendar systems is to remind the user of certain tasks [8]. However, our studies clearly showed that in case of mobile applications this requirement is of minor importance. Gustav, who uses a PDA in combination with Microsoft Outlook, was bothered by the reminder feature of his PDA and disabled it, because he checks his schedule at least once a day. In general reminding was not an important issue to the participants of our study, probably due to the fact that they either checked their calendar regularly or knew important events by heart.

Calendars as Diaries

Sonja showed us two rather personal entries, inserted in her calendar during the observation weeks two and three. These entries concerned her shopping behavior, helping her to look up when she purchased a particular object and furthermore to remember what she had done in the past. In addition we found out that people tend to keep old paper calendars [see also 3]. These findings clearly reveal the emotional value of calendars for their users, comparable with the function of diaries.

Calendars affect (crucial) Privacy

In the first informal interview round with 36 participants, a critically important element in this study was identified: calendars are regarded as very intimate objects comprising sensitive data. Thus, many of these participants felt inconvenient to take part in our analyses. Further studies have to show whether personal entries or business entries are crucial factors for these constraints. Privacy was recognized as a concern in previous studies, especially in case of group calendar systems or calendar data stored on shared servers [4]. In addition, Palen lists privacy concerns about information-based and time-based content for groupware calendar systems [6]. Some of them are also valid for personal scheduling, such as medical appointments as an illustration for personal privacy of information. Nguyen and Mynatt describe how users encode their entries to set up a permission control over their data [5]. We also could see in our study that many calendar entries make only sense to the owner of the calendar. For example a name could mean different things, such as a meeting with a friend, a job note, or a medical appointment.

Personalization and Emotion

Personalization of calendar entries was a very important issue for the participants of our study who used paper calendars. They used different colors and light pens to highlight specific aspects of the calendar and to emphasize the personal meaning of specific entries. One of the participants used two different colors to distinct between birthdays of family members and of friends. The others used those writing instruments closest at hand, however the use of different color schemes was important for them, too. Other means of creating emotional expressions were the use of *emoticons* and *contextual signs* (Figure 1). For example, Ingrid placed a sad smiley next to an entry stating the name of her boyfriend and a late point in time reminding her of her last visit when her boyfriend, who lived in another city, was late due to his work. Contextual signs included circles or lines of different shapes to emphasize certain entries. For example, Ingrid used a line shaped like a flash to underline the description for an important exam. Ingrid affirmed in the final interview that a key element for a calendar is the possibility to change the visual appearance of entries. Emoticons and contextual signs might not have an obvious functional character, but they do have a very important emotional value to the owner of the calendar. Such signs reflect the emotional relation between entries and the users, evoking a certain feeling in them, such as for example joy, happiness, or sadness. They also add to the immediate recognition of entries and hence support quick browsing through entries.

Entries as well as the calendar as an object itself have an emotional meaning. People tend to keep additional sheets of papers in their calendars not because of rational meanings, but due to sentimental reasons [9]. Taylor and Swan describe this in the context of lists and notes as "the sense of emotion embodied in material artifacts." We made very similar observations in our calendar study and therefore strongly emphasize the relevance of emotionality and sentimentality for calendaring systems.

CONCLUSIONS

Results from our study are in accordance with most findings observed in previous studies. However, there are highly interesting results that we could derive from our data, which are especially valid for personal scheduling and had not been identified in a similar study before. Paper calendars are still the preferred medium as private calendaring system. This is probably due to the affordances of paper and the fact that it allows individual dedication of space to suit the users' needs. For example, we observed that our participants not only used their paper calendars for recording scheduled events, but also for to-do lists, as diaries, as containers for additional material, and for recording other contextual information. In contrast, participants with a demanding side job relied on digital calendars for managing their events.

We observed the application of different coloring schemes, emoticons and contextual signs in paper calendars, which suggests that there is also an emotional meaning to the entries and the calendar as an object itself. Furthermore, those participants, who had a thoroughly selected type of paper calendar and made heavy use of emoticons and contextual signs, used their calendars most frequently. This motivates the conclusion that a calendar, which sustains an emotional value for its user, is more likely to be used for personal scheduling than strictly functional calendars. The emotional and sentimental meaning of calendars has not been investigated before and therefore constitutes one of the main contributions of this research work.

While early studies focused on assembling implications for the design of digital calendars, we believe that it is high time to reconsider these implications with regard to recent changes in technologies and changing roles of individuals in our society, which has a large impact on the requirements of personal scheduling. When digital calendar systems appeared first, it was important to extend the technology in order to meet users' requirements. In the near future, technological progress will allow enriching existing physical artifacts with digital capacities. This creates a huge design space that needs to be explored. Emotion is an important parameter in this design space, which has to be incorporated into future applications.

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