



Parents' Reflection with a Digital Family Calendar: A Case of Using Scrapbook Calendars in Japanese Families

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Abstract. HCI research is increasingly focused on how technologies can help parents understand children's needs and state by enabling them to reflect on their children's activities. Use of a digital family calendar could have great potential in helping facilitate this process. However, relatively few studies have been carried out on this topic. This study investigated (1) how parents reflect on children's activities with a digital family calendar, (2) how parent-child interaction is like at the time of the reflection, and (3) how the parents' reflection and the parent-child interaction change over time. A three-month research study was conducted involving nine Japanese families using a digital family scrapbook calendar to share past, current and future events. Based on the results, we have proposed several design suggestions for reflective use of family calendars.

Keywords: Parents' reflection · Parental awareness · Digital family calendar · Parents · Children · Multiple user interaction

1 Introduction

Parents have an important role to play in children's psychological, social and educational development [1]. Parents need to adjust their behaviors to their children's current developmental, emotional, or mental states and needs in order to provide effective support and help them to engage in healthy social and educational activities [1]. This requires parents to be aware of and reflect on their children's behaviors [2]. However, how parents become aware of and reflect on their children's behavior depends on each parent's cognitive ability to envision the child's mental state [3], and the amount of time and energy they have for family activities [4]. Therefore, supporting parental awareness and facilitating reflection is a very important topic in the field of HCI [5].

The digital family calendar is a popular tool for facilitating parental awareness [2]. It is especially helpful for parents to be aware of each family member's daily activities in order to help coordinate the family schedule [2]. Use of the digital family calendar could, therefore, have great potential for facilitating reflection. However, prior work has

rarely focused on how effectively parents can actually reflect on children's activities by means of a digital family calendar, and how best to use a digital family calendar for this purpose.

In this project, we conducted a three-month research study involving the use of a scrapbook calendar (Fig. 1). The objective of this research study was to investigate (1) how parents reflect on their children's activities when using a scrapbook calendar, (2) how parent-child interaction is like at the time of the reflection, and (3) how the parents' reflection and the parent-child interaction change over time. Based on the results, we provided several design suggestions and proposals for more reflective use of family calendars in the future.

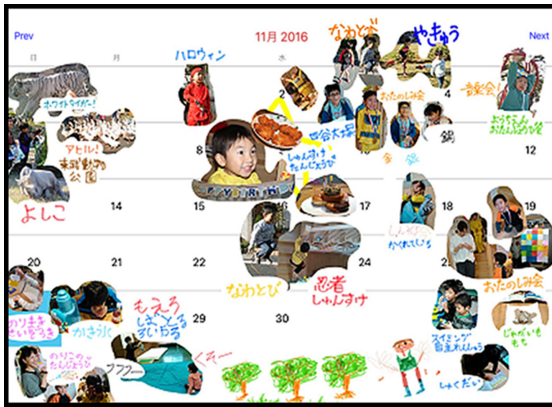


Fig. 1. Scrapbook calendar

2 Research Methods

2.1 Participants and Procedure

Nine families participated in this research. Table 1 shows the family members and their respective ages. One parent and child pair from each family, shown underlined in Table 1, participated in a workshop before the actual research trial began.

Four workshops were held from the end of April 2019 to the beginning of May 2019. Each parent and child pair participated in one of these workshops. In the workshop, an iPad was provided to each pair, the scrapbook calendar was introduced. An operating manual was also given to the parents. The parents, shown underlined in Table 1, answered the questionnaires provided and were interviewed twice over the three-month trial period. The first questionnaire and interview took place six weeks after the workshop, in the middle of June 2019, and the second one was conducted three months after the workshop, at the beginning of August 2019. The interview used a semi-structured interview style in which the interviewer and the interviewee were able to converse freely, based on a predetermined set of open-ended questions [6]. Each interview took about two hours to complete, including answering the questionnaire.

Table 1. Summary of the families. The letters, “F”, “M”, “S”, and “D” indicate father, mother, son and daughter, respectively. The numbers in parentheses indicate their ages. Those parents underlined were interviewed and answered questionnaires throughout the research trial. Those children underlined participated in the first workshop.

| No. | Family member (age) | | | | | |
|-----|---------------------|---------------|---------------|---------------|---------------|-------|
| | Parents | | Children | | | |
| 1 | F (55) | <u>M (51)</u> | S (22) | D (20) | <u>S (11)</u> | |
| 2 | <u>M (43)</u> | | <u>S (11)</u> | | | |
| 3 | <u>F (41)</u> | M (41) | S (12) | <u>D (10)</u> | D (6) | |
| 4 | F (40) | <u>M (39)</u> | <u>D (9)</u> | D (6) | S (4) | |
| 5 | <u>M (37)</u> | | D (12) | <u>S (7)</u> | | |
| 6 | <u>F (42)</u> | M (41) | S (17) | S (13) | <u>S (11)</u> | |
| 7 | <u>F (41)</u> | M (40) | S (13) | <u>S (11)</u> | D (8) | D (8) |
| 8 | <u>F (41)</u> | M (43) | <u>S (9)</u> | D (6) | | |
| 9 | <u>F (41)</u> | M (36) | <u>S (7)</u> | S (5) | | |

2.2 Materials

The scrapbook calendar allows users to decorate it with pictures and typed words or emojis (Fig. 1). It was developed to help families share details and impressions of past, current and future events and activities [7].

In this research, in order to evaluate parents’ reflection on their children’s activities, in keeping with the procedures outlined by Kocielnik et al. [8]: stage 1 (noticing—building awareness of events and behavior patterns), stage 2 (understanding—analysis of the situation from different perspectives, formulating explanations and observations about the reasons for the things noticed), and stage 3 (future actions—development of a new perspective, learning a lesson, or gaining new insights for the future). In accordance with the definition of each reflection stage described above, we developed a questionnaire to assess parents’ reflection (Table 2). We also asked all participants about the amounts of family conversation that occurred when the scrapbook calendar was used (How much conversation does the family engage in when the scrapbook calendar is used?) and when it was not used (How much conversation does the family engage in when the scrapbook calendar is not used?). All the questions were answered using a 7-point scale (1: never - 7: very often/very much).

3 Results

3.1 The First Interview Results

The first interview was held six weeks after beginning to use the scrapbook calendar. In all the families interviewed, children actively edited the calendar and some parents

Table 2. Questions in the questionnaire used to assess parents' reflection

| Reflection stage | Questions in the questionnaire |
|------------------|---|
| 1 | How often do you find out about your children's activities by looking at what your children have edited with the scrapbook calendar? |
| 2 | How often do you discuss what your children have edited on scrapbook calendar with them? |
| 3 | How often do you change your mind or behavior by looking at or talking about something your children have edited with the scrapbook calendar? |

reported reflection at stages 2 and 3. The following sections show the types of reflection reported by parents.

At stage 2, parents and children discussed children's events or activities added on the calendar, along with some additional information. P4 described how she talked about the past events added by her daughter:

P4: I can easily come up with detailed questions about the added events. Therefore, I can understand the details of her daily activities.

P4 realized that the scrapbook calendar had helped them come up with detailed questions about activities added by their children. The overall quality of parent-child conversation became deeper as parents asked questions, received additional information, and gained a better understanding of their children's activities by means of reflection.

At stage 3, parents gained new insights about their children's interests or characteristics. P7 explained what he discovered when he saw the calendar edited by his children:

P7: I understand which events my children are interested in and how much they look forward to them, and I can clearly understand their preferences.

In the case of P7, he gained new insights simply through observing the calendar edited by his children. In contrast, P6 gained new insights through having a conversation with his son.

There was no parent who reported reflection stage 1 at which they noticed children's events with scrapbook calendar. One reason why this happened is because the most families, except F3 and 7, had paper family calendars at home to share individual events and coordinate family schedules. Parents fully understood children's future activities, as usual in Japan. Another reason is because in the most families, there is a daily habit in which family members talk about their daily activities. Therefore, parents knew children's past activities through their daily conversation habits without scrapbook calendar. Because of these reasons, reflection stage 1 was considered not to be mentioned in the interview.

3.2 The Second Interview Results

The second interview was held 3 months after beginning to use scrapbook calendar. Some parents mentioned the same kinds of reflection as in the first interview. At stage 2,

parents and children discussed children's events or activities added on the calendar with some additional information. P4 reported that scrapbook calendar facilitates asking her child detailed questions as in the first interview. Also, P7 told us that they gained new insights about their children's interests or characteristics:

P4: I ask my daughter about the added activities. Therefore, I can understand the details of her daily activities.

P7: By seeing the calendar edited by my children, I understand which events they are attracted by.

Some parents mentioned reflection at stage 3 not observed in the first interview. They newly found their children's characteristics over a certain amount of time. Figure 2 shows the edited calendars by P3 and C3. P3 mentioned that he found his daughter well-organized and patient. P5 also told us that she newly found her son's preference because of his sustained activities with scrapbook calendar. Figure 3 shows the edited calendars by C5.



Fig. 2. Edited calendars by P3 and C3 for June and July. The orange letters were added by P3, and other letters, pictures, and emojis were added by C3. Some pictures and letters are obscured by a mosaic effect for privacy protection.



Fig. 3. Edited calendars by C5 for July and August. All the letters and pictures were edited by C5.

P3: My daughter decorates the calendar in a very specific way, and she has kept doing it this way for months. She seems to like to do it. I did not know that she was so well-organized and patient.

P5: My son keeps drawing decorations and pictures on the calendar even though most of the pictures are unrelated to any actual events. I did not know that he liked to draw pictures so much.

As in the first interview, no parents reported about reflection stage 1. As a specific feature of the second interview, there were families, F1, 2, and 9, who stopped using scrapbook calendar by the second interview. P1 explained that her son lost his motivation to use it because of the undesirable behavior of the system. P2 told us that she and her son could not find compelling reasons for using it because she and her son continued with the same routine. Also, P9 also described that it was difficult for his family to use digital family calendar as a new family habit.

3.3 Questionnaire Results

In order to investigate the relationship trends between parents' reflection and family activities, we performed correlational analyses based on the questionnaire and log data achieved in the first and second interviews. From the log data, we calculated the average numbers of times the calendar was edited per day for each family from the first workshop to the first interview and from the first to the second interview. The data of 3 families, F1, 2, and 9, in the second interview were excluded from the analyses because they stopped using scrapbook calendar before the second interview. The correlational relationships among the evaluated scores and calculated log data are shown in Table 3a for the first interview and Table 3b for the second interview. The average score of each reflection stage in the first interview was 4.25 ($SD = 1.41$), 3.42 ($SD = 2.15$), and 3.58 ($SD = 1.69$) for stage 1, 2, and 3 respectively. Also, that in the second interview was 5.00 ($SD = 1.10$), 4.33 ($SD = 1.21$), and 3.83 ($SD = 0.75$) for stage 1, 2, and 3 respectively.

In the first interview, the amount of family conversation without scrapbook calendar was positively related to reflection stage 1. On the other hand, in the second interview, it was negatively related to all the stages of reflection. The novel tools are initially incorporated into daily life and, later on, used meaningfully in various situations [9]. Scrapbook calendar was assumed to be used in pre-existing habitual family conversation in the first interview. Therefore, families accustomed to have a lot of family conversations had more opportunities to talk with scrapbook calendar and facilitate parents' reflection.

Moreover, in the first interview, reflection stage 1 and 2 were positively related to the amount of family conversation without scrapbook calendar and negatively related to the average number of times the calendar was edited per day. When users start to use novel digital tools, the learnability of the tools is important, and the functionality of the tools becomes more important than the initial learnability over time [9]. As the initial stage of using scrapbook calendar, there were more opportunities for the parents and children to talk about how to use scrapbook calendar. Such opportunities seemed to facilitate talking about the edited events and parents' reflection. In the second interview, such conversation and opportunities for parents' reflection seemed to disappear because of parents' and children's expertise in using scrapbook calendar.

Table 3. Correlational relationships in (a) the first interview and (b) the second interview. The numbers show the correlation coefficients. “Conv. w/o SC” indicates the amount of family conversation without scrapbook calendar, “Conv. w/ SC” indicates the amount of family conversation with scrapbook calendar, and “Ave. No. of add” indicates the average number of times the calendar was edited per day. S1, 2, and 3 indicates reflection stage 1, 2, and 3 respectively. The grayed out correlational coefficients indicate significant or marginally significant correlations. ⁺*p* < .10, **p* < .05, ***p* < .01.

| (a) Correlational relationships in the first interview | | | | | | |
|---|--------------|------------------|-------------------|------------------|-----|----|
| | Conv. w/o SC | Conv. w/ SC | Ave. No. of add | S1 | S2 | S3 |
| Conv. w/o SC | 1 | | | | | |
| Conv. w/ SC | .18 | 1 | | | | |
| Ave. No. of add | -.06 | -.91** | 1 | | | |
| S1 | .73* | .64 ⁺ | -.58 ⁺ | 1 | | |
| S2 | .24 | .73* | -.75* | .60 ⁺ | 1 | |
| S3 | .17 | .03 | -.22 | .44 | .40 | 1 |

| (b) Correlational relationships in the second interview | | | | | | |
|--|-------------------|-------------|-----------------|------------------|-------|----|
| | Conv. w/o SC | Conv. w/ SC | Ave. No. of add | S1 | S2 | S3 |
| Conv. w/o SC | 1 | | | | | |
| Conv. w/ SC | -.22 | 1 | | | | |
| Ave. No. of add | .27 | .51 | 1 | | | |
| S1 | -.87* | 0 | -.63 | 1 | | |
| S2 | -.78 ⁺ | -.37 | -.30 | .75 ⁺ | 1 | |
| S3 | -.84* | -.15 | -.24 | .73 | .95** | 1 |

4 Discussion and Conclusion

We discussed in the Related Work that digital family calendar can be a tool to help parents deepen their reflection on children’s activities. Based on the results of this research, we found that parents experienced various levels of reflection on children’s activities with scrapbook calendar. Several conclusions regarding how to design digital family calendar for facilitating parents’ reflection can be drawn from the results of this study.

First, digital family calendar should be considered for children to add activities and events. Children’s active use of digital family calendar is a critical factor to cause parents’ reflection. In this study, scrapbook calendar allowed children to use with simple operations. As a result, children in all the families actively used it, all the parents’ reflection was triggered by the activities added by children.

Second, digital family calendar should be supportive for children's sustained use. In this study, we found that children's sustained use of scrapbook calendar caused parents' deep reflection. Children's sustained use of digital family calendar could be supported by letting them use alternately with their parents or siblings, giving them cues for taking turns as an example, or play with it, such as drawing pictures.

Third, digital family calendar should be designed with a consideration of parent-child conversation based on edited contents. In this research, we found that parent-child conversation based on children's edited contents caused parents' reflection. Moreover, the quality of questions from parents influenced the type of the reflection. Parents can ask questions for additional information or finding out children's feelings or thoughts.

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