Managing Family Healthcare with Multimedia Chat Apps: A Survey on What is Missing

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ABSTRACT

Chatting and messaging apps allow people to share information (text, images, etc.) using a simple, well-understood interaction metaphor of a conversational time-line. These apps can help small task-oriented user groups, like caregivers of a family member, to coordinate with each other in group chats to get things done. However, whereas existing chat apps are well-suited for communicating and sharing content on-the-go, it is difficult to retrieve content generated and shared over time or related contents that showed up over time. Currently, it is also necessary to install multiple apps that may require separate user accounts for sharing for example task lists or calendars. In this work, we provide results from a survey that investigates what additional features are considered useful in a multimedia enriched chat application used to coordinate caregivers of a family member. We also look into what an extended multimedia enriched chat interface should look like and which features it should provide.

KEYWORDS

Chat apps; Messaging; Healthcare; Multimedia

1 INTRODUCTION

Messaging on mobile phones once was a novel way of communicating, by sending and receiving 160 character messages, composed on 12-digit multi-tap keypads. Now, messaging apps are not only the most commonly used apps on mobile devices. They allow people to share information using a simple, well-understood interaction metaphor of a conversational time-line. In particular, they can help small task-oriented user groups (like caregivers for a loved one) to coordinate with each other to get things done. They can exchange helpful multimedia information in form of text, audio, images, and videos. However, whereas existing messaging apps are well-suited for communicating and sharing content on-the-go, it is difficult to find and retrieve content generated and shared over time. With all messages and content shown in the same manner on a single

time-line, information can get out of sight easily, because it disappears at the top of the chat screen when new content is posted at the bottom. Consequently, questions may remain unanswered or important information may escape one's attention because it is not possible to mark important elements or answers to questions directly in the chat.

This work proposes a new approach for organizing procedural knowledge in a formerly routine chat. In this paper, we first analyzed existing messaging apps for helpful features. We look into GUIs that break up the linear order of chat messages by introducing thread-like structures. We present first results of a survey on extended chat features and interfaces which indicate that certain features are desired in chat apps to support the management of tasks and appointments/meetings. The paper ends with a discussion and conclusion of our findings.

2 RELATED WORK

We analyzed several commonly used messenger apps to identify useful features. Another solution would be the use of question and answer systems (like Stack Exchange [16]), but these are not suitable for every day group communications, especially when these require an easy overview and exchang of multimedia information.

We analyzed Android messenger apps with more than 10,000,000 users (on February 2, 2016) for features that could be helpful for group management like Facebook Messenger [5], Skype [12], WhatsApp [20], and WeChat [18]. Each of these apps has one or more of the following features: image and/or video editing, file transfer, search in chats, marking of messages, display of users who read messages, and editing features for already posted messages (copy, forward, recall, delete, translate, quote). Most of these features are very useful for chats in small groups, especially the search function, file transfers, as well as quoting and marking of messages. Telegram [17] and icq [8] provide a function to answer an element (which is cited and added at the bottom of the chat with the answer) to follow up on a message.

Team and business messaging apps provide advanced features compared to regular communications between friends. Besides group chats, files are stored with the chat and can be accessed anytime. The team and business messaging apps like HipChat [4] and Slack [13] provide a large number of features that are useful in daily work-life. A concept using threads was introduced by Slack. It provides a link that opens all threads in a long list. Depending on the number of threads, one may loose overview in the long list. However, considering our target users of small private groups with mixed smartphone usage expertise, being used to simple apps and GUIs that do not require further configurations than granting

access to an already existing address book, the mentioned apps may lead to confusion for these users. Features have to be added and configured manually which may be considered too difficult and thus not be used.

Not focusing on chats are family management apps. The OurHome app [11] and 2Houses [1] provide easy-to-use features that are needed for our intended user group. They provide features like family calendars, task- and shopping lists, expense management, and information exchange. Both apps provide helpful features but focus too much on the management effect of different roles in a family and barely support commonly used chat features. This requires users to synchronize in at least two apps.

While some of the messaging apps allow to reply to a message by citing it and adding it at the bottom, the timeline-based linear structure of the chat is kept. No feature is provided, that allows thread-like structures in a chat or other mechanisms like text analysis, to keep a discussion about a topic connected. None of the existing messaging apps allows people to mark questions and see directly linked answers. It is not possible to send time/location reminders.

3 FIRST USER STUDY

We conducted a survey that tried to find out how people use messaging apps to coordinate in smaller groups which have to manage a (possibly long-term) task.

3.1 Procedure/Data Collection

Participants filled out an online survey with a series of questions about how they use messaging apps. First, they were asked which messaging apps they you use regularly (more than once a week). Then they were asked to write a small text about how they can keep track of all tasks and missing pieces of information while keeping a group informed. They also should describe what features and functions would make their currently used messaging app more helpful in organizing an event. After that, we proposed the following list of features and asked the participants to set a slider between "not useful" (0) and "very useful" (100) for:

(1) Send notes to a group (every group member has to mark the note as read)
(2) Send notes to group members/single users (everyone has to mark the note as read)
(3) Send a question to the group (question is marked in the chat and appears on the start page of the app until it is marked as answered)
(4) Send a question to group members/single users (question is marked in the chat and appears on the start page of the app until it is marked as answered)
(5) Send a task (to-do) to the group (task has to be marked as done, may have a deadline and may require feedback (like a photo of the result))
(6) Send a task (to-do) to group members/single users (task has to be marked as done, may have a deadline and may require feedback (like a photo of the result))
(7) Schedule message to be sent at a future time (type the message now, but decide when it should be shown to the recipient(s))

(8) Send a time-based reminder (reminder appears on a certain date/time to recipients)
(9) Send a location-based reminder (reminder appears when a recipient enters a certain area on a map)
(10) Send a time- and location-based reminder
(11) Have a calendar for the group
(12) Mark messages as important/"like" messages
(13) Search for a particular word in a chat
(14) Search for images/audio/video in a chat
(15) Export parts of the chat (for example solutions to problems, answers to questions) for future use (for example on FAQ sites)

Most of these functions only require the addition of well known interface concepts like input masks for settings or calendar views to already existing chat apps. However, the concepts in questions 3 and 4 require extended user interfaces to manage the information with a better overview.
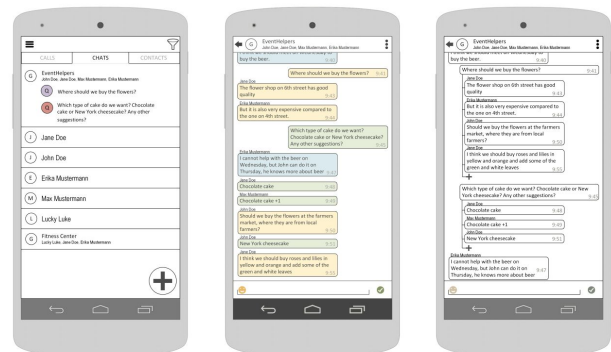
Figure 1: Left: Startscreen of the app with subtopics in a chat - center: Colored chat view - right: Tree view of the chat

To find out how the chat should be rearranged and displayed, we showed a regular chat view and three prototypical chat interfaces views illustrating thread-like structures in chats. The regular chat view shows all elements in a linear order as known from commonly used messaging apps. The colored view (see Figure 1 (center)) shows messages that are part of a thread (like answers to a question) in the same color, the timeline of the messages is kept. The tree view (see Figure 1 (right)) shows answers to a question right underneath the question. The timeline of the whole chat is broken up (but the timeline of the answers for one questions remains intact). The concept with multiple screens (see Figure 1 (left)) only shows a question in the group chat and provides a button to open the conversation regarding the question in a new screen. This concept is also breaking up the timeline similar to the tree view. For each of the views, the participants were asked to evaluate how appealing the GUI is, how clearly the GUI is arranged for keeping track of topics and discussions, and if it is obvious which comments are answers to which question. The participants were then asked to rank the solutions from clearest/easiest to understand to most confusing/hardest to understand.

The last page of the survey contained demographics and questions about used project management software, job situation, and

situation in personal life. The last three questions were asked to find out if the participants are used to project management and the management of small groups. The responses to the questions with free text fields were analyzed using open coding. Common themes were extracted and reported. For each page in the survey, we saved the answering time to see how long it takes participants to fill it out and decide if the answers can be valid. The slider page furthermore had a "dummy" question asking the participants to set the slider to a certain value.

3.2 Participants

Survey participants were recruited through Social Network Systems (SNS) and Amazon Mechanical Turk (AMT). We used a snowball system through emails and postings on social networks[1] trying to find as many participants from Europe as possible (because this continent is less available in Amazon Mechanical Turk). HITs[2] on Amazon Mechanical Turk [2] were used to get answers from participants from the US (participants were paid $ 1.30 for a 10-minute survey). Our survey was completed by 84 participants whereof 13 participants had to be excluded resulting in valid data from 71 participants (48 male and 23 female). Thereof, 22 were below 29 years old, 28 were between 30 and 39, twelve were between 40 and 49, and nine were older than 50. 44 culturally identified with Northern America, 27 with Europe or Asia.

From the 71 participants, 12 work alone, 35 are a member of a team without leadership responsibilities, 10 lead a small team (1-5 persons), 7 lead a team with 6-10 persons, and 7 lead teams with more members. Regarding the usage of project management software, 28 stated that they do not use any, 24 use Microsoft Project [10], 13 use Smartsheet [14], 10 use Trello [19], 6 use Atlassian JIRA [3], and the rest uses other software. For their personal live, 38 participants stated that they live alone and do not have to take care of anybody, 19 are a mother/father with children, 4 take care of someone in their family (parents, grandparents), the others live in other conditions.

With more than one selection possible, 51 participants use Standard text messages (i.e. SMS), 32 use Facebook messenger [5], 32 use Skype [12], 20 use WhatsApp [20], 18 use Google hangouts [7], 11 use Snapchat [15], 6 use Slack [13] and 4 use WeChat [18]. The other apps were used less. All participants used at least one of the messaging apps, which allows the conclusion that they have sufficient knowledge about the tasks in our survey.

4 RESULTS

The first page of the survey assessed pre-existing patterns of how people organize tasks in a smaller group and what features in their messaging app would help them doing this. The first open text question asked people to describe how they would keep track of all tasks and missing pieces of information while keeping a group informed. 24 participants mentioned that they update the group with group messages on a regular basis. Regarding the organization, around 40 participants use a "helper"-document like a spreadsheet, a text file, a notes app, and/or some sort of list. 11 of the participants use cloud

storage for group documents or Google docs [6]. 8 participants use a calender or reminders for important milestones and deadlines to keep track and then inform the group with group messages.

4.1 Feature Suggestions

A great variety of features was mentioned when the participants were asked to describe what would make their messaging app more helpful in organizing the event. The most often mentioned features were shared task lists, shared documents or (personal and shared) note areas, and shared calendars and events that were connected to the chat. A mentioned unique feature was to notify *"If any data changed on the spreadsheet, it would be nice for there to be an alert or a TLDR version sent through the messaging app."* Participants wanted some sort of ticketing system that allows them to assign tasks. A function that allows to set up polls or votes was considered as useful. It was also considered as important to see who received a message (read-flag). A small group of participants wanted to be able to group, sort, or highlight messages for future reference. They explicitly mentioned *"different windows for different parts of the conversation"*, *"a way of keeping certain important messages easy to see"*, or a feature *"that could group and sort messages by the specific topic (such as important facts, questions, etc that would be helpful in organizing the event)"*. One participant wanted an *"ability to save a conversation [...] so you could discuss an idea with someone else in the group, then use the saved conversation to take notes on the idea and other ideas that might have come up during the conversation. The ability to share the conversation with others, [...] so others could read the conversation and maybe add something to it that the original people involved didn't think of."*

Another section of the survey enlisted and described features on a scale from not useful (0) to very useful (100), were 50 was considered as neutral. All of the proposed features were considered useful as indicated by mean values above 50. The most useful features were the calendar for the group ($m = 82.79$, $SD = 21.05$) followed by a search for a word in chat ($m = 76.59$, $SD = 20.89$), and sending of time-based reminders ($m = 79.24$, $SD = 19.25$).

4.2 Structured Chat Interface

After evaluating single features for extending chat apps, we wanted to find out how participants perceive chat interfaces that structure the chat in a certain way. The proposed three new interface designs were compared to a standard chat interface using a 5-point Likert scale ranging from -2 (strongly disagree) to 2 (strongly agree). We asked about opinions for each interface:

- Using this view, the GUI is appealing.
- Using this view, the GUI is clearly arranged for topics and discussions.
- Using this view, it is obvious which comments answer a question.

As a last task, the participants were asked to rank the prototypes according to their preference. Results showed that the participants found the colored view the most appealing ($m = 0.87$, $SD = 0.81$) followed by the tree view ($m = 0.37$, $SD = 1.06$). Asking participants if the shown interface was clearly arranged for keeping track of topics and discussions in a chat, the tree view achieved the highest value ($m = 0.99$, $SD = 0.85$) followed by the view with multiple

screens ($m = 0.54$, $SD = 1.13$), and the colored view ($m = 0.41$, $SD = 1.15$). Taking a look at how obvious an interface shows, which comments are answers to a question, also the tree view scored best ($m = 1.18$, $SD = 0.90$) followed by the view with multiple screens ($m = 0.75$, $SD = 1.18$) and the colored view ($m = 0.42$, $SD = 1.26$). In all questions, the traditional chat had overall negative values, being the worst for clearness and obviousness. An overview of these results can be found in Figure 2. Calculating the mean value over all three questions, it can be stated that the tree view achieves the best result ($m = 0.85$), followed by the colored view ($m = 0.57$), the view with multiple screens ($m = 0.34$), and the regular chat ($m = -0.34$). The same order resulted from the ranking question where participants were asked to order the views regarding their preference. Here, the tree view was evaluated first by 34 participants, the colored view by 26 participants, the multiple screens view by 7 participants, and the regular chat view by 4 participants.
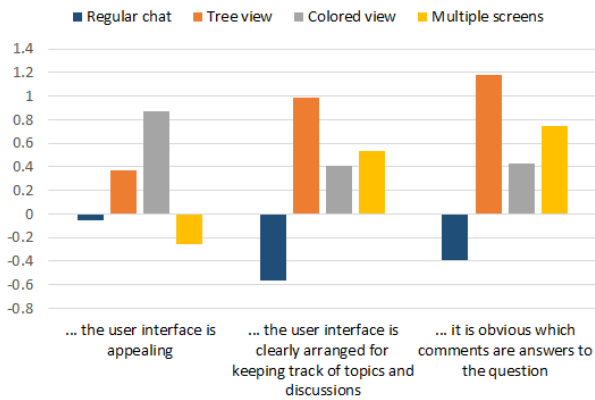
Figure 2: Results for the different screen concepts regarding appeal, arrangement, and overview.

5 DISCUSSION

This is a first study about extensions for chat interfaces and new thread-like structures in chats. While we only got 71 valid replies to the survey, first hints can be given on future implementations in this area. However, our survey did not show large differences between the results for the proposed features. User tests and the usage of apps with these features in daily life have to show which ones are used, how, and for what.

Another important question is how the interfaces have to be extended to allow users to reply to a thread in a chat. This survey only looked into possible ways of structuring the chat, not into the question how to add new messages to a thread. The concept with multiple views opens a new window that looks like a regular chat, but tree and colored view require a new form of interaction to add a message to the thread (at a specific point in the timeline) and not to the end of the chat conversation.

6 CONCLUSIONS

In this paper we look into extended chat interfaces with a new thread-like structure extending the linear timeline, and useful features that may be helpful for small groups to organize tasks and

share responsibilities between group members, like to-do lists or calendars. Our review of literature and apps showed that no system exists that combines the aforementioned features in an easy to use and configure way.

A survey with 71 users showed that many people only use standard messaging apps which are complemented with external lists or spreadsheets to keep track of tasks. Desired extensions for these chat apps were a calendar, reminders, and search functions to retrieve information. We introduced three new chat interfaces (a colored view, a tree view, and a multiple view concept) and compared it to a regular chat interface. We found that users prefer the tree view combining timeline and thread-like structure followed by the colored view marking parts of a discussion in the same color to group messages, which is a helpful feature for small groups trying to gather information. In future work, we have to implement and test the whole system (for a description see [9]) with a large enough user group.

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