
Mobile Application Prototype to Support Time Management For University Students: Design and Evaluation

Peng Gao

University of Tasmania
Sandy Bay, TAS 7005, AU
pengg@utas.edu.au

Tao Gong

University of Tasmania
Sandy Bay, TAS 7005, AU
taog@utas.edu.au

Abstract

In today's society, smart phones have become an indispensable part of people's lives. At the same time, the accelerated pace of life to promote people's daily arrangements are becoming more and more complex. People have experience of forget some important tasks which makes them feel regretful. To solve this problem, an application for smart phones is introduced to help people plan and record tasks, such as the assignments of every University student. In this report, three prototypes of the application are described and tested using think-aloud usability test. The result and discussion of it is presented. It proves that the application can be improved by using appropriate test methods.

Author Keywords

low-fi prototype; high-fi prototype; usability testing; think-aloud evaluation; time management; mobile; application.

ACM Classification Keywords

H.5.2 [User Interfaces]: Evaluation/Methodology; Prototyping; User-centered design;

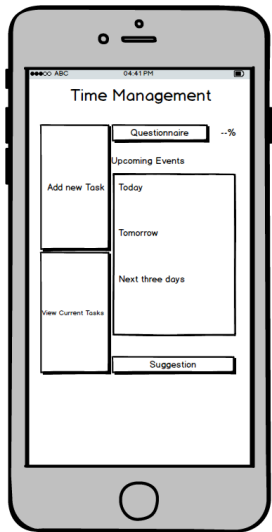


Figure 1: Main Screen

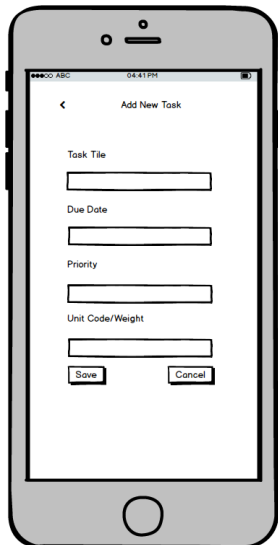


Figure 2 Add New Task

Introduction

In this report, a time management application is introduced. Skills of time management is very important for people especially for students who have a lot of assignment to do. This application aims to help people manage their tasks and test their ability of managing time.

This report first introduces the design with two low-fi prototypes and one high-fi prototype. Then it provides the usability test method and results. A user ability test is done to understand what kind of interface with same function is the one people really want to use. Further discussion of the results and the weaknesses and strengths are given. Finally, the conclusion of the report is presented.

Prototype Design

In this part, three prototypes of the application are described with comparison. These prototypes include two low-fi prototypes and one high-fi prototypes. For these three prototypes, all the functionality implemented are almost same. According to [4], providing different prototypes which have same functionality can make the user give more objective rating which can help select the better interfaces for certain part of the application.

As shown from Figure 1 to Figure 4, the first low-fi prototype (P1) implement the functionality described in Assignment requirements. On the main screen, a title is shown at the top. Four buttons – questionnaire, add new task, view current tasks and suggestion - are provided to users. These buttons will take the user to the other screens except button "suggestion" which will show some information by opening web browser. In

addition, a score of the time management questionnaire is shown beside questionnaire. And tasks for next five days will be shown upcoming events area. In Figure 2, user can add new task such as title, due date, priority and unit code with weight. User can save his task by clicking button "save" and go back to main screen by clicking button "cancel". On screen view all tasks, all the information of one task will be presented as a row in a table where the first row shows the label of each task. Every task can be modified by long-time touch the screen and be labelled as "done". The task labelled with done will not be shown next time the user view current tasks. And the due date and priority can be clicked to sort the table, which means the tasks can be categorised according to the order of due date or priority.

The functions in prototype P1 are implemented in prototype 2 (P2) in Figure 5 and prototype 3 (P3) in Figure 6.

To compare all the three prototypes, the reasons for select different features are discusses as follows. P1 is the most basic design which does not consider user's actual experience using mobile application. It is just from the first impression of the designers who does not have the actual developing experience for IOS applications. Comparing with prototype 1, P2 is different to P1:

- P2's buttons have different position which emphasize the upcoming tasks in current month.
- Another difference is that the questionnaire has a separate screen to show the statistics of all the

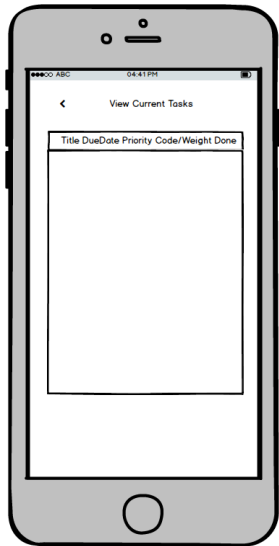


Figure 3: View All Tasks

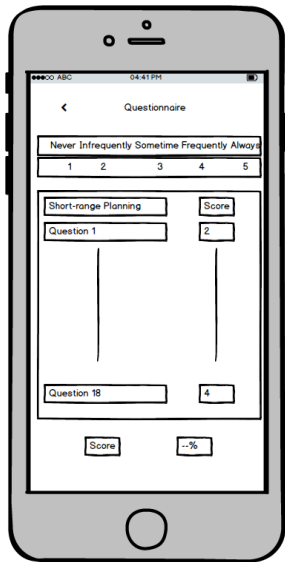


Figure 4: Questionnaire

answers to questionnaire which gives user more information.

- The add new task screen provides selectable view to users which makes it easy for user to input information.
- The biggest difference is that in every screen of P2 except the main screen a home button with icon is provided to users. This button is easy to recognize for users.

When implementing the high-fi prototype 3 in Figure 6, some differences with P1 and p2 are

- the button "add new task" and "view current tasks" are moved to the top of screen to show a clean view the upcoming tasks.

- At most three upcoming events are provided to users in the main screen because the other tasks can be easily seen by sorting the tasks in screen "view current tasks" according to due date.
- The screen to add new task is changed to use "place holder" function of text field to guide what should be input in every text field. This will give users the biggest space to input and avoid the keyboard override the input area.
- And the due date and categorisation can be selected from a prompted sub-view from the bottom of the screen.

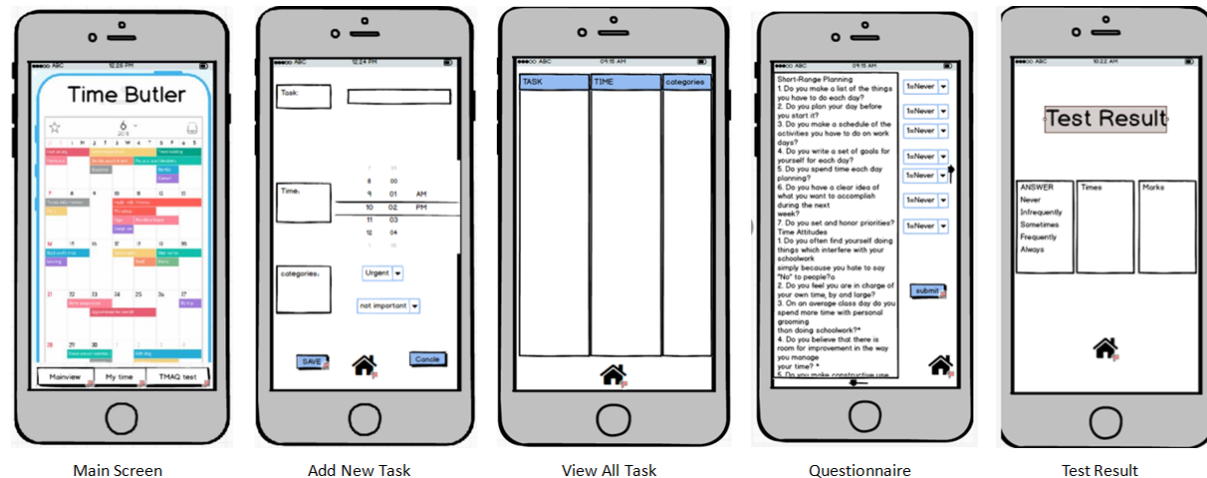


Figure 5 Low-fi Prototype 2 with the screens

| | Coding | First language | Major |
|----|--------|----------------|---------|
| U1 | No | Mandarin | Account |
| U2 | Yes | Mandarin | ICT |
| U3 | No | English | ART |
| U4 | Yes | English | ICT |

Table 1 Information of the participants

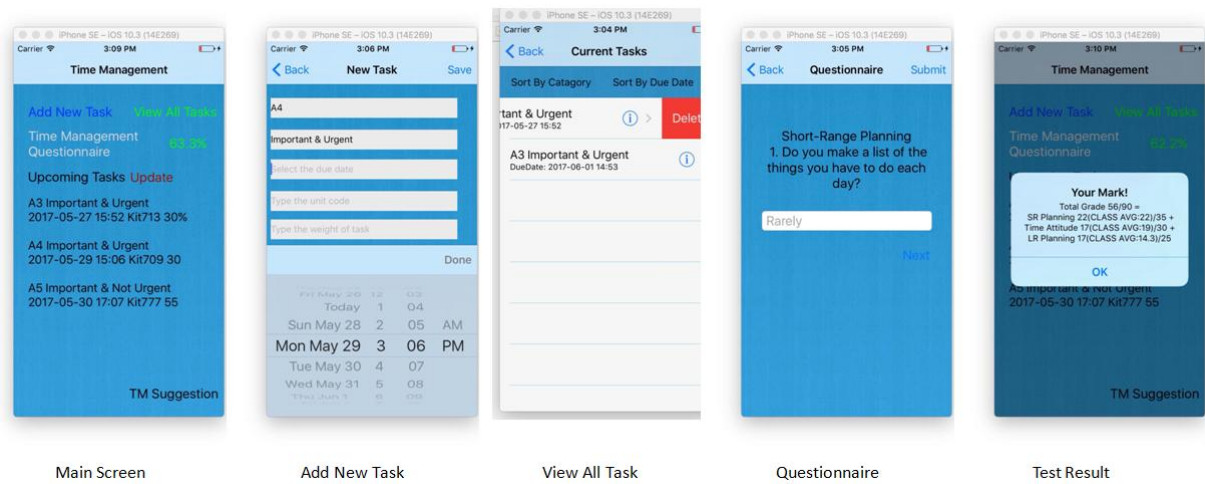


Figure 6: Low-fi Prototype 2 with the screens

- The questionnaire is simplified by showing only one question every time and there is a next button and/or previous button to navigate all the questions below the question. This will show users a clear and concise interface to do the test.
- P3 will show the scores in main screen and an alert view after users submit the questionnaire.
- The view all task screen makes use of the function provided by “table view” and “table cells” in IOS environment which have a lot of option to show the details, delete one task and show digest of one task.
- The sort function is provided by two buttons. They can be clicked to show either ascend order or descend order of the tasks according to the sort criteria every two clicks.

The three prototypes describe in this part will be evaluated using simple discount usability methods in next part.

Usability Methodology

To test the three prototypes, two kind of tests were conducted.

Two students of other groups and ourselves test the usability of the two low-fi prototypes. So for each low-fi prototype there were three users to test it. A basic set of task, such as add, change, delete, view the tasks were tested to clarify the function of the interface provided. Also it will the initial development of high-fi interface. This is the first step of iterative refinement of the user interface as discussed in [2] which emphasize the concept of user-centered activities.

T1: User takes the time management questionnaire to get his/her score for time management

T2: User add 4 tasks

T3: User checks his/her all tasks

T4: user modifies one task due to error

T5: user deletes one completed task

T6: view the upcoming tasks

T7: Re-evaluate the time management skills

T8: Categorize the tasks

R1: add a new task

R2: review the history tasks

R3: delete a task

R4: edit a task

R5: sort the tasks

R6: answer any questions and save the results

R7: check the result of Time Management Questionnaire.

R8: update the upcoming task

As described in [1], one technique of discount usability engineering approach - simplified think-aloud method - will have best ratio of benefits to costs when three to five participants test the prototype. Therefore, to test the high-fi prototype of the app, we invited four users to help us test our app. The first user is a student of Accounting from China who uses the English as the second language. And the second user is one student who has coding experiences for android and English is his second language. The third user is a student who uses the English as the first language and does not have any coding experience. The fourth user has programming experience for desktop application and speak only English. Because our system uses the English language as the operational language so we want to test whether this will make people confuse if they are not familiar with system language. Also, people with developing ability is tested to check whether the background of programming interfere the use of the program.

To conduct the test, the participants were introduced the basic functionality of the app. And they are told about the think-aloud method. One of the designers was ready to give assistance during the test. And the other designers took notes when the participants did the test. Due to the limit of available Mac computer, the test was done one after another. The test tasks designed and related successful requirement are described at the side bar. The table 2 shows their relation.

| Tasks | R1 | R2 | R3 | R4 | R5 | R6 | R7 | R8 |
|-------|----|----|----|----|----|----|----|----|
| T1 | | | | | | X | X | |
| T2 | X | | | X | | | | |

| Tasks | R1 | R2 | R3 | R4 | R5 | R6 | R7 | R8 |
|-------|----|----|----|----|----|----|----|----|
| T3 | | X | | | | | | |
| T4 | | X | | X | | | | |
| T5 | | X | X | | | | | |
| T6 | | X | | | X | | | X |
| T7 | | | | | | X | X | |
| T8 | | X | | | X | | | |

Table 2: Tasks and requirements

Results

The test for the two low-fi prototypes helped improve the interface as shown in the high-fi prototypes which combined the good parts of low-fi prototypes.

The result shows that interface language has some influence for the users but not too much because the words used are common. Most of them can finish most of tasks. Also, the coding experience will help users finish the test faster and better than people without the experience. The major does not influence the results.

| Tasks | User1 | User2 | User3 | User4 |
|-------|-------|-------|-------|-------|
| T1 | U | U | U | U |
| T2 | U | U | U | U |
| T3 | U | U | U | U |
| T4 | U | U | U | U |
| T5 | A | U | F | A |

| Tasks | User1 | User2 | User3 | User4 |
|-------|-------|-------|-------|-------|
| T6 | U | U | U | U |
| T7 | U | U | U | U |
| T8 | F | U | A | A |

Table 3: Completion Results. U=Unaided, F=Failed
A=Require Assistance

| Tasks | U1 | U2 | U3 | U4 |
|-------|------|--------|------|------|
| T1 | 160s | 125sec | 175s | 104s |
| T2 | 250s | 200s | 280s | 104s |
| T3 | 2s | 2s | 3s | 4s |
| T4 | 15s | 20s | 20s | 12s |
| T5 | 50s | 10s | 80s | 6s |
| T6 | 25s | 5s | 5s | 6s |
| T7 | 20s | 20s | 15s | 30s |
| T8 | 60s | 20s | 45s | 20s |

Table 4: The Completion Time of users for each task.

Discussion

As shown in results part, the application can be well used to support people to manage their time. Most tasks are completed by users except two failure. And the time to complete the tasks is almost same except the failed tasks and tasks that required assistance.

The reason of failure for user 3 in task 5 is that she never used iPhone and can not get any tips to delete a task by swiping the cell. And user 1 failed in task 8 because he did not understand categorize can be achieved by sort and the sort result is not obvious to get the impression that tasks are categorized.

According to the design process and test results, the application has its own strengths and weaknesses. The questionnaire screen provide more space and time for user to think deep about his habits. All the details of questionnaire and tasks are stored permanently so that user can have a full history of his information. However, some features are not good. The delete function is not obvious for users. And according to Fitts' Law[3], the button in all the screen are too small and no obvious icon which is not good. The upcoming tasks in main screen must be updated manually which should be changed.

Conclusion

This report described the process of prototype design and usability test of an mobile application. Three prototypes are tested using discount usability test approach. The results show that user-centered methods can help improve the interface design. A set of well designed test tasks are also important to test appropriately. User should be involved in the process from the beginning to the end to help build good interface iteratively..

References

1. Jakob Nielsen. Guerrilla HCI: Using Discount Usability Engineering to Penetrate the Intimidation barrier.1994.Retrieved May 25, 2017 from <https://www.nngroup.com/articles/guerrilla-hci/>
2. Andreas Prinz, Philipp Menschner, and Jan Marco Leimeister. 2012. Has NFC the potential to revolutionize self-reported electronic data capture?: an empirical comparison of different interaction concepts. In CHI '12 Extended Abstracts on Human Factors in Computing Systems (CHI EA '12). ACM, New York, NY, USA, 1679-1684. DOI: <http://dx.doi.org/10.1145/2212776.2223692>
3. Bruce Tognazzini. First Principles of Interaction Design (Revised & Expanded). 2014. Retrieved May 25, 2017 from <http://asktog.com/atc/principles-of-interaction-design/>
4. Maryam Tohidi, William Buxton, Ronald Baecker, and Abigail Sellen. 2006. Getting the right design and the design right. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '06), Rebecca Grinter, Thomas Rodden, Paul Aoki, Ed Cutrell, Robin Jeffries, and Gary Olson (Eds.). ACM, New York, NY, USA, 1243-1252. DOI=<http://dx.doi.org/10.1145/1124772.1124960>