

iPhone Usability as Perceived by Novice Users

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Keywords: iPhone, Usability, Evaluation, User Testing.

Abstract: Gestural devices have introduced new challenges to the field of user interaction. iPhone, despite the high intuitiveness of its gestural interface, raises a number of minor and major usability issues that due to its widespread usage affect a large user population. This study examines the usability of five preinstalled iPhone applications (Contacts, Clock, Camera, Calendar and Safari) by conducting testing sessions with users that have no (or limited) prior experience with iPhone, iPad and iPod and can thus be considered novices. The results of the usability assessment confirm the list of potential usability issues documented in related sources and stress the crucial importance of gestural interaction devices conforming to established fundamental principles of usable interaction design.

1 INTRODUCTION

Apple iOS features among the three mobile OSs that hold roughly 66 percent of the overall market share (with the other two being Google Android and Windows Phone 7) (Ziegler, 2011) and as foreseen (IDC, 2011) by 2015 the collective worldwide market share of these three OSs is projected to grow to more than 80%. Accordingly, the development and sale of native mobile applications (i.e. applications that users can download and install directly to their phones) is growing exponentially and mobile application downloads across all devices are expected to reach 50 billion by 2012, a sharp increase from the 7 billion such downloads in 2009 (Schroeder, 2010). iPhone native applications available at App Store are currently over 500,000 (Apple App Store, n.d.) in categories ranging from games, lifestyle or social networking to education. In the 3rd quarter of 2011 Apple sold 17 million iPhones a number that corresponds to an annual increase of 21% (Cozza et al., 2011) while iPhone 4S was launched on October 14th, 2011 and Apple announced having sold over four million iPhone 4S devices within the following three days (Apple Press Info, 2011).

In this study we investigate a set of potential usability problems (as documented in the related literature) of five iPhone preinstalled applications

namely Contacts, Clock, Camera, Calendar and Safari. The investigation has the form of a series of usability testing sessions with users that have no (or limited) prior experience with iPhone, iPad and iPod, so that there is no learning effect accounted for in the test results. Usability is thus assessed on the basis of how well the applications support and guide the users in accomplishing the predefined scenarios addressing typical everyday tasks of a smartphone owner.

2 USABILITY ISSUES

In this study the focus is set on identifying potential usability issues in a set of typical tasks executed by iPhone users and involve the Contacts application, the Clock, the Camera, the Calendar and Safari. These built-in applications face (probably among other) the following problems:

1. Users usually look for a physical button for shooting a photo in the Camera application
2. In the Calendar application users swipe horizontally to get to the next/previous month.
3. Users cannot easily find the alarm editing feature in the Clock application. Instead, they are pressing on the non-editable time display field.
4. In the Calendar application the next month

button and the (+) button for adding new events are side-by-side, resulting in accidental activations

5. In the Clock and the Calendar spinning dials for setting the time usually cause problems to users as they tend to start sliding their finger outside the active dial areas.

6. In the Safari the Go button and "backspace" arrow are also placed side-by-side resulting in frequent accidental activations.

7. In the Safari, the button indicated by the arrow in Figure 1 confuses users as to its operation (some think it is for opening a new web page or zooming but it is actually for bookmarking tasks and for sending the current link by email).

8. Last but not least, a feature that causes confusion to users is the way to delete an item from a list.

The present study investigates whether these problems are actually reported during user testing, which is their severity and whether there are additional usability issues to report, that were raised during the execution of the trivial usage scenarios of the five aforementioned applications.

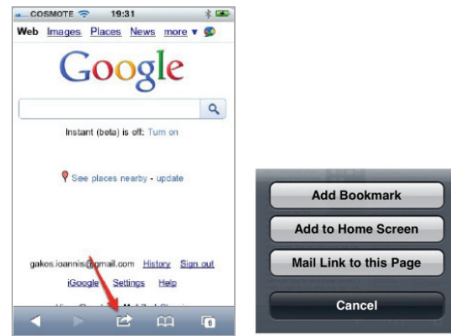


Figure 1: This Safari button (that opens the menu to the right) causes confusion concerning its meaning.

3.3 Scenarios

Users were asked to complete five scenarios, each one focusing on a specific iPhone application (namely Contacts, Clock, Camera, Calendar and Safari). The participants completed 4.2 out of 5 scenarios on average (i.e. 84%). Table 1 contains the scenarios used to test the iPhone usability and the percentage of users who completed each scenario without encountering difficulties.

3 METHODOLOGY

3.1 Experiment Design

Experiments were conducted from September 7th to 18th, 2011 at the specially equipped e-Business Lab at the Technological Institution of Messolonghi, Greece. Participants were given iPhone 4 devices, as well as a printed sheet with the scenarios to execute and were asked to think aloud during the tests while they were video-recorded. Upon completion of the scenarios they were asked to fill-in an online questionnaire.

3.2 User Sample

The user sample was selected based on the level of their familiarity with the iPhone, iPad and iPod devices, so as to investigate the usability of the devices for users who have no (or very limited) prior usage experience. Although both genders are well represented, male users slightly outnumber female users, with the sample consisting of 34 men and 26 women aging from 19 to 30 years old. Most of the participants (summing up to 93%) were either undergraduate students (55%) or had a university degree (38%). All users had used mobile phones for more than five years but the majority (73%) had never used an iPhone before.

Table 1: Scenarios for user testing.

| Application | Scenarios Description | Freq |
|--------------------------------|---|-------|
| <i>Contacts</i> | Create a new contact named "John Doe" and telephone number "123456789" | 91.3% |
| | Change the contact name to "Mac Grow" | 82.6% |
| | Delete the contact | 68.1% |
| <i>Alarm setting (Clock)</i> | Set up an alarm for tomorrow morning at 10:00 a.m. | 90.1% |
| | Change the time to 11:00 a.m. | 80.1% |
| | Cancel the alarm | 31.8% |
| <i>Photo taking (Camera)</i> | Take a photo | 72.7% |
| | Go to the photo gallery(?) to see the photo you just took | 91.3% |
| | Delete the photo you took | 100% |
| <i>Task setting (Calendar)</i> | Create a new task with description "exams" for the 15th of September at 15:00 p.m. | 100% |
| | Create a new task with description "lab" for the 15th of October at 13:00 p.m. | 90.1% |
| | Change the time of your second task ("lab") to 15:00 p.m. | 86.3% |
| | Delete both tasks | 95.5% |
| <i>Web browsing (Safari)</i> | Open the Safari application and navigate to www.in.gr | 100% |
| | Open another Safari window and navigate to www.google.com | 81.8% |
| | Go back to the Safari window displaying page www.in.gr | 77.2% |
| | Store www.in.gr as a bookmark named "in.gr" | 59.1% |

4 RESULTS

In this section we analyze the collected data in terms of individual tasks. All participants completed successfully (even if they faced some problems) the Camera and Contacts scenarios, while only 36% of users came across difficulties and didn't manage to complete the Clock scenario. Some users (14% and 18% respectively) also failed to complete the Calendar and Safari scenarios but their number is not as high as the number of those who failed the Clock scenario.

Figure 2 shows the average time per scenario. Although the Clock scenario had the smallest success rate, its average completion time was low due to the fact that many candidates quit the scenario when they had difficulties. Unlike difficulties of type b, the difficulties of type a did not affect the success rates but both types of difficulties imposed a penalty to the completion time in Figure 2. Type c problems did not affect the success rates but in this case also a penalty has been imposed to the completion time. From a usability perspective, type c problems may not have the severity of type b but reside to a tricky 'grey area' of usability problems that usually remain undiscovered and thus unresolved.

A thorough examination of the videos led to the identification of the most frequent mistakes made by users in each scenario with the results summarized in Table 2. In an effort to categorize the severity of difficulties recorded, one ends up with three such types: (a) the difficulties users managed to overcome, (b) the difficulties users failed to overcome, and (c) the errors they made but did not realize making.

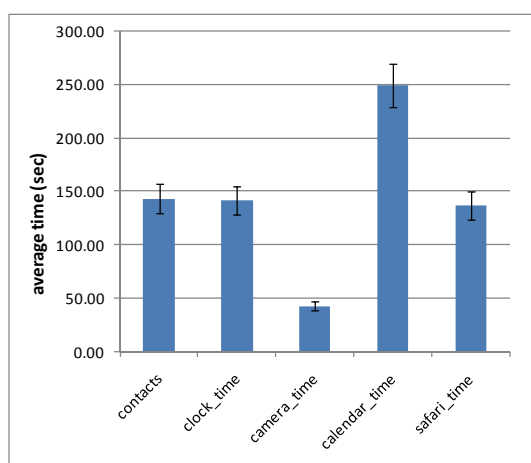


Figure 2: Average time per scenario.

Specifically, even though 13.6% of users didn't edit correctly a contact at their first attempt and 22.7% didn't delete the contact correctly, all users finally completed the Contacts scenario. On the contrary, the difficulties users came across in the Clock scenario resulted in 36% failure. This is due to the fact that many users (22.7%) couldn't edit the alarm, as they were clicking on the alarm they wanted to edit and finally gave up. In this failure rate also contributed the 18.1% of the users who didn't delete the alarm but deactivated it without realizing the difference. The same happened in the Camera scenario where 22.7% of the users took more than one picture without realizing it.

The difficulties users had in the Calendar scenario didn't significantly affect its successful completion but users considered this scenario to be difficult (Figure 3). In the Safari scenario, 31.8% was very confused with the bookmarks button resulting in an 18% failure percentage.

Table 2: Frequency of errors observed.

| Contacts | Freq. |
|---|--------------|
| To edit a contact they tapped on the contact | 13.6% |
| To delete a contact they deleted the contact name using the keyboard | 22.7% |
| Alarm setting (Clock) | Freq. |
| To edit an alarm they tapped on the alarm | 22.7% |
| They didn't delete the alarm, they deactivated it | 18.1% |
| Photo taking (Camera) | Freq. |
| They took more than one picture without realizing it | 22.7% |
| Task setting (Calendar) | Freq. |
| They didn't use the month view | 18.1% |
| To set the hour they clicked on the hour option instead of using the spinning dials | 13.6% |
| They didn't add a second appointment but edited the existing one | 13.6% |
| Web browsing (Safari) | Freq. |
| They didn't open an additional webpage but edited the address field of the existing one | 18.1% |
| They had difficulties with the bookmarks button (did not find it easily) | 31.8% |

Returning to the numbered list of potential usability issues recorded prior to this study (in section 2), it is important to notice that they were all confirmed. More specifically, issue no. 1 has been confirmed by the 6.7% of users (even though all managed to locate the non-physical button), issue no. 2 by 10% of users, issue no. 3 by the 22.7% of users, issue no. 4 by 8.3%, issue no. 5 by 18.3%, issue no. 6 by 20%, issue no. 7 by 31.8% and issue no. 8 by 22.7% for the Contacts application and by

18.1% for the Clock.

The remarks collected by the questionnaire were also quite significant. Users were asked to evaluate the difficulty of each scenario. All questions were scalar with 5 possible answers each, ranging from “very easy” to “very difficult”. In Figure 3, we can see the evaluation of users for each scenario, as well as the overall evaluation (i.e. for all scenarios). It is easy to observe that the Photos and the Contacts scenarios were evaluated as the easiest ones, while the Safari scenario considered the most difficult.

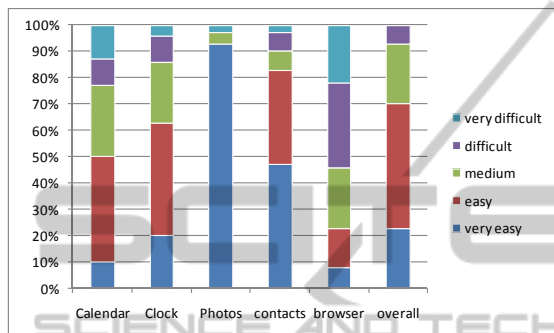


Figure 3: Users' evaluation for each scenario.

5 DISCUSSION AND CONCLUSIONS

This study investigated the case of iPhone, one of the most widespread gestural devices currently marketed, and focused on identifying potential usability problems in five iPhone preinstalled applications namely Contacts, Clock, Camera, Calendar and Safari. The investigation had the form of a series of usability testing sessions with users that had no (or limited) prior experience with iPhone, iPad and iPod, so that there is no learning effect accounted for in the test results. Usability was thus assessed on the basis of how well the applications support and guide the users in accomplishing the predefined scenarios corresponding to typical everyday tasks of a smartphone owner.

Based on a set of usability issues reported in the literature and referenced in numerous online sources, the study investigated whether these problems actually occurred during user testing, which was their severity and whether the tests revealed additional issues. Overall, the study confirmed the list of potential usability issues and also the crucial importance of conforming to established fundamental principles of usable interaction design.

REFERENCES

- Apple App Store, n.d. Apple – iPhone 4S – Find more than 500,000 apps on the App Store. Available online [http://www.apple.com/iphone/built-in-apps/app-store.html, retrieved: 15/12/2011].
- Apple Press Info, 2011. *iPhone 4S First Weekend Sales Top Four Million*, 17 October 2011 [Online] Available at: http://www.apple.com/pr/library/2011/10/17/iPhone-4S-First-Weekend-Sales-Top-Four-Million.html, [Accessed 14 December 2011].
- Cozza, R., Milanese, C., Zimmermann, A., Glenn, D., Gupta, A., De La Vergne, H. J., Lu, C. K., Sato, A., Nguyen, T. H., Shen, S., 2011. *Market Share: Mobile Communication Devices by Region and Country, 3Q11*, Gartner, 14 November 2011. Available online [http://www.gartner.com/DisplayDocument?ref=clientFriendlyUrl&id=1847315, retrieved: 14/12/2011].
- IDC, “IDC Forecasts Worldwide Smartphone Market to Grow by Nearly 50 Percent in 2011”, 29 March 2011. Available online [www.idc.com/getdoc.jsp?containerId=prUS22762811, retrieved: 10/12/2011].
- Schroeder, S., 2010. *Mobile App Market to Surge to \$17.5 Billion by 2012*, 17 March 2010. Available online: [http://mashable.com/2010/03/17/mobile-app-market-17-5-billion/, retrieved: 11/12/2011].
- Ziegler, C., 2011. *Visualized: US Smartphone Market Share, by Manufacturer and Platform*, Made Pretty, 3 March 2011. Available online [www.engadget.com/2011/03/03/visualized-us-smartphonemarket-share-by-manufacturer-and-plat/, retrieved: 10/12/2011].