
Experiments in App Stores - How to Ask Users for their Consent?

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Abstract

Distribution channels, such as the Android Market, provide researchers the opportunity to conduct experiments with a large number of participants. However, sometimes it may be necessary to ask for the users' consent beforehand. One question that repeatedly came up in our group was how effective different approaches of asking for consent are. In this paper we report from a study that compares four alternative consent dialogs, using an unchecked checkbox, a pre-checked checkbox, two buttons, and a single OK button. We found that all approaches except for the unchecked checkbox are suitable to sample a good share of the app users as participants (57-88%). Looking at how companies collect data we, however, stress that further guidance for researchers conducting unsupervised studies in app stores is needed.

Keywords

Research in the Large, Consent, Ethics

Conducting Experiments in the App Store

Distribution channels for mobile applications, such as Apples App Store or Google Android markets have made it very easy to bring mobile application to end-users. With little effort, it is quite easy to achieve thousands of downloads. Recently, the HCI community

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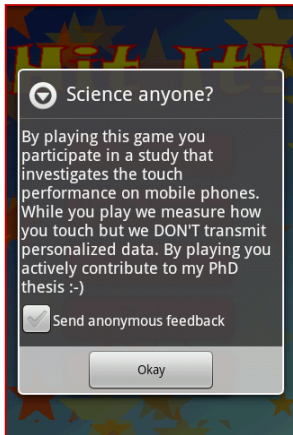


Figure 1. Unchecked Checkbox approach

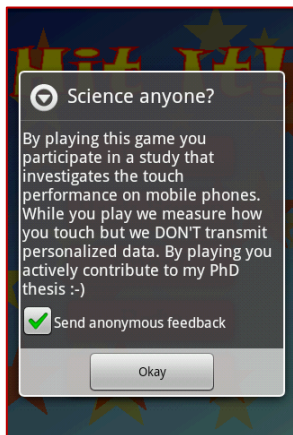


Figure 2. Checked Checkbox approach

has discovered these distribution channels as a means to conduct user studies "in the large". The idea is that while the user is using the app normally, it is used to collect data for scientific purposes, e.g. by experimentally comparing different methods of information presentation.

One example from our group is "Poke the Rabbit" [2]. On the surface this application is a mere game where the user has to find and poke/touch as much rabbits in a limited amount of time. Since the rabbits are scatter for beyond the border of the screen, we use different off-screen visualization techniques. Under the hood we conduct an experiment by randomly switching the off-screen visualizations and statistically compare the players' performance. Having published this application in the Android Market we collected data from 3,934 participants.

One of the questions that repeatedly came up when conducting such experiments is how to ask the user for her or his consent to participate in the study. In this paper we report from an experiment we conducted with the sole purpose of testing different ways of asking for the user's consent.

How to obtain informed consent

To investigate how to best obtain the users' consent we created a simple game where users had to hit appearing circles. When starting the game for the first time, a dialog appeared and asked the users for their consent in participating in a research study. To ensure that the text did not influence the participants, all dialogs contained the same text. It reads: "*By playing this game you participate in a study that investigates the touch performance on mobile phones. While you*

play we measure how you touch be we DON'T transmit personalized data. By playing you actively contribute to my PhD thesis :-)".

If the users agreed the app sent a ping to our server, indicating that a user had agreed to participate and what type of consent had been presented.

We tested dialogs with four different ways of asking the user to participate in the user study: unchecked checkbox, checked checkbox, two buttons, and single button. The way is randomly selected when the app is started for the first time. The user must pass the respective dialog in order to play.

Unchecked Checkbox

Figure 1 shows the dialog with the unchecked checkbox. The checkbox is located next to a text reading "*Send anonymous feedback*". In order to participate in the study a user had to tick the checkbox and then press the "Okay" button. Ethically this dialog plays safe. Even if the user does not read the text at all she or he will not be joining the ranks of the participants. However, this also means the user has to read and opt-in to participate in the study, which may lead to a large number of drop-outs.

Checked Checkbox

Figure 2 shows the dialog with the checked checkbox. The different to the previous dialog is that the checkbox is checked by default. To participate in the study the user has to merely click the "Okay" button. This dialog is more difficult from the ethical point of view. In some countries, such as Germany, companies are permitted to provide pre-checked checkboxes if this means the user accepts e.g. receiving a newsletter. Users who do

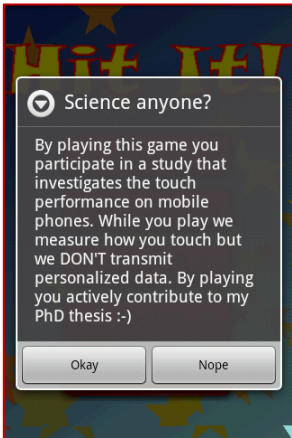


Figure 3. Two Buttons approach

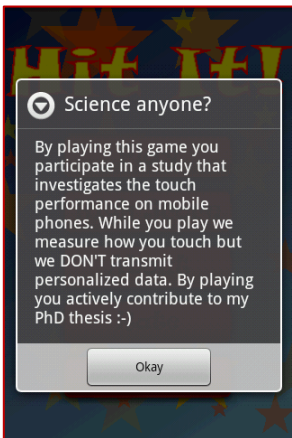


Figure 4. Single Button approach

not read the text may become participants by accident. However, we assumed that there might be in increased suspicion against pre-checked boxes.

Two Buttons

Figure 3 shows the dialog with two buttons. Instead of a checkbox, two buttons are provided, reading "Okay" and "Nope". From the ethical point of view this kind of dialog has the advantage that the users have to choose. They are forced to think about the alternatives, unlike the previous versions, where clicking "Okay" might have been done without thinking. However, this might also lead to a greater drop-out, since people may consider not to participate.

Single Button

Figure 4 shows the Single Button dialog. The users were only offered the "Okay" button. In order to not participate in the study the users had to cancel the application by using the respective hardware keys. Ethics-wise this dialog is most difficult, as the user has no choice but to participate in the study in order to play the game.

Sampling Rates & Discussions

For the timeframe we run the study the app was installed 3,275 times (according to Google's Android Developer Console). Assuming perfect randomization, each of the four dialogs appeared 818.75 times. Figure 5 shows the number of participants generated per dialog.

The Single Button approach generated most participants, the Two Button and the Checked Checkbox approaches generated a bit less participants, and the dialog with the unchecked checkbox generated notably less participants (around 8-12% of the other methods).

With respect to the checkboxes we were afraid that the "Send anonymous feedback" text would have a negative impact on the participation rate. However, as the participation rate in the Checked Checkbox approach was eight times higher, the influence seems to be marginal.

For the Two Buttons approach we were surprised by the high return rate. We assume that users were not sure

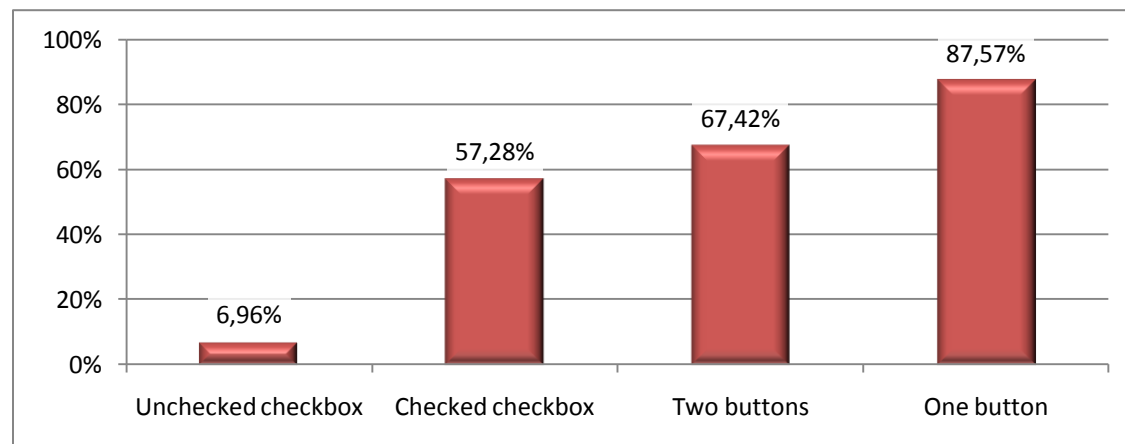


Figure 5. The diagram shows the number of users by condition who accepted to participate in the user study.

what would happen if they clicked “Nope”. They could have assumed that the app would close then. In fact, clicking nope allows playing the game without participating in the study.

Further, we are surprised by the generally high return rate of most of the methods. We assume that users might have wanted to investigate the game and see if it is “worth” participating in the user study.

Nevertheless, while we discuss the necessity of asking the user to collect non-private data, it feels a bit outdated to ask for the user’s consent. For example, by using Google we all silently agree that the search engine archives our, sometimes intimate, search results for 18 month, in order to improve its search algorithms. In [1] Calabrese et al report from a study where they analyzed 1 million anonymized cell-phone traces, probably without the explicit consent of the traced users. With respect to mobile apps, 15 of 30 Android apps that were investigated by Enck et al. [3] transmitted even private data to remote advertising servers. The only information was the warnings in the Google Market that the application would have access to the internet and to the GPS location.

But, at the same time, when we go into the field with our users we have to obtain informed consents or address our ethical boards. So, while the “world out there” seems to get along with monitoring and “spying” on people, researchers who feel bound to behave ethically remain without orientation. What is really missing at the moment is a compass to guide researchers in conducting unsupervised studies in app stores.

With respect to the dialogs, the Two Button approach seems most appropriate. Two-third of the users agreed to participate, and due to the forced choice we can assume that there was at least of brief moment where this choice had to be reflected.

Conclusions and Discussion Needs

We presented a study where we compared for different ways of asking app users to participate in a research study where no private data was collected. Three methods returned a respectable number of participants (57-88%). Only when asking the users to opt-in the participation rate was low (7%).

The question remains, which of these methods are ethically sound and what guidelines a researcher should adhere when collecting non-private data via app stores.

Acknowledgements

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Example citations

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