

Recruiting Software Professionals for Research Studies: Lessons Learned with the Freelancer Platform Upwork

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ABSTRACT

Finding software professionals to engage within a research project is not an easy task. Potentially relevant platforms like Reddit, Stack Overflow, and GitHub do not welcome or explicitly forbid research recruitment. Researchers can draw on their personal network, but it will not be representative and exhausted over time. This is why for studies that require experienced developers, we have turned to a large-scale freelancer platform to recruit participants, and report lessons learnt. Looking for experienced developers, we recruited 25 software professionals with an average industry experience of 11.7 years from 12 countries for 90 minute semi-structured interviews for \$105 compensation. Trying different recruiting channels, we ended up hiring 10 of them on the online freelancer platform Upwork. With 12 million freelance developers, Upwork offers access to a huge pool, but it was not designed for research study recruitment. Researchers have to interact with each participant individually to arrange scheduling and payment, which sometimes requires a great deal of time, and the ability to screen participants is limited. We conclude that platforms such as Upwork are potentially helpful for recruiting specialist developers but require careful planning of the recruitment process and investment of time.

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1 INTRODUCTION

Since secure software is a key element of achieving security, how developers handle security issues in the development process has become the focus of research. However, recruiting suitable participants for developer studies is more challenging than recruiting

end-user participants, for which platforms such as *Amazon Mechanical Turk* (MTurk) or *Prolific Academic* are commonly used. Platforms like *Reddit*, *Stack Overflow* and *GitHub* have millions of developers as users, but using those platforms to recruit participants for research studies is not welcome at best and is explicitly forbidden in many parts of the platforms. Researchers can try to draw on their personal network, but few have one that is representative of the developer population and not exhausted after several studies. Finding developers with a certain level of experience, and the ability to reflect their practices, or developments in the industry, can be particularly difficult. That is why we gave *Upwork* a try.

The Study. In a previous research project [2], we explored how software development companies dealt with usability and security in their software development process (SDP) and the interplay between the two. There was only one study on how companies dealt with usable security in their SDP [1], which was limited to 3 specific companies. Our goal was to gain diverse insights into the SDPs of a wide variety of companies by conducting 90-minute semi-structured interviews with software professionals. We wanted to reconstruct the SDP with the participants, focusing on security features being developed, which potentially affect the user experience (UX) of the feature – and potentially, thereby also its security. Hence, we aimed for participants who (1) participated in developing or designing such a feature and (2) were willing to talk about a specific case from their professional career.

2 RECRUITING APPROACH

Whereas we utilized several channels (including *Reddit*, *Twitter*, *personal networks*) to recruit 25 software professionals in the aforementioned paper [2], within this paper, we focus on the recruiting through Upwork that we used to recruit 10 of the 25 participants.

Recruiting Process with Upwork. Upwork [3] is an online platform where businesses, freelancers, independent talents and agencies can connect to each other. As a client, one can create job posts that the freelancers, also called *Upworkers*, can apply to (or be invited by the client).

The jobs offered range from longer-term jobs on an hourly basis to small projects with fixed prices. All communication is required to go through Upwork. The identity of the client must not be disclosed through job posts or profile descriptions. Once a contact or contract

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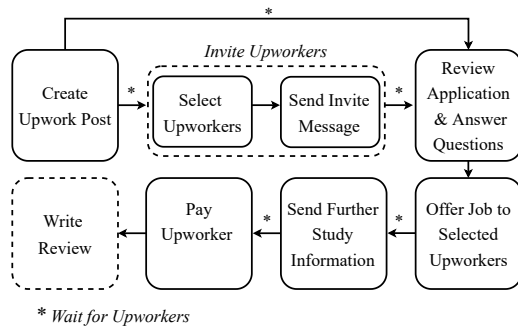


Figure 1: Overview of the Upwork recruiting process.

is established, it is not allowed to pay the Upworkers other than with Upwork for the next two years. Figure 1 illustrates a generalized abstraction of our approach using Upwork for a study with software professionals, which can be adapted and applied to other studies.

Pre-Questionnaire & Scheduling. The interview was preceded by a pre-questionnaire that started with giving general information about the study and its purpose. The next page contained the study’s consent form, a simplified illustration of the data handling process, and a detailed data protection document for downloading. This was followed by questions prompting for background information like demographics and professional experience. At the end of the questionnaire, we integrated *Calendly*, an online scheduling platform. This allowed the participant to pick one of hundreds of available dates and time slots for the interview. We alternatively offered manual scheduling via chat to consider potential concerns about using a third-party service.

Compensation. As compensation, we paid \$105 (€1 per minute), so our job post also appeals to experienced software professionals from countries with high wage levels. We had the impression that due to the uniform payment, i.e. regardless of the country, we received more requests from low-wage and non-Western countries.

3 EXPERIENCES WITH UPWORK

Overall, the recruiting process worked well, and we gathered the data we were looking for. Using a service like *Calendly* simplified the interview scheduling and saved a lot of time. Only two Upworkers did not use it, so we scheduled it manually via Upwork’s chat. Also, embedding the formal approval and consent within the study’s pre-questionnaire led to almost no inquiries.

Engagement with Upworkers. The cooperation with the Upworkers in our project was characterized by professionalism, and all Upworkers had industry experience. Even though the financial incentive was probably the main reason for participating in our study, the participants were extremely friendly, open-minded and helpful. At some points, however, we had to answer some questions in advance, e.g. whether it would be okay if they left out some details and described some things more abstractly in the interview. Most Upworkers asked us for a review (visible on their Upwork profiles) after finishing the task – which we, of course, provided.

Ethical Considerations using Upwork. Researchers are allowed to reveal their identity on Upwork only after participants have

accepted the job. Cancelling a job on Upwork usually does not lead to positive reviews. Of course, this can pressure the Upworker to do the job (i.e. the study) even if one may not be satisfied with some points. This makes it all the more important to clarify that cancellation is possible at any time, even without the consequences of negative reviews. One should also ensure that external parties and other Upwork members cannot see who worked on a job, as this would reveal who participated in the study. As a previous completed job is usually shown on the Upworker’s public profile, we recommend using rather generic titles in study job posts or informing the Upworkers about a possible deanonymization risk when the study is included in their profile’s job history.

Accounting & Reimbursement. Reimbursement at university may be hard, as Upwork issues up to five receipts per participant. In addition, there are the receipts of the credit card that is required for payment on Upwork. The accounting and reimbursement effort depends, of course, on the structures and requirements of the research organization. However, the effort is significantly higher than for Prolific or MTurk because they are designed for mass study recruiting – not forcing researchers to handle the payment for each participant individually with six receipts. Overall, the process was time-consuming but worked out without any problems.

Direct Recruiting & Job Posts. Upwork also offers the opportunity to invite Upworkers to look at a job post. These so-called *invites* are limited to 15 invites per job post by default (depending on the Upwork membership plan), but with upgrading the job for about \$30, this limit can be raised to 70 invites per day. Since this could introduce a researcher selection bias, we highly recommend keeping track of the criteria used to search and select potential participants. We often looked into a profile and found further criteria not to invite an Upworker (e.g. Upworker has no industry experience listed on his profile). Upwork allows customizing and personalizing the invitation message, which we used to increase the chance that the Upworkers consider our invite. It is also possible to add questions to the job offer, which Upworkers are asked to answer when applying to the job (e.g. for screening). But the functionality is very limited, and the selection relies only on self-reporting.

4 CONCLUSION

For our study, using Upwork worked well, and we found highly experienced software professionals from the industry without major difficulties. However, Upwork is designed for freelancing and *not* conducting studies. This implies some limitations and challenges, including some time-consuming queries, limited screening options, tedious billing and reimbursement, platform-specific ethical considerations and an overall highly manual recruiting process. Hence, the time and effort needed limits the platform for recruiting larger samples. However, for small to medium studies, we can recommend Upwork given enough time and financial resources. While we did not contact companies, asking those for participants might be more tedious and difficult without personal relationships. Thus, Upwork allows to reach out beyond the personal network to recruit. All in all, Upwork is a recruiting channel that researchers could consider. For that reason, this paper presents a blueprint for Upwork recruiting that can be adapted to other research projects.

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