Structured Handoffs in Expert Crowdsourcing Improve Communication and Work Output

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ABSTRACT

Expert crowdsourcing allows specialized, remote teams to complete projects, often large and involving multiple stages. Its execution is complicated due to communication difficulties between remote workers. This paper investigates whether structured handoff methods, from one worker to the next, improve final product quality by helping the workers understand the input of their tasks and reduce integration cost. We investigate this question through 1) a "live" handoff method where the next worker shadows the former via screen sharing technology and 2) a "recorded" handoff, where workers summarize work done for the next, via a screen capture and narration. We confirm the need for a handoff process. We conclude that structured handoffs result in higher quality work, improved satisfaction (especially for workers with creative tasks), improved communication of non-obvious instructions, and increased adherence to the original intent of the project.

Author Keywords

Expert crowdsourcing; crowdsourcing; CSCW;

INTRODUCTION

Many professional, complex projects are split and structured into interdependent tasks [4]. As a result, there is a salient need to enhance crowd collaboration among experts[3]. However, most existing crowdsourcing platforms assume that work will be carried out independently, resulting in additional time and labor incurred during moderation, integration and bugfixing [5]. The expert crowdsourcing model introduces complications in coordination and conflict [5] which is similar to coordination neglect in traditional organizations [2].

This paper introduces lightweight, structured handoffs to minimize coordination neglect, through person-to-person, i.e. "live" and artifact-to-person, i.e. "recorded" methods. These are applied to remote, expert crowdsourced projects that require technical and creative expertise. We hypothesize that having a formalized structure of handing off the task from one worker to the next will help workers understand the form

and function of their task input, reduce integration costs, and prevent downstream errors.

STUDY DESIGN

This study manipulated the web design and implementation process. 16 participants worked to build 6 newsfeed webpages. We designed our task to: 1) have precedence and relevance to the crowdsourcing community, 2) have open ended solutions which leave room for creative license, 3) be challenging enough to assess technical capability/shortcomings, 4) require communication of different areas of expertise among workers, and 5) be sequential since sequential task decompositions are more scalable than parallel setups[1].

In the "live" scenario, the experimenter "authors" the task, and hands off the requirements to the designer through a live conference and screen share. Both then interface together for a desired amount of time in activities of their choosing. The author then leaves the call and the designer proceeds with the work. Once the designer indicates completion, he/she then performs the same screen sharing and video conferencing step with the developer.

The "recorded" scenario consists of screen and audio recording as the method of handoff, so the previous worker is not required to be present for the next. Designers make a short screen capture video (1-5 minutes) with voiceover for the developer. Designers are encouraged to navigate the design flow, show inspirational websites, voice general intentions, etc.

Figure 1. Study handoff scenarios
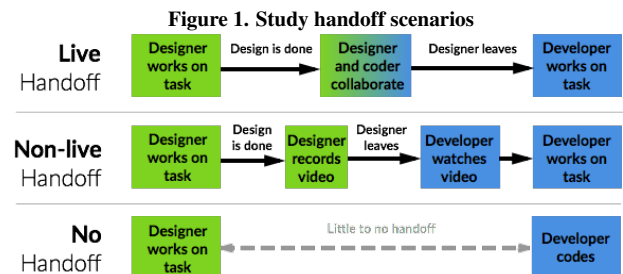
Since all scenarios entail two roles, a designer and a developer, we strove for conformity during hiring. We recruited designers on Stanford campus and developers via oDesk.

Procedure

Two methods, one live and the other recorded, are refined and tested. In addition, there is a control group given the same

task but no instructions for performing the handoff, to simulate the existing standard in crowdsourcing. Two runs are performed for each method, each with one front-end designer and one front-end developer (see Figure 1).

The designer is given a very rough idea of what to wireframe from the author, i.e. the experimenter. The control scenario experts were simply given the authors' original instructions and open access to the work done by previous workers. All project-related materials are shared via Google Drive and workers are given uniform access.

RESULTS AND DISCUSSION

16 participants successfully carried out their roles in the 6 projects to completion. These participants have unique survey answers, and comprise of 6 different newsfeed designs and front-end code.

H1: Handoffs help the workers understand the form and function of the input of their tasks

In general, users found that time spent doing live and recorded handoffs were "valuable" or "somewhat valuable". Under all test scenarios, we found that all workers indicated valuable time spent when learning about the work already done.

We assessed user experience in various aspects. On a scale from -1 to 1, the developers' satisfaction of information received was 0.8 in the handoff scenario and 1.0 in the no handoff scenario. On the other hand, the designers' satisfaction was 0 in the handoff scenario and -1 in the control scenario. We found that while developer satifaction were unchanged by the handoffs, the designers responded more positively in the handoff condition.

This suggests that for creative tasks such as design, it is important to have handoffs to convey quality information. This result is further validated by worker comments in the survey: a designer in the handoff condition found that "The instructions were very long," whereas a designer in the non handoff requested that we "make [the] author guideline more sophisticated."

We coded assessments of designers' wireframes and developers' code. The best compliance of developer's work to designer's intent was seen with the live handoff. Both designers for the "live" handoff scenario intended for simple and minimal interfaces, which were reflected in their final HTML layout. Author handoffs and instructions explicitly state "minimialist" desires. In the control case, the exact lines of designers' wireframes were rigidly followed. We derive the insight that: in handoffs, workers were able to better perpetuate the minimalistic, newsfeed-like design intention from author, to designer, and finally to the developer.

H2: Handoffs reduce process losses and integration costs

"Live" handoffs helped developers ramp up to the design intent in an average of 1.5 minutes. From live chat logs, we know both trials averaged 10 minutes of interaction. The 1.5 minute in ramp-up time in the live scenarios indicate time that developers spent independently assessing previous work.
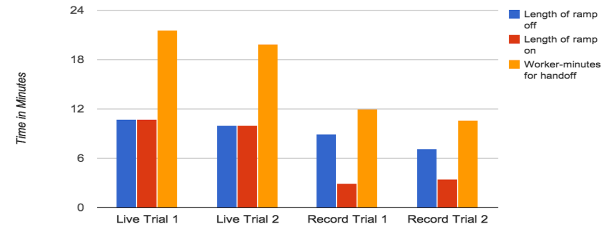

Figure 2. Lengths of time used by workers for handoff

Thus they found the getting up to speed process less frustrating than the control group, who spent an average of 7.5 minutes reading instructions and wireframes. The "recorded" handoff participants reported the highest ramp-up times, averaging 8 minutes across 4 people.

An average of 10 minutes were spent for live handoffs (see Figure 2). In the "recording" scenario, the previous worker spent more time making the video. But the subsequent worker spent significantly less time ramping up to the designer's work. We venture to extrapolate that, should creating the videos become more convenient, the total time for the "record" handoffs will further decrease.

CONCLUSION

We found that integrating handoffs in expert crowdsourcing produced better results. Live and recorded handoff methods led to more work output and higher quality work than no handoffs. For remote experts with flexible schedules, the live handoff method proves most effective. For the common case, when workers cannot agree on a time to meet, the recorded method provides an alternatively effective improvement. Future work should consider and implement the introduced handoff techniques in expert crowdsourcing platforms such as Foundry[5].

REFERENCES

1. André, P., Kraut, R. E., and Kittur, A. Effects of simultaneous and sequential work structures on distributed collaborative interdependent tasks. In *Proceedings of the 32nd annual ACM conference on Human factors in computing systems*, ACM (2014), 139–148.

2. Heath, C., and Staudenmayer, N. Coordination neglect: How lay theories of organizing complicate coordination in organizations. *Research in organizational behavior 22* (2000), 153–191.

3. Kittur, A. e. a. The future of crowd work. In *Proceedings of the 2013 conference on Computer supported cooperative work*, ACM (2013), 1301–1318.

4. Malone, T. W., and Crowston, K. The interdisciplinary study of coordination. *ACM Computing Surveys (CSUR) 26*, 1 (1994), 87–119.

5. Retelny, D., e. a. Expert crowdsourcing with flash teams. *26th annual ACM symposium on user interface software and technology* (2014).