Post-Deployment Usability: A Survey of Current Practices

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ABSTRACT

Despite the growing research on usability in the pre-development phase, we know little about post-deployment usability activities. To characterize these activities, we surveyed 333 full-time usability professionals and consultants working in large and small corporations from a wide range of industries. Our results show that, as a whole, usability professionals are currently not playing a substantial role in the post-deployment phase compared to other phases of user-centered design, but when they do, practitioners find their interactions quite valuable. We highlight opportunities in HCI research and practice to bridge this gap by working more closely with software support and maintenance teams. We also raise the need to understand what might be called 'usability maintenance,' that is, the process and procedures, by which usability is maintained after deployment.

Author Keywords

Post-deployment usability, usability practices

ACM Classification Keywords

H5.2. Information interfaces and presentation: User Interfaces - *evaluation /methodology*.

General Terms

Human Factors.

INTRODUCTION

A key component of user-centered design (UCD) and usability engineering is the commitment to usability principles throughout the analysis, design, implementation, and deployment phases [5, 6]. While upfront user research and prototyping are crucial to designing user-centered products, learning from users in the deployment phase about their *actual* use of the product is also valuable [5, 6]. However, prior works [4, 8] have suggested that this "ideal" UCD process across all four phases rarely happens in practice: most companies invest heavily only in upfront UCD methods. Our literature review indicated that research on usability practices has largely centered on upfront UCD methods, with little work substantiating how usability is actually practiced in the *post-deployment* phase.

Given that most software companies invest a major portion of their budgets on maintaining software [3] and providing technical support[1] *after* a software has been released, understanding the UCD practices in the post-deployment phase is critical for identifying opportunities and challenges in supporting a product's overall usability.

To better understand the state of post-deployment usability activities in industry, we surveyed usability professionals in North America and abroad. We received 333 responses from Usability professionals working in large and small corporations representing a variety of industries. Our key findings suggest that the role of usability appears to diminish in the post-deployment phase and usability professionals are rarely involved in postulated post-deployment activities [5] such as usage logs analysis, customer support logs analysis, benchmarking, and *in situ* usability testing. However, respondents also indicated that when they were involved, they found significant value in interactions with support.

This paper is the first to provide empirical evidence through a large-scale survey about the current state of post-deployment usability. In this regard, it complements prior surveys of usability practitioners [2, 8] that have focused on upfront usability activities. Our results further provide an impetus for the HCI community to better align UCD with software support and software maintenance activities that play a critical role in supporting the overall user experience.

THE SURVEY INSTRUMENT

Our survey consisted of 16 multiple choice and open-ended questions. We began by asking respondents about their demographics, such as job title, experience, company size, industry, and location. Next, we asked questions about direct involvement in the 4 different phases of UCD and asked respondents to specify their particular pre-deployment and post-deployment activities. We devised categories of activities based on previous surveys [7, 8] and recommendations in UCD/usability lifecycle guidelines [5]. We also asked respondents about their interactions with software support and software development teams in the post-deployment phase. Lastly, we gave respondents a chance to share their stories about post-deployment usability activities.

We distributed the survey online during the summer of 2010. We advertised on 15 different usability-related mailing lists

CHI 2011, May 7–12, 2011, Vancouver, BC, Canada.

[1] http://www.supportindustry.com/2009supportmetrics.html

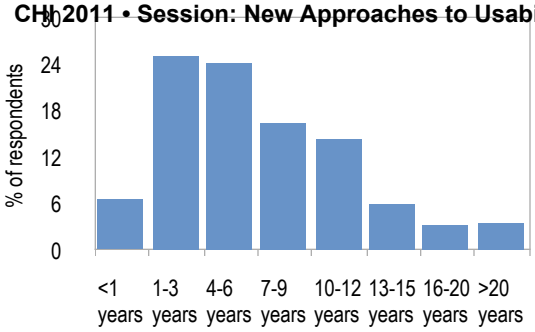

Figure 1: Distribution of respondent's experience.

User Experience Designer	18.3%
Interaction Designer	15.6%
User Experience Researcher	8.4%
User Experience Manager/Director	5.1%
User Researcher	4.5%
Information Architect	4.2%
Usability Professional	3.3%
Usability Engineer	3.3%
Interface Designer	3.3%
Product Designer	3.0%
User Experience Architect	2.7%
Usability Specialist	2.4%

Table 1: Top 12 job titles

Large Corporation (> 1000 employees)	48.7%
Small Corporation (< 100 employees)	16.1%
Medium Corporation (100-1000 employees)	15.2%
Usability Consulting Firm	7.0%
Design Agency	4.4%
Non-profit Organization	1.9%
Educational Institution	1.6%
Self-Employed/Freelance	1.5%
Government or Military	1.3%
Startup	0.9%
Advertising Agency	0.6%

Table 2: Respondents' organizations

and discussion and alumni lists of major HCI training programs. We also made use of social networking sites such as *LinkedIn* and *Facebook* to advertise our survey in professional discussion groups. In some cases, we personally contacted team leads in large corporations and consulting groups and asked them to encourage their employees to participate in our survey. The respondents were offered a chance to participate in a $50 gift card drawing.

DEMOGRAPHICS OF RESPONDENTS

The survey was targeted at anyone who identified as a usability or a User Experience (UX) professional. Our respondents listed a variety of job titles and represented various design and usability roles. Table 1 shows the top 12 job titles of our respondents. Most of the respondents (78.8%) were full-time employees, 17.1% were contractors and the remaining were part-time or temporary employees or self-employed.

Figure 1 shows the range in years of experience our respondents had in the usability field. About a quarter (25.2%) of the respondents fell in 1-3 years range while another quarter (24.3%) were in the 4-6 years range. They represented organizations of all sizes, with the majority being from large corporations (Table 2). These organizations specialized in a variety of software, hardware, and web applications, including e-commerce sites, operating systems, online search, computer-aided design tools, social networking sites, government sites, among others. We received the largest number of responses (83.8%) from North America, followed by Asia (6.3%) and Europe (6.0%).

POST-DEPLOYMENT USABILITY

We now describe responses related to survey questions that explored different facets of post-deployment usability.

One question we asked was *In which phases of development are you directly involved in some capacity?* The responses to this are shown in Figure 2. Among our respondents, 76.1% said that they were regularly (**always** or **usually)** involved in the user research phase. The majority of respondents (87.7%) said that they were regularly involved in the design phase. The involvement appeared to decrease in the implementation phase, but 69.2% of the respondents reported being regularly involved. Only 50.9% of respondents reported involvement in the post-deployment phase. Overall, the level of involvement of our respondents differed significantly across the 4 phases of development ($\chi^2_{(3,\ N=333)}=219.9$, $p<.0001$).

Our next question was, *Please describe your main role after a product that you helped design has been deployed.* Responses are shown in Figure 3. We asked respondents to select all options that best described their role after a product had been deployed. It appears that most of the respondents (70.3%) started working on another product and/or the next version of the current product (69.1%). Only 23.1% of respondents said that they were involved in conducting benchmark tests while 33.0% said that they monitored feature data for the deployed product.

Next, we asked respondents about the usability-specific activities that they engaged in both *before* and *after* a product was deployed. The activities and the comparison of responses are shown in Figure 4. Almost all usability activities appeared to drop after a product had been deployed. The only significant increase was in the use of satisfaction surveys ($\chi^2_{(1,\ N=333)}=95.2$, $p<.01$). Also, note that 12.0% of the respondents selected not applicable (N/A) for the post-deployment phase.

Our next question was, *How often do you interact with support specialists (i.e., product support, customer support) after a product has been deployed? (via email, phone, or in-person meetings).* Responses are shown in Figure 5.

Close to a quarter (23.4%) of our respondents reported never interacting with support specialists after deployment, while

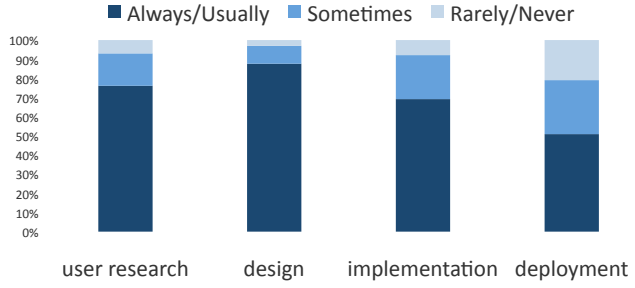

Figure 2: Usability involvement in different phases of development.

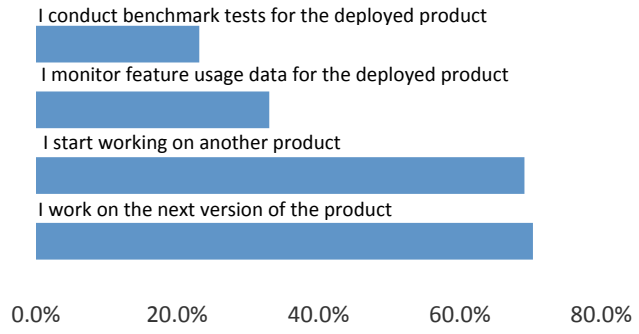

Figure 3: Main role of respondents after deployment.

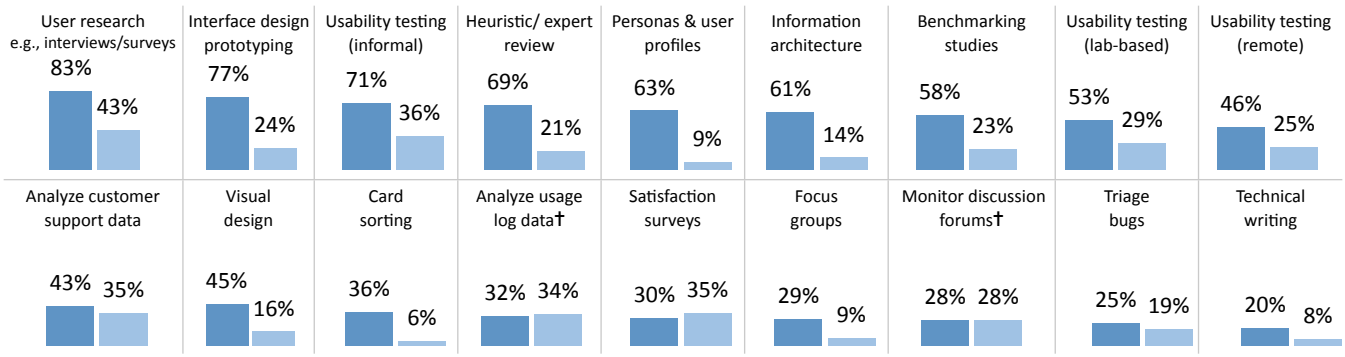

Figure 4: Proportion of respondents' indicating involvement across a range of activities. Dark bars represent the pre-deployment phase; lighter bars represent the post-deployment phase. All pre/post differences were significant ($p<.05$), except those indicated by (†).

another 30.2 % only interacted once in a while. Another 10.6% of the respondents said that they were not sure about their level of interaction. Among the 6.3% of respondents who talked to support specialists every day, about a third (33.3%) were from small corporations.

We also asked respondents to list where the support specialists were located in their organizations (Table 3). About half of the respondents (49.8%) said that support specialists were located on the same floor as the usability professionals or within the same building. A quarter of the respondents (23.1%) were not sure where support specialists were located.

The next question we asked was, *How often do you interact with software developers after a product has been deployed? (via email, phone, or in-person meetings)*. These results appear in Figure 5. Compared to support specialists, usability professionals appeared to have a more regular interaction with software developers after a product had been deployed ($\chi^2_{(1, N=333)}=71.7$, $p<.0001$). Among our respondents, 24.9% said that they interacted with developers every day and another 18.0% said they interacted a few times a week. Still, about 30.0% of respondents did not appear to have much interaction with developers (never or only once in a while).

In terms of location, 56.5% of the usability professionals said that developers were located on the same floor as them and 39.0% said that developers were in the same building (Table 3). This difference was significant compared to the relative location of usability professionals and support specialists ($\chi^2_{(5,N=333)}=67.8$, $p<.0001$). It appears that software developers in general were more collocated than support specialists and this could be one reason why usability professionals had more of an interaction with developers overall. However, closer examination reveals that of the respondents who talked to developers every day or few times a week, 35.7% said that developers were located in another office at another location. This finding suggests that there are factors other than location that could underlie the difference in interaction among usability professionals and software developers versus support specialists.

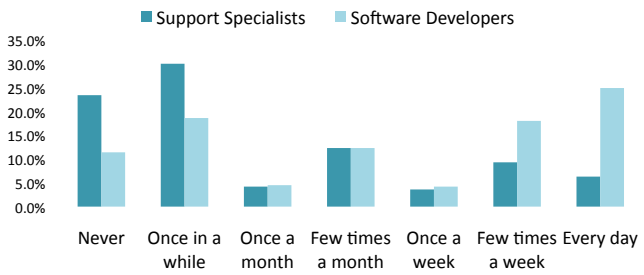

Figure 5: Frequency of interaction with support specialists and software developers after a product has been deployed.

Perspectives on Post-Deployment Usability Activities

We also asked respondents to reflect on their role in post-deployment usability in free response questions; there was a 51.8% average response rate for the two questions. We used respondents' comments to begin to understand some of the trends that we observed in the quantitative findings.

First, we filtered responses based on comments from respondents who said they were always involved in the post-deployment phase to see what type of activities they engaged in. Respondents described activities such as monitoring current usage, benchmark studies, satisfaction surveys, user testing, and having informal contact with users, consistent with Figures 3 and 4. However, some respondents were still not satisfied with their level and type of involvement in the post-deployment phase:

> We get good feedback, but we don't work directly with customers, so it's hard to understand their specific pain points. I have a suspicion that there are minor irritations that don't ever get reported because people just don't think it's worth the effort to write to customer service. Without direct customer usability research, I don't exactly know what those are.

Next, we filtered responses based on comments from respondents who said they were never or rarely involved in the post-deployment phase. One prevalent response was that usability professionals tried to be more heavily involved upfront to prevent post-deployment issues. Another response

Location	Support Specialists	Software Developers
Same floor as me	25.7%	56.5%
Same building as me	25.7%	39.0%
Another office at a different location	38.4%	34.9%
I'm not sure	23.5%	7.9%
In an office, but I work remotely	7.6%	7.6%
In the office where I consult	5.1%	5.7%

Table 3: Location of support specialists and software developers in the organization, relative to the respondents

was that usability professionals did want to be more involved in post-deployment usability but the hindrance came from organizational cultures and perceptions about the role of usability:

> Involve us! Don't think we're just there to run a test for you--reach out to us and share your concerns for deployment and give us feedback after it's deployed.

Even when there was interest in sustaining usability throughout the lifecycle, it appears that product delivery schedules and resource constraints made it difficult to practice usability after deployment. Another challenge stemmed from organizational structures because in some cases customer support and software maintenance groups operated in silos, unaware of each other's activities.

DISCUSSION AND CONCLUSION

Our survey findings have several implications for post-usability research and practice, especially from the perspectives of software support and software maintenance.

The Software Support Perspective

The before/after findings of usability activities showed that only 34.8% of respondents appeared to leverage customer support data in the post-deployment phase, even less than the pre-deployment phase (Figure 4). Furthermore, over 50% of respondents never or rarely talked to support specialists. Since support specialists are at the front lines of directly interacting with end-users and helping them troubleshoot or learn about product features, it is possible that usability practitioners are missing several opportunities for learning about user experience from the field. As today's systems are becoming more complex and enabling idiosyncratic customizations, it is likely that the role of support will continue to be integral in supporting and evolving user experience. Thus, our survey findings highlight the need for the usability community to consider ways in which customer support data can be leveraged more effectively to guide iterative design tasks.

The Software Maintenance Perspective

The software engineering community has long recognized that software maintenance and evolution are an inevitable part of the software development life cycle [3]. Software developers spend most of their time triaging and fixing bugs. Only 18.9% of usability professionals said that they are directly involved in helping triage bugs, and about 30.0% of respondents never or rarely talked to software developers after a product had been deployed. Since a number of bugs that arise in the post-deployment phase are potential design and usability bugs [4], there is opportunity for exploring how usability professionals can play a more influential role in the bug triaging process.

Are usability professionals *really* doing user-centered design?

Our results show that, as a whole, the role of usability in current practice appears to diminish after a product has been deployed. This finding is somewhat troubling given that iteration and user feedback have been advocated as core components of all phases in UCD and the usability engineering lifecycle [1, 5, 6]. Given the increased uptake of usability in industry, it is not a surprise that the value of getting upfront design into organizations has paid off. However, despite sincere intentions in tackling potential usability problems upfront, we know from current industry practices that a number of issues emerge in the post-deployment phase (hence, the large software maintenance costs [3] and software support costs). Thus, post-deployment usability may be the next frontier in translating research into practice.

We propose that within the field of usability, there needs to be focus on "usability maintenance," paralleling software maintenance. The goal of usability maintenance should be to enhance post-deployment user experience based on the actual use of a product and provide ongoing support for usability principles of learnability, efficiency, memorability, recovery from errors, and satisfaction. As discussed above, we can start further studying and inventing opportunities for support and maintenance teams to interact with usability practitioners.

Limitations and Future Work

This survey provides the basis upon which future work can investigate industry practices in the post-deployment phase in more depth and devise new methods or guidelines. We generalize the survey findings with some caution since the survey was only distributed in English and respondents were largely from North America. However, since our respondents represented a variety of usability-related positions and a range of organizations of different sizes and specializations, it is possible that these results would hold globally. Our study currently provides an aggregate, quantitative view of usability practices, but in future work, we hope to tease out the effect of organizational cultures, usability positions, and differences between large and small corporations. It would also be interesting to complement these survey findings with observations of interactions among usability professionals and support specialists and software developers. Lastly, it is likely that in some cases pre-deployment activities on one version of a product can be considered post-deployment activities on the previous one and in future work we hope to shed light on such nuances. Together, we hope these perspectives will reveal new opportunities for usability maintenance.

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