Answers

Case 1: Changing Products Means Changing Behaviors

1. To be successful Jim needs to have experience with a wide variety of user-experience techniques so he can select the appropriate design and research methods and develop a process that works within the unique context of JMC’s situation. He needs to understand how the functional areas other than user experience influence product design at a software company so he can effectively partner with these teams. He also needs to have enough technical knowledge to gain the respect of the engineers and the founder and CTO. Examples of skills Jim should have include
   • User-centered requirements analysis
   • Contextual inquiry
   • Task analysis
   • Use case development
   • UI design
   • Design specifications and guidelines
   • UI prototyping
   • Heuristic reviews
   • Cognitive walkthroughs and inspection methods
   • Graphic design
   • Usability testing
   • Formative testing of early design concepts and prototypes
   • Summative testing to evaluate products with respect to usability goals
   • Knowledge of other functional areas related to software product development
   • Project planning
   • Marketing research and communication
• Requirements analysis and specification
• Quality-assurance techniques

Jim does not need to be an expert in all these things, but he does need enough understanding of them to develop plans that take into account how they fit together and make the appropriate trade-offs. He also needs to have experience working with teams and persuading them to make significant changes, both in terms of the UI design and their related processes.

2. Jim should begin by examining JMC’s existing processes, and the artifacts related to those processes, to understand how products get developed at the company. All companies have processes. Some companies follow formal processes, leveraging things like International Organization for Standardization standards, whereas others are more informal in their practices. Even small start-ups have ad-hoc processes, even if they aren’t aware of it on a conscious level. Examples of artifacts related to product development processes include requirements documents, bug databases, design specifications, and project plans.

Then, Jim should talk to the key decision makers and thought leaders to understand their views regarding the organizational needs for user-experience deliverables. Although the people in the company may not be experts in usability or design, they are his clients, and he needs to determine how to best meet their needs and integrate them with their existing processes. One way to determine whom to talk to is to review the organizational chart. Jim should introduce himself to the functional leaders and ask them to explain their roles and identify how their teams impact the user experience. It is also important to consider “thought leaders,” individuals who may not be in formal leadership positions but who hold authority due to expertise or tenure. These individuals can typically be identified by analyzing how decisions are made or by informal networking.

Finally, Jim should then examine the products and identify any weaknesses that may relate to functional deficiencies within the organization and determine their root causes. Often, just looking at the UI indicates where problems exist organizationally. For example, if the UI is inconsistent, it often reflects a lack of collaboration and high-level design oversight. If the UI is extremely buggy, it might mean that insufficient time has been allocated to coding or quality activities by the person in charge of project planning. Or, it could mean that the teams are not reusing and refining common UI components.
because the technical architects have encouraged custom work. More custom code tends to correlate with more bugs. Keep in mind that the goal of this type of informal review is to determine what functional weaknesses exist in the organization that contribute to poor product design. Jim should conduct more formal studies of how the product is used if he truly wants to learn about the usability of the product. He should also consider reviewing customer support data and how he might get some informal input directly from customers.

3. As is the case at many start-ups, technologists founded the company. Each functional area grew quickly, but the user-experience function was overlooked in the process, because the initial founders and management team were unfamiliar with the concept. They were smart people but tended to ignore the perspectives of others. They never realized that what might be obvious to them might not be so obvious to someone else. As the company grew, management failed to establish clear roles and formal feedback loops, both in general and specifically for user experience. Teams began to try to address related problems independently—they failed to partner effectively with each other and their customers. Unknowingly, many of the teams were working on problems related to user experience. For example, both professional services and the engineering teams were often working on the same problems independently. Jim has the advantage of looking at things not only from a fresh perspective, but also from a cross-functional perspective. Of course, as a user-experience specialist he also has the knowledge of best practices that have worked at other companies that he can apply to the problems at JMC.

Simply having good engineers who can write the code is only a piece of the puzzle. Software product development is a team effort, but teams only work well when everyone knows their role. As the functional teams in JMC struggled to define their roles and integrate into the rest of the organization, they lost focus on the customer. Collaborating with customers and end users was not a priority because the various functional teams were too internally focused. In some cases this was because functional teams defined themselves as competitors instead of partners. All too often individuals or teams may define themselves in ways that can undermine the success of the organization as a whole. Herbold (2004) calls this the “fiefdom syndrome.” The fiefdom syndrome is a key problem for most new user-experience initiatives; overcoming it requires breaking down barriers to
collaboration by changing processes to reward the correct behaviors. For example, if people are rewarded for making dates without regard to quality or encouraged to define requirements in terms of solutions, then other individuals cannot play their role effectively to create good products for customers.

4. When a person first joins an organization, she or he may have delegated authority but has to work to gain earned authority. Earned authority only comes through trust, and trust only comes with collaboration. There are many possible options here for Jim to get the rest of the company on board. However, Jim needs to identify a relatively low-risk, but visible, quick win to buy him the time and credibility to take on problems that are more substantial. Although there are many possible projects on which to focus, Jim needs to find something to help his initial sponsors. He needs to keep their styles in mind and use tactics that resonate with them. If possible, Jim should define his initial project as something that involves collaborating with the other functional areas so that his work is visible to them and he can gain their trust. He should also choose an area where he can foresee success. It is not the best time to try and choose the most complex problem.

5. It’s probably not a good idea in this situation to push ahead and try to run a usability test. Jim could try to run such a test, but he needs to make a decision about the trade-off between spending the time to run a usability study to get data and having enough time to fix what is obviously broken. In an ideal situation he would have enough time to run a study, analyze the results, and then help the team fix the design based on the findings. However, in this situation that might not be realistic. Running a study might take more time than he can afford. Even if testing is feasible, Jim needs to consider the relative amount of effort when weighing alternative options. He also has to consider whether his results will be well received by the team. Given the situation, Jim may find resistance if he runs a study and tries to get the team to make design changes at this point.

6. Jim could do an informal review based on heuristics. However, there are several possible drawbacks to this approach that should be considered. First, unless Jim is a domain expert, his findings may not be as valid as those of a user-experience person who has worked on a product for some time and knows the user profile and use cases well. Second, he has not yet established credibility with the team. They may
argue that the problems he reports are not significant or not agree with his prioritization of the problems. He could try to do a survey (to gather satisfaction measures by feature area) or remote study of users to get their feedback on the existing UI, but there are some logistical issues to consider, including getting a list of users and their contact information (not just the corporate customers who purchased the product, but the actual end users).

Jim could simply sit down with the engineers and try to prioritize the known issues. This might be a viable approach, but it assumes the team will cooperate and the list of issues currently known is relatively complete. It also assumes the team will take time away from their planned development activities to meet with him and they have sufficient time to fix the identified problems.

7. Jim should consider the nature of the problems he has learned about:
   - Inconsistency due to lack of collaboration and shared vision in both layout and terminology
   - Lack of documented user-centered requirements driving product design and project estimates
   - Teams spending a lot of time in meetings debating design details during implementation
   - Quality issues related to lack of formal tracking of UI bugs
   - Last-minute changes related to the informal processes impacting schedule and overall quality

8. Jim needs to make sure his recommendations are actionable. His points must describe observable outcomes that map to the pain points of the audience of his presentation. Jim needs to focus on immediate tactics that might enable slightly different longer term goals as part of his change management strategy. For example, it makes sense to drive thinking about users and use cases before usability testing. Without agreement on whom the product is designed for and what tasks it needs to support, making progress on usability testing is next to impossible.

Case 2: Managing Politics in the Workplace

1. When deciding where to position his company, Joe needs to understand that the Cleveland Company culture has not evolved from printed to online publishing. He is accustomed to working in a newer digital development culture that is more concerned with
software and Internet services than traditional media. To be successful, Joe knows he needs to be working with the researchers who are developing the online newspaper. He therefore needs to position his department in a direct relationship with those who can benefit most from his services, such as the webmasters at the home office and the developers who are creating the online magazine from the printed magazine. Joe needs to work as part of the Cleveland.com team and become an integral part of their development process.

2. It was not clear at the outset who was running the meeting. There was no agenda. Although Lyle called the meeting, he had Linda set up the room and order the food. Linda also kicked off the meeting. This all gave the impression that Linda was going to run the meeting.

3. Lyle should have set the expectations for the meeting long before it began. There was no agenda sent to the participants. Participants can’t prepare if they don’t know what they’re preparing for.

   Further, Lyle didn’t facilitate the meeting in a way that encouraged collaboration. He instead set up a contentious atmosphere. It would have been better to have had a dialogue with the key players before the meeting to better understand their individual issues. Then, he could have set an agenda that would have framed the issues in an objective way and worked toward helping them to create a better working relationship.

   Also, because Joe and Linda are both team leaders doing similar work, this problem should have been addressed earlier, and not in such a public forum. Lyle let the problem fester and grow to a point where it was more difficult to resolve.

   Finally, Lyle should not have abandoned the group, leaving them to find their own solutions. Lyle could have considered bringing in an expert in organizational psychology to drive home the point that interpersonal issues ultimately affect the ability of the individuals in the group to influence change and produce a viable product for profit in the marketplace. The expert could have facilitated the meeting, working in time to affect problem solving and team building.

4. Underneath the practical issues that led to problems, there are also underlying emotional issues between Linda and Joe. They should therefore get together and plan how to improve their working relationship. Perhaps they should start out with weekly meetings to review and coordinate the work they are both doing. These meetings could include a discussion of where there might be overlap and
where they might be able to help each other. As time goes on and the working relationship improves, the need for weekly meetings might decrease and they could have more informal means to check in with each other. They should also plan a way for both their teams to work together on a regular basis.

A full team meeting or outing would be a good way to cap off these efforts and ensure that everyone is in fact working together as a team. Especially when teams are geographically separated, there is a great need to have at least one face-to-face meeting so everyone can have a greater familiarity with all the people who are part of the team.

5. Joe had been feeling frustrated with Tim because he never seemed to have enough time for him and his team. Tim had told him that he would come out to California to see the lab and meet the team, but each time he canceled his trip. Joe was traveling to New York City at Tim’s suggestion. He was not sure what message Tim was sending by failing to make the trip to California to meet the team there. Joe did try to laugh it off to make light of the situation and develop a thick skin, especially in front of his staff. However, he was not completely successful because he still found himself feeling uneasy and disappointed. Meanwhile, Tim had made an effort to get to know the people on his team. He worked well with the folks in the home office; he just needed to make that connection with the people in the remote office.

6. Tim should be clear about his expectations for Joe and his California team. Because Tim called the meeting, he has a responsibility to Joe to prepare for the meeting and to treat him with respect during the meeting. The best way to do this would be to send Joe a meeting agenda ahead of time so he could see the points Tim wanted to cover in the meeting. He should also ask Joe for his input regarding what he would like to accomplish during the visit. Likewise, Joe should try to understand that Tim is new to his position and needs a little more time to settle in. Tim should also take care to prepare the New York and California teams by making sure he communicates with everyone beforehand so they all come to the meeting with the same expectation. Knowing there has been some difficulty in the past, Tim should know that the meeting might be tense. Tim needs to take leadership by being careful in setting expectations, ensuring there will be no surprises in the meeting that would throw everyone off balance.
7. The bigger problem is the way the Cleveland Company treats its remote employees. Cleveland doesn’t understand the importance of getting remote teams to work smoothly together. This is because remote work doesn’t fit in their business model. Newspapers are generally written in one location and often printed nearby. The business people all see each other in the course of a day. By contrast, in the digital world people often work together online and in conference calls. It is not uncommon for everyone on the team to be in a different city. The Cleveland Company needs to learn strategies for creating better remote working teams, such as
   • Coordinating calendars, encouraging people to call in from many locations
   • Using technology to enable remote collaboration
   • Sending out agendas ahead of time
   • Preparing for meetings by ensuring their teleconference and web-conference setups are working properly
   • Going around the virtual room to give everyone a chance to talk

8. Tim’s manager should help him with various aspects of his job. First, when Tim was interviewing for the position, his manager should have included everyone in the interview process, including, at the very least, Joe and Linda and other direct reports. Tim should also have been briefed on the team dynamics. Once that process was complete, there would have been more buy-in from the employees if they believed they had been a part of the selection process. In addition, Tim’s manager should be running the first few meetings between Tim and his team so that everyone is comfortable. Only then should Tim be set off on his own, to forge his own relationships with his team.

9. Tim probably thought Linda could help him find a way to get his new division to work together. Linda had been building a corporate human factors and usability presence for years. Tim is busy focusing on trying to respond quickly to the changes in the economy and wants to move from working on traditional printing to the digital business. He knew Linda would be integral to his goals.

10. Linda’s presence at the meeting probably made Joe feel marginalized. As it was, Joe and his team did not feel valued. He knew it was hard to work from a remote location and that he had to work extra hard to communicate and connect with the team in New York. The UCD team in California feels disenfranchised from the rest of the company.
Joe also fears for his job and sees Linda stepping into a position that puts another layer between him and Tim. Also, Joe had thoughts of moving up in the organization and believed himself more qualified than Linda because he has formal training in the field and she didn’t. Linda’s presence at the meeting added to Joe’s feeling that he was not valued by his superiors and that he did not have enough status to have a private meeting with his direct manager. Joe knew he had to come up with a different way of relating to the team in New York.

Case 3: Raising Awareness at the Company Level

1. Jill should assume that Red Fox has little understanding of UE for the following reasons:
   - Before Jill joined the company there was insufficient investment in UE resources, which is a strong indication that there is a lack of understanding of the benefits of UE within the company.
   - There was no UE high-level manager, and the two designers probably did not have the opportunity and/or the experience to evangelize UE. With UE so understaffed, the two designers most likely had no time to evangelize because they were working on a large number of projects. Even if the designers had time, they most likely didn’t have experience in usability, metrics, and information architecture and would not have been able to paint a complete picture of UE for anyone in the organization.
   - It only takes one executive to hire a UE vice-president but that doesn’t mean there is a pervasive understanding across the company about UE. In the case of Red Fox Technologies there could be more than 1,000 other people who wouldn’t know why Jill was hired.
   - It is possible that a predecessor who did not have a UE background managed some UE people but didn’t have the knowledge to either evangelize or to practice solid UE principles and methods. Jill had joined companies in which her predecessors had been a marketing art director and an engineering manager, neither of whom had a strong background in UE.
   Even though a predecessor may have had some positive influence, because of employee turnover many of those people may no longer
be in the same departments or even in the company. From Jill’s experience, education and evangelizing are ongoing activities because of employee turnover, growing organizations, and reorganizations. One benefit of reorganizations is that employees who have become aware of the benefits of UE can become distributed throughout the company and help to influence others.

A predecessor might actually have had a negative impact, which could be why there were only two designers in a company of more than 1,000. A predecessor may have spread misinformation, been inflexible in processes and methods, or have considered only the user experience without considering the business needs and trade-offs. If this is the case, not only does Jill need to raise awareness, she also needs to address some misunderstandings.

2. In her first 2 months Jill should use the following strategies:

- Understand the company: Jill should learn as much as possible about the company, its culture, and the business goals and values. This is critical so that Jill can know how to prioritize work to best support the company to achieve its business goals.

- Perform a knowledge gap analysis: A gap analysis is performed by comparing the status of different states, often comparing how something currently “is,” the current state, with how something “should be,” the more ideal state. Jill should assess the current levels of understanding of UE across the company, including any incorrect impressions (the “is” state). She should then compare the levels of understanding (and most likely there will be multiple levels of understanding because different people and different groups will have different sets of knowledge) with what she believes the organization needs to know to make more optimal decisions (the “should” state). The difference between these two states is the gap. By understanding this gap, Jill can then assess what areas she needs to focus on—such as education or introducing and integrating processes—and also determine the priority of addressing these identified issues.

- Understand the internal customers: Jill should learn as much as possible about the key stakeholders, including their values, goals, and terminology. By aligning with these, Jill can translate UE goals, which are probably not understood by stakeholders, into terms they can understand. For example, if an important goal is to reduce development and quality assurance time, Jill can ensure
that the people she hires and the activities that her team focuses on will address these needs.

- Understand the development cycle: Every company has differences in how it takes an idea and eventually launches it. Sometimes the development cycle is documented as a process, sometimes as multiple processes depending on the type and scope of the project, and sometimes there are no documented processes. Any company that either is trying to obtain International Organization for Standardization (ISO) certification or is ISO certified has documented processes. (Many vendor companies have an interest in becoming ISO certified because the certification often provides the company with an advantage during the vendor-selection process.) Documented processes typically mean higher efficiency and higher quality results because the processes reduce confusion and missed steps. Even with documented processes, more times than not there are at best small differences between what is documented and what is practiced, so it is also critical to assess what is practiced and how much what is practiced varies across the company and from project to project.

3. To optimize decision making, the UE department should actually be at the same reporting level as engineering and marketing. If the UE department is not reporting at the same level, the company is still driven more strongly by these other departments than by UE. This is another clear indication that Red Fox Technologies is not fully educated about user experience and its benefits.

4. The following three items should take the highest priority:
   Item 1: Building a usability lab. There are many reasons why building a lab is an important area to focus on early:
   - Usability labs are one of the most effective strategies for raising the awareness of UE within companies.
   - From a practical standpoint, usability labs can be used for a variety of UE activities, including comparative and benchmark usability evaluations and participatory design sessions.
   - With access to a lab with a one-way mirror, stakeholders across the company can watch live evaluations, which increases the likelihood that they will address the issues identified in the usability sessions. Also, web-based applications can enable employees to view sessions from their desks if they aren't able to watch in person.
• Usability labs outfitted with video production and editing tools can also enable the efficient production of video highlights and remote viewing of the usability evaluations if stakeholders are in other geographic locations. These features enable even wider influence of the usability evaluations, allowing stakeholders to watch at other times and locations.

• As Jill knows from past experience, the usability lab can act as a tangible icon of a concept not familiar to stakeholders. People may not understand what UE is, but a first step is to know that there is a lab and that activities occur in the lab.

• Usability labs can help to close important customer deals, thus helping to raise awareness even more. By giving customers tours of the lab, the customers understand the importance the company places on increasing the usability of the products and services. Jill had been able to help close multimillion dollar deals by providing prospective customers with a tour and background of the steps the company takes to increase the usability of their products.

• Jill has also used the completion of usability labs as an opportunity to significantly raise the awareness of UE both within the company and with customers. For example, Jill has had a major usability lab’s grand opening event at a previous company. She invited the entire company to come tour throughout the day, had presentations from the CEO and the president both live and broadcast across the company, gave a presentation on the benefits, invited the press and important customers to attend, had the ever-popular free food to lure people, and also had giveaways with the group name on them. Although this event required significant planning and a budget for the food and giveaways, this one event introduced the concept of UE to literally thousands of people in one day. In addition, by working with the CEO and the president on the messaging, they communicated during their presentations the importance of projects using the usability labs. After the grand opening, Jill had people from all over the company contacting her, saying “I don’t know exactly what I need to do, but I know I’m supposed to be bringing my projects through that lab.” Jill also provided important customers with customized tours over the next few weeks.
Item 3: Hiring. From past experience, Jill knew that hiring was priority one for multiple reasons:

- With more UE professionals, Jill had more people to demonstrate and raise the awareness of the importance of UE.
- From past experience, open head count does not necessarily remain open. Jill wanted to fill the positions before anything could reduce her head count allocation. For example, many companies institute cost-containment measures such as putting open head count on hold after a quarter with flat or reduced revenue.
- Because there were visual designers within her new team but no usability engineers, information architects, and other roles, Jill needed to augment her current team with additional skills.
- One of the reasons Jill accepted the position at Red Fox is that they appeared to be willing to make a significant investment in resources, particularly after she spent some of the interview time educating the executives and communicating that it was a factor in her consideration of the position.

Item 6: Gaining direct contact with customers. To run usability evaluations, along with other reasons, Jill knew that UE needed direct contact with customers.

- Although it’s also important to obtain feedback from prospective customers, Jill’s perspective has always been that it is a waste of time and resources if a company is not using both real customers and prospects in their usability evaluations.
- Customers can be involved in a wide variety of UE methods in addition to usability evaluations in the lab, including participatory design sessions, interviews, longitudinal studies, and field studies.
- Customers who are involved in UE activities typically have increased satisfaction with the company and often mention their positive experiences with UE team members to the sales or marketing representatives or executive sponsor. One of the most effective ways to raise executives’ awareness is for customers to cite the positive influence of their interactions with UE.

5. Although all the items have significant benefits, and progress could be made on any of the items (particularly if an activity involving that item were to start or be underway in some part of the organization),
the three items listed above provide greater leverage for performing the other items:

- Integrating UE into documented processes assumes there are sufficient resources to support the activities.
- If sufficient UE head count has not been allocated and there is no current ability to hire, a plan for project prioritization and resource allocation would be one of the first three activities to perform. This plan would communicate the head count needed and the ramifications of not hiring, such as many or most projects not involving UE. If there is open head count, filling those positions would be the priority (Item 3).
- Information about UE is beneficial but isn’t as critical as hiring the resources before the demand for UE increases due to internal communication about UE and its benefits.
- Integrating UE into corporate or departmental goals typically depends on both the time of year and on building some understanding and credibility within the organization. As a result, this is typically one of the later tactics to use.
- Integrating UE into project requirements is also typically performed later because the process for creating requirements needs to be updated and the UE requirements need to be identified.
- UE release criteria have the same considerations as requirements in that both the process and the release criteria need to be identified.
- Integrating UE goals into executive bonuses is often one of the last tactics to use, because typically relationships with the executives need to be established before this can happen. On rare occasions, if a company has a strong initiative to create a culture change, this tactic can be used more quickly.

6. The UE organization and staffing plan also serves to raise the awareness of how UE groups should be staffed and structured. In addition, the plan demonstrates how even nine additional employees do not provide the coverage for all the projects Red Fox had planned for the coming year. By making trade-offs explicit—whether the decision is to do fewer projects or hire more UE people—the UE organization can make executive management more aware of the requirements for a sufficient level of UE resources. To maintain credibility for the UE staffing levels, Jill and her team need to
demonstrate significant added value to projects to justify the head count. Spreading UE resources too thin would not result in significant improvements, so Jill needs to ensure that important projects are properly supported, even if it means other less important projects have no resources. Also, the plan demonstrates Jill's business perspective (her ability to plan and manage against a plan), which increases her credibility among the executives.

7. Companies vary quite widely in which department owns the documentation and oversight of development processes and to what extent the life cycle is documented. For example, some companies have fully specified and detailed processes starting from the conceptual phase to post-deployment. Jill had used different strategies to integrate UE into company processes in the past. In one company the processes were written by the quality officers and maintained by the quality department, so Jill became a quality officer to influence the processes used across the company. At Red Fox Technologies, the production group owned this responsibility. Jill and her team performed the following steps to document and integrate UE into the development processes:

   • Document the UE process: Jill and her team worked with some of the production team to map out the UE activities and deliverables and integrate them into the development process (including the all-important requirements phase at the start of the projects).

   • Integrate UE approval for project milestones: To raise awareness for UE and ensure quality, Jill added approval steps to the process so that projects that affect the UI could not be built and released until approved by UE.

   • Integrate UE approval for prioritizing and activating projects: Jill became a member of the executive team that prioritized the projects so she could ensure that UE issues were brought to light during this important activity. The same team decided when to give projects the green light with resources and a schedule, so Jill could ensure that the UE resources were available and provide input to the other executives regarding any user-experience considerations.

8. Integrating UE into the documented processes is not sufficient for ensuring that UE is incorporated into the development processes as part of the daily practice. Jill knew from experience that most of the
time companies deviated from their documented processes—sometimes they were minor deviations and sometimes they were major. To help raise awareness, UE needs to become integrated into the documented processes and into everyday practices.

9. Embedding UE goals into executive bonuses might seem like a major win for raising the awareness of UE. However, if no one checks with UE to see whether the goals have really been achieved, then all the executives could simply declare victory, thus full bonuses, for the UE-related part of their bonus structure. Jill doesn’t want to be naive—when it comes to executive compensation, why wouldn’t executives declare full achievement of these goals? Jill needs to make sure that she works in checkpoints so that she can help the executives successfully meet the goals and that she or another UE team member verifies the status to ensure that the goals are truly met.

10. The existence of UE release criteria will not ensure that projects meet the criteria. As with the goals and bonuses discussed earlier, the UE release criteria must be achievable with the time and resources allocated as well as the technological constraints. Jill and her team needed to actively work with the other project team members throughout the life cycle to maximize the likelihood that the project would meet the UE release criteria. Although theoretically the project could be held up if it didn’t meet the criteria, if the effort hadn’t been made throughout the life cycle to address the criteria, the project would most likely be released regardless of whether or not the criteria had been met.

11. Some pitfalls of UE release criteria are as follows:

- Unachievable goals: If there are not sufficient resources or time allocated or there are criteria that are not feasible with the technologic constraints, then the goals were not properly planned.
- Credibility: When goals aren’t properly planned, not only are the UE criteria not met, they lack credibility. If UE goals are disregarded because they are not realistic during one project, they are more likely to be disregarded in other projects in the future.
- Setting idealistic goals: Most UE professionals would like to increase the usability of all aspects of all their projects. However, from a business perspective this is not necessarily the best approach for the company given limited time and resources. The more that UE can demonstrate it is focused on what is most important for the business, the greater the awareness will be of the benefits of UE.
12. Jill has seen over the years how differing opinions among UE professionals about methods and approaches, in addition to terminology used, can erode the credibility of the UE group when expressed to the company at large. Jill is a big believer in continual process improvement, including constantly challenging how to improve the efficacy of processes and methods. However, she is also a believer in keeping these debates and conversations within the UE group and practicing consistent messaging outside the group to maintain credibility.

Case 4: Usability Step by Step: Small Steps to a More Successful Site

1. Dorothy, the site’s creator, is very attached to the site and far too close to it to assess it objectively. Sheila’s reaction to the site is based on a comparison of her experience with this site and others she uses regularly. For Sheila, change is a positive step; for Dorothy, change is an implied criticism and a possible threat.

2. To communicate effectively with Dorothy, it’s important to acknowledge her contribution to the site and the value of the site as it is. Laura’s experience with NVIP so far has taught her that she must be prepared to support any assertions about how the site should look, work, or be structured with references to authoritative sources and data from actual users, which many teams find more compelling than some “expert” from whom they’ve never heard. She should model effective communication techniques for Sheila and, when the opportunity arises, explain how she plans to approach Dorothy. Finally, she should also provide her with evidence rather than opinion about how to revise the site.

3. Usability testing drives design and redesign. It pinpoints problem areas, helps prioritize trouble spots and gaps, and makes sense of the comments and reaction of users. Usability testing is the first step in a process of analysis that leads to recommendations for better products and services. Usability also helps prevent rework and misdirected efforts by shedding light on what users and visitors do rather than what they believe they do. In situations where user research has not been part of the initial development cycle, as in this case, later usability testing can provide critical information about user personas, task flows, and preferences.
4. A website redesign involves a reexamination of all elements of the site, from structure and navigation through images, link labels, page types and formats, metatags, style sheets, and content. A good redesign is more than just a renewal—it’s a fresh approach to solving the problem of meeting both the audience needs and site owner goals, which have frequently expanded, multiplied, or shifted with time—or were never systematically addressed in the first place. Usability testing is one of the key tools for informing a redesign; it enables a fresh perspective on the use of the site.

5. To avoid disruption of the site, the redesign could be implemented in phases, with each phase concentrating on changes that integrate with one another and naturally cascade to the next set of changes. To reassure an anxious client like Dorothy, Sheila could explain that the changes can be accomplished without taking the site down. For example, she can explain the use of “redirects” for links, when current URLs are replaced with code that automatically sends visitors to corresponding replacement pages in the new site. In this way the ADP team can be assured that the content visitors are accustomed to finding will always be available. In this case Sheila could also point out that at this site only a very small number of documents and pages are consistently used by over 90% of visitors. The rollout of the redesign could be planned to ensure that these most-visited pages are always available and highly visible. Implementing changes in phases also ensures that visitors do not experience “site shock”—reaching a site that has been overhauled and no longer resembles the site they thought they knew.

6. The ADP team is reluctant to consider any changes. They are not convinced that any “outsider” is knowledgeable enough to offer a useful critique of the site, and they secretly believe the site is fine just as it is. A steady diet of praise has made them certain they already do everything right; they have found the magic formula that works. Natural inertia can also be a problem, because change means work—and can be threatening or frightening.

    Sheila’s slightly adversarial relationship with Dorothy is another potential barrier; Laura could find that she is tainted by association with Sheila. The small size and tight operating budget for the ADP team means that committing to a website overhaul may be beyond their reach in terms of both personnel and money. Time frames are constraints as well, in two ways: the tests must be conducted during
the current fiscal year, which ends shortly, and the recommendations for improvements cannot involve taking the site down for repairs for more than a few hours.

7. This team is not convinced that its website needs help; this is probably the most critical obstacle to the success of the plan. The team also faces constraints of time and money. The ADP team is small and has a limited budget that might not cover the costs of even the modest plan that Laura has suggested. Laura’s approach could diminish the team’s resistance by appealing to impersonal “data” and “standards”—but it could also backfire. Negative feedback could humiliate the team and make them discount the results of the tests. Laura plans to appeal to the service orientation of the ADP team and its respect for research rather than opinion. She also intends to offer usability services at the lowest possible cost and to include ADP staffers as part of the usability test team.

8. Laura is describing a best-case scenario for conducting and applying the results of a usability test. She is not drawing attention to the inexperience of most of the team members, the investment of time required to plan and prepare, or the possibility that recruiting participants and conducting the sessions may not go smoothly. Also, she is not considering the possibility of any technology problems (although she does plan to prepare a backup disk with site contents for use in case an Internet connection is not available or crashes). Laura is also making the assumption that the experiences of both new and existing visitors will reflect problems at the site and support Sheila’s conviction that change is needed. She is repressing the fact that new visitors’ needs and preferences might be very different from those of established visitors.

9. For tests of a commercial site, it would be a simple matter to point out that if visitors fail to find products or carry out processes for purchase, the site loses money. Because e-commerce is fiercely competitive, owners of such sites have a compelling reason to watch their competition and keep pace with or overtake the competition. Although owners of such sites must also manage costs, they attract and retain visitors by ensuring high satisfaction with their products and with experience at their sites.

10. Probably most important, Coral and Laura should have insisted that ADP team members be more involved with test sessions and with analyzing the results of the sessions. They could have worked harder
to ensure that Dorothy and Maxine were available to observe some sessions along with Larry. If Maxine and Dorothy had had the opportunity to view some of the sessions and ask questions of the participants directly after the sessions they watched, the test findings might have been more convincing, or at least less surprising. If Larry, Maxine, and Dorothy had taken part in analyzing the results, they might have been more receptive to the findings and more invested in considering changes to the site.

The NVIP team could have helped to dispel tension and build trust by inviting the ADP team members to share more of their plans and aspirations for the website and talking about ways to fulfill those plans. They could also have encouraged more “venting” and expressions of disappointment or disagreement, allowing the ADP team to have their say and believe their ideas and concerns had been fully heard. The NVIP team might also have encouraged ADP personnel to express their fears about the impact of changes to the site, because ADP team members had a gut feeling of “if it ain’t broke, don’t fix it.” Depersonalizing the results and recommendations by referring to other sites and to difficulties and setbacks with the NVIP site might have helped, as well as a more complete acknowledgment of the hard work and success associated with the ADP site. Working to provide a face-to-face meeting might have been worth the cost and effort: Direct communication could have alleviated many of the problems that were exacerbated by lack of eye contact and inability to read body language.

11. The ADP team is resisting recommendations because they don’t really believe that visitors to the site experience the difficulties observed by the NVIP team; at heart, they don’t believe their site needs improvement, and they fear that changes made by outsiders will “spoil” the site. The ADP team has not really come to trust the NVIP team: They fear losing control of the site, they may believe their work is not valued by the NVIP team, and they believe the NVIP team doesn’t understand how visitors use the site. The project goal to improve visitor experience at the site has been obscured by the need for both teams to vindicate their ideas about what’s best for the site. Playing up the areas where the ADP team was “right” might have helped, but the root cause goes back to the original lack of commitment to the project. The ADP team also faces constraints with time and money. This small team has its hands full maintaining the
current site. They have neither time to make extensive changes
themselves nor money to hire others to overhaul the site.

12. Additional approaches to the ADP team include
   - Asking the ADP team how they plan to reach the goal of
     improving the site for everyone
   - Inviting everyone to brainstorm what the site could do or offer
to work better for visitors
   - Reviewing the test results and ask the ADP team to interpret the
     results
   - Accepting the fact that it may not be possible to overcome the
doubts of this team: They did not initiate the project and did not
accept the premise that the site needed to be improved.

Finally, it is worth noting that Laura should look for a more
receptive team with which to work. Coral needs successes to build
credibility for usability at NVIP. Resistant teams are not the best
place to start, but they are more likely to embrace usability when
they see the value other teams place on it or when they observe the
successes of others.

13. No matter how receptive the audience, it’s a good idea to present
positive findings up front and emphasize them. With this particular
audience, a segue from “it’s very good” to “and here’s how it can be
even better” might have been more effective. The report neither
included quotes or descriptions of user paths nor provided examples
of comparable problems (and possible solutions) taken from similar
sites. Data and statistics from published research could have been
effective in persuading Dorothy and her team. These elements might
have helped Dorothy and her team receive the “bad news” with
more equanimity.

14. Like other public health researchers and educators, Dorothy, Maxine,
and Larry were domain specialists with confidence in their own
expertise and a deep respect for formal quantitative research. They
could best be persuaded by strong appeals to their commitment to
public service, coupled with a wealth of supporting hard data
presented in chart or graph form.

15. As Laura and Coral suspected, the change in tone was likely a signal
that ADP team members had decided, collectively or otherwise, to
“cut their losses” and escape the discussion gracefully. Although
Dorothy was constitutionally and by training inclined to argue every
point and let no statement or inference go unchallenged, she may also
Answers

have been threatened by the clarity and confidence of Coral’s team. The ADP team could not concede Laura’s points without losing face, and there seemed to be no way to agree to changes without admitting that the site needed improvement—something Dorothy was simply not ready to do. It might have helped if Laura had asked why the tone of their responses and reactions had changed, but unless the subject was raised with great tact, it might also have made ADP team members even more defensive and uncomfortable.

16. The outcome will most likely be that ADP will appear to accept the findings but refuse to act on the recommendations Laura presented—unless Sheila is able to pressure the ADP team into accepting the recommendations. However, this may result in observance of the letter rather than the spirit of the recommendations, and in the end it may not bring much real improvement.

17. Laura, Coral, and Sheila have probably not convinced the ADP team that their site has flaws, and they probably have not demonstrated the value of usability to Maxine, Dorothy, and Larry. However, the NVIP team had significant achievements, including designing and delivering a usability test in a short time frame with limited funds. The NVIP team also had experience with both clients and audience members. They apparently mastered “low-rent” usability methods and learned a great deal about how to communicate effectively with a skeptical and strong-minded client. The team successes included
- Rapid test design
- Low-cost test methods
- Effective on-the-spot recruiting
- Operating effectively by leveraging team members’ skills: Sheila’s communication skills, Coral’s ability to organize, and Laura’s usability experience and background as a facilitator of sessions and teams

Case 5: Growing a Business by Meeting (Real) Customer Needs

1. In this situation Johanna might suggest field research and usability tests to learn what RevPhoto’s customers need and how well the current product meets those needs. The research will help the team determine which features customers need and which they struggle with or don’t
need, as well as whether they have problems that the product is not solving at all.

2. It is well worth the research investment for RevLev to figure out what’s broken before launching into a solution. The sales drop has caused them to acknowledge they have been out of touch with customer needs for some time now. This wake-up call should convince them not to rush to code solutions. Because they won’t have the resources to fix every problem they learn about, they need to know which areas of the product to focus on most.

3. An optimal research approach includes involving a cross-functional team made up of engineering, product management/marketing, UCD, and technical support in all phases of the research. By watching customers and analyzing the results together, each team member can contribute their unique perspective and have buy-in with the solution.

4. There are many valid ways to gather information on the customer’s workflow. A few that are commonly used in software companies are field observations, asking customers to rank a list of tasks on paper or in e-mail, in-depth customer interviews by phone, and online survey tools. Regardless what limitations the team faces in time and costs, they should be able to run some type(s) of effective research that will reveal more of the customer’s perspective.

5. The key to success for RevLev—and all software companies—is to design a product that solves their customers’ problems. To do that, the team needs to learn from the customers themselves. By doing good field research, RevLev increases the chances of fixing their products the right way—to meet their customers’ needs.

   In addition, when time is short and improvements are critical, it will save time in the long run to have buy-in from the cross-functional leaders from the beginning. By being included in the research, each functional group is represented in setting and agreeing on the product direction.

6. The team should explain the need to enact the following three recommendations:

   1. Do not invest further in the features circled in green (Figure 5.1). The task/success data show that these features already successfully meet the customers’ needs. The team can invest its resources to improve lower rated features.

   2. Focus heavily on improving success rates for the items circled in red (Figure 5.1). The data show that success rates with these tasks
are below 50% (low ease of use) and rank in the list of Top 10 tasks that users want to do with RevPhoto.

3. Do not invest in the three planned enhancements shown in Table 5.2. Because customers do not value doing these tasks highly, this is not where the team should focus its efforts.

7. Relying too heavily on only quantitative or qualitative data (whether in the lab or the field) does not give a complete view of customers’ needs. The team validated the quantitative survey’s Top 10 list by going into the field to learn about customers’ usage patterns and problem areas.

8. During field research, the team followed a plan to determine which tasks customers did with RevPhoto to validate the Top 10 survey data. By paying attention to other tasks customers performed, the team noticed this “surprise” usage. Though great surprises like this don’t happen regularly, without field research, they wouldn’t be discovered at all.

Case 6: But the Usability People Said It Was Okay . . . Or, How Not to “Do Usability”

1. Ellen, with 15 years in the usability business under her belt and 5 years of experience at this company, should have known better than to propose a Band-Aid solution without at least a little more information. She should have asked several things:

   • Why does this need to be done so quickly? Chances are she could at least have postponed a discussion with Tom until Monday, to get a little more information about the project.
   • Why was Tom in her office so late on Friday afternoon? It would have been useful to know if he had suddenly been asked to go talk to her or whether he’d forgotten and was making his crisis her problem.
   • Who had asked him to talk to her and why? Understanding whether this was a request from above or if it just came up in a casual conversation in Tom’s group would have helped her make a better decision about how to handle the request.
   • What’s the usability group’s level of responsibility on this project? Specifically, were they being asked to take full responsibility for the design (e.g., they get final say) or to contribute suggestions to
influence the design (e.g., their ideas may or may not make it to the final design)? If Ellen had clarified this point with Tom, both would have been better prepared for what followed. Ellen could then have made clear to her team what they should expect, and Tom, when asked later, might have remembered he had specifically told Ellen he wasn’t handing her responsibility for the final design.

Any of this information might have suggested to Ellen to either put more resources on the project (if it was really important) or to politely turn it down (if it was a more casual request).

2. Nancy, while new to the company, wasn’t new to the usability business either. She should have asked the basic questions that are good background for any project involving a usability evaluation:
   • Who are the users for this information? When would they be using it? Why was this information suddenly being made more widely available?
   • What was the schedule for the project, and was there any wiggle room in the schedule?
   • What stage was the design at? Was this the final version? How was it actually going to be given to users?

   If Tom couldn’t answer any of these questions, Nancy could have helped him work through them to resolve some of these open issues. Even in a short conversation, it would have been clear to Nancy whether or not the project was well thought out. If not, and there was no way to get clarification, this probably would have been a good time for Nancy to gracefully exit or to hand the project back to Ellen for resolution.

3. Tom, with 30 years in the facility management business, probably was doing what he thought he should. Educating Tom about the right way to ask for help from the usability team was Ellen’s job, and one that she should attend to quickly.

4. In a company where the term “mental model” is used in casual conversation, it might be a good idea for Ellen to lend Tom her copy of The Design of Everyday Things and suggest he take a look at the first three chapters so he’ll have more background. These first several chapters are accessible for most readers and convey the essential points about user-centered design and can give anyone the vocabulary they need to be more functional in an organization that is using terms like “mental model.”
Ellen should probably also spend some time with Tom trying to anticipate what projects the usability group is likely to be called on. Although his group is not one that she normally supports, she does seem to be asked to find resources for his projects periodically. Understanding what might be coming, and even suggesting where her group would be most or least helpful, could help control the flow of projects into her area.

5. Ellen needs to go back to her team and have a discussion about how the team talks about their work. Using this story as background, they could talk about how to present results and recommendations. Putting their work in the proper context for their clients, especially for people who work with them infrequently, could be really helpful for the clients to understand what work has been done and to ensure the data aren’t inadvertently misused. She should also emphasize two other points:
   - Usability team members involved in one-off projects need to be careful to clarify what their roles and responsibilities are on a particular project and scope their language and efforts accordingly. If they are only being asked for recommendations, they need to be very circumspect about presenting these.
   - When working with a team that is relatively inexperienced with user-centered design methods, it’s important to take a few minutes to educate them about what the user-centered design process can and can’t provide, as well as limitations and appropriate uses of data.

Although it might seem like overkill, she needs to emphasize to her team the importance of really working to counter this image of their team as an approving body. Most usability teams work as partners with their clients, and any positioning that seems to put them in a position of judgment can be very detrimental to building the necessary working relationships.

6. Ellen also needs to go back and have a chat with her manager, Todd, and enlist his help. She needs to give him the information and language that he needs to use to shape discussions when he hears usability recommendations being misused. If he has a better idea how people can sometimes misinterpret their work, he can help cut off some of these incorrect perceptions earlier by himself. Plus, he needs to be aware that Ellen is going to push back a bit more on projects where she’s concerned that their efforts won’t be used effectively, and
she needs to get his buy-in that their group shouldn’t be used as just a casual set of design reviewers.

7. Ellen could have provided some more background information to Eric by asking Allan a few more questions:
   • Is there anyone else besides Bob who wants to review these signs? Who and why?
   • Have they tried this kind of thing before? What happened if it didn’t go well? Why does he believe it will go better this time?
   • What is the usability’s group role? How will it be represented?

8. Ellen should do the following things:
   • She should first call Tom and check in with him about his expectations and find out what he knows about the project so far. She can review their recent conversation and confirm that Tom really is looking for design assistance, and he’ll be careful not to represent their work as approving the project.
   • Ellen should next check in with Eric to see whether he has time and is interested in the project; then she should probably give him a few words of wisdom:
     — Make sure that Allan knows that Eric is there to help with the design, and the goal is to come up with something they both believe is effective: ideally, a design they’ve been able to check with users.
     — She needs to remind Eric that this is exactly the kind of situation that she had just discussed with the group. He needs to be careful to represent himself as a partner, not an approver, on the project.
   • Ellen also needs to make Eric aware that Bob wants to review the designs. She should have him talk to someone else who has worked with Bob on a project like this and get some advice about how Bob likes to be involved. For example:
     — Does he like to see early designs, or present early design ideas?
     — Does he prefer to only see almost finished designs? If so, how likely is he to cause significant rework?
     — Does Bob like to see quantitative data to support conclusions, or will convincing qualitative information be more appropriate?

9. Eric should do the following things:
   • Set up a meeting with Allan to review project goals, timing, budget, and so forth. He needs to push Allan a little to find out
if there are any underlying agendas that need to be taken into account.

- Because this isn’t Allan’s usual kind of project, Eric should expect to take Allan through the early steps of deciding who is the target audience and the goal of this project. However, Eric also needs to take into account that Allan may never need to do this kind of work again, and so Eric should scope his efforts to educate Allan accordingly.
- Eric should take Ellen’s advice about finding someone who has worked on projects that Bob wanted to review, and get advice. If it turns out Bob can deal with early designs, then make sure to get him involved. If he prefers to see finished designs but is likely to recommend significant changes, then Eric might want to help organize the project to get a reasonably final project to Bob early enough to accommodate any changes that might need to be made.
- Eric finally needs to underline the point with Allan that at the end of the project, Allan will be able to say that he worked with the usability group and that the final design incorporates their recommendations (and carefully repeat, “I’m not approving this, I’m helping you shape the design”).

10. Not likely. He only asked that usability be involved, not that a complete user-centered design process should be applied. Given the history to date and Ellen’s experience, this seems like a sensible time to test the boundaries of when it’s okay to push back on requests that are out of scope.

11. Ellen should, however, go have a chat with her boss, and make sure he’s okay that she pushed back on this. She needs his support, just in case Bob asks him about the project.

**Case 7: Estimating a User-Centered Design Effort**

1. Shea had estimated her activities the way she had always done for her UCD team lead. John had given her free rein to define a UCD process and then map the activities to his development plan. Now she realized she had to define and estimate the work at a more detailed level to do that mapping. She would have to break down the UCD
phases into individual tasks and estimate how many hours each task would take. That way, she could lay out the activities on a timeline and answer John’s scheduling and resource questions.

2. To prepare for estimating at this level, Shea recalled how she spent her time on projects for her previous employer, and she sought out experienced colleagues at other companies for their advice. From the information she collected, she created a more detailed UCD plan. She included the parameters for each research component (such as number and length of sessions) and the tasks and intermediate deliverables—such as the test plan, protocol, and report—to carry out each component. She then estimated the hours to perform each of the tasks.

3. Adding up time for meetings and preparing status reports, Shea decided to allocate five hours per week for project management. She multiplied the number of weeks for each activity by five hours per week to calculate the number of project management hours per activity. She then reduced her available UCD hours by five hours per week to allow time for project management. She knew this reduced availability would add more weeks to her schedule, and she needed to see how many more.

4. Shea reduced her available UCD hours per week by yet another five hours per week to reserve time for other company initiatives.

5. Shea discussed the timelines with each vendor and learned that the vendors were allowing time for Apollo Appraisal’s review of their deliverables. The vendors also extended the recruiting time to include multiple review checkpoints—review of participant profiles, screening materials, surveys, and final candidate recommendations. Shea had not built these deliverables into her own schedule.

6. An alternative solution is whether a vendor could staff the two Phase 1 research activities to occur concurrently. But then she would not have the data from the competitive testing to inform the design of the ethnographic research; plus the data would be in multiple researchers’ heads. Another solution is to hire two firms, each performing one of the activities, again so that the activities could happen concurrently. This approach would pose the same disadvantages as the first solution, plus she would be managing multiple vendors.

7. Her third alternative solution was to reduce the scope of the two Phase 1 research activities so that a single firm could perform them within a shorter timeline. She decided she favored that approach.
8. Shea knew that in a structured work environment like John’s department, the style guide would be the UCD specification. Without a style guide, Shea would spend even more time explaining and reexplaining the principles and specifications of the UI design to the engineers. She concluded that lack of a style guide would jeopardize other deadlines and increase the chance of more inconsistencies across the design.

9. Shea decided to start with an abbreviated draft of the style guide and add more information later. She also decided to look at her overall plan again to see whether she could perform some things in parallel or possibly eliminate some activity without major risk. She noticed that she could start usability testing of the prototype at the same time as work on the style guide.

Case 8: A Case Study in Card Sorting

1. The primary problem with the LANDAUS.COM website is that users have difficulty finding specific items. The reasons items are difficult to find relate primarily to weaknesses in the website’s organization. The contents of a website should be organized in a way that reflects users’ expectations. For example, a user visiting a website that sells boating and diving merchandise would probably expect, at the very least, separate sections for boating and diving equipment. Within each of these main categories, users might expect that contents be further categorized.

   Andy should also explore the possibility that other aspects of the website are contributing to the customers’ difficulties. These may include insufficient product information on the site or poor descriptions of customer service policies. But because Landau’s has had a successful mail order business for many years and because the website simply used the content from its catalogs, it is unlikely that poor content is the culprit.

2. When a website grows over time, often the information architecture used to initially structure the site may not hold up in the long term. A simple website with only one level of navigation, such as Landau’s original site, may be adequate to house all the site’s products and content when that universe of content is small. But as the site adds content, a single level of organization may become untenable. The typical response at this point is to add more categories and subdivide...
the existing categories. However, if this is done in an ad-hoc fashion, without a true sense of the big picture, a site can quickly sprawl out of control. Categories stop being “clean” and content does not easily fit into a logical location. Consequently, it is difficult to find content once it’s categorized.

3. Several aspects of LANDAU’S history, culture, goals, and development process have led to the current problems with the organization of the website:
   - LANDAU’S does not have a multidisciplinary design team in place. Their team consists mostly of programmers and one visual designer. The team apparently has no one with usability, user-centered design, information architecture, or interaction design skills and no one who understands the business of making money on the web.
   - The testers test function and system reliability, not usability.
   - The executive in charge of the website is not a technologist and doesn’t have any training in web design, usability, development, and so forth. Although it is not necessary for executives to be experts in the specifics of website design, they should have enough understanding of user-centered design to make personnel, strategy, and resource decisions.
   - LANDAU’S practice of hiring multiple contractors for website development may lead to inconsistency in the product’s user experience. If different groups create pieces of the user experience and the efforts of those groups are not coordinated, the result may be an inconsistent user experience.
   - The website was modeled after the catalog, which is a paper document. Creating a successful website is not just a matter of putting a paper document online. A website must take into account the user moving through a virtual information space; organization, navigation, interactivity, and ease of use are critical components of success. In addition, technical considerations such as download speed, performance, forms, shopping carts, search engines, and the checkout process contribute heavily to the user experience with a website.
   - The website was designed without input from the users. LANDAU’S employees provided design input. To successfully design a user-centered product, real representative users must provide input.
• Landau’s succeeded as a retail outlet partly because they were “high touch” with customers, providing expert advice and service. That approach typically doesn’t translate well to the web. Andy did not spend enough time thinking about how to maintain the approach in Landau’s move to the web.

• As Landau’s grew and added product lines, they may have moved away from the founders’ core competencies. It’s possible that Landau’s doesn’t understand how to sell its products as well as they used to.

4. Andy should educate himself, at least at a basic conceptual level, about website design. Through this education, Andy will likely discover that a well-organized website is not an accident and that there is a body of knowledge and practice that can help him with his user problems.

Andy should then proceed to address the key problem with the website: its lack of coherent organization. But who decides whether a site is “well organized”? At LANDAUS.COM, the development team “put their heads together” to organize the site. They used the catalog for guidance. Perhaps they looked around at other websites. But they did not go to the users. Andy needs to find a way to involve users in the redesign of the site.

5. First, Barry could group closely related items into a single composite item. For example, LANDAU’S sold seven different brands of boat motors. Instead of listing each motor separately, Barry could choose to create a single item called “boat motors” and in the description refer to the item as follows: “There are seven different brands of boat motors sold. Please sort this item based on where you would put boat motors in general, regardless of brand.” Barry realized that this would preclude users from certain sorting schemes. For example, imagine one of the motors was made by a company named AquaTech. Also imagine that AquaTech manufactures other boating supplies. By combining AquaTech motors with all other brands of motors, users would be prevented from creating a category defined by brand. Barry decided to address this concern by discussing with Andy how important brand is to LANDAU’S strategy: Did they want to emphasize vendor brands? Was there a solid business case to do so? And how would this compromise other organizational schemes for items? One way to address this concern is to allow users to shop by brand as well as by category. In essence, this would allow the website to have multiple organizational schemes. Because it is easy to
understand how to organize a website by brand, the card sort exercise could focus on understanding how users sort by concept.

Another way to reduce the number of items in a card sort is to separate out groups of items that obviously seem to fit into different categories. For example, LANDAU’S primarily sells boating equipment but also sells diving equipment and clothing. Barry could make the case that diving equipment, by all reasonable predictions, would likely be sorted into a different category than boating equipment. He could make the same case for clothing.

There is some risk inherent in this approach: By splitting out these items into separate card sort studies, Barry would essentially be making decisions on behalf of the users. This approach sounds contrary to the entire intent of card sorts: to have users sort the items and make the determination of what categories should exist. But holding too closely to this principle may be a case of the perfect being the enemy of the good. The key to making these decisions is to make them based on the lowest possible level of inference, that is, to split out groups that are clearly, conceptually distinct, and perform multiple studies. A “presort” activity, where a small number of users sort a subset of cards before the actual card sort study, may provide some security in making these decisions. If users tend to sort items together in presort exercises, these items should be included together in the same study. If they sort the items into separate categories, then they can comfortably be kept separate in multiple studies. Further, if there is any doubt about whether certain items should be assigned to one study or another because they could exist in more than one category, then the items should be included and repeated across the studies.

Performing multiple studies also requires performing a final “sort of sorts.” Once all the “sibling” studies are performed and categories are generated by each, a final study can be performed in which these categories become the items for a new sort study. This final sort “boils up” the results and creates higher level categories. So, for example, Barry can do a study for diving merchandise and one for boating merchandise. Imagine that the diving study generates several categories (e.g., “Masks and Snorkels,” “Regulators,” “Tanks,” “Wet Suits,” etc.), and the boating study also generates several categories (“Small Craft,” “Boat Care Accessories,” “Trailers,” etc.). Once all categories from each study are determined, they become the items in a final study done with a different group of users (e.g., participants will sort “Masks
and Snorkels,” “Regulators,” “Tanks,” “Wet Suits,” “Small Crafts,” “Boat Care Accessories,” “Trailers,” etc.). The final set of categories will be the highest level categories on the website (e.g., “Diving” and “Boating”).

A third way to reduce the number of items from a card sort is to simply eliminate some content items that can be assumed to be sorted together by users. This approach is similar to splitting out obvious groups in that it requires the researcher to make some assumptions about how users will sort the cards. But again, if the alternative is that the study will be compromised by having too many cards to sort, this approach provides a better alternative. Presorting studies can again help provide validation of the researcher’s assumptions.

6. Barry should interview content experts, both inside and outside of LANDAU’S. He would be able to learn a great deal about boating and diving. He would understand that the items used while engaging in these hobbies have some very specific names that mean very specific things to those who use them. In such cases, trying to avoid jargon may in fact militate against the accurate placement of the cards. In such cases Barry should not rename those items. It would also be important for Barry to take great care in writing a clear, thorough description of the item that will accompany the item names. When users sort the items, they will see these descriptions, which will help them better understand exactly what the items are. For example, customers familiar with boats might not know that octopus in the world of diving is an apparatus that allows more than one person to have access to the same oxygen tank in case of an emergency. On the other hand, diving customers might not know that a downrigger is a device for a boat that allows one to place a fishing line at a desired depth.

7. To further ensure that users sort cards accurately, Barry can take additional steps:

- He can review the cards and remove or change words in the item names that might influence users to group them together. In the “door” example earlier, “door mat” might be changed to “floor mat” and “door knob” to “handle.”
- Barry can provide clear instructions to users helping them understand how they are to sort the items. For example, Barry can tell users they are to put items into categories based on where they
would expect to find them on a website. By directing users in this way, they will have a clear context in which to perform the exercise.

- Finally, Barry can recruit carefully, selecting only those users who are truly target audience members. In the case of LANDAU’S, for example, only users who purchase diving equipment should sort the diving items.

8. Barry should proceed to the information architecture phase of the project.

Case 9: The HURIE Method: A Case Study Combining Requirements Gathering and User Interface Evaluation

1. As the catch phrase goes, “early and often.” The research shows (e.g., Karat, 2005) that money spent on usability engineering is usually well cost justified, more so early in a software development project. User data can be collected, via a variety of methods, to inform designs early in the cycle and validate them late in the cycle. In the requirements gathering and analysis stages, task analysis and contextual inquiry are valuable methods. During design and early development, prototype testing can provide vital data in this iterative (design–test–redesign–retest) design approach. As the real product takes form, end-user testing is the most common usability evaluation method, and for good reason. Even when the product is shipped (or has “gone live”), surveys and field study continue to bring in user data to drive the designs of subsequent versions.

2. The benefits of a pluralistic usability walkthrough are as follows:
   - It entails real user feedback.
   - It can be carried out very early in the product development cycle.
   - It affords direct contact (and the aforementioned collaborative redesign) between users and developers.
   - It affords some performance data and some satisfaction data.

   The usability team selected this method because, first, it would allow them to collect some user data in the short amount of time
that the representative users were available to them and with the nonfunctional prototype UI. In addition, because this evaluation method involves the design and development team directly, during data gathering it is a particularly good method when introducing a product development team to the joys of usability engineering.

3. Of course, it is often the job of a usability professional to convince a team that their “baby is ugly.” But what if the usability team has to say, “Your baby is not worth keeping”? (This stretches the metaphor to the breaking point. Perhaps better, “Your product cannot be salvaged.”) If the procedure had found a roomful of representative users who were unconvinced of the value of the product concept, the stakeholders would have been happy to learn it sooner rather than later. Luckily, the usability team did not have to address this, because the test participants almost universally found the product to be of potential value. Because the product developers were in the room, hearing the pluralistic usability walkthrough participants’ comments just as the usability team heard them, it makes the pluralistic usability walkthrough method particularly useful here; presumably, the product developers would be arriving at the same conclusion and would not tend to question the veracity of the analysis as they might if they were not present during the evaluation. Had the results been different and the entire product called into question, then depending on the amount of market research that had gone before, it might make sense to expect the stakeholders to invest in another evaluation, to corroborate the negative findings, before jettisoning the entire project.

4. The wording used in such a study should be descriptive but not persuasive, more like a product concept description than marketing literature. That is, if a test participant heard, “This is a product that must do X,” he or she could scarcely be dissatisfied upon seeing a prototype that reflects X as a product function. Rather, the introductory words should focus on the goals of the product (i.e., “to train battle commanders”) and leave it up to the HURIE participants to decide (before they see the UI prototype) what the product requirements should be. In our walkthroughs we asked the product developer not to specify the exact features that were in the prototype or even in the plan.

5. The team should recognize that product requirements mentioned after the walkthrough are likely to have been motivated, or at least
influenced, by the pluralistic usability walkthrough exercises. This does not invalidate them. But it does require the product developers to be aware that the stated requirements might well have been different had the UI prototype been different. Those user requirements gathered in the HURIE method before the pluralistic usability walkthrough exercise are purer, therefore, at some level. However, the user requirements heard at the end of the exercise might be just as valuable, especially given that the entire HURIE method confirmed the goodness of the general direction of the product. One could even argue that the postprototype requirements are even more valid, because it's much easier for people to think about functional possibilities after seeing a prototype than just in the abstract. As with all usability findings, the product development team, including the usability professionals, should filter the findings through their own design sense, as they build the product.

6. It would have been preferable to have had a large collection of actual battle commanders to test. Times being what they are, these men and women tend to be busy elsewhere and so “help with usability testing of some future training tool” is a task that would most likely struggle to make it to the top of the “to do” list of many of them. The team was grateful for the two populations of users they had access to, and they embraced their comments universally strongly in their presence but in direct proportion to their representativeness to the ultimate user audience once the team analyzed the data. That is, when a comment came from a participant with actual battle commander experience, that comment carried more weight than one coming from a noncommissioned officer from the Army Medical Command, especially if the two comments were contradictory.

7. This is not peculiar to the HURIE method but has general applicability to all usability evaluations. Especially given the tendency for usability professionals to be in the “critique” business, it is imperative to demonstrate that they are not simply criticizing. The assumption of an attitude of humility, acknowledging the difficulty of design in the first place, is a good first step. The presentation of a “next turn of the crank” redesign, to address the problems unearthed and to give the whole team a “next” design to work with, is a type of “constructive criticism” that goes a long way toward team building and expedites the speed of iterative design progress. There are various ways to provide this constructive criticism. One way of course is to
do a complete redesign of the UI. But another way is to offer “redesign directions,” or some sample ideas that give examples of how certain problems might be solved but that are not meant to be a complete and final redesign spec. An example is the small segment of a redesigned screen in Figure 9.1.

8. This is a difficult distinction, sometimes bordering on arbitrary. It may be more important from a “turf” standpoint (“Does this go into the UI requirements document or the functional requirements document?”) than from an actual product standpoint. More substantively, the distinction may lie with who shall address the solution. A UI designer may expect someone else to be more knowledgeable about functional/business requirements but would be more inclined to take the lead on UI redesign issues. Basically, if an item came up in the pre-walkthrough discussion and was associated with new functionality, it qualified here as a “new requirement.” If it came up as part of the pluralistic usability walkthrough and was an emendation of some existing functionality, it was a “usability problem.” Indeed, they are all part of the same product stew.

9. Why not? If time allows (and it does not take much time), it forces the entire team—including the product developers—to think about the users’ goals and couch the product goals in non–design-specific terms. And it provides an opportunity to keep the user in the forefront as the entire product team pursues a user-centered design (e.g., Vrendenburg et al., 2002) approach. If not routinely asked, then at least the usability professionals should determine whether functional requirements were systematically determined through some user-centered research or not. If not, the usability professional would be well advised to include in any UI evaluation some requirements gathering or requirements validation.

10. Imagine you were developing a personal digital music recording and playing device and were about four months from shipping when Apple announced the iPod. Clearly, the success of the iPod would have influenced your potential audience. Their expectations, their mental models (Norman, 1990), would be changed, and so the requirements for your product might change. Even in less dramatic examples, it is easy to imagine ongoing shifting in users’ requirements, and so it is theoretically a good idea to repeatedly collect user requirement data to corroborate the current requirements or to fine-tune them.
Case 10: Two Contrasting Case Studies in Integrating Business Analysis With Usability Requirements Analysis and User Interface Design

1. Although the bad news on this project is the inaccessibility of the general population of end users, the good news is the availability of the three dedicated SMEs. Elizabeth could interview them—in person, on the phone, and via e-mail—to get a consensus on what the key user categories are and what the key differences between them might be. This input would then support her development of a user profile questionnaire. She could also rely on the SMEs to give general descriptions of the variety of work environments involved and use this as input to a questionnaire aimed at sampling work environment characteristics. Given the small number of actual end users, this questionnaire could be distributed to them all.

   Whereas no one on the team has a terribly concrete idea yet of the detailed functional scope of the application, the available SMEs could at least provide good descriptions of the overall work of the users as currently performed. Again by phone and e-mail, Elizabeth could guide the SMEs in generating a list of low-level tasks that are at least candidates to be included in the application. This input could then guide her development of materials to support a card sorting exercise (see answer 2 below).

   Once she has had them help her compile a list of candidate user tasks for this application, Elizabeth could provide the SMEs with examples of generic task scenarios to explain what she will ultimately be after from other end users. Then she can ask each SME to generate one or two scenarios from their own experience in the publicity manager role in a similar format. She can then use these more relevant and realistic task scenarios as the basis for explaining to other users what she would like from them.

2. Given the inaccessibility of the end-user population, Elizabeth must conduct all her requirements analysis tasks remotely. She could prepare written instructions and supporting materials for end users to respond to as described in answer 1 above and post them on the common website shared by all the 35 existing users. An e-mail from
an authoritative member of their organization could direct them to
the website and request/motivate their participation. One side benefit
Elizabeth could hope for from remote administration of her
requirements analysis tasks would be larger sample sizes than she
could gather through one-on-one in-person sessions.

A user profile questionnaire would be pretty straightforward. It
would be easy to design a questionnaire for users to respond to
online (see http://info.zoomerang.com/, http://www.surveymonkey
.com/, and http://www.websurveyor.com/gateway.asp) or even just
download, print out, fill in with pen, and return to her by mail.
Questions would relate to such user characteristics as computer
literacy, web literacy and Windows literacy, frequency of use of
different relevant user tasks, role experience level, typing skill, and so
on.

Elizabeth could also incorporate into this questionnaire another
group of multiple choice questions aimed at collecting key work
environment data. These questions would tap into such things as
open/closed office space, level of noise, level of interruptions, and
level of cooperation and support across users.

For the card sorting exercise, Elizabeth could create a document
containing the list of tasks to be sorted and complete written
instructions on how to conduct and document the sort and send back
the results. (Card sorting is often used to provide input to organize
static content into an information architecture for websites but is just
as useful in providing input into how to organize functionality—that
is, user tasks—on transactional applications.) Alternatively, there are
commercial software tools available to conduct remote card sorting
exercises that she could find and use (see Righi and Wood, in this
volume).

Using a sample of relevant and concrete task scenario examples
generated by the project SMEs (see answer 1 above) as well as the
same task list used in the card sorting exercise described above,
Elizabeth could similarly create a set of instructions on how to
generate and document task scenarios and post it on the common
website and ask that users submit documented task scenarios to her
via e-mail.

3. One disadvantage of dedicated SMEs (as well as the rest of the team)
is that they often believe, as revealed in Sandra’s comments, that they
represent all the users and are experts in the users’ work, so that it is
unnecessary for the team to involve any other users in user-centered
design tasks such as usability requirements analyses and usability
testing.

To handle this, Elizabeth will have to rely on the support of the
project manager to allow her to carry out the usability requirements
analysis tasks she wants to conduct and get the SMEs to participate
in the way she needs them to (see answer 1 above). Then it will be
important to involve both the SMEs and the developers in these
tasks and, in spite of the geographic dispersement of the team, to
work closely with them all on an ongoing basis to ensure their
understanding of the data being gathered and its relevance to the
design process, which comes next.

To this end, Elizabeth should be sure to document her analysis of
the requirements analysis data she collects and share it with the team
and then constantly refer back to it as she embarks on the user
interface design process. Seeing data from a representative sample of
users will help the SMEs see that their knowledge, preferences, and
opinions are not necessarily always perfectly representative of the
population at large. If she keeps reinforcing the connection between
the data and the design, at least over time the team will start to
appreciate the importance and relevance of the requirements analysis
data. The biggest mistake she could make would be to fail to ensure
that the team comes to understand the connection between the data
and the design ideas she based on them. Without that connection
being constantly reinforced, even as lead designer she may constantly
be challenged on her user interface design proposals, both by the
developers and by the SMEs, who believe they are the users.

4. Given the lack of clear functional specs, Elizabeth needs to conduct a
highly collaborative design process. Because the team is geographically
dispersed, she will need to hold frequent meetings by conference call
in which all team members participate. Because the team has no
experience working with a lead user interface designer or usability
engineer, she will need to manage these meetings very carefully. She
will need to establish her authority for making final user interface
design decisions (being the author/owner of the design specs makes
this easier!) but also successfully solicit useful input from others to
help her optimize these decisions.

At the same time she will need to get other team members to
make business, functional, and technical decisions that have not yet
been made but that the user interface design, as it evolves, must be
premised on. She will need to educate all other team members in
an ongoing way about the rationale for her user interface design
decisions and how the requirements analysis data that she collected
support those design decisions. She will need to establish mutual
respect and clear roles among the team members, as none of them
alone can accomplish the design task and they need to collectively
exploit all the skill sets in the team to produce the best possible
application for its intended users.

Although she does not yet know for sure what user tasks will
and will not be supported by the application, she does have a fairly
complete list of possible user tasks and also insight into a logical
information architecture for these tasks from her card sorting data.
She also has some insight into some very important and specific
usability requirements that will impact the design of a high level
conceptual model (i.e., navigational structure and the presentation
of it).

Elizabeth can start by drafting a user interface design spec that
defines a possible overall information architecture and high-level
conceptual model (i.e., how the information architecture will be
visually presented and interacted with) for the potential set of
functionality she has researched. This spec might define how the user
would navigate across all potential tasks and what cues and contextual
information might be provided to help users keep track of where
they are in multiple ongoing tasks but would not include the details
of how the individual tasks would be carried out once arrived at
through the navigational structure. What would and would not be
included at this level of design is illustrated in the screen design
illustration shown in Figure a.1.

This initial high-level user interface design spec could then be
used to drive team discussion that would explore both the technical
feasibility and the business utility of supporting each potential task,
while at the same time proposing a user interface design for
navigating across those tasks that would meet the identified usability
requirements. Ongoing team discussion would result in decisions to
cut or support identified tasks and with ongoing feedback from SMEs
would also provide usability feedback on the high level design.

Then, once the high-level design (functionality plus information
architecture and conceptual model design) becomes somewhat
stabilized, it could be used as the context within which to explore and make decisions regarding lower level functionality and detailed user interface design. For example, once the basic flow and presentation of navigating to any search task was defined through the earlier iterative design discussion, then such within-task details as exactly which search criteria should be offered for each category of search task and how those search criteria should be presented could be drafted and presented for feedback and discussion. An example is given in Figure a.2.

In this top-down fashion, paper specifications of user interface design ideas could be used in an iterative process involving the whole team to iterate toward both functional and user interface design specifications simultaneously. This would require that every design meeting be attended by both the business representatives (the SMEs) and the developers (both project management and staff), so Elizabeth could get both technical and business feedback on the feasibility, utility, and usability of her functional and user interface design ideas all at once.

5. Given that Elizabeth had the opportunity to collect some fairly high-quality usability requirements data up front to drive user interface design and will have ongoing access to the three SMEs to provide regular input and feedback and serve as user interface design walkthrough participants as a part of the design process, she concludes she
will get the most “bang for the buck” from the time and effort to gather enough users together for a formal usability test fairly near the end of the design process, when a live prototype representing not only the information architecture and conceptual model but also the screen/page design standards of a subset of key tasks can be built and tested. She will hope that her usability requirements analysis data and the ongoing feedback and input from the project SME’s have provided adequate input to ensure that her information architecture and conceptual model are fundamentally sound. She will rely on this one relatively late formal usability test to help refine all levels of user interface design and serve as validation for the design before development and launch. There is certainly risk in testing so late, but there is also always risk, and one simply must decide how best to spread it out.

6. There were probably a number of factors key to the success of this approach on this particular project.
• First, the *project team was small*, only about a half a dozen key team members. This made the informal collaborative, iterative approach realistic.

• Second, the project manager was a *clear leader dedicated to achieving usability*. Without her unwavering support, as well as her day to day involvement, it would have been harder to establish clear roles and authority early on within the team.

• Third, the *ready availability of three dedicated SMEs* made the relative inaccessibility of the rest of the user population manageable.

• Fourth, *being the author/owner of the user interface design spec* made it much easier for Elizabeth to maintain control of user interface design decisions. Similarly, *being lead user interface designer* also made it easier for her to ensure that the implications of the usability requirements analysis data she had generated had a direct impact on the user interface design.

• Fifth, this was an *application of only low to moderate functional complexity*, probably making the somewhat informal approach to business requirements analysis and specification workable.

• Sixth, the *particular project team members* contributed significantly to the success of the project. They were motivated team players with good attitudes, good skills, and good interpersonal skills. The team had good chemistry. The impact of this should not be underestimated.

• Finally, the *frequent and very collaborative design meetings* were likely key to success. Especially given the geographic dispersement of team members, without the evolution of buy-in, trust, and mutual respect across team members that the frequent meetings helped build, it is not clear that the necessary communication and team work—undoubted key factors in the success of this project—would have resulted.

7. Any combination of the following circumstances could have made the approach used on this project riskier and might have had an impact on the outcome:

• A larger project team
• No clear support for usability in management
• No dedicated SMEs on the team
• More complex functionality
• A different set of team member personalities and motivations
• Usability engineer cast as an advisor to someone else designing the user interface
• A less ongoing and collaborative style of team interaction
• A larger and more diverse user population

8. The approach of developing both business and functional requirements and user interface design in parallel in an iterative fashion based on user interface paper prototypes had at least three very desirable aspects.
• First, there was no real or perceived redundancy in user research to accomplish both the detailed business and usability requirements. Often when usability requirements are researched after a rigorous and traditional business requirements analysis has been conducted, this feels to both project management and users like a redundant effort, and to some extent it is. The process is redundant, although the data captured are quite distinct.
• Second, because user interface design and functional design were conducted in parallel in a single process, there was close involvement of all team members in both. This was not only more efficient, but also more effective, in that all team members had input to all decisions, accomplishing the important goal of finding good compromises among usability, functional, and technical issues.
• Third, because functional requirements were explored through paper user interface design prototyping, users (in this case, the three SMEs) did not have to learn to interpret any formal but unnatural nonintuitive formats for modeling and specifying functionality. User interface designs are a completely natural way for users to come to understand proposals for functionality and respond to them.

9. Absolutely yes! Elizabeth has the complete support of the project manager, Captain Ogden. He believes that usability is absolutely critical on this high-risk project, and he is absolutely right in that assessment. He has adequate funding to support a rigorous usability requirements analysis effort. In addition, the project is moving very slowly and there is time in the schedule to do things right. Elizabeth will simply not be able to deliver a high-quality user interface design without the kind of data she needs (i.e., user profile data, card sorting data, task scenarios, and work environment data) and that is clearly not available from analyses already completed. She should propose a very aggressive, thorough, and detailed usability requirements analysis phase as part of her overall usability engineering project plan.
In spite of the fact that—as in this case—extensive interviews and observations of users in their natural work environment are typically conducted to support business requirements analysis, business requirements analysis documents rarely contain such things as detailed and accurate user profile characteristics, realistic user task scenarios, work environment descriptions, and results of card sorting exercises with users. Business analysts are looking for data to feed into functional specifications and system architecture design. They are typically not attuned to the kind of data that should drive user interface design and so rarely collect and document it, even though it’s often right in front of them as they do their interviews and observations.

In addition, although Captain Ogden himself seems highly knowledgeable regarding the end users, their tasks, and their work environment, it would be very risky to rely on a single person’s perception of 56,000 other users and 50 different work environments. He will be a valuable source of information to drive Elizabeth’s requirements analysis planning and preparation, but she simply must go into the field and study the users, their tasks, and their work environment herself, in as representative a way as possible, to be an effective user interface designer on this project.

10. Elizabeth does not have to convince Captain Ogden; he is already convinced. But she has a large project team whose cooperation she needs to succeed but who may be hostile given that they have already spent a lot of time generating some user interface design, and she needs to convince them of the value of her requirements analysis work. She also has to make it clear to them that her requirements analyses work is not redundant with—nor does it invalidate—the extensive business requirements analyses they have already conducted over a period of several years. Ultimately, she may also have to explain to already hostile users that she involves in her research that what she is doing is not redundant with what they have already participated in with business analysts in the past.

To convince these potential skeptics, Elizabeth can argue that the “what” (i.e., functionality) but not the “how” (presentation of functionality through a user interface) has been researched to date. Although the process may look similar on the surface (interviews and observations of users in their work environment to understand their tasks), the data captured and documented in the business analysis are simply not the data needed to drive user interface design. Elizabeth
can describe user profile data, task scenario data, work environment data, and card sorting data, with a brief explanation of how they are used to drive user interface design, to convince others that the type of data she needs is simply not currently available.

Elizabeth can also argue that this is a very high-risk project (millions of dollars, many years invested, criticality of keeping track of millions of pieces of property, but currently no data available that could drive successful user interface design) and that its level of usability will make or break it. She can also argue that the cost of her usability engineering project plan is literally a drop in the bucket given the overall project budget and will provide some critical and cost-effective insurance on such a high-risk software development project. It will also have little or no impact on the overall project schedule.

The recognized history of abysmal failures in the past due in part to a lack of attention to usability can also be pointed to. Finally, Elizabeth can point to examples of the costs of not getting usability right from her past experience and from the usability engineering literature.

Elizabeth must be careful not to appear hostile to or competitive with the SDI staff responsible for the current user interface design that Captain Ogden is convinced will not work. She will have to work hard to establish credibility with these people and establish a cooperative working relationship with them. Focusing on the data she collects in her requirements analysis—which they did not have access to—as the rationale for her user interface redesign ideas, rather than simply her “expert opinion,” will help establish her credibility and avoid hostility and competition.

11. A good rule of thumb for conducting user profile questionnaires is to shoot for an actual sample of responses from 10% of the total population. This in turn requires a distribution to about 33% of the total population, because you can typically only expect to get back about 30% of the questionnaires distributed to internal users. That is, sending out to 33% will yield back 30% of 33% or about 10%.

However, this population is very large—56,000. Elizabeth would have to distribute 18,480 questionnaires to hope for 5,600 (10%) back. This number, 18,480, is too many to distribute and too many, at 5,600, to collate, so this rule of thumb is simply not practical in this case. Instead, Elizabeth will simply have to be practical. In cases
such as these, a good general number of questionnaires to base an analysis on is 100. To get 100 back, Elizabeth would have to send out 300 (expecting a 33% return). But, in this case, Elizabeth has identified four distinct categories of users, and she wants to get a good sample of each category. She decides that what is practical is to send out 800 questionnaires, 200 each to the four categories. Her hope is to get back at least 66 or so in each category.

To help ensure representativeness in her final sample, she should draw on Captain Ogden to select individuals to distribute the questionnaire to across the four user categories. She should be sure her target users vary in important ways within categories and are drawn from a good selection of the 50 station houses across the city.

12. Elizabeth should draw on Captain Ogden’s standing with higher-ups in the CPD and get the highest possible person in CPD to sign a cover letter to the questionnaire requesting that sample users fill it out and return it by the due date. This may help ensure a good rate of return.

The cover letter should also make it clear that the purpose of the questionnaire is to help ensure that the application being developed is as usable as possible for its end users when it is launched. This is the first step of a “PR” campaign Elizabeth must conduct to overcome end user hostility to IT efforts within the CPD. Figure a.3 presents the cover letter that Elizabeth designed for her user profile questionnaire.

13. The available business requirements documents just seem too big to digest, and Captain Ogden has suggested that it’s not likely to be productive for Elizabeth to rely on these documents for orientation information. Instead, she should rely on Captain Ogden and his staff to help her get a sense of the range of property inventory task variations that occur so she has some sense of what to expect—and look for—when she visits station houses to conduct in-context observations and interviews.

She should draw on Captain Ogden’s familiarity with the station houses to help her select a representative set to visit and to schedule days and times in which property inventory tasks are most likely to occur and to accompany her and introduce her. Given the known hostility of users to IT, his relative seniority and the fact that he is not a member of CPD IT, is himself a police officer will help ensure some level of user cooperation. Then her own “PR” efforts during
Dear Future Property Inventory Application User:

Inventorying and tracking property in the CPD is currently handled by a complex paper process. The Property Inventory Application, currently being developed by the CPD, will automate all tasks related to inventorying and tracking property. Users will include not only police officers, but also stationhouse chiefs, property managers, and stationhouse clerks.

This questionnaire has been prepared by the Property Inventory Application development team to help us learn more about the future end-users of the application. Your participation is critical to the success of the application, and information that you and other future Property Inventory Application users provide through this questionnaire will help us to design a higher quality application. Your input will help us ensure that the application will be tailored to the needs of you, our users, and thus easy to learn and easy to use.

The questionnaire is anonymous, and we will be summarizing all responses to describe whole groups of users, rather than referring back to any single questionnaire. The more candid and accurate you are in your responses, the more useful the information gathered through this questionnaire will be in helping us to meet your needs. We know the current manual property inventory procedure is tedious and difficult, and we want to make it easier. We can only do this with your input.

It should only take you about 15-20 minutes to fill out this questionnaire (it looks long, but all questions are simple multiple choice). Please return it to your stationhouse chief by [date] if possible, but whenever you can. To insure your anonymity, do not put your name on the questionnaire. Thank you - your participation is greatly appreciated!

Best regards,

[Signature]
Captain Ogden, 33rd Precinct

John A. Doe, CPD Commissioner

Figure a.3. Sample user profile questionnaire cover letter.

her observations and interviews will need to help foster that cooperation (see answer 14).

Given the unscheduled and unpredictable occurrence of the tasks to be observed, she should probably plan to visit a half a dozen station houses for several hours each on an initial round. Depending on how lucky she is in being able to actually observe property inventory tasks while at station houses, she can then schedule
additional rounds of visits as needed. She will have to play it by ear. She should aim in the end for visiting a dozen or so station houses that would be expected to show the range of variation in property inventory activity and to end up with a dozen or so task scenarios that represent the range of complexity and frequency described by Captain Ogden.

Elizabeth can plan to use idle time at the station houses (when no property inventory tasks are occurring) to conduct a card sorting exercise with some users. She should aim for a dozen or so users to participate and do the best she can to ensure that they represent at least key variations across and within the four user categories.

Elizabeth understands that a dozen or so task scenarios and a dozen or so users participating in her card sorting exercise is hardly a representative sample of CPD’s 56,000 users and highly variable and complex property inventory tasks. However, she also understands that even these little bits of data, which may even be skewed in some ways, are better than no first-hand data at all. She will simply balance scientific validity with engineering practicality and do what’s possible. The key to these relatively small samples providing valid and useful information will be in her sampling techniques. Captain Ogden will be able to help ensure and assess representativeness.

If Elizabeth runs out of time and budget to support additional rounds of field visits and still does not have as much data as she would like because her visits simply have not coincided with enough property inventory activity, she will just have to rely on project team staff to fill in her understanding of task variations. Figure a.4 presents one of the task scenarios Elizabeth collected in her visits to the station houses.

Figure a.5 shows a screen shot from one stage in the subsequent design of the property inventory application.

14. As stated in answer 13, the fact that Captain Ogden is himself a relatively high ranking police officer and is not from CPD’s IT department makes him an ideal person to provide initial introductions at station houses. After Elizabeth is introduced to each user she will observe and interview, she should briefly acknowledge past IT failures (in a professional and diplomatic way) and emphasize that the whole point of her involvement in this project is in fact to ensure that the application being developed is designed to take into account all the demands and difficulties of their job and to support them in carrying
Scenario: Complete Inventory of Property

User: Police Officer (PO)

Description: Domestic dispute - couple filing charges against each other. He beat her with a broomstick, she attacked and cut him with a knife, someone called to report the incident and the PO picked them up and brought them in, with the knife as evidence, a beeper for safekeeping, and a bag of marijuana which was taken at the premises where the arrests were made.

Task Steps:

1. PO goes to desk with perpetrators and shows all property, filling out a summary form for the Stationhouse Chief. Stationhouse Chief makes entry in Command Log.
2. PO secures the prisoners, takes fingerprints, and checks for warrants.
3. PO stores property in her gun locker.
4. PO writes up an Arrest worksheet and Desk Appearance forms, questioning the prisoners to obtain required information.
5. PO enters info into the Arrest System herself and obtains an arrest number, which she writes on her hand.
6. PO contacts assistant district attorney (ADA), faxes the Arrest worksheet to ADA office.
7. PO disposes of the prisoners (she must within 2 hours of the arrest, or the Stationhouse Chief will have to file a special report explaining why she did not).
8. PO fills out a worksheet for the Complaint System.
9. PO enters info into the Complaint System herself and obtains complaint numbers.
10. PO retrieves property from her locker.
11. PO returns to the desk, and herself gets inventory forms and bags, for which she signs out on the scratch property index (in other stationhouses, the Stationhouse Chief distributes the bags and inventory forms and keeps the scratch property log).
12. PO bags the property, and enters the relevant inventory number on each bag.
13. PO fills out inventory form worksheets (optional).
14. PO takes bags and inventory form worksheets to Stationhouse Chief for checking (optional).
15. PO types up the inventory forms herself, recording the arrest number and bag numbers, and also types up a letter of transmittal for the narcotics, a Request for Controlled Substance Analysis form, a Domestic Dispute form, and a Prisoner Medical Treatment form (with a great deal of repeated header info on all forms).
16. PO takes all forms to the Stationhouse Chief for approval—he checks especially all the cross-referencing of numbers (arrest #, complaint #s, inventory #s, bag #s), signs off, takes blue copies of inventory forms, and makes entries on scratch property index, and in Command Log.
17. PO seals all bags and attaches inventory forms.
18. PO disposes of all property and inventory forms: narcotics in the Narcotics "Mailbox," other property in Property Room

Task Closure: This scenario took from 1 pm, when the arrests were made, until almost 4 pm to process.

Figure a.4. Sample task scenario.
out that job. She can give a very brief overview of the field of usability engineering, emphasizing the purpose and importance of user-centered design, which clearly these users have never experienced before. All during her observations and interviews she can present herself as an “apprentice” to the user’s masterful expertise and listen closely to and paraphrase back users’ frustrations and needs. This will provide stark contrast right off the bat to IT’s past approach of zero user input into application design and zero sympathy for their frustration with implemented software applications.

The good news here is that, generally speaking, user-centered design techniques—and in particular usability requirements analysis techniques—sell themselves when done well. It becomes very clear very quickly that it’s all about listening to and understanding user needs and then premising a design on those needs. Experience has shown that users respond with a great deal of enthusiasm and cooperation once they understand that someone is actually paying attention to their needs, valuing their expertise, and attempting to
accommodate everything about them and their work in the tools they are designing for them.

Case 11: A Case Study in Personas

1. Consider creating personas in the following situations:
   - You’re beyond the “features battle” and are competing in your market based on overall customer experience. In other words, it’s not enough for your product simply to contain features: What matters is how people use and perceive value in those features.
   - It’s clear that your team does not share a vision of exactly who the customer is.
   - Your product’s requirements seem unclear or are changing frequently.
   - You’re designing for a new group of customers or for a market with which you have little experience.
   - You’re targeting several groups of people with different needs and are unsure if it’s possible to satisfy them all.
   - Information from existing research doesn’t seem helpful when considering how to design your product.
   - You simply don’t know enough about your customers to make good decisions.

2. Personas describe what motivates customers, what behaviors they exhibit, and in what context they function. Typical information includes the following:
   - **Goals.** What outcome is the person trying to achieve? People have different levels of goals, such as life goals, which help explain a person’s overall outlook (e.g., “Make a difference in the world”), and domain goals, which explain what a person is trying to achieve in the context of using your product (e.g., “Finish every project on time”). Personas tend to focus on domain goals, unless your product can actually help people to achieve a life goal. To test if you’ve identified is a true goal, ask yourself “Why is that important?” Keep digging until you’re no longer describing a task or a process. Goals are outcomes. They generally stay the same regardless of tools or technology. If by introducing a new product you’re likely to change someone’s goal, then you likely haven’t identified a true goal.
• **Tasks and processes.** How is the person trying to achieve their goals? What solutions have they put together, if any? What steps do they take, and why? It’s possible—in fact, quite probable—that the product you’re designing (or redesigning) will change these tasks and processes.

• **Inputs and outputs.** Information or objects the person requires or provides to other people. For example, a software developer might require business and technical requirements as inputs and would produce various forms of code as outputs.

• **Tools.** What tools does the person use? Tools could be computer hardware or software; paper forms, checklists, or notebooks; communication devices; and so on.

• **Relationships.** Who does this person rely on in the course of their job? Who relies on them? For instance, an x-ray technician in a hospital would rely on the receptionist to schedule patients; various physicians would rely on the technician to produce quality images.

• **Environment.** What factors in the physical environment influence this person and their behaviors? For instance, in many factory settings, workers on the floor can be far from the nearest computer and may avoid using it unless absolutely necessary. Likewise, what factors in the social environment influence them (e.g., social status, group dynamics, and so on)?

• **Past experience.** What past experiences contribute to people’s skills or expectations of your product? For instance, consumers switching their home telephones to a new VOIP system may bring some firm ideas on how these phones should work, based on their history with traditional phones.

• **Burning needs.** What does the person find most frustrating, irritating, or annoying? For instance, the shipper at an import/export company might hate how they have to type addresses into their courier’s website—when that information already exists in an address book on their computer.

• **Identity.** The finishing touches that bring the persona to life as a character: a name, a photograph, some personal details to make the story engaging.

3. When people are skeptical of personas, it’s a signal that they don’t believe the effort will produce value. This commonly stems from two fronts: a belief that it’s unnecessary to understand customers better or
a lack of clarity around how personas will ultimately be used. For the latter point, kick off the project with a 1- or 2-hour workshop in which you explain how the personas will be created (the observation and analysis process) and give examples of how they can be used (to prioritize features, to set concrete design objectives, and so on). For those who are skeptical about the need to understand customers better, one of the best strategies is to actively involve that person in the process, particularly in the field research; it’s rare for someone to spend time on-site with customers and not find the experience valuable. Another smart move is to summarize and share with everyone the main themes from your initial round of interviews with project stakeholders. Once personas are unveiled, it’s common for people to forget what they thought originally and say, “Yeah, that’s pretty much what we’ve always known”—even if it’s not. A record of those original assumptions can be useful to compare against.

4. The team had already taken a few steps to reduce the time and expense of their research, namely choosing cities that would cut down on the travel required. Other ways of reducing time or costs are as follows:

- **Conduct fewer interviews.** The simplest way to trim the work is to perform less research by recruiting fewer people. However, it’s not possible to identify patterns without a large enough sample size, and best practices indicate that you should meet with a minimum of four people per “user type,” resulting in at least 15 interviews for a typical small persona project. A large project might include up to 60 participants.

- **Conduct interviews by telephone.** If the project budget or timeline won’t allow all interviews to be conducted on-site and in-person, interviews could be conducted by telephone—although the learning experience will be less rich than being in the user’s home or work environment. For instance, you’ll have such opportunities as observing how people interact, confirming what skills they exhibit while demonstrating a piece of software, and asking about the purpose of those Post-It notes on their computer monitor. Over the phone, you’re unlikely to uncover differences in what people say they do versus what they actually do, something Greg has already warned Joanne about several times. Whenever possible, conduct at least some of your interviews in person.
• **Offer less generous incentives or no incentives at all.** Some people are excited to participate regardless of the fact they’re getting paid; they just love the idea of being involved. Try recruiting without an incentive and see if you’re successful. In some situations employees are prohibited from accepting incentives because of company policy.

• **Have the client handle recruiting.** This won’t likely make recruiting go any faster, but if you’re a consultant it frees up time for you to spend on research planning—so it saves time (and therefore money) overall. This approach works best when you’re attempting to recruit customers of an existing product, as the client should have access to customer lists. They’re also more likely to get through to the right people without being turned away.

• **Skip the research entirely.** In this approach you create the assumptive personas that Roberta mentioned briefly. This process usually involves one to three days of a facilitated workshop with representatives from the project team, with perhaps another day or two for writing and designing the personas themselves. This approach is not considered a best practice in persona development, but it’s sometimes the only realistic option, especially for shorter term projects and for those on tight budgets. It can help teams to at least agree on a shared vision of the customer, even if that vision is based on flawed or incomplete information.

5. Listed below are some topics and questions that are common to explore in any kind of persona research, regardless of the product domain. Note the question that explores goals: It can be difficult for people to answer direct questions about what their goals are. Instead, you may have to infer their goals from indirect questions such as this.

**Goals**
- Think of the last time you had a really great day at work (or at home, if that’s the context you’re studying). What happened to make you feel that way?

**Job responsibilities**
- How would you describe your job here at [company name]?

**Tasks**
- What would you say are the five most common activities that you perform on a day-to-day basis?
Habits and routines
- Was yesterday a fairly typical day for you? If yes, tell me about yesterday, starting with the moment you arrived at work. If no, what wasn’t typical about yesterday?

Relationships
- Imagine that tomorrow someone inexplicably doesn’t show up for work. Whose absence would have the biggest impact on your ability to get things done?

Burning needs
- If you could change one thing about [the study domain], what would it be? What makes you want to change that?

6. This type of research can take participants by surprise, as they expect the conversation to be about product features, not about them. Thank them for their ideas and make sure you either record them or get a copy of their list—then explain candidly that your objective is to learn about the people and the environments in which the product will be used. “Once we understand that, then we’ll start thinking more specifically about product features.” Most people understand this point and will allow you to shift the conversation accordingly.

7. When you can’t establish rapport with a participant, this is when it’s great to be part of a small interview team. Switch roles on the fly and let someone else take the lead, someone who seems more likely to connect with the participant. There are other strategies as well:
  - Begin your interviews with very easy questions, such as having people describe their job roles. Save the more difficult or more personal questions for later.
  - Ask open-ended questions that encourage people to elaborate, instead of simple yes or no questions.
  - Ask the participant to demonstrate something. They may be more comfortable explaining a tangible process.
    If nothing makes the interview go smoothly, bring it to an end. There’s no point in wasting their time or yours if you’re not getting good information. Thank them for the opportunity to get together and then withdraw.

8. It appears that people send documents as e-mail attachments quite often, despite the apparent lack of security. To explore this further, the research team needs to confirm this behavior with their remaining participants, ideally through concrete evidence. Exactly what documents do people send as attachments? How do they deal with
confidential documents in particular? Roberta’s strategy of asking Yoko to send her a document was excellent, because it prompted a behavior they could observe. Participants might be persuaded to open their folder of sent e-mails to illustrate what they sent in the past week. Another approach—though use this carefully!—is to deliberately ask a provocative question and see how people respond. For instance: “Wow, this seems like a cumbersome process to follow. Wouldn’t it be a lot easier simply to send this as an e-mail attachment?” At that point, people might begin elaborating further on their true feelings and behaviors.

9. This is a common situation. As you conduct interviews and learn more about the domain and the potential customers, you will likely explore new areas of investigation. During analysis, you will have no data on those topics from your earlier interviews. Also, you occasionally may run out of time during an interview or simply forget to ask a key question. This isn’t always a problem that needs to be addressed; if you’ve collected data from enough people to identify it as a pattern, you might feel confident enough to simply move on. If you’re not feeling confident, however, you could contact the relevant participants and gather the missing information by e-mail or telephone. Most participants are happy to hear from you afterward—in fact, it’s good practice to ask them if you may call if this situation arises. If you’re missing some straightforward information across a large number of people, a quick web survey might be the best approach.

10. No. Personas represent major patterns of behavior, goals, and context. Some of your findings won’t make it into the personas at all because they were not observed across a significant number of participants—but they may be valuable for other reasons and should be shared accordingly. Consider publishing a point-form report that collects the “Interesting Things We Learned That Aren’t Captured in the Personas” (though more appropriately titled, perhaps!). For instance, in this case study the ClickDox research team met two participants whose technology platforms were dictated entirely by their customers. These were consultants who would have liked to upgrade their networking equipment but couldn’t; their large client insisted that all vendors use the same setup. This had an impact on their ability to exchange documents electronically. An interesting observation worth sharing—but not indicative of a major pattern nor core to defining the personas.
11. It’s impossible to say how many primary personas you will have; in fact, until you complete your analysis, it’s difficult to predict how many personas you will have of any type—although experience suggests a range of three to six is quite common. But what should you do if you have more than one primary persona? By definition, each persona would require its own product. Thankfully, in software and on the web, this is sometimes an option. The really hard work in development is usually behind the scenes, in a program’s algorithms and data structures; it may be possible to create different interfaces for people to interact with while leaving the background code intact. However, this is often not an option due to project constraints. If you can build only one user interface, then at least you will do so with the explicit knowledge that your design decisions may require tradeoffs in favor of one or the other of your primary personas.

12. Customer insight is valuable to almost everyone in an organization, but personas are purpose-built to inform decisions about product development. Their highest utility is in several activities:

- **Design.** Whether it be interaction design, information architecture, or visual design, the information contained in and empathy generated by personas is inspirational.

- **Usability.** Personas give usability specialists a yardstick against which to judge a product’s utility, desirability, and ease of use. They also act as superb profiles of the types of participants to recruit for usability tests.

- **Documentation.** The technical communicator’s mantra is, “Know your audience!” Few technical communicators would fail to benefit from the detailed insights into their audience that can be found in personas.

- **Development.** For software developers who have little to no contact with customers, personas do much to illuminate the people who use the products they build—and therefore can have a real impact on what features are implemented and in what manner. Also, personas can help quality assurance teams to write high-level test cases much earlier in development than normal.

- **Marketing.** Personas provide a richer description of customers than traditional market or customer segmentation models. They contain information to help marketers position a product in the marketplace (how will potential customers understand the unique
value of our product?) and how to communicate its value (what can we say to make people pay attention to our product?). They also help identify barriers to acceptance (e.g., the need for ClickDox to work with Outlook).

13. Joanne followed some advice from Digital Rockit on how to insinuate the personas into the ClickDox environment:

- She made sure that everyone received their own set of laminated personas.
- She hung large 2-foot by 3-foot full-color posters in a prominent hallway near the development team.
- She occasionally hung pages in public areas that highlighted quick facts about particular personas. For example, one page in the cafeteria advertised that “Timothy hates it when people claim to have read his report but didn’t!” These got people talking.
- The personas were required to attend every meeting. Either the posters or a set of laminated sheets had to be available for reference when discussing items that could impact the customer experience.
- During design reviews, Joanne sometimes asked people to role-play specific personas when critiquing a design.
- People were encouraged to avoid talking about “the user”—and pressed to be specific about which user they had in mind.

Case 12: User-Centered Design for Middleware

1. A big factor in the eventual success of the user interface was the foresight of the company to hire an interaction designer. His expertise allowed him to devise a completely new product concept using models and metaphors familiar to the user. The interface worked for many other reasons, not the least of which was a clear marketing vision and a dedicated, passionate engineering team.

Vivek was so worried that the user wouldn’t “get it” that he spent a great deal of time talking with Bob and other potential customers about how they might use such a product. So, although there was not an explicit UCD process used, the company did many of the right things. Vivek and Brian had a very clear vision of what they wanted for the user, and although the situation was not ideal
(the complexity of the concepts and the aggressive schedule made it very difficult to get clear feedback from the user), they had a gut feel for the user's reaction. Luckily, their instincts proved right, and they made good design decisions.

2. To improve the product, Carl needed to incorporate the essence of UCD and get feedback from Bob and other customers about how they were really using VirtualCenter 1.0. Carl could talk to Vivek and Brian about doing user studies. Vivek and Brian were largely unfamiliar with UCD, so Carl might write up a small survey of user testing techniques and outline their respective value to the UCD process. Because VMware knew little about how Bob and other customers were actually using the product, contextual inquiry would seem the most logical candidate to apply. Carl could recommend this course of action.

3. The CI study and the report were highly credible with the engineers and the marketing folks because Pamela and Carl talked to experienced representative users and because Pamela presented a well-thought-out and organized report. The recommendations became the cornerstone for improving VirtualCenter. Carl convinced the key managers to embrace the results, and Pamela performed the study in a professional and credible way. The report was essential for gaining acceptance not only of the results but of the process itself. It is likely that the managers at VMware are more willing to accept the costs of user studies and contextual inquiry because of the success of this first study and the good press it received internally.

4. For the most part, the study validated that the key concepts embodied in VirtualCenter 1.0 were correct and well accepted. This made Brian and the engineers eager to address what they saw as the simpler job of fixing individual areas that had no user input when they designed the user interface. If they had missed the mark completely, it would have been a harder blow and would have made the job of deciding how to change things more difficult. Pamela made a point of emphasizing that the overall conceptual model worked. In the end, the report had exactly the right tone of balancing the positive aspects with the need for improvement.

The work to clean up the user interface was significant and required a lot of redesign and engineering but was viewed as an
improvement to the existing application rather than starting from scratch. It is always easier to edit than to stare at a blank piece of paper.

5. The interaction designer, Carl in this case, is the person who creates the interface from his or her understanding of the user’s tasks, the engineering schedule, and his or her expertise in user interaction design. The usability engineer, Pamela, is the person who creates a user study that exercises the design to verify its validity to the user. Although the expertise for these two roles overlaps in a big way and many people who call themselves one or the other in fact do both, it is generally preferable that the person who designed a given product is not the person who tests it. This is like asking the cook to find out if the guests like the food; they will be biased toward positive feedback.

6. The goal of UCD is to create applicable user interfaces that are easy to use and to provide the right models that allow users to achieve their goals. When a design succeeds, users tend to increase their reliance on the application, and the demands on the feature set can quickly grow beyond the expectations of the original vision. With VirtualCenter 1.2, the system enabled users to easily create large numbers of virtual machines, which swamped an interface that was created to properly accommodate 50 to 100 virtual machines. Engineering and user experience teams must watch carefully for changes in the patterns of use as the market matures and ensure that the product design will evolve over time to maintain its level of quality.

7. How does one go about integrating new features without losing the ease of use of the popular original version? With a lot of user testing. To this end, the team needed to conduct user studies during the course of designing version 2.0. Most of the new concepts (clustering, resource pools, and load balancing) should be run through the usability process. The clustering concept, which is completely new, would have to be studied fairly heavily due to concern that it would not be well understood or would be misunderstood by users of hardware clusters. Some of the concepts with less impact would have to be left out due to time constraints. While Carl and Pamela were studying the new concepts, they had to also keep an eye on how these new concepts “played” with the existing user interface
constructs and planned the testing activities to ensure that the user would not have any trouble transitioning to the new models.

8. The team consisted of lots of creative professionals with strong opinions and a huge passion for creating a great interface. Each person saw the system differently and interpreted the end user’s view of the product in his or her own way. Results from the contextual inquiry and the latest round of user testing convinced some folks, but not all. The final form of the interface took quite a bit of time and effort to flesh out and delayed decisions in several key areas (inventory and resource pools being the most important).

The team discovered that it is not a good idea to get too many people involved in the brainstorming and early decision making. If the group had comprised just Vivek, Brian, and Carl, they could have come to a consensus much sooner and probably chosen something closer to the users’ preferences. Because there were about six to eight additional engineers and a few more marketing people involved, the opinions ran in too many directions to make a clear decision. The final decision was one of compromise and was not entirely based on the users’ needs.

9. The best way to decide whether a new model will be effective is to get the user to try it out and compare the new model with the way they are accustomed to doing things. The VMware team considered several alternatives (see Figure 12.7), which were presented to users. Unfortunately, there was no clear consensus among the users: Some liked one model, whereas others liked a different model better. In this case, it is up to the design team to select a model. This selection must be based on the designer’s expertise and understanding of the various use cases, not his or her own biases or lack of knowledge. An ambivalent user base is not a ticket to take the easy way out. On the contrary, it is the designer’s responsibility to implement the best idea without the help of a clear user opinion.

10. The medium-fidelity prototype from modified screenshots of the existing product that Carl and the interns built allowed them to put the new concepts into context with the existing product, helping the user understand its usage. Interestingly, this medium-fidelity prototyping method worked extremely well. The danger of high-fidelity working prototypes or even medium-fidelity static ones such as this is that it is too easy for users to get stuck on issues such as font type, background color, or icon style rather than the more
important conceptual issues of ease of use and navigation. Low-fidelity prototyping is extremely popular because it cannot be mistaken for the real product. The wisdom is that low-fidelity prototypes elicit more honest feedback from users because they can see that it is just a prototype and not a lot of effort has been put into building it yet. Users may be reticent to criticize something they believe is mostly complete because they don’t believe their feedback will get implemented. Additionally, low-fidelity prototypes focus the users’ attention on the concept behind the design rather than the details of the implementation.

All of this wisdom is true. But medium- and high-fidelity prototypes are useful particularly when the user is already familiar with the product. Showing them a paper prototype at this point would only confuse them because they would lose the context of the application. Carl and his team wanted to learn from the users not only if they understood the new functionality, but if they believed it “played well” with the rest of the application and didn’t interfere with the original concept. By seeing static screenshots with the proposed changes rendered to match (using placeholder icons and graphics), the users were able to understand the new functionality within the context of the application they already knew.

11. Using WebEx to display the static prototype remotely, Pamela was free to engage users from any location, including Europe, and to schedule the tests at times when it was most convenient for the user. The users could sit with their current VirtualCenter product and refer to it during the interview. This led to a somewhat more relaxed atmosphere and allowed the user to engage in the test free from additional influences. Furthermore, it was less costly and time consuming than flying to the user’s location and was therefore a better value proposition.

During the test session, having Pamela in private communication with Carl and the design team via instant messaging allowed them to confer in real time without disrupting the test. Because the user was not privy to this communication, the flow of thought among Pamela and the team could be very candid and fluid. This helped Pamela not only address the user’s questions with greater accuracy than she could normally, but also allowed the team to respond to the user comments with questions of their own that might not occur to Pamela.
Case 13: Isis Mobile: A Case Study in Heuristic Evaluation

1. Heuristic evaluation was a better choice than user testing for the following reasons:
   • No working product samples are available yet.
   • Waiting for functioning samples means added cost and time to change tools and rewrite software and may risk missing a release deadline. It is early enough to implement design changes to prevent major usability issues now, before time is spent implementing commonly known issues that can negatively impact users. Budget constraints likely prevent a larger more in-depth early study to be performed.
   • There do not seem to be any internal usability engineers and no usability input to the products to date. Thus it seems highly likely that evaluations by outside usability professionals will find usability problems that can be addressed now rather than later after a usability test.

2. Increasing the number of expert evaluators helps to ensure most design issues are identified. Different people bring different areas of expertise into the evaluation. They also look at things from their own perspectives and may rate severity of issues differently, which promotes discussion on the range of experiences users can have when they encounter these issues.

3. It is important for evaluators to perform their evaluations separately, so they don't bias each other and so they maintain their own list of issues, severities, and solutions.

4. Finding as many problems as possible allows for the following:
   • It gives the design teams options on how they can effectively address the issues.
   • Different design alternatives allow the design teams to determine other factors that need to be considered when determining which solution to implement, such as corporate goals, user requirements, budget and resources, consistency across other tasks not considered in this evaluation, platform constraints the evaluators are not familiar with, and so on.

5. It is important to get everyone's view on the issues because each evaluator has different experience evaluating other and different types of products. Also, their different skill sets and different backgrounds can
bring different information and perspective to the problem. This also ensures that all evaluators are seeing the whole problem before giving their severity rating, which may be adjusted if a new angle to the problem is brought to the table.

**Case 14: Academic Manuscript Submission: A Case Study in Interaction Design**

1. Rob thought PIs would submit their manuscripts at least as often as postdocs. In fact, very few PIs would act as submitters. Therefore relatively few submissions would be complete right away. Most submitters would get as far as generating a PDF confirmation file and then have to send it to someone else for approval. Postdocs would probably have to follow up with their PIs to get the submission approved (that is, they’d have to pester their PIs). Had Rob and Sarah skipped the user analysis stage, they would have made a user interface for the wrong audience.

2. Sarah suggested that an initial screen should list all the information and files needed for submission. Because they didn’t have all the needed information, it would be easy for a submitter to get halfway through the process and then realize they had to go to their department secretary to pull a file with the grant number. An initial screen would let them gather everything first so submitters could go through the whole process at once and avoid frustration. Additionally, Sarah and Rob decided that submitters should be able to save and exit the wizard at any point along the way.

3. Scenarios are a tool and should be optimized for their intended use. Sarah chose to include steps like entering grant information in their scenarios because they were modeling a specific system with relatively few alternate paths. She knew entering grant numbers would be part of the system, even though nobody did that when submitting papers to journals. If the team had a less clear idea of the final product, she would have written the scenarios to strictly reflect what she observed. Because she and Rob knew the additional steps and roughly where they would happen, Sarah chose to combine the reporting and requirement steps to save time.

4. Sarah divided the hub screen into four tabs to more closely match the wizard and to keep from having a long screen. Her initial concept was
to have a single read-only screen that showed all the manuscript’s information. As that screen grew, however, Rob voiced concern that the page would be too long. She therefore split the page into four tabs that were read-only versions of the wizard screens. She wasn’t sure about the approach, but figured that usability testing would let them know.

5. A usability evaluation of a conceptual design should show whether users understand the design’s approach and navigation. Sarah and Rob had structured the project to use the industry best practice of iterative design. That is, they would repeatedly produce a design, collect usability data, and revise the design. The design foundation stage of a project is the most useful time to follow this strategy because there is still time to make radical changes to the interface if the design has major problems. Sarah wanted to know if users understood what the wizard was for and how it worked. Although she thought that splitting the hub into four tabs would be effective, she wanted to find out if submitters would understand what they were looking at. At this stage she wanted to find out if the progress indicators were useful or not—if so, then she could later work on fine tuning on indicator’s exact look and feel. If not, however, she could drop it completely. In other words, Sarah needed to know if the page navigation worked and if the general feature set on each page was understandable. There would be time to work on the details of label names and button placement later.

6. Usability testing, expert review, and cognitive walkthrough each provide good feedback early in the design process. In this case, Sarah chose to do a cognitive walkthrough. She did not have access to another usability professional to do an expert walkthrough (sometimes called a “heuristic review”), and it wasn’t practical to review her own design. Sarah knew that first attempts often have usability problems that become obvious once you start the usability evaluation, so she chose to do a cognitive walkthrough because she wouldn’t have to prepare as many paper screens. Cognitive walkthroughs are quicker and less labor intensive to conduct than a formal usability test.

7. Both designs have their strong and weak points. Sarah and Rob pointed out that the progressive form reveal design is simple and concise. Yet it does not offer the flexibility in help and guidance that a wizard does. For experienced users, the progressive form reveal model is probably faster. But Rob and Sarah had found that most of their
users only submit two to four papers per year. So, the progressive form reveal model didn’t fit the users’ needs and habits.

8. Persuading Dr. Lithgow would take both data and tact. Rob and Sarah, having spent a great deal of time and thought on their design, decided that the best strategy would be to look for things to praise in the competing design but argue that the wizard approach should prevail because ease of learning was paramount. Wizards require no learning and give more flexibility to hand-hold new users through a process, whereas progressive form reveal is more efficient for experienced users. They had interview data and usability test data to back them up.

9. Rob and Sarah could have reviewed the design with Sergei until he assigned a developer. Sergei didn’t like what he had seen, and he did not express his opinion to Rob and Sarah. Had Rob and Sarah formed a better working relationship with him earlier in the design process, Sergei would probably have been happier with the resulting design. Further, if he did not believe he had the time to review each iteration, he may have been prompted to assign a developer sooner. Andrew was caught in the middle of this situation. His boss had directed him to propose an alternate design, but he would then have to join Rob and Sarah’s team with either his design or theirs having “lost.”

**Case 15: The Mulkey Corporation: A Case Study in Information Architecture**

1. Many projects use only one point of view to drive the creation of requirements, but on this project the strategy team collected and analyzed three different points of view: the business executives, the users, and the “like company” websites. The client executives communicated what the business goals were for mulkeycorp.com to be considered successful in the eyes of The Mulkey Corporation. Generally, client executives don’t have a detailed understanding of who their website users are and what their needs are, but on this project they did. The strategy team was able to document this perspective during the executive interviews. This was beneficial to the strategy team, allowing them to combine the information from the client executives with their own expertise and experience to determine users’ needs and expectations. Another benefit was realized when the
competitive audit validated the kinds of content, functionality, and tools being used on true competitor websites and also on other websites with similar content. By knowing the kind and amount of information and tools available, the competitive audit also helped inform the strategy team what the user expectations would be. The strategy team then analyzed the relationships and interdependencies between these three different points of view to create and prioritize the requirements.

This process also provided invaluable information for the information architect. As you will see in the next section, Nelle used the requirements to make recommendations for the changes that needed to be made to mulkeycorp.com. Nelle created high-level flowcharts and wireframes that were reviewed by the Windy Pine Consulting team and John’s team. The competitive audit was especially helpful for Nelle during the reviews to be able to refer to what did and didn’t work on the competitive sites to validate the information architecture.

2. Using members of the team to determine user objectives saves time and money; however, there are definite drawbacks. Team members cannot represent all levels of a user type. For example, a team member who is familiar with a process would have a difficult time listing objectives for a novice user (even though they were once novice), and it would be hard for them to document objectives for an expert user because they aren’t one. Also, team members do not have the intensive day-to-day experiences that real users have. Furthermore, team members are generally too close to the design and may lose their objectivity.

    Depending on the size of the consulting company, the strategy team might be able to find representative users within their company. The strategy team could then interview these users about the kinds of objectives they would have. However, the team must keep in mind the cost, scope, and timeline so that they don’t cause a negative impact to the project.

    Also, using content owner subject matter experts who have reviewed historical focus group results provided the strategy team with some voice of the user even though it was through several layers of interpretation:
    • The interpretation of what the moderator saw during the focus groups (data degradation level 1)
• The interpretation of what the moderator presented to The Mulkey Corporation team (data degradation level 2)
• The interpretation of what the content owner subject matter experts told the Windy Pine Consulting strategy team (data degradation level 3)

The strategy team could ask to review actual video or audio tapes from previous focus groups. Unless The Mulkey Corporation has a good system for archiving this type of user input, it is likely no one will know where the tapes are. They could also ask to review the original focus group reports. However, every research company presents results and recommendations differently so there is no guarantee about the amount or quality of the information or about the relevance of previous focus group data to a current situation.

3. It was important to look at the websites before nailing down a final “like company” list. Some criteria used by the team included the following:
• Some of the companies were in the same type of business as The Mulkey Corporation (not all had to be). These companies would be considered true competitors, and it would be easier to compare apples with apples. More specifically, the strategy team could compare the types of overall content displayed and in what order (hierarchy, importance) it was displayed.
• The website had to have representative content, functionality, and tools. For example, to take an in-depth look at a topic such as “citizenship,” there had to be a sampling of websites to compare against that had citizenship type of content. This is an example where the websites in the competitive audit didn’t necessarily have to be in the same type of business.
• Subjective evaluations were also made as to the aesthetic quality of the website, the quality of the information architecture, and the quantity of information available. Ironically, these typically go hand-in-hand; sites with poor aesthetic quality also, generally speaking, have less content. It could be that these companies have little funding for their websites so all aspects of their websites suffer. For example, if there are two sites that the strategy team is trying to choose between and both are in the same type of business as The Mulkey Corporation and both have representative content, a good differentiator is aesthetic and information architecture quality and/or quantity of content to be evaluated.
4. The competitive sites weren’t evaluated with real users against real-user objectives so there is no guarantee that the competitive sites provide the content, functionality, and tools that the users need or want. However, if your main user type is an investor and the competitive audit shows that 16 of 17 sites offer a stock quote page full of current data about the daily stock price, it is safe to assume that users will expect to find a stock quote page. If they don’t find one, they will be disappointed.

It is also important to evaluate the content, functionality, and tools from a heuristic point of view. Even though all the competitive websites offer a dividend calculator tool, this doesn’t necessarily mean that the calculator tool is usable. On mulkeycorp.com, there was a limitation on how far back data could be provided—data were not available before 1980. Instead of offering a text input field like the competitive sites, the dividend calculator tool on mulkeycorp.com was designed to use drop-down menus that only allow the user to select dates from 1980 forward. Therefore this design prevents the user from entering a date for which data are not available.

5. Ideally, John should get buy-in from the content owners on the information from the strategy presentation, including the business objectives, user objectives, competitive audit results, and requirements. Making the content owners aware of the strategy results would help ensure no big data points were missed or misunderstood. It would also give the content owners an opportunity to participate in the requirements process before seeing the proposed changes and being asked to give their final approval.

6. The content owners at The Mulkey Corporation validated and approved the strategy recommendations, which put the project light years ahead in terms of reaching consensus on a definable, actionable, agreed-upon set of requirements. This was a critical step in preventing scope creep.* Having John’s team review and approve the strategy and IA recommendations ensured that the Windy Pine Consulting team maintained a clear understanding of the business objectives and that the requirements and recommendations continued to reflect these objectives.

* Scope creep happens when the client or an internal team member asks for content, functionality, tools, etc. that are outside—or above and beyond—the agreed-upon scope of the project.
7. An IA is a critical asset to the team. The IA translates the requirements into tangible visualization through the use of high-level flowcharts and wireframes. High-level flowcharts allow the team to see the proposed skeleton of the website redesign. Once the skeleton is approved the IA creates wireframes, offering the project team a point of clarity—what each page or page type could look like before the pages are graphically designed or programmed. It is the essence of looking into a crystal ball. Titles can be changed, content can be moved around, and new links can be added or removed. All these changes can be done before one line of code is ever written. The IA also maintains consistency of terminology, navigation and navigation models, button names, site functionality, error messages, and so forth. The IA remains focused on the user experience and overall usability of the website from a user advocacy point of view. Although some IAs may have usability expertise and hands-on training, it would not be uncommon for most to not have this background.

8. When Nelle reviewed the competitive audit results (see Table 15.2), she quickly realized that the News section was most often called “News,” “Media Center,” or “Press Center.” She also learned that the Citizenship section was more commonly called “Citizenship” or “Corporate Citizenship” than variations of “Responsibility” or “Commitment.” She used the information from the competitive audit and leveraged the tone on the current mulkeycorp.com website to validate that she did not need to change the section names News and Citizenship.

9. Two of the challenges with this type of user input are that no one knows, for sure, who these users are (do they fit the profile?) or the specific goals or intentions of these users (what are their objectives?). For example, a noninvestor could be giving feedback about the Investor section. One way to keep this from occurring would be to limit the web survey to users who have actually visited certain sections. For example, if a user only visits the About Us and Our Investors section, offer questions specific to the About Us and Our Investors sections but not the Citizenship section. Still, the users’ intentions have to be assumed by a “best-guess” interpretation, and the feedback should be evaluated as a whole. Some could argue that indirect user input is not 100% valid, but others would argue that indirect user input is better than no user input.
10. Nelle started working on the next phase while also participating in graphic design reviews with Jessica to ensure that the information recorded in the wireframes was accurately translated into the graphic designs. Nelle also consulted with David when technical issues arose to ensure that the fine details were not overlooked due to technical constraints and that the user experience was maintained through the relaunch of the website.

11. It seems to be human nature to want to continue to analyze and to perfect. Therefore the longer any team has to review and focus on a page, the more ideas they are likely to come up with to make it “better.” Nelle was very familiar with this phenomenon. In fact, she changed her high-level flowchart and wireframe notations from “Final” to “Approved.” She’d learned that no design is ever final—even after a design is launched and on the web.

12. When Jessica added the anchor link, she only solved one of the two issues with the original design. The more critical issue was still not addressed. The stock chart, which is updated based on data the user enters into the calculator, needed to be visible above the fold. Jessica, the graphic designer, believed the design options were limited based on the page width and the page width was limited by the template in the content management system. Nelle explained that a new template could be used that would allow more width on the page. After discussing this change with the technical architect, they all agreed that changing the template was the best solution. Jessica came up with the design as seen in Figure a.6. Nelle reviewed and approved this design, as did John.

13. Some might argue that having the IA lead usability discussions would bias the results. In some cases this might be true. However, having an IA who is skilled in usability testing can be an asset. On this particular project, having the IA lead the usability interviews was beneficial. Being familiar with usability testing methodology, the IA asked unbiased questions based on the test objectives that were agreed on by the client’s team. Another benefit was that the IA had an investment in the project and was motivated to listen to users’ input to make the website experience the best it could be for the target audience.

14. A lot of the problems with the original instructions occurred because the instructions did not do an efficient job explaining what the user would be doing and where the user would be doing it. Step 1 covers
“Creating an Account,” but there is no link for the user to take action. Step 2 is about “Accessing and Submitting the On-line Application.” There is a reference to “part A” in the subtitle, but you have to look really hard (and be paying close attention) to realize that part B is a subpart of part A. That is definitely confusing. It is not clear why step 3 was missed by so many applicants. One explanation might be that this information fell below the fold line and the users simply forgot.

For the redesign, Nelle thought it was important to separate each step and to call attention to them graphically. She also added a How to Apply page, which gave an overall summary of what the user would be doing in each step and provided the user with a downloadable set of instructions that the user could print to have available off-line. All three steps are listed at the bottom of the How to Apply page, as shown in Figure a.7, with a short description of the task. The tasks are links, and clicking on them will take the user to that page. Steps 1 to 3 are displayed at the top of subsequent pages and the step that the user is on is highlighted.
How to Apply

In Step 1, you will have to:
- download (save) the template Proposal (P) to your computer; and
- complete and save your responses into the template.

In Step 2, you will have to:
- complete Registration (R) online;
- upload (attach) your completed Proposal (P) from Step 1; and
- submit Registration (R) online with your Proposal (P) attached.

In Step 3, you will have to:
- Compile hard copies of your completed Registration (R), Proposal (P), and additional Attachments (A), and
- Mail copies of your Application Package: Registration (R), Proposal (P), and additional Attachments (A) to the address provided in the Step-by-Step Instructions.

Step-by-Step Instructions

We’ve made available a downloadable and printable version of the full step-by-step instructions to apply for a grant. NOTE: These are the same instructions displayed in Steps 1, 2, and 3 below.

Download Step-by-Step Instructions

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Download &amp; Prepare Proposal (P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2</td>
<td>Submit Proposal (P) &amp; Registration (R) Online</td>
</tr>
<tr>
<td>Step 3</td>
<td>Send Proposal (P), Registration (R), &amp; Attachments (A)</td>
</tr>
</tbody>
</table>

Figure a.7.

Knowing that users don’t like to read a lot of text, Nelle suggested putting the key instructions for each step directly under steps 1 to 3 at the top of each page (see Figures a.8, a.9, and a.10). The key instructions reiterated what the user should do. It was also critical that all the pages use consistent terminology (proposal, registration, attachments).

After the key instructions, a prompt led the user to the next step. Under the prompt to proceed to step 2, “Helpful Hints” were added.
These hints were based on users’ input about specific points in the application process that were troublesome.

Step 2 was much more complicated (remember part B was a subpart of part A in the original design). Step 2 still required three actions, so the key instructions listed the three actions. It is also displayed in bold that the users should read all the instructions (see Figure a.9). The three actions are then displayed as subtitles on the page so that if the user only scanned the page, the user would see “First,” “Second,” “Then,” and realize there were multiple actions.

Nelle discovered when she was talking with the contributions content owners at The Mulkey Corporation that the log-in wasn’t as simple as entering an ID and password. Nelle learned that there were three different scenarios for log-in:

---

**Step 1**

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Download &amp; Prepare Proposal (P)</th>
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<tbody>
<tr>
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</tr>
<tr>
<td>Step 3</td>
<td>Send Proposal (P), Registration (R), &amp; Attachments (A)</td>
</tr>
</tbody>
</table>

**Proposal Template:**

The Proposal Template MUST be downloaded (saved) to your computer so that you can edit and save your information into the template. Your completed Proposal can then be submitted online as directed in Step 2.

**Download Proposal Template**

Once you have completed your Proposal (P), you can proceed to Step 2.

**Helpful Hints:**

- How to download (save) the Proposal (P) Template
- How to access the Proposal (P) Template
- How to complete the Proposal (P) Template (after it has been saved to your computer)

---

**Figure a.8.**
Step 2

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Download &amp; Prepare Proposal (P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2</td>
<td>Submit Proposal (P) &amp; Registration (R) Online</td>
</tr>
<tr>
<td>Step 3</td>
<td>Send Proposal (P), Registration (R), &amp; Attachments (A)</td>
</tr>
</tbody>
</table>

In Step 2, you will have to:
- complete Registration (R) (Note: This is not the same as the Proposal (P) in Step 1);
- upload (attach) your completed Proposal (P) from Step 1; and
- review and submit Registration (R) online with your Proposal (P) attached.

We recommend that you read all of these instructions first.

First, you must login in order to access Registration(R) for this grant.

Please click on the appropriate link below:
- I have not applied online for a grant in the past 12 months. When you click this link, the Account Login screen will appear. You MUST choose: “I am a new online applicant” on this screen.
- I have previously applied online for another grant in the past 12 months. When you click this link, the Account Login screen will appear. You MUST choose: “I am a returning online applicant” on this screen.
- I want to access my saved Registration(R). When you click this link, the My Account screen will appear. From there, you can access your partially completed Registration (R).

Helpful Hints:
Duis autem vel eum iure dolor in reprehenderit in voluptate velit esse molestie consequat.

Second, you MUST complete the Registration (R) and upload (attach) your completed Proposal (P) from Step 1.
- Duis autem vel eum iure dolor in reprehenderit in voluptate velit esse.
- Duis autem vel eum iure dolor in reprehenderit.
- Duis autem vel eum iure dolor in reprehenderit in voluptate.

Helpful Hints:
Duis autem vel eum iure dolor in reprehenderit in voluptate velit esse molestie consequat.

Then, Review, Print & Submit Registration (R) with your Proposal (P) attached

Once you have completed all of the steps above:
- Duis autem vel eum iure dolor in reprehenderit in voluptate velit esse.
- Duis autem vel eum iure dolor in reprehenderit in voluptate.
- Duis autem vel eum iure dolor in reprehenderit in voluptate velit esse.
- Duis autem vel eum iure dolor in reprehenderit in voluptate.

You will receive an email notification confirming receipt.

Helpful Hints:
Duis autem vel eum iure dolor in reprehenderit in voluptate velit esse molestie consequat.

Proceed to Step 3

Figure a.9.
Step 3

<table>
<thead>
<tr>
<th>Step 1</th>
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</thead>
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<td>Step 3</td>
<td>Send Proposal (P), Registration (R), &amp; Attachments (A)</td>
</tr>
</tbody>
</table>

Before mailing your Application Package, make sure that you have:
- Completed your Proposal (P);
- Completed your Registration (R);
- Attached your completed Proposal (P) to your Registration (R);
- Printed the "Printer Friendly Version" of your Registration (R); and
- Received an email confirmation that your Registration (R) was submitted online.

In addition to electronically submitting the Proposal (P) attached to the Registration (R), applicants must mail a hard copy Application Package containing one (1) original and three (3) copies of the Attachments (A) listed below.
- Attachment 1 - Duis autem vel eum iure dolor in hendrerit in vulputate velit esse.
- Attachment 2 - Duis autem vel eum iure dolor.
- Attachment 3 - Duis autem vel eum iure dolor in hendrerit in vulputate.
- Attachment 4 - Duis autem vel eum.
- Attachment 5 - Duis autem vel eum iure dolor in hendrerit.
- Attachment 6 - Duis autem vel eum iure.
- Attachment 7 - Duis autem vel eum iure dolor in hendrerit in vulputate velit esse.

Figure a.10.

1. User had not applied for a grant with The Mulkey Corporation in the past 12 months.
2. User had applied in the past 12 months.
3. User had applied in the past 12 months and wanted to reaccess a saved application.

Nelle believed that it was important to get the user logged into the correct path. Otherwise, a user with a saved application might not be able to find their application if they logged in as a new user.
Each of the three log-in scenarios is described with its own link into the application.

The content in the second and third parts of step 2 was displayed as a bulleted list (see Figure a.9) instead of paragraphs of information (see Figure 15.19). The bulleted format makes it easier for users to read, especially when there are multiple actions in a step. At the bottom of the page is a link to take the user to the last step (see Figure a.9).

By displaying each step on its own page and by reiterating that there are three steps on every page, the design helps prevent users from missing the last step. On step 3 the key instructions reiterate what the user should have already completed. Step 3 also describes in detail the hard copy requirements for the grant application (see Figure a.10).

15. John’s team and the Windy Pine Consulting team should continue to evaluate periodic user feedback received through web surveys, user behavior analysis provided from web analytics, and usability testing. For a multiyear project, The Mulkey Corporation should reengage the strategy consulting team to reassess the business objectives using executive interviews and to reassess the competitive arena by performing a new “like company” audit.

On this project, The Mulkey Corporation decided to reengage the strategy consulting team one year after the original assessment. This provided John’s team and the Windy Pine Consulting team with a refreshed perspective. Most “like company” websites had been updated over the year, but a few of the sites were very stagnant and had not changed. The stagnant websites were removed from the list, and new “like company” websites were added in their place.

The results of the second strategy engagement were very fascinating. Some of the baselines had changed and some of the leading practices* were dramatically different. This allowed The Mulkey Corporation to compare their changing business objectives and user objectives with the changes in the competitive arena. Because of these changes and the multiphased approach on this project, John’s team and the Windy Pine Consulting team reevaluated the requirements. Some of the requirements were moved up in priority, and others were moved down or removed altogether.

* A leading practice is defined when only a few (and sometimes only one) of the “like company” sites have a particular type of content, functionality, or tool.
Case 16: Incorporating Web Accessibility Into the Design Process

1. Because no one in the company has any significant knowledge or experience with accessibility issues, Liam’s choices are to develop expertise in-house, hire external accessibility consultants, or some combination of the two.

   Approach 1 is to develop internal expertise to address compliance. Liam could send a few web designers (technical leads, web designers, and usability specialists) to training classes and give them time to learn about accessibility issues. The technical skills that are necessary to successfully address accessibility issues include at least a working knowledge of HTML, CSS, and JavaScript, although designers with programming experience using CSS, dynamic HTML, XML, and other newer technologies would be an advantage. The designers also need to be high enough up in the organization to have the authority to effect change in the development process. The trained resources could serve as accessibility advocates and internal resources, mentoring and training other technical leads, developers, and product managers regarding accessibility design and implementation. The accessibility specialists could also be responsible for working with product teams to ensure product compliance, functioning as “accessibility compliance officers.” Additionally, the accessibility experts would be tasked with developing company-specific guidelines and standards. The major drawback to this approach is that developing in-house expertise is time intensive for the technical staff. Ramping up in accessible design practices takes time away from their other job responsibilities. They also have to be interested and willing to change their current design and programming strategies, if needed.

   Approach 2 is to hire outside accessibility consultants. The consultants would conduct accessibility evaluations of the products and recommend solutions to problems. A project manager would be needed to act as the liaison between the consultants and the product manager, technical lead, and usability specialists for each project.

   The advantage of outsourcing the evaluation work would be that the company could benefit from the expertise right away. Experienced accessibility consultants have worked on several projects in a variety of contexts and domains and may well have encountered similar issues in other products. They provide an independent
perspective; management may be more receptive to raising the priority to incorporate and fund the accessibility recommendations. However, because accessibility is a relatively new concept for many usability practitioners and other professional technical communicators, few qualified accessibility experts may be available at the time for such a large and intensive project. Consultants would also require a significant amount of time to understand the products and proprietary product code. They face a steep learning curve on the technical side as well as on the organizational/political side of the business.

2. Users who are blind face significant barriers in using websites because many sites are graphics intensive and require the use of a mouse to interact with the site. When the site contains lots of graphics and images interspersed with the text, the pages can be harder to understand because screen readers (and other assistive technology) render the pages in a linear fashion, starting at the top left-most corner of the page and following the order of the underlying code through the rest of the page. Also, many times designers forget to make sure that every graphic has an associated description (alternative text), and when it’s missing the screen reader assistive technology reads the file name, which is gibberish a good deal of the time. As for the mouse, users who are blind use keyboard inputs and sites that use certain types of programming options make it impossible to use just the keyboard to interact with the site. Figure a.11 pictures a man

![Figure a.11.](image)

*Figure a.11. Song-Jae Jo scans a document using the Kurzweil 1000 software program. He will read the scanned copy using his screen reading software. (Used with permission.*)
scanning a document (using the Kurzweil 1000 software program) which will display on the screen in front of him for his screen reader software to read.

Low vision and legally blind users (those who have some vision but whose corrected sight is equal to or less than 20/200) are concerned with being able to see text or images. Text size, color combinations, and color contrast significantly affect legibility for these users. Users need to significantly enlarge the text size of all items on the page, using screen magnification tools such as ZoomText. However, if the text size is fixed in the code, then users can’t take advantage of the technology. Additionally, when letters and numbers are included in graphics (e.g., graphic links and buttons), they take on a blurry “pixelated” look when they are magnified, making the text very difficult to discern. Finally, people with partial sight or congenital color deficits, as well as those who are older, find it difficult to distinguish between certain color combinations. It is important to appreciate that it is the contrast of colors one against another that makes them more or less discernible, rather than the individual colors themselves.

Meanwhile, people with anomalous color vision, which is commonly called color blindness, have difficulty distinguishing between combinations and/or pairs of colors, usually red–green combinations or, more rarely, yellow–blue combinations. Using color coding without a redundant way of communicating the information and not providing good color affects not only color blind people but other users as well. However, using Cascading Style Sheets would allow pages to be given an alternative color scheme for color-blind users.

3. Users who are deaf or hard of hearing are primarily concerned with the increasing use of multimedia content that does not include captioning for the audio track and a transcript of the material. The TBD applications included a few virtual tours of corporate retreat locations that would need to be captioned, and a text-based version of the tour should be created. The designers also need to remember not to design interactions that depend on the assumption that users will hear audio information or audible cues. Over time it would be really helpful for the virtual tours to include a version that incorporates American Sign Language wherever possible.

4. Users with physical disabilities and motor impairments typically use an input device other than the mouse. They may also use a nonstandard
keyboard or one-hand devices because they either cannot type two keys simultaneously or they hit multiple keys by accident. Requiring users to enter the same information more than once is not only tedious, it is also prone to additional errors. For users who do use a mouse to interact with the site, if the buttons and “hot spots” on image maps are not large enough and spaced far enough apart, users with hand tremors will have difficulty selecting the item.

5. Users with cognitive impairments can have deficits in memory, perception, problem-solving, conceptualization, and attention. These may result from a range of conditions such as mental retardation, autism, brain injury, Alzheimer’s disease, and old age. Similarly, learning disabilities can affect a variety of memory, perception, problem-solving, and conceptualization skills. Learning difficulties include reading problems such as dyslexia; computational, reasoning and organizational deficits; and nonverbal learning disorders. These are sometimes also associated with attention deficit disorder and hyperactivity. Cognitively impaired users need information to be presented in small discrete units without other distractions (such as blinking objects) on the page. Complex inconsistent displays or uncommon word choices also make websites more difficult to understand, as do pages that require people to remember information to interact with the site.

6. To identify the key company stakeholders for this initiative, Carmen would need to ask herself which roles would be affected by Section 508. Carmen should approach nearly every area of the company due to the scope of the effort and the resources she needs to meet the deadline. Figure a.12 shows the affected resources for the two main products by development phase. She should set up informational meetings with several groups within the product development organization, concentrating on the technical leads, development teams, and product managers. She should also meet individually with project managers from the larger products. In these meetings she should play short video clips that showed people with various types of disabilities interacting with websites using assistive technologies to help raise awareness about the value of accessible design for existing and potential customers.

   On the business side, Carmen should meet with members of the customer service division because they would be a valuable resource for understanding how people with disabilities might have trouble
Executive and product team resources were involved at only certain points in the overall accessibility initiative:

with existing products. They would also be responsible for handling calls about accessibility issues after the new law went into effect, so it was important to get early support and buy-in from them. Carmen should meet with the government sales representatives from the marketing and sales organization as well.

Carmen created awareness-raising activities to get everyone excited about and engaged in the accessibility initiative. She provided demonstrations of how pages look from different perspectives
(e.g., running the home page through color blindness and color contrast tools to show how the page renders for people with visual deficiencies). Additionally, Carmen could “challenge” stakeholders (even via e-mail or as part of a status report) to try to go to their favorite website and use it with just the keyboard but no mouse. She would also encourage all stakeholders and team members to view the user experience sessions or watch highlight video clips of the key issues as they became available. The key is to encourage stakeholders to participate in this effort so that everyone gets first-hand knowledge of the impact an inaccessible design would have on disabled users.

7. For an accessibility initiative to be successful, all stakeholders would need to devote their time and financial resources to the accessibility project. The most difficult challenges are usually prioritizing the accessibility initiative with the other projects, figuring out the impacts on release schedules, and deciding how to weave the work into the development process for each type and size of project. The technical leads and product managers for the affected projects will need to meet with the executive team to establish the priorities for the various development efforts. Options for dealing with the integration of the accessibility enhancement work include having a few developers investigate the accessibility issues across the product suite and develop solutions or having each developer and/or product team be responsible for figuring out solutions, which can be shared with the other teams. Having a few developers develop accessible code examples that the other developers can use would save time, but that savings would have to be weighed against having dedicated resources who would not be working on other functionality. The advantage of having all the developers trying to generate solutions to accessibility issues is that each developer would come up the learning curve at the same time, leading to more engaged development teams and probably a higher number of viable solutions.

Across the company most of the work was completed in six months, including two months setting up the project and conducting initial analysis, followed by at least a month for performing detailed analyses, and three months for implementing enhancements and retesting the products.

8. A common question about accessibility initiatives is how long it will take to complete the project. The answer depends on the level of
interactivity, how dynamic it is, the types of JavaScript event handlers used, and number of pages. If the site is an informational website with lots of content, then the accessibility effort would take a few weeks. The sizing would need to include time for adding alternative text to images, adding headers to the content sections, making text versions of PDF pages, ensuring that the menus use non–mouse-based event handlers, and making sure that the text is resizable. For complex interactive web applications, the estimate would probably be from a couple of months to six months, depending on whether or not standards-compliant coding practices were used. If the site complied with W3C standards, then most of the work would involve checking for the same items mentioned above. However, if the site did not adhere to standards, then significant programming changes will be needed, taking several months.

9. In forming a project team, Carmen might find that the most significant challenge would be to create a team small enough to be efficient but large enough to include the key organizations and resources. Key members would include a combination of the following:

- Technical leads: Depending on the number of products affected, the similarity of the products, and work load priorities, one to two technical development leads would be needed for a major accessibility initiative.
- Product managers: Some product managers want to be involved in every aspect of the product design, whereas others depend more on the development team to make sure that accessibility is addressed and incorporated into the product design.
- Customer service representative: One higher level representative is very valuable as he or she is in regular contact with customers calling in about issues with the products.
- Quality assurance specialist: This resource is important during the implementation and testing phases, as he or she can write Perl scripts to automate the testing for some accessibility enhancements (e.g., ensuring that every image tag has an “alt” attribute).
- Accessibility project manager: This person is vital to the success of the project because he or she coordinates and negotiates with all the product teams affected by the accessibility initiative.
- Design and usability specialists: If there is no “Carmen” at your company, then these resources have the interdisciplinary
background and skills needed to ramp up on accessibility, and they likely have already had some exposure to the area.

10. Carmen could recruit users with disabilities to work through the TBD products. Watching users who are blind and/or have visual impairments, particularly those using screen readers and/or screen magnifiers, interact with the major functionality on TBD’s sites would yield valuable insights for the team. Because the sites use multimedia or Flash presentations, working with users who are deaf and hard of hearing would be a good idea, too. She could also try out several simulation tools to see how different pages from the TBD sites would look for people who are color blind or have difficulty with color contrast. Using the sites with no mouse would give a quick indication of the sites’ usability for assistive technology users. She might try enlarging the text on the screen as much as possible and then try to read it while looking through a straw, somewhat simulating the effect of macular degeneration. Carmen could download a demo version of a talking browser and then try using listening to a few pages with the monitor turned off.

11. To conduct the detailed product inspections, the product managers should identify a few main product task paths in their respective products. The paths should be representative in that they include the entry point to the site (log-in screen), home b (e.g., pages with forms), search and data entry results, price sorting features, and informational pages.

An inspection summary template (similar to the template in Table a.13) should be created to ensure each of the 16 standards from the Section 508 evaluation would be addressed systematically. The template should include columns for indicating whether the site complied, did not comply with each standard, or did not apply. Another column was used to list specific pages where problems were found during the evaluation (refer to Figure a.13 for a partial listing of a combined Section 508 and WCAG checklist). Another column could be added to track progress. Over time, code examples can also be added to the spreadsheet to document and disseminate repairs to the larger development team.

12. Without an ongoing compliance process in place, products will fall out of compliance relatively quickly. New technologies arise that may pose accessibility problems, new features may be added, and existing features may be modified or enhanced, without being tested or
<table>
<thead>
<tr>
<th>WCAG /§1194. 22</th>
<th>Section 508/WCAG Priority 1 Checkpoints</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>In general (Priority 1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>Provide a text equivalent for every nontext element (e.g., via “alt,” “longdesc,” or in element content). This includes images, graphic representations of text (including symbols), image map regions, animations (e.g., animated GIFs), applets and programmatic objects, ASCII art, frames, scripts, images used as list bullets, spacers, graphic buttons, sounds (played with or without user interaction), stand-alone audio files, audio tracks of video, and video.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a)</td>
<td>A text equivalent for every nontext element shall be provided (e.g., via “alt,” “longdesc,” or in element content).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure a.13.** Comprehensive checklist that includes both section 508 and WCAG checklists (partial listing).

retested for accessibility. For example, when new or different developers join the team and they are tasked with maintaining and/or developing new code, they may not be aware of the accessibility aspects of the product and inadvertently undo the completed work. At TBD a new developer took out the alternative text on several
Another developer added JavaScript-based menus to the navigation area for a product (rather than using CSS), which meant that screen reader users could only select the first item in the menu.
13. With a project of this scope being completed under fairly severe time constraints, it is inevitable that some aspects of the project are not done. In the case of TBD, the team needed to move on to other projects and they were not able to accomplish several elements of their plan. These elements should be included but were not done for the TBD site:

- Publish a formal accessibility compliance process.
- Obtain funding and support for an accessibility compliance specialist position.
- Establish a training program—including both accessibility concepts and tools—for all developers, product managers, project managers, web designers, usability specialists, etc.
- Develop in-depth quality assurance test scripts for accessibility—only alternative text on images were tested; nothing else was added to the automated test scripts.
- Test and enhance the products using the W3C WCAG, which was significant because the products were not accessible at all with JavaScript turned off. Carmen recommended that WCAG priorities 1 and 2 be built into the next round of accessibility testing because many other countries base their accessibility policies on WCAG checkpoints.

Finally, continued executive level support, awareness raising efforts, and required accessibility compliance training are critical for the long-term success of a compliance process.

Case 17: From .com to .com.cn: A Case Study of Website Internationalization

1. The activities that the meeting attendees outlined are mostly at the operational level, not at the strategic level. The main element they are missing is research, specifically research of the Chinese market and the Chinese user experience:

   First, the approach to developing the Chinese market was merely triggered by a phone call from an executive at a Chinese media company. MediaCentral.com does not have any prior research upon which to base their internationalization strategy. For instance, the company has no information regarding to which countries the investment should go first, or what the return on investment
expectation is. Relying on excitement and gut feeling is not enough to support a business decision.

Also, user experience research is not in the roll-out plan. There was an underlying assumption that the user experience with the MediaCentral.com website would be common across countries after the text was translated. However, people living in different countries often have dramatic differences in their needs. For instance, the credit card is the primary payment method in the United States but is far from the most important payment method in China. So, text describing the use of credit cards in the U.S. site would not be applicable to the Chinese consumers.

2. Market research should be conducted to support and verify business decisions. Before the team discussed the roll-out plan and schedule, detailed market research should have been conducted to decide the overall global expansion strategy. Many companies are expanding their business and development globally. Some have the goal of reducing operational costs, but others are intending to increase revenue. For MediaCentral.com, a fast-growing Internet company, going global is definitely a long-term direction, but the company must conduct careful research to determine their approach to expand into China.

Some questions for consideration are as follows:

- *What is the prospective profit for doing business in China?* Because China has enjoyed the highest economic growth in the past decade, this market is expected to continue to grow tremendously in the next few years. However, this does not guarantee the same level of financial return for all business investments in China. MediaCentral.com is an online merchant. Online shopping is not a mainstream mode of commerce in China. This implies that MediaCentral.com may expect a lower return on investment in China than in other countries to begin with.

- *Are there other investments that would bring more returns for the company in the short term?* It is true that pioneers have their advantage in a new market. Companies who invest late in the market often need to pay a much higher price to catch up to more established companies. However, because of the drastic differences between the U.S. and the Chinese cultures, adapting a product to the local Chinese market could be very costly. In many cases, improving products in mature markets may bring in more revenue.
Should some unique approach be taken for the roll out in China?
The differences between Chinese and U.S. culture often have important implications on the business decisions. For instance, there are many ways for promoting products and acquiring users, such as television campaigns, road shows, and giveaways. The effectiveness of each method may be different between the U.S. and Chinese markets. Coupons are very popular in the United States, but this is not the case in China. In contrast, the most popular promotions are combined discounts and gifts in the Chinese consumer market. Also, holidays, fiscal year conventions, and seasonality often have significant impact on business volumes. In the United States the sales of collectable items related to U.S. history are the highest around Memorial Day and National Independence Day. General collectable items sell the most around the Thanksgiving and Christmas season. However, China has a completely different set of holidays than the United States. These differences will consequently generate different sales patterns over the year.

It is often very hard for people to enumerate cultural differences without sufficient exposure to these cultures. Therefore the team should involve people who are familiar with the culture of the targeted marketplace in the discussions. Jim Lee is an excellent person to start with. Jim may be able to suggest a very specific time frame and the best approaches to launching the site. Jim could also be helpful in creating the initial user base for MediaCentral.com using his connections in China.

3. User research is critical when designing an international site. A site developed from one country or region may encounter a number of problems in another country or region. If user research were included in the process, the following areas would be taken into more consideration:

- **User profiles**: People with different backgrounds often use websites in different ways. The background characteristics that affect web usage behaviors include age, gender, and years of experience using the web. There are clear differences in user profiles between the U.S. and Chinese users of MediaCentral.com site. For instance, research has shown that Chinese web users are generally younger than the average U.S. web user. Based on statistics from China Internet Network Information Center (CNNIC) in 2006, about
70% of the Chinese Internet users are under 30 years old. However, based on statistics from ClickZ, about 60% of Internet users in the United States are over 30 years old. Therefore a web page design that appeals to middle-aged users may not be satisfying to the majority of Chinese users who, as a group, are younger than the average U.S. web users. Here are some examples of other popular user attributes that caused different behaviors between the U.S. and Chinese web users:

- Typical computer literacy
- Typical web literacy and frequency of use
- Typical typing skills

Demographic data and trends of the Chinese web users are officially surveyed and documented by CNNIC.

- **User preferences and conventions:** Some of the differences in preferences and conventions include aesthetics of layout, font types, density of graphics and animations, and colors. These differences often have direct design implications on a website. For example, Chinese web pages generally have much more information, mixed with extensive use of graphics and animations. Many Chinese users perceive such designs as a reflection of richness in content. However, these designs are generally deemed as bad design for U.S. websites, due to information overload. On the other hand, a web page that is perceived as clean for U.S. users may be perceived as too bland for Chinese users. This difference can be seen by comparing, for example, the home page design of msn.com (Figure a.14) and sina.com.cn (Figure a.15). Both sites are among the most popular portal sites in their markets. It is clear that sina.com has much higher density in content and more extensive use of graphics and animations.

- **Commercial landscape:** It is widely known that China has a very different commercial landscape than the United States. These differences lie in a number of areas, such as market share, business etiquette and policies, and financial transaction processes. For instance, most e-commerce companies in the United States consider other similar e-commerce companies as their competitors. However, in China the competitors of e-commerce companies are largely traditional brick-and-mortar companies.

- **Cultural differences:** Chinese cultural and social context often affects user preference and behavior. For example, many Chinese pay
great attention to numbers. In Chinese, the number 8 has the same pronunciation as “fortune” and hence is considered a lucky number. By contrast, the number 4 often has a negative connotation. So phone numbers with more “eights” often cost tens or even hundreds of times more than an average or a poor number. Some of the “very best” numbers with a good rhythm may cost up to hundreds of dollars. On the other hand, some of the “very bad” numbers never even sell in the market.

- Convention and translation issues: Some of the content on the U.S. site needs to be adjusted based on the Chinese conventions during translation. These conventions include formats of date and time, currency, temperature, icons, and reading direction. For instance, the date in the standard U.S. format is in the form of
However, in some other cultures, including Chinese culture, the standard format for dates is year/month/date. Also, the measuring units (inches, pounds, etc.) on the U.S. sites would need to be converted to metric measuring standards (meters, kilograms, etc.) for the Chinese site.

User research should be incorporated in the process from the beginning to the end of the development cycle. In the early design phase, research should be used to collect user requirements and evaluate competition for the specific market. User research should also be conducted to help with design iterations. It should be assumed that adaptation work is needed after a site is translated to another language.

Figure a.15. Home page design of sina.com.cn: A typical "rich" Chinese design.
4. The problems illustrated here are attributable to the country-specific website content. Simply translating this content into another language does not make it applicable to the users of that country. Rather, the content should be revised based on local requirements and conventions:

- In the first example regarding driving directions, if a dynamic map is still necessary for the users, the mapping application that only works for the U.S. addresses should be replaced by the corresponding applications that support mapping in China.
- To solve the second issue regarding the shipping calculator, further research is necessary to determine how shipping works for China. Popular shipping providers may require users to input information in different ways. For example, the rules of shipping charges against range of weight may differ among shipping companies. This information can only be acquired from local shipping providers in China.
- The third issue regarding credit card payment should also be addressed by acquiring more information regarding financial transactions in China. Because the existing solutions around credit cards do not work in China, this function should be redesigned around the feasible online transaction methods available in China.
- To resolve the fourth issue, the form elements should be reevaluated with typical Chinese users. The security questions and the name fields should be redesigned.

5. All four problems are actually examples of many common issues when adapting websites or other product content into another country. For MediaCentral.com, a company that was not experienced in internationalization, these initial findings imply that rolling out a site in China is much more complicated than pure translation. Some of the issues, such as the different use of measurement units or the functionality of certain applications, were relatively obvious. Other issues, such as desirable security questions, are much more subtle. There could very well be other subtle cultural issues, such as connotation of dates and interpretation of rhymes, that could cause design issues. These issues are very hard to tackle by people who do not have sufficient knowledge or background in understanding cultural differences. Thus involving people who live in China to address these problems becomes very essential.
6. After addressing the issues raised by the translator, Richard and his team would most likely realize that the site launch is more complicated than they had originally anticipated. Richard and his team would require more help from people who have a more in-depth understanding of the Chinese culture and business, not to mention some explicit expertise in the localization of websites and user experience in general. Some of the minimal actions they should consider before moving any further are as follows:
   • Reviewing page designs with a local Chinese collector who might be a potential user of MediaCentral.com. This collector could be seen as an extension of the design team and provide invaluable information about the Chinese market and typical user needs. This person could also provide some quick feedback on design directions.
   • Launching the site in phases instead of all at once.
   • Lining up strong Chinese customer support resources during the phased launch to provide on-demand assistance. A large number of problems exposed after the site is first used by real users should be expected. So, having a phased launch with customer support would help avoid problems becoming too big to handle.

7. Richard and his team took their design to a potential user to get feedback. This clearly helped them make a number of design decisions to improve the site. Leo was a very special potential user of the MediaCentral.com website, compared with typical current users. His uniqueness was reflected by the following:
   • Expert in the collection of a certain period of Chinese history
   • Fluent in English
   • Unique personal background as a descendant of a royal family
   These personal attributes definitely helped the design team. Leo was able to provide richer information than typical users due to his superior knowledge in Chinese collections. This helped the team quickly acquire information regarding design considerations, because there were a very limited number of people available to provide specialized feedback such as this.

8. There are a number of weaknesses with the approach Richard and Elaine took:
   • Leo has a very unique profile, which isn’t typical of most Chinese collectors. His opinion may not represent most intended users. For instance, Leo’s fluency in English is helpful in communicating
with the design team. However, bilingual people are often more tolerant of translation problems than monolingual Chinese speakers.

- The team got feedback from only one person due to resource limitations. Feedback from one user does not provide any information on how more members of the targeted user group would react to the design. Given Leo’s unique background, the findings from talking to Leo could very well be skewed away from the findings if more and typical users were involved in the exercise.

- The study process itself was not rigorous. In the exercise, Richard and Elaine walked through the design for Leo instead of asking Leo to complete certain tasks by himself. Richard and Elaine were likely inclined to take Leo through the typical path they believed most users would take. However, in reality, many users would have their own ways of using the site, which often trigger usability problems beyond the designers’ anticipation. It would not be surprising if many potential usability issues did not surface because the user did not get a chance to use the system to accomplish actual tasks. In addition, Richard and Elaine conducted the exercise over the phone, through which they may have unconsciously lost much valuable information than if they conducted the study face to face with Leo. There are many nonverbal cues, such as expressions of confusion, which researchers can capture in a face-to-face study. This is especially important in doing a study in China. Chinese culture emphasizes more implicit nonverbal cues in conversations than does American culture. Chinese people tend to be more reserved in verbal comments, which makes nonverbal cues much more important in revealing issues accurately.

- It is not always a good idea for designers to test their own designs. The designers often form certain expectations during their extensive involvement in the project. These expectations often cause some bias toward certain user reactions. Study participants also tend to intentionally hide their negative opinions when talking directly to the design team or the product owners. These factors would often jeopardize the objectivity of the findings. This is especially important when conducting studies in China, because the Chinese culture highly values courtesy and discourages
100 Answers

confrontation. When they know the questions are being asked by the designer, they may become very hesitant to provide any negative comments.

- The walkthrough was done in English. Although Leo is fluent in English, most people articulate things more fully in their native tongue. For a usability study with Chinese users, it would be better to conduct the sessions in Chinese and provide a translator for the English-speaking team.

9. The following points may have improved the study:

- A professional user researcher who speaks Chinese planned and had run the study. A professional researcher would be experienced in generating more rigorous and systematic research plans. They are also trained not to ask any leading questions, which nonprofessionals often make the mistake of doing.
- More participants representing typical users had been included in the study. This may take more time and resources. However, it would ultimately save money if a problem were discovered earlier in the process.
- Participants had been asked to complete key tasks with high-fidelity design prototypes. Low-fidelity prototypes allow testing to happen sooner and thus are often used to collect user comments on design concepts. However, many of the findings from testing low-fidelity prototypes may not apply after many visual and interaction elements are introduced into a high-fidelity prototype or final products. So, more and different usability issues could surface by allowing participants to interact directly with a high-fidelity prototype of the product.
- The exercises had been conducted by an independent researcher at a third-party location in China (not over the phone). This setup would help avoid any concerns participants might have about voicing negative comments. Again, due to the nature of their culture, Chinese people are more aware of context. Their reactions to the product will be more significantly influenced by the protocol used for this evaluation. In this case, if the study had been conducted by an independent researcher, the participants would have been much more comfortable raising controversial comments versus those provided when conducted by the owner of the product. It also would have been good to have had a facilitator from the same culture as the participants. Participants
would feel better understood and would consequently be more willing to provide subtle details behind their comments.

10. An action plan should be put in place for the various aspects of the website that were found to be problematic:

1. Action plan for bugs
   - Enumerate the variation of computing environments and dedicate resources to test out implementations more thoroughly. The design team should try to get statistics on what technology is used in China and leverage the problems collected from customer support. This way, they would know which computing environment they should test the site on.
   - Conduct lab-based testing to simulate typical computer and network configurations. After getting information on the main configurations, it would be very efficient to simulate these configurations in the lab and test the site functionality with them. It is often impossible to test all the combinations, but lab testing can find lots of issues, including some serious ones, which may prevent site launch.
   - Test the website in the user’s actual environment. There might be many hardware and software configurations in the real world that are very hard to predict or duplicate in the lab environment. So, the team should also sample some real users to test in their own environment. Such tests can be very resource intensive. So, it is good to plan such a study after getting a handle on the resources required for lab-based testing. In-home studies are an important step to verify the testing results in the lab and to be sure that it did not miss any important aspects of the actual user settings.

2. Action plan for confusing content:
   - Conduct heuristic reviews with more language specialists, domain experts (such as media professionals or collectors), and usability specialists. Language specialists are often professionally trained and experienced to write accurately for different types of readers. For instance, they know what words or phrases should be used for the general public and for more specialized user groups. Domain experts would be able to provide more insights on how to accurately express content that is best understood within their field. Chinese usability specialists could be helpful for both content and format. Even if the
team has the resources to go to China, they’d likely need the help of a native firm to conduct testing. Choosing a vendor or two in the early stages means being able to get answers more quickly later on.

- Conduct user studies that focus on the quality of the content. After the content is created by translators and language specialists and reviewed by domain experts, it still needs to be tested by the real users. Real users may not be as professional or sophisticated as content creators with regard to reviewing content, but they may reveal real usability issues that experts do not find. Actual user feedback will almost certainly lead to the discovery of more practical problems than the reviews from a few experts.

3. Action plan for layout and color:
- Conduct heuristic reviews with native Chinese speakers to fix apparent visual design issues. Similar to asking language experts to review the contents, having Chinese people with a strong user interface design background review the site would be very helpful. These professionals can provide invaluable feedback about site design issues, so that more problems can be fixed before showing the site to users.
- Research best practices from other site implementations. Good graphic user interface designs have lots of user experience commonalities. Researching designs of other sites will save lots of time for the designers. For instance, the team may not need to conduct separate research with the users to know what the best line spacing should be for a Chinese website. Instead, they can simply collect the line-spacing information from the most popular sites in China and quickly arrive at an answer.

11. Within the first nine months of being hired by MediaCentral.com, Sarah designed and conducted a number of studies, including focus groups, expert reviews, and iterative usability tests. She directly studied more than 100 Chinese users and communicated usability issues efficiently to the design team. In June 2003, the site was launched again successfully. This time customer support received far fewer complaints. Clearly, this success was largely a result of effective user research, which accurately addressed the needs of the Chinese users.

Yes, a user researcher can help solve the speed issue.
The site speed problem seemed to be more of a technical issue than a usability issue. However, site speed relates not only to the performance of the hardware, but also to human perception. People experience site delays in a very subjective manner; the delays can “feel” long or brief without objectively being either. So, a user researcher can provide special input on the human side of the puzzle. They can directly relate user responses to system performance.

The user researcher has the unique opportunity to collect evidence from real users and delve more deeply into the specific instances of the general problem.

12. Based on knowledge and experience in site speed issues, Sarah might come up with the following speculations and hypotheses to take into account when she developed a research plan:

1. Perceived site speed versus real site speed
   - **Hypothesis:** Depending on the setup of the code on a web page, the site speed perceived by the users can be very different from what is actually recorded by machine. For instance, if the images are all shown as empty squares before they fully appear, then they are perceived as loading faster than in a setup that would not display anything until it is completely received from the client computer.
   - **Implications/challenge:** Perceived site speed, instead of actual site speed, should be measured in the study. However, it is a subjective measurement. This adds some complexities to the measurement. For instance, the user’s judgment of what constitutes a complete page load is subjective, and it may be differently perceived among participants, making it difficult to compare across individuals or groups.

2. Above the fold versus below the fold
   - **Hypothesis:** Users care more about how fast they can view the contents above the fold (the area that is viewable without scrolling) than the contents below the fold.
   - **Implications/challenge:** A standard screen resolution for testing should be defined to ensure that roughly the same amount of content is measured across participants.

3. Client side versus server side tracking
   - **Hypothesis:** The data that can be tracked from the server does not necessarily reflect the speed from the client side
because the user-perceived site speed depends a lot on the settings in their own computer. For instance, if some content is cached, it would load much faster than content that is not cached.

- **Implications/challenge:** The tracking on the server side is much lower in cost than discrete user testing from the client side. Once a system is set up, it can collect a lot of data with little effort. There is also a possibility to automatically track downloaded data from the client side, which requires installation of specially designed software. Both methods would show superior scalability, but it is critical to have a solid prediction model for perceived download speed using the automatic tracking data.

4. Potential large variance from many sources

- **Hypothesis:** Page download speed certainly depends on many factors. Some of the main factors include
  - Connection services: There are a number of Internet connection service providers, and each offers a series of service options and prices.
  - Geographic spread: Internet connection speed relates to the hardware infrastructure of the services. Different cities may have different quality of cable and phone lines, which affects the connection speed.
  - Internet traffic within a day and across days: Within a day, there could be variations in web traffic, and this certainly would affect download speed for individuals. Also, across days, (e.g., working days vs. weekends and holidays), there are also different patterns for download speed.
  - Computer configurations: There is a wide variety of computer brands and level of configurations across different computers. The computational and networking capabilities of each computer would significantly affect the download speed.

- **Implications/challenge:** In general, a relatively large amount of data needs to be systematically acquired from a number of cities, at certain specific time frames, with certain computer configuration restrictions. The cities should be representative of the location and provider options within the country.
Based on her speculations and hypotheses, Sarah should outline the following main attributes for her study plan:

- It should be a self-guided site test, which requires participants to follow study scripts and conduct the studies individually without moderation by a study administrator. This makes it possible to complete the study with a large sample size in a timely manner.
- Study participants should use both a stopwatch and software to record load times. This way the data reveal the level of correlation between perceived load time and actual load time.
- The test should be conducted in multiple cities in China to understand the impact of different network infrastructure across different areas.
- Broadband and dial-up users should both be tested because both types of network services are popular with Chinese users.
- Measures should be collected multiple times during a day and across some days, so that the variations of network load due to Chinese users’ life-styles can be captured.
- The measured effect of cached and noncached results should be collected. Once a page is loaded, content may be stored in the cache, which means it will load faster the next time. Capturing both cached and noncached results would reveal this difference.

Case 18: Designing for a Worldwide Product

1. One should consider that much of the development for the site generation tool was not based on requirements stemming from a good understanding of their markets. Caroline had argued that they did not have the knowledge of how the end consumers from around the globe worked and what their expectations would be. The new business division was targeting a new user group, the end traveler, with whom they had little experience. Additionally, they had never built a product that would adapt its user interface as a function of each market’s culture. Their traditional product, which targeted the travel agents, had a single user interface—the agents were required to adapt to it. It was critical that the new division take the time to learn about their new
users, the travelers, and the new cultural requirements with which they had not dealt to date.

Caroline’s concerns ended up being validated by the customers who complained that their websites were not well adapted to meet their markets’ needs. They were doubly disappointed because not only was there little new revenue, they were also losing money for things such as help desk resources.

2. Based on the customer complaints, the On The Go division should determine the gaps between their customers’ needs and what they are currently providing. They should review the site generation tool options to ensure that they are providing the right customization possibilities to allow the customers to adapt their websites for their markets. It also appears that they may need to invest in the visual appearance of the user interface to answer criticism such as, “It just doesn’t look professional.”

3. Caroline had argued unsuccessfully in the early days of the On The Go division that they would need to retain some part of the budget to invest in research to ensure a base understanding of the markets for which they were designing. The decision to move forward without conducting this research was reflected in the poor results they had witnessed.

Caroline recognizes that the lack of knowledge of their markets’ needs is the root of the problem. Therefore it makes sense to invest in the research that she would have liked to have done in the very beginning. Caroline would be well served to create a project and find someone to lead the project who will understand the best way to gather the types of data they need. Any redesign should then be premised on these data.

4. There should be two main objectives of a redesign project. The primary objective is to define a site generation tool that can create websites that are well suited for the end users in each market. The sites need to be usable, and they need to make the users feel acclimated—as if it were designed for them. They should review the entire user interface to see what usability improvements could be made universally and to reassess which site components could really be the same for all customers and which ones would have to vary as a function of customers in different markets. The secondary objective of the project is to redesign the site generation tool so that it is easier to maintain and manage. Ideally, they would find that they have fewer numbers of site setup options to manage at the end of the project.
It might appear initially that these two objectives are conflicting. The primary objective would imply that the tool needed to be more flexible to provide more customization possibilities, whereas the secondary objective would require that they reduce the number of options provided for the site setup. However, the two objectives are not necessarily opposing. In the past the designers had often “over-designed” and had created too many options because they were unsure of what customers really needed. The research would be the foundation upon which decisions for the redesign would be made. With a better understanding of their markets’ needs, they would be able to reduce most of the guesswork that had taken place to date. They would be able to review across all markets to determine when one solution would truly suffice for everyone and when multiple solutions were absolutely necessary. When they did need to create multiple solutions for a design problem, they would have a better idea of what those solutions needed to be thanks to the research.

5. The ideal approach to the problem would be to conduct primary research with end users around the world. But it would be worthwhile to consider other sources, particularly resources that are already available to the project team. Some of these could include:
   - Trends in customer feedback collected during customer meetings, phone calls, or sent by e-mail
   - Usability reports that had been conducted to date
   - Help-desk reports from internal departments as well as from those managed by their customers
   - Independent studies and reports that address cultural differences (general reports and reports specific to e-commerce)
   - Review of the site-settings statistics to see which site settings were being used and which were not

   The advantage of these other types of information is that they are more readily available and can be reviewed before they begin to shape the plans for the international research in the markets. What they learn from these other reports will help them understand and organize the problem patterns, and they will be better able to prioritize their research—in terms of subjects and markets.

6. To perform research on a global basis and to design and deliver a solution (even if only partially) to hundreds of customers within nine months is a tall order. Jean-Marc will most certainly need to look at phasing the project. He should look at listing all the product components/features that need to be redesigned and determine which
components will be included at each phase. To determine this, the team will need to prioritize the user interface components by determining their frequency of use and by defining which components are creating the most difficulties for the customers and end users.

After that, they will need to ensure that grouped product components within each phase can be released as a “stand-alone.” In other words, it is necessary that the components within each phase can be released independently from the other product components because they will not be able to release a product that contains a mixture of the old design and the new design. However, they would be able to temporarily maintain two versions of the product—the old version and the new version. The customers would be able to decide whether to publish a site with the old user interface version but which contains all of the product components or a site with the new version of the user interface but which contains only a subset of components.

The second challenge the project team needs to address is their inability to perform design reviews with all their 300+ customers around the world. They should define a subset of travel agencies who are as representative as possible of their global markets. These customers will need to commit to investing their time to review the design proposals that are put forth throughout the project.

Finally, the biggest challenge is to find a way to shorten the timeline required for the end users around the world to evaluate the design proposals. One way to do this is to perform each round of usability evaluations in a different subset of markets. When the project moves to the next phase, previously designed components can be retested along with the new components. In this way the team is able to profit from another iteration of testing on the redesigned components and to gather additional data from the second subset of markets. The team could also consider outsourcing some of the usability tests so that the tests can take place in parallel. The advantage of performing the research themselves is that they can draw directly from their observations rather than relying on someone else’s interpretation, but it would mean that they could cover less ground with their current resources. The obvious advantage of outsourcing some of the testing is the ability to increase the rate at which they gather data. Additionally, it could be beneficial to have insights from someone not already embedded in their industry—a fresh perspective.
However, they would need to consider the amount of time it would take to manage an outsourced study (e.g., contract negotiation, training on their business/industry/current product, etc.).

7. The revised/shortened version of the project plan introduces some risks. For the project team to deliver the first part of the redesigned user interface within the seven to nine months, they must assume their findings from the usability tests demonstrate that they have achieved their objectives. If they arrive at the end of the phase and find that they have not succeeded, they will have to consider making further changes to the designs. And if these changes are considerable, they should perform another iteration and cycle through the reviews again. In this case they would not be able to meet the date prescribed for the first deliverable.

It could also happen that they learn things in later phases that would impact the designs completed in the previous phases. If this were to happen, the project team may have to make changes to previously confirmed design solutions—design solutions that may have already been coded and tested. Making changes to code is more expensive and, as a result, less likely to happen unless it is critical to the success of the product.

Case 19: Inspecting a User Interface

1. An effective engagement relies on mutual trust. For the practitioner, an effective interview ensures that the brief is clearly defined in terms of a business and technical context. For the client a well-conducted interview shows that the practitioner is professional and trustworthy and can become an effective partner in solving the problem. Trust is especially critical in a usability inspection; the warrant for the results is the perceived competence and integrity of the evaluator.

2. Stuart did not describe to Hannah any history of user-centered design at Prometheus. However, it is probable that teachers and learners were not actively involved in shaping the usability requirements and user experience design. Prometheus could certainly have reduced risk by evaluating earlier design representations such as low-fidelity prototypes.

3. By fully understanding Stuart’s requirements, Hannah could design an evaluation that would deliver the answers Stuart needed, making the
appropriate trade-offs between commercial value and scientific rigor while ensuring a focus on the most relevant set of issues.

4. Inspection methods involve role play. Evaluators adopt the perspective of a specific user role concerned with achieving some realistic goal. By playing the role, they predict both the subjective and objective user experience arising from the characteristics of that role. For example, assumptions about motivation, culture, skills, domain knowledge, and application experience might all be critical in assessing the fit of a solution to its intended audience. For example, knowing that users might include E2L (English as a second language), readers might focus the evaluators’ attention on the appropriateness of idiomatic or complex language. On the other hand, awareness of time constraints would encourage evaluators to consider whether the design is sufficiently efficient to satisfy user needs.

5. Good design can be seen as a win–win solution that satisfies both the business goals of the sponsor and the personal goals of the users. An evaluator consequently needs to understand the needs of the organization to assess the fit to strategy. For example, an evaluator should not over-emphasize the lack of walk-up-and-use learnability in a design that has been optimized for efficient use by trained users. Without a good understanding of the business context, evaluators are likely to focus on surface issues such as typography and layout. Business context ensures that the evaluators also consider more abstract issues such as the fit to the user’s conceptual model or the adaptation to the context of use.

6. Hannah might use something like the template shown in Figure a.16 to analyze Stuart’s input. She could use this analysis as the basis of a formal study design.

7. Susan, Michael, Erica, and Martin would make a good team. Collectively, their skills give good coverage of the areas to be evaluated. Furthermore, they can generally be expected to be professional and insightful. Ronald’s skills in design legislation are not strongly relevant to this study. Rose’s standards skills are somewhat less critical in web design, and her style may be a liability. Hannah would, of course, need to ensure that Erica restrained her sense of humor when describing observations.

8. If Hannah chose the wrong team members, the team might potentially miss critical issues, overstate problems, or write in an inappropriate style. Although the latter two problems could be
Logistics

1. When the evaluators should start and complete their inspection
2. How to install, access, and run the design
3. Documentation and background reading
4. Security and confidentiality instructions
5. Evaluation manager’s name and contact details

Goals

For each user goal:
Role, context, goal description (as perceived by the user), and scenario

Views

For each view:
Name, description, and unique identifier (e.g., URL)

Evaluation checklist

A checklist to guide the evaluators’ attention to areas of interest to the client.

These might include references to the following resources:

1. Heuristics (e.g., Nielsen usability heuristics [Nielsen, 1994])
2. Guidelines (e.g., RNIB guidelines for accessible design)
3. Principles (e.g., Universal principles of design [Butler et al., 2003])
4. Standards (e.g., Common User Access [IBM, 1993])
5. Legislation (e.g., U.K. Disabilities Discrimination Act [Disability Rights Commission])
addressed by editing, the cost would be high. Because an inspection may generate several hundred individual observations, rewriting for style while maintaining the sense of the original can be time consuming and error prone.

9. Hannah might be concerned with ensuring that observations are prioritized consistently by an independent analyst who is also thoroughly familiar with the business context and can make an informed judgment on severities. Additionally, she might believe that evaluators can add more value by spending less time “voting” and more time discovering.

10. Good design should be recognized and acknowledged to encourage best practice and temper criticism. Reporting achievements is an effective technique for building trust by demonstrating a balanced professional perspective.

11. Asking for a principle encourages practitioners to think analytically within a theoretical framework and tends to discourage “false positives,” that is, unsupported opinions that may distort the data. The principle may also subsequently help the study manager to classify the observation against a predefined coding scheme.

12. Observation 1 (“Too much pink”) is a subjective personal opinion. Although the principle seems valid, it does not support the evaluator’s opinion. The recommendation is also inappropriately specific. Observation 2 (“More than seven menu entries”) is based on a misapplication of a useful principle. The “magic number 7 ± 2” describes Miller’s work (Miller, 1956) on empirically determined limits for the number of meaningful chunks that can be held in working memory. Although this research might be helpful for assessing the maximum practical length for a menu readout by an interactive voice system, it does not define the limits for a menu presented visually. Kent Norman’s work on menu psychology (Norman, 1991) is probably more relevant here. Although observation 3 (“Insufficient contrast”) makes a good point, incorrect spelling and inappropriate humor mar the quality of the report. Furthermore, the issue is identified as legibility rather than readability. Where legibility relates to appropriate use of type and color, readability is a function of style and vocabulary. Finally, this finding also fails to include a recommendation.
13. Observations that are factually or theoretically incorrect are likely to misinform the client and may ultimately lead to inappropriate design changes. Correct but poorly presented observations may not communicate the issues and could, in extreme cases, damage the credibility of the entire evaluation team.

14. Following up observation 1 with the evaluator might uncover a more substantive concern with the branding implications of selecting a color palette. Observation 2 can probably be excluded, and observation 3 should be edited for spelling and style. Hannah might also offer some mentoring to all three authors with a view to improving their reporting style for subsequent studies.

15. A predefined coding scheme has a number of benefits:
   1. It reduces the time and effort required to code raw data by eliminating the need to discover an emergent framework through multiple iterations.
   2. It improves analytical consistency within and across projects by requiring evaluators to use a common model.
   3. It supports meta-analysis such as historical comparisons, trend analysis, and benchmarking.
   4. It can help to shape an analysis to accurately reflect both the business concerns of clients and the scientific models of skilled HCI specialists.

On the other hand, emergent coding frameworks are powerful tools for finding and communicating the unexpected. Using a predefined scheme establishes an analytical “set”; issues outside the framework may be missed, ignored, or misclassified. Additionally, a predefined framework is only helpful for analyzing issues within its scope. For example, a usability scheme is not helpful for analyzing domains such as safety, accessibility, or branding.

16. Clients are typically more focused on the “bottom line” than the detailed results. Although they may be interested to know that a design makes unreasonable demands on its user’s working memory, their primary concerns are more likely to include assessing any resulting risk to their business strategy, mitigating this risk through appropriate design interventions, and avoiding reoccurrence by defining an improved design process.

17. Business readers generally prefer concise pithy reports. Listing all the supporting evidence for each finding would make the report bulky
and repetitive. However, supporting a summary with selected references to the underlying observations both illustrates the overview and demonstrates a rigorous process. Of course, other stakeholders, such as designers and engineers, may wish to review the full set of findings to understand and address the issues described.

18. The “business impact” dimension maps observations to business outcomes. For example, if many observations were coded against Adoption in this dimension, Hannah would predict a risk to uptake by potential users. She might also trace back through the associated “Task impact,” “Effect,” and “Cause” codes to understand why users might choose not to adopt.

19. The “Cause” dimension of the coding scheme maps observations to phases and activities in the design process. For example, if many observations are coded against the phase Understanding Users, Hannah might recommend more investment in primary user research.

20. Hannah was concerned that Stuart should get the best outcome from his usability investment. In practice, study reports are not always translated into action—often because clients can be daunted by the perceived difficulty of improving the design. However, a joint planning session frequently identifies “quick wins” and affordable follow-up activities.

**Case 20: Billingsly: A Case Study in Managing Project Risks and Client Expectations**

1. The new account software is causing a variety of problems at Billingsly:
   - The new account software is difficult to use. It is poorly organized, with the most important parts of the online form interspersed among parts that are not critical for opening and maintaining a new account. Compounding the problems is the fact that more regulatory information is required than in the past.
   - In the past the financial consultants recorded the information needed to open a new account in the presence of the client by asking the appropriate questions and recording the answers directly onto the paper or online form (the InSight application). Now because the new account software is difficult to use, it makes the financial consultants feel foolish and clumsy in front of
Their clients. Consequently, the financial consultants collect the information needed to open a new account by jotting down notes on scraps of paper and passing the notes along to their financial assistants to deal with. Often, the financial assistants have to contact the clients to acquire the remaining information, further stalling the process.

- Because the process takes longer with the new account software, branch offices are not as productive and profitable as they once were.
- The users of the software at Headquarters are forced to work harder and longer to compensate for the problems at the branches. Their morale is also poor.
- The snowball effect (the new account software is more difficult to use, thereby slowing down the process, in turn affecting morale and self-esteem) is causing financial consultants and assistants to leave Billingsly for jobs with competitors.
- Not only was morale low, but branch office managers were angry. Some were calling for those responsible to be fired.

2. Ownership of the problems being caused by the new account software is not clearcut. IT resides in its own division; branch office operations resides in another. IT designed and built the new software; however, the productivity, profitability, and ultimately employee satisfaction at the branch offices come under the purview of the business side of the house. As manager of the IT group that designed and built the software, Vicky believes she owns the problem. Sam, on the other hand, is ultimately accountable for the branch offices and, as such, believes solving the problem is his responsibility. In the end, because of the organizational structure and governance at Billingsly, it is virtually impossible to lay ownership of the problem—and therefore its solution—at any single person’s feet.

3. There are many reasons Billingsly might arrive at the conclusion that they should look outside the company for help in solving the problem:
- Most of Billingsly’s profits come from opening new client accounts. The software that enables financial consultants and assistants in the completion of this task is, therefore, one of the most important pieces of software that Billingsly can provide its financial consultants and financial assistants. Even though the software is being produced by Vicky’s department, it was Sam whose focus was on the overall impact to the business.
• The policy at Billingsly toward new software is to buy first and only secondarily to design and build in-house. This could lead one to the conclusion that Billingsly’s IT department has more skill in creating feasibility studies and managing the creation of new software than it does in designing and building it.
• According to Sam, Billingsly’s IT department already had a shot at creating the new software and failed.
• Sam knows he has to stem the tide of their best financial consultants and financial assistants leaving for what they perceive to be easier means of closing new accounts. He also knows he has to act fast. He believes that Billingsly’s own organizational structure may be a contributing factor to its failure in this area. An outside firm can focus solely on the problem and bring stronger skills to bear.
• Sam knew that Billingsly’s technical architects and developers had specified the functionality and designed the current software’s user interface. How could that be? They weren’t user interface designers.
• Billingsly’s usability department is already spread too thin. In addition, they’re admittedly not designers. They’ve made a clear decision to spend their time evaluating solutions.

4. Some potential problems with the RFP IFineInc could foresee at this point are as follows:
• The RFP is not specific enough about the technical documentation required. Does Billingsly want use cases? A technical spec? A user interface spec? A requirements document? All of these? Some or one of these? Will Billingsly’s IT department want to rely most heavily on the working prototype as their “spec,” or will they want the documentation to play the stronger role in guiding them in the final design and development of the new solution?
• Although Billingsly states in the RFP that the ultimate deliverable is a working prototype, it appears they are looking for the design of an entire product in a couple of months’ time. To get to a working prototype, the team will have to go through many of the same steps they would use to get to a final product, especially in the area of UCD. Just as with a full-blown solution, the UCD team would still need to understand users, their workflows, and
their requirements; understand what’s wrong with the current solution; design the high-level conceptual model; iteratively usability test and refine it; design and usability-test detailed design; create the working prototype; and document the requirements and technical specs for implementation purposes. Billingsly seemingly expects more than can be reasonably delivered in a short period of time.

- Although the RFP was written by IT, it appears that there are two sets of strong stakeholders—IT and business, each residing in its own division. And, although the business stakeholders were the most interested in the new project at the information meeting, the RFP was issued by the IT department, which resides in a different division than the business stakeholders do.
- In the information meeting tension existed between IT and business. How would they work together during the project? Would 1FineInc end up being pulled in both directions, thereby satisfying no one? IT would be interested in such things as how they will apply the deliverables to the implementation of the solution. They would want to know how easily the design will be able to be implemented, if it will fit with their software standards, and will they be able to begin their analysis phase in 3 months? In the end, IT wants to get it right, but they also want it to go away. The poor user acceptance of AccountNow diminished them in the eyes of the business. The business stakeholders want the design to be right this time. They want to show the prototype to the branches as soon as possible and then get it released as quickly as they can after that so they can quell the dissension. Even though the RFP was issued by IT, everyone at the information meeting deferred to Sam. Who will lead the project at Billingsly? IT or the business stakeholders?
- Billingsly would be a new client for 1FineInc. Although 1FineInc has successfully designed, developed, and delivered solutions for other financial services companies, Billingsly is the largest one 1FineInc has dealt with. 1FineInc can base its plans and estimations on its experience with similar smaller firms in the same domain, but there are lots of unknowns, including such things as how long it takes deliverables to be approved, is there a formal deliverable approval process, will Billingsly want robust reports and lengthy interim presentations throughout the short
process, or will they more likely want each activity to feed directly into the design of the new prototype?

- Billingsly has a usability department, and, indeed, much of the RFP focused on usability; however, Billingsly was looking for a top-notch usability and design firm to come in and redesign the new account software. The RFP asked 1FineInc to explain how it would work with Billingsly’s in-house usability department. 1FineInc was confused. If Billingsly has a usability department, why were they going outside the company? It seemed that 1FineInc had to walk a narrow line in laying out its approach to the problem. It could not offend Billingsly’s usability department; at the same time it had to convey to Billingsly that 1FineInc was the best choice for them in the usability arena. No matter how 1FineInc framed it, how was Billingsly’s usability department going to react?

- The RFP was vague in its request for a prototype. What did Billingsly mean by “new user interfaces”? Was there more than one? Should the prototype be a redesign of the entire solution? If so, 1FineInc would need more time.

- Because of the problems caused at the branch offices by the first release of the new account software and because of the number of users, divisions, and stakeholders involved, the prototype project will have extremely high visibility in the company. The vendor who wins the contract will be under daily scrutiny by competing groups who want different results from the project. Who will have the final say?

5. Typically, there are more screens than use cases in a software application. Yet Billingsly said AccountNow currently consists of 14 screens driven by 28 use cases. This could have several huge implications for 1FineInc:

- Because 1FineInc won’t have access to the current solution before being selected, the number of screens and use cases are the main contributing factors in estimating the length and, therefore, the cost of the project.

- This could affect the way 1FineInc estimates the number of user profiles. The number of user profiles is a contributing factor in the planning and execution of the user input and feedback techniques 1FineInc proposes for the project. It determines such things as the number of user types 1FineInc would need to
engage in contextual inquiry sessions. It also determines how many participants would need to be scheduled for both the 3 x 3 iterative prototyping and usability test sessions and the final usability test. The number of users engaged in all these activities affects the overall duration of each of the usability techniques and, therefore, of the entire project: the number of sessions to be conducted, the length of time needed to analyze issues and problems found, and the amount of time needed to create and present the findings from each of the techniques. If 1FineInc proposes a set number of techniques and the number of user profiles is greater than expected, 1FineInc won’t be able to deliver on time and in budget, ultimately a critical success factor in consulting engagements.

- Because there are few standards in use case writing, 1FineInc may not understand how large the current solution actually is. Does Billingsly include all aspects of a scenario and their exceptions in one use case, or is each exception a separate use case? Is there one major use case for opening a new account, or is each account type documented in its own use case?

6. In addition to the information the team gathered about the users, their tasks, their work, their environment, and their requirements, the 1FineInc team made an important discovery during the contextual inquiry sessions at the branch offices. They learned that InSight is above all else an online form. But they also learned that most of the work the branches did involved forms. InSight was a form, but many of the other applications were forms or collections of forms or containers for forms. Why were the forms spread across so many applications? The team noted inefficiencies in the branch work in general because the users are forced to traverse applications to locate and deal with all the forms they might use in one day, and they are often prompted to gather information for their clients that they already have in another form. The AccountNow prototype project isn’t structured to solve this bigger problem. The danger for Billingsly is the AccountNow project solves only part of the problem at the branches. Sam’s phone may stop ringing with complaints about the online account software, but it may start ringing with complaints that the forms used on a daily basis at the branches require redundant information to be gathered and the users are forced to go in and out of many different applications to find all the forms they need for the
day. The danger for 1FineInc is that they may be perceived as solving one problem while creating another, which would reduce their chances of winning any new work at Billingsly.

7. Although Billingsly follows a traditional waterfall approach to design and development, 1FineInc’s approach is more iterative. At the end of the design phase IT wants something they can use to go off and develop. They want a proscriptive deliverable that they can use as a type of specification. They want the design done. The UCD approach, however, is ongoing with each subsequent iteration building on and adding to the one before. The detailed design phase in UCD actually overlaps the beginning of development. This isn’t as cut and dried as Billingsly IT would like it to be and is accustomed to.

The output of the $3 \times 3$ is a high-level design—even a conceptual model—to move forward with through detailed design and implementation. But when does “high-level design” end and “low-level or detail design” begin? To human–computer interaction specialists the line between high-level design and detail design is messy. In the $3 \times 3$ process the home or main page is fully fleshed out; however, the remainder of the pages only exist to illustrate the path through the tasks that were selected to be prototyped. The home/main page, therefore, contains both high-level design and navigation, but because it is as fully fleshed out as it can be in the first round, it’s bound to reflect details as well. In fact, if there’s time and the designers have ideas about the details of a design, they often end up in the $3 \times 3$s. There are no hard and fast rules around what goes in and what doesn’t go in a low-fidelity paper prototype. The purpose of paper prototyping is, after all, to try out lots of ideas with users while still early in the process. This is definitely one of those areas of HCI and UCD that is more art than science.

8. Because of the tight schedule, made tighter by the delay in the start of the project due to Billingsly’s legal and contracts process, the 1FineInc team had to remain very focused on the specific tasks they were doing leading up to the working prototype. They needed every spare minute to complete the work they needed to do before the branch visits, and they needed all the time they could get when they returned from the branches to compile and analyze data and prepare for the next presentation of findings/results. They did not have time to meet regularly with Billingsly’s IT group as much as they should
have or would have liked to. Consequently, communication suffered and actions were misconstrued on both sides. Billingsly perceived 1FineInc to be evasive when, in actuality, they were just busy. 1FineInc hadn’t been clear on Billingsly’s expectations from the beginning of the project and yet they didn’t have time to meet to talk things through. In addition, 1FineInc was unaware that Billingsly was trying to begin technical analysis and design during iterative prototyping and usability testing.

9. 1FineInc didn’t know why the IT group wanted the paper prototypes at this point in the project. It seemed to the 1FineInc team that Billingsly would want to wait until the prototype was closer to completion. After all, this was a prototype and not a full-blown application. The reasons IT wanted to see the paper prototypes before testing include the following:
   • IT may have wanted to have input to the design. Even though they weren’t designers and they had not interacted with the users, they had designed the initial release and might be able to spot potential problems ahead of time.
   • IT wanted to begin sizing the effort so they could begin planning implementation. Were there elements of the interface that would require extra work? Did the workflow and navigation fit with their back end processes and databases?
   • IT feared what the branch offices would see. Would they react negatively? Would they be promised new functionality that the team couldn’t deliver? They didn’t understand the nature of paper prototyping and hence could have been afraid of over promising, not realizing that UCD practitioners approach this carefully by level setting at the beginning of each user session.

10. The questions Vicky’s team asked were either about low-level detailed design or about tasks and paths that weren’t the most important and frequently performed; hence, they weren’t the tasks/scenarios that had been prototyped. The 1FineInc team knew Sally had explained the 3 × 3 process to IT during the sales pursuit and again at the project kickoff meeting. What was it about high-level design that IT didn’t get? Did they not realize that they couldn’t prototype three unique approaches to the entire solution in 5 days? Not only was it an impossible task to do, it wasn’t part of the purview of the first round of the 3 × 3. In the first round they wanted to learn if they had the “right” conceptual model—a model
that would map to the user's mental model. They wanted to know whether they were directionally correct, not that every “i” was dotted and “t” crossed.

11. Due to the aggressive schedule that Pamela’s team had to adhere to in order to complete the project on time and in budget, they had deferred important meetings with Billingsly’s IT group. When they were finally able to carve time out to have the meeting, they discovered each group had different expectations about the final deliverables. Pamela’s team thought they were documenting only the tasks that had been through the UCD process and that they were including in the working prototype. Tim and his team thought that the entire AccountNow solution would be documented in the use cases. How had each team arrived at the conclusion it did? The RFP is vague: It refers to “new user interfaces.” Pamela’s team was so focused on getting designs and contextual inquiry and test materials ready in time for the next set of branch office visits that it hadn’t taken the time to ensure everyone had the same expectations.

12. 1FinelInc needs to complete the working prototype and the associated documentation. They need to either create a change order to include prototyping, usability testing, and writing use cases for the remaining tasks or they need with work with Billingsly’s IT group to include the work in the next phase of the project. They should work with IT to ensure that several more rounds of iterative prototype and usability testing are conducted during the detailed design phase.

Case 21: Aikot Corporation: A Case Study in Qualitative/Quantitative Remote Evaluation

1. Mark realized that although Aikot has an online presence in a number of countries throughout the world, he has many unanswered questions about the visitors and their experience on the site. Specifically, Mark needs to answer the following questions to help him understand how visitors are using the site:
   • Who is visiting the website?
   • What are they doing when they are there?
   • Are they successful in completing their tasks? If not, why?
   • Why are visitors leaving the shopping cart process?
   • Do the profiles of the online visitors match the profiles of Aikot’s off-line visitors?
• How does the website visit impact visitors’ impression of the brand?
• How does the website visit impact future calls to action such as returning to the site, purchasing products on the site, and recommending the site to others?

2. Aikot uses Hit Box web analytics on the site to track the number of unique and returning visitors. They have implemented the Hit Box code on all style sheet templates and individual pages of process funnels such as the site registration process. Mark and his team use the Hit Box data at the most basic level to identify traffic flow. These data are not enough because they do not tell why visitors are doing what they are doing. Mark needs to understand why visitors are doing what they are doing in addition to where they are going and dropping off. Mark needs to correlate the web analytics with data from real visitors to have a more complete understanding of the user experience on the website.

3. Several aspects of the development process and team structure may have contributed to the lack of knowledge about the influence of the website on the company’s bottom line. The online Internet marketing team consists of product managers, a website manager, a web content manager, and a third-party design agency. There is no multidisciplinary design team in place, and, most importantly, there is no one representing the customer.

   The main goal for this team was to build a website. They did not understand or know that to build a website that is both compelling and easy to use, they need team members with specific usability, user-centered design, market research, information architecture, or interaction design skills.

   In addition, personal performance goals for the product managers on the team are based on product development release schedules rather than how well their products perform in terms of revenue growth or how easy it is to find their product on the website. The result is that product managers focus more on ensuring products are developed on time rather than on how successful website visitors are in finding information and accessories about the product on the website.

4. To be successful, the online team needs customer advocates. Team members designated as customer representatives or advocates often have a background in human factors engineering, usability, psychology, or market research. These team members are the customer advocates who conduct a variety of user research activities to learn more about the
customers and their goals. The customer research informs the design team as they develop the website.

Mark has a lot of work to do, including
- Revamping the marketing plan
- Setting concrete measurable goals for the web channel
- Identifying who is coming to the website, and why
- Learning about visitors’ experience on the website
- Understanding what works well and what needs improvement on the website
- Revamping the website based on what he learns from this process
- Hiring personnel or learning enough to do the work himself

5. At the conclusion of their meeting, the Aikot user experience team should have outlined the year’s goals for the website, as follows:
- Understand who is visiting the website.
- Identify visitors’ goals and activities performed on the site.
- Identify visitors’ expectations for the website.
- Understand how successful visitors are in achieving their goals and completing their activities.
- Identify areas of the website that work well and those that need improvement.
- Identify key metrics for the website, obtain baseline measures, and set growth targets (both minimum and maximum).
- Conduct user research to help inform the design and development process.

6. Conducting exploratory quantitative/qualitative online remote research on the Aikot website will allow the team to invite people who are naturally visiting the website. The participants will be able to complete the study in their own environment whether at home, in the office, or somewhere else and will not have to travel to a usability lab or research center. The participants will be able to use a computer they are familiar with and that represents their actual technical work environment. Participants may take as much time completing the study as they want. Anne will have her team add Javascript code to the home page of the website that is used to pop up an image or message inviting people to give us their thoughts about the website experience.

Quantitative/qualitative online remote research is an effective way for Anne and her team to gather customer attitudes, intentions, and behaviors and measure performance directly on a website. This combination of qualitative and quantitative data will help inform
Anne’s team about the strengths and weaknesses of the site so they can work on improving the online customer experience. Because a significant number of people naturally visiting the site are invited to participate in the study, Anne and her team will have confidence in the findings regarding what is working well and what needs to be improved on the site. In addition, the large sample sizes will help them understand who is visiting the site and provide data that will enable them to create profiles of these site visitors.

This approach combines the best aspects of market research, usability research, and web analytics. The Aikot team will have data in large quantities to help them understand the behavior of current and potential customers and to provide insight into the attitudes, intentions, behavior, and performance of a statistically significant sample of site visitors attempting real-life tasks on Aikot’s websites.

7. By conducting an online remote exploratory research project, the team will be able to collect the following information:

- Identify who is coming to the website (current customers, potential customers, from which geographic location, compare online visitor profiles with the off-line profiles, etc.)
- Identify visitors’ level of familiarity with Aikot’s brand (do they own Aikot’s products, how long have they used them, do they intend to purchase more products)
- Understand visitors’ expectations for their visit (find product information quickly, make a purchase online, compare products easily, etc.)
- Understand what visitors intend to do while visiting the website (find the price, purchase items, find support information, order services, find store locations, etc.)
- Assess success in completing their tasks on the site (how long did it take to complete the tasks, was the experience difficult or frustrating, why was the task difficult, what helped visitors succeed)
- Understand how satisfied they are with their visit to the site (did visitors find what they were looking for, did the information meet their expectations, were they able to do what they wanted to easily and quickly)
- Measure ease of finding information needed (including easy-to-understand language or terms)
- Compare expectations before and after the website visit
- Measure visitor success based on personal goals
• Understand the result of their site experience on key calls to action (e.g., likelihood to recommend, likelihood to return, likelihood to purchase)

8. To invite visitors to participate in the study, Ann’s team could intercept visitors at each of the designated Aikot home pages (United States, Germany, Mexico) with an invitation in their own language. A welcome message describes the process and the invitation will provide a link to a remote study.

9. Anne’s team can set up the study to make the participant’s experience as natural as possible in the following ways:
   • After participants agree to participate, ask them a few questions regarding their intentions for visiting the website and their mindset at the start of the visit.
   • Before participants begin interacting with the website, they will need to download a small application that is used to collect behavioral data such as time on task, URLs visited, and search field entries. Alternatively, the behavioral data can be captured using a proxy server set up by the online research application vendor.
   • Next instruct the participants to continue with their visit. During this part of the process, participants will interact with the website completing the activities they originally came to the site to complete.
   • To find out whether or not participants were successful, present them with a set of questions designed to elicit feedback regarding their experience.
   • Finally, the team can ask other questions they are interested in understanding.

Some remote online research applications will capture other information while the participant interacts with the website, such as how much time it takes to complete the tasks, how much time is spent on each page, the URL of the pages visited, and the navigation paths followed while completing the tasks. Other data captured might include time and date of the study and search terms entered in search fields. This information will help the team understand some of the behavioral aspects of the experience on the website.

Just as with traditional usability studies, Anne and her team can decide whether or not to offer an incentive to the participants of the remote studies for their efforts. If a website has a high daily unique visit rate of 5,000 or more, researchers generally do not have to
provide an incentive for this type of evaluation. This research methodology uses self-directed tasks rather than directed tasks for other types of studies. One alternative would be to start the evaluation without offering an incentive and then if the response rate is low, offer an incentive.

Case 22: Using Technology to Automate Summative Usability Testing

1. One major advantage is that the CIF has been developed and adopted by several of the most respected and influential technology companies in the world. A second advantage is that the CIF allows one to measure the “performance” of a product, which could better inform the business of competitive advantages or even risks. The CIF also allows for more direct comparisons across studies over time.

2. There are many things Doug should highlight:
   - CIF provides a standardized report for summative usability studies.
   - CIF is designed to ensure that efficiency, effectiveness, and subjective satisfaction are measured.
   - CIF allows for easier test procedure replication.
   - CIF can help reduce reporting time for usability staff.
   - CIF was created by an international committee of usability professionals and continues to be revised and improved.

3. The biggest benefit regarding a single score is that it can be digested by development teams and executives. If the goal was to achieve a “5” or to increase a previous score by 10%, it is easy for the team to determine a product’s standing. In addition, consumers of usability data are often numbers driven (e.g., software engineers or marketing professionals), and providing data to them in their own language can help to ensure that the data are noticed and acted on.

4. The biggest risk in combining related metrics into a single score is ensuring the validity of the “scoring formula,” because the output of such a score is only as good as the science used to create it. Therefore it is critical that the scoring mechanism is judiciously reviewed and validated through objective testing and peer reviews.

   Another risk is that the formula is too complex, either in reality or in perception. In general, individuals will not use or trust a new method or concept if they do not fully understand it or at least grasp
it conceptually. Rachael’s team had a goal of being able to explain and teach their formula to other usability professionals within 10 minutes.

5. When looking at complex concepts with rich sets of data, it is often the goal to have a single score to provide a meaningful summary. Credit report scores, educational scores (such as the MCAT, LSAT, or GRE), and even an IQ score are all examples of the combination of multiple attributes used to determine a single score.

6. Most usability professionals come from a research background, and unless they make a conscious effort to attain rudimentary business skills (i.e., project planning, forecasting, and budgeting) they may struggle when attempting to have a more strategic impact in their business. Leading large and complex projects will tap these skills; without them, the usability professional may be at a significant disadvantage. In addition, having a good grasp of business fundamentals can help a user researcher make more informed decisions regarding user versus business requirements and trade-offs. For example, a system may contain a feature that users find frustrating or too time consuming (e.g., inputting a customer’s information into a customer relationship management system). From a user’s perspective, this may seem to be a waste of time, because if they were not required to do it they could tackle more customer calls in a day and therefore appear more productive. However, tracking this customer information may be critical to the business and every bit as important as handling customer calls. Therefore user research may focus on how to make this “annoying” but necessary feature as usable and nonintrusive as possible but in no way suggest that it be removed.

7. Based on the proposed tools, method, and scoring mechanism, Rachel’s main selling points of the new plan presented to Jerry were as follows:
   - No negative impact on attaining tangible product score cards that key stakeholders could easily internalize or on the single and consistent measure for usability that would afford the ability of user research to track improvements over time and to allocate resources to low scoring areas
   - Ability for user research to execute studies in a fraction of the time because multiple studies could be conducted simultaneously
   - Fewer sessions and therefore reduced study/lab costs and resources
• Ability to turn around data almost instantly via automated reporting
• Potential to “baseline” many more features of a product because more tests could be run in less time with little impact on the development team or user research (economy of scale)

8. There are a few potential problems with the new plan:
• Rachael now had vendors but no tests for them to run as previously scheduled, so she assigned them other work that was neglected due to staffing constraints.
• There was also some ill will between Rachael and some other leads in Jerry’s organization because the development of her tools required other work in the division to be temporarily paused or deprioritized. To help alleviate this, Rachel scheduled one-on-one meetings with the leads of the groups affected to better explain the project and its strategic importance.
• The product team was expecting data to flow in, but Rachael had to tell them that the schedule was slipping. However, they appreciated the fact that she promised that her team would deliver the entire data set early.

9. One major difference is that this team needed to set up their lab to run many participants concurrently. Each participant needed their own system, and most traditional labs do not accommodate this type of setup. Therefore one may need to secure a larger room to run the study (e.g., a conference room or a lab designed to run focus groups).

10. A great benefit of this type of study is that it could allow a researcher to run many more participants; however, if the recruiting pool is scarce (e.g., highly technical participants), it may be difficult to recruit enough people, especially if you narrow the study’s time frame.