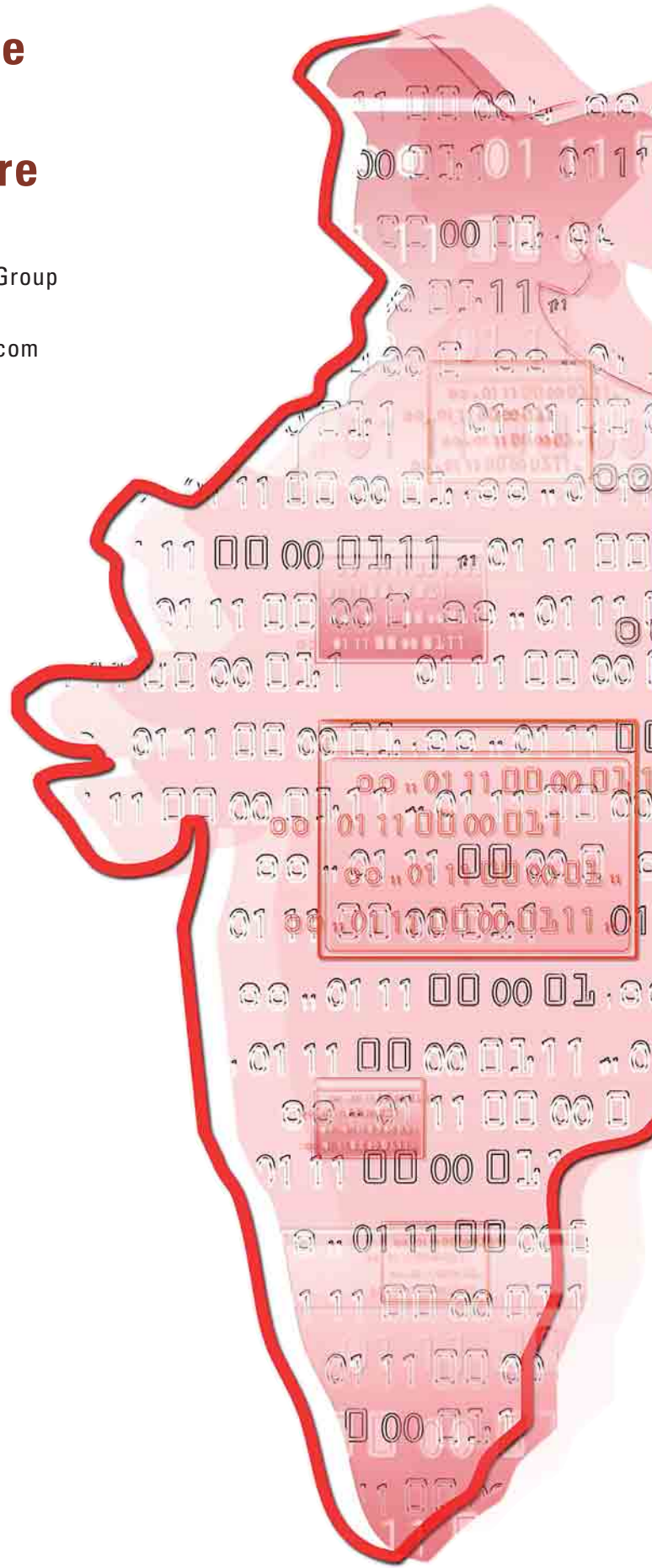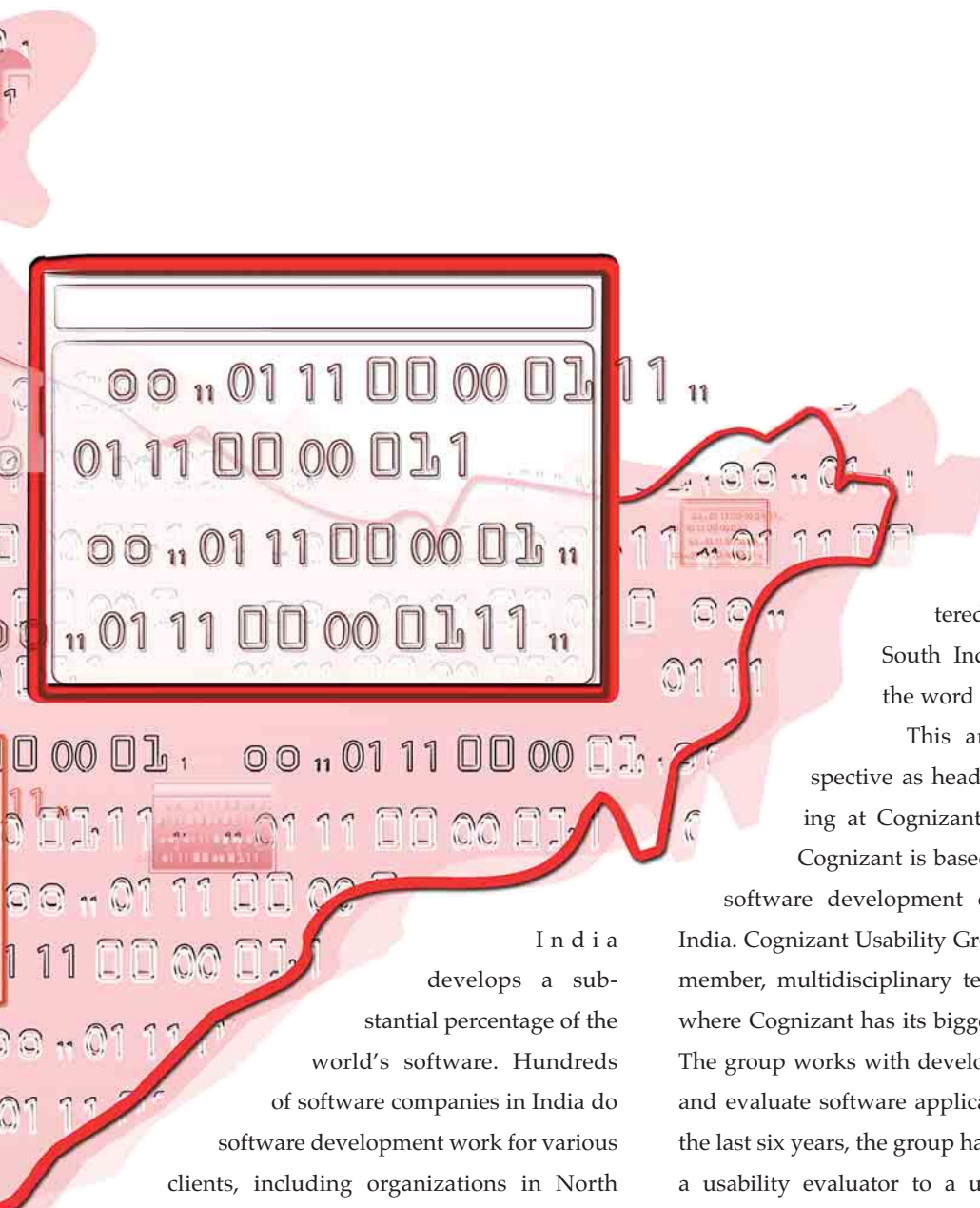# Advancing UCD While Facing Challenges Working from Offshore

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This good news is sure to be extended to include many more companies as ACM-chartered organizations like CHI South India continue to spread the word across the country.

This article reflects my perspective as head of usability engineering at Cognizant Technology Solutions. Cognizant is based in New Jersey, but its software development centers are located in India. Cognizant Usability Group is a centralized, 10-member, multidisciplinary team located in Madras, where Cognizant has its biggest development center. The group works with development teams to design and evaluate software application user interfaces. In the last six years, the group has moved up from being a usability evaluator to a usability improver to a usability designer, facing and addressing many challenges along the way.

Usability in India

India faces the challenge of misconceptions about interface design that are common among developers. These include myths about usability, and a mistaken model of interface design that leads to a system-oriented rather than a user-oriented approach.

Myriad Myths

In India, HCI may be confronting many or all of the

India develops a substantial percentage of the world's software. Hundreds of software companies in India do software development work for various clients, including organizations in North America and Europe. Although it is accepted that Indian programmers are skilled, would users say that the best interfaces come from India? Hardly any center of learning in India offers a significant course in human-computer interaction (HCI) or usability. Most of the technically savvy programmers are unaware of principles and techniques of good design. Further, myths that impede good design are rampant.

In spite of all these negative factors, one or two companies are doing good usability work, adapting offshore usability models and actually advancing the usability discipline by doing some pioneering work.

same usability misconceptions that exist in other countries. In my experience, the following three myths, however, stand out as causing the most damage.

1. "Pretty screens are all you need." Since the DotCom boom days, many companies in India, as in the West, have tended to think that designing a good user interface means designing pretty-looking screens. Unfortunately, some of their clients too have demanded pretty looks above all else. Companies that advertise for "usability specialists" end up hiring graphic designers, who are typically the only ones that respond to the ads. Sadly, many of these people are not even likely to be formally trained as professional graphic designers. They are instead experts in operating a graphic tool such as Adobe Photoshop, having recently "graduated" from one of the Web design courses that have sprung up all over India. At best, these people deliver attractive screens, as "make it attractive" is often their only single objective.

2. "I can design on my own; just give me some guidelines." Often, software development teams simply ask for guidelines so they can design interfaces themselves. Other times they ask for checklists and templates or perhaps a two-day training course. These requests reveal a belief that achieving usability is a matter of learning and applying a few simple rules.

Such rules may be enough to help them achieve relatively smaller things like correct placement of buttons. But software development teams need to ask themselves if they can really achieve a well-structured menu by using a checklist or ensure easy navigation merely by following some guidelines. HCI people in India need to continue spreading the word that there is no substitute for the contribution of trained usability engineers.

3. "Usability is about testing:" When I first set up the usability lab at Cognizant in India, I made an all-too-common mistake. I called my team Usability Lab. The problem is that when people see the testing facility and the equipment, they start equating usability with testing. Adding to that, they read and believe what many popular usability experts talk so much about— testing. As we know, it is often more efficient to invest in good design practices than in testing alone. Unfortunately, equating usability with testing leads people to believe that programmers or graphic designers should continue to design the user interface and that usability specialists should be consulted only later for testing.

The Cognizant development organization in India is increasingly under pressure from clients to deliver usable interfaces but need more education

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about what this requires. First, we frequently conduct road shows in Cognizant divisions all over India, primarily aimed at software project managers. Here, we not only share before-and-after examples that demonstrate the value of usability engineering, we also explain the projected return on investment for Cognizant's clients. People slowly learn, for example, the relative higher importance of quick navigation versus, say, the "prettiness" of screens—when the artifact in question is a software application for serious business use. Second, Cognizant usability engineers discourage requests for things like guidelines and checklists by explaining through examples why they may not help substantially improve design. Finally, the idea that usability is synonymous with testing is fading. Of course, the first thing I did toward debunking this myth was to change the group name from Usability Lab to Cognizant Usability Group!

Mistaken Model

At most Indian software companies, programmers design the user interfaces. Indian programmers are sound technically and enjoy doing technical work such as database design. Their top priority is to get their programs to work correctly. When they are required to design the user interface, however, they naturally find it hard to switch from system-thinking to thinking from the user's viewpoint. Moreover, they are unlikely to know user-centered design techniques, because hardly any institution in India currently teaches HCI design as part of computer science programs.

When such professionals design the user interface, their inspiration is often the system's internal design. For example, the user interface might get structured the way the database is structured. Programmers typically prefer this approach because they do not need to invent a design from scratch— and they can implement the design easily. As we know, such a system-oriented approach deprives users and buyer organizations of the many potential benefits that can otherwise result from a user-centered approach.

At Cognizant, to replace the system-oriented, user-*interface* design practice with a user-*centered* design approach, we did two things:

1. Integrated the process. Working with Cognizant's Process and Quality Management group, we integrated a user-centered design process with the company's SEI CMM Level 5 software engineering process.

2. Hired and trained usability engineers. Replacing a system viewpoint with a user viewpoint not only requires a process, but, more important, the

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right people to apply that process. As I stated earlier, the challenge I faced in hiring is that India has few people educated in HCI or usability. Therefore, I hired a few who were educated in the United States. The rest of the team consists of people from different related disciplines whom I have personally trained.

Offshore Usability Engineering

Offshore usability engineering, by definition, is about applying usability methods at a location where actual or representative users are not available. The idea of offshore usability engineering certainly sounds like a paradox, and the approach faces obvious challenges. But given the realities of offshore software development, Indian-based HCI still has an important positive contribution to make for buyer organizations.

In Jakob Nielsen's September 16, 2002, *Alertbox* column (www.useit.com/alertbox/), he says that offshore usability work in a country like India can present potential difficulties such as:

- Lack of usability professionals
- Local users are not representative
- Separation of usability professionals from users

The rest of this article analyzes these three challenges and discusses some of the strategies we have been using to address them and to contribute HCI expertise to offshore development projects.

To put it briefly, we have worked to solve the first problem by hiring academically qualified usability engineers, such as people trained at an American uni-

versity. We address the second problem by either conducting tests in the "home" country or using recruitment methods that ensure that you have closely matching local users for your tests. Finally, we approach the third problem by having an appropriate onsite-offshore model. The problem is that solving all three of these together is quite hard and takes time. Let's examine each challenge more closely.

Challenge 1: Lack of Usability Professionals

Hiring HCI people for offshore projects is important for the same reason that hiring them is important for projects done entirely at home. For offshore projects, a lack of academically trained usability professionals in India is the fundamental problem. One obvious reason for this is the lack of formal HCI training in India. Therefore, creating a usability group requires pulling together a group with diverse skills and helping them both to focus those skills on HCI and to acquire new knowledge in HCI.

At Cognizant we addressed this challenge by assembling a group of people with university education in industrial design, architecture, psychology, technical communication, graphic design, and computer science. People in the group who have HCI and related education acquired from American universities work to pass that knowledge on. Three of the 10 team members have worked in the United States and therefore also have some understanding of cultural differences.

Challenge 2: Local Users Are Not Representative

Clients and prospects from the West who have visited Cognizant's usability lab in Madras have said, "It's

great to know you do usability testing here, but how do you handle the cultural differences?" More specifically, they were asking if it makes sense to use Indians as representative users when the typical actual user is a white male between 25 and 30. Here's how we addressed this issue.

1. Before we start any test, we put a great deal of effort into understanding the users and how they perform their business tasks. We try to take this information into account when analyzing our test results.

2. We use a recruiting procedure to ensure that people we bring in as test users closely match real users in the "home" country. For this we use a form that captures user profiles and another form that prospective users fill out. We compare these two and select only people whose profiles closely match those of real users. For example, if the software application being tested is used by undergraduate clerks in a bank in the United States, we hire undergraduate clerks from banks in India. We know that it makes better sense to have the actual users "test" the product. Because of who Cognizant's clients are, this means

conducting the test in North America or Europe. We use this method when the client agrees to fund the expense of India-based usability engineers traveling to the "home" country to conduct tests there.

3. If we test in India, some culture-specific design issues may still remain unmet. From experience, we've seen that those unmet issues are often related to colors and similar visual design issues. Such issues may not significantly affect user performance, and they can be relatively easy to correct based on feedback from actual users. We get such feedback by making the application available to the real users. This approach does not always produce the ideal result. Often, it is the head of a user group or a client representative who finds time to provide the feedback. Also, these are typically reviews, rather than formal usability tests, although client-managed tests do happen in a few projects.

Challenge 3: Separation of Usability Professionals from Users

Offshore software development, in spite of its cost and other advantages, has one obvious downside—that is,

Creating a **usability group** requires pulling together a group with **diverse skills** and helping them to **focus** on HCI and to acquire **new knowledge** in HCI.

the geographical separation of the development team from the client and user organizations. For offshore HCI work, this could mean poor understanding of users or inability to conduct reviews and tests with real users. Therefore, the resulting user interfaces may not necessarily be tailored to the target users.

As we have learned more about how to deal with this issue of geographical separation, the role of our usability team in development projects has evolved. At Cognizant we first started by conducting usability inspections offshore and delivering reports that listed design problems. Although the development team was able to implement the few easily actionable points in our report, they tended to ignore the points that required extensive thought and redesign. As a result of this experience, in the first few projects, we started delivering redesign solutions too, based on our inspection findings. The development teams were startled to see the difference we made in the designs, and they appreciated our work but did not find the time and people to implement total redesigns that we recommended. Instead, they made the easier-to-implement changes, which were often just minor improvements. Thankfully, we are now in our third generation. In our current approach, we have assumed actual lead responsibility for design of the user interface for the development team. Now our role is more clearly defined and our efforts are estimated and billed to clients.

India is 10 to 12 time zones away from the United States! Can modern-day tools such as phone and e-mail help? They do, and we use them a lot, but they are not enough. In the first several projects, we had trouble getting information about what kind of people we were designing or redesigning for. What doesn't work effectively is depending on the offshore development team for knowledge about users or use scenarios. Development teams have many things to worry about, and knowing users well might not be at the top of their list. In such cases, the India-based HCI team should try to have users fill out detailed user profile questionnaires and conduct telephone interviews.

Gradually during the past four years we have also evolved a more systematic division of labor that we call the "onsite-offshore model." This means that activities that need close interaction with client and users are done at the client or user site, and other activities are performed "offshore" in India.

The following list is an onsite-offshore model that is a modified version of the one shown in Figure 1. We used this version in our most recent project for a U.S. client:

1. Study (onsite and offshore): At project kickoff, our India-based usability engineer traveled to the United States and used such HCI methods as user profiling and task analysis to understand not only users, but also the workflow and tasks, users' goals for performing those tasks, and use scenarios. He created a task description document and got client sign-off on personas and scenarios, all of which will be used as inputs for design work that will largely happen in India. In parallel, one offshore usability engineer tried to
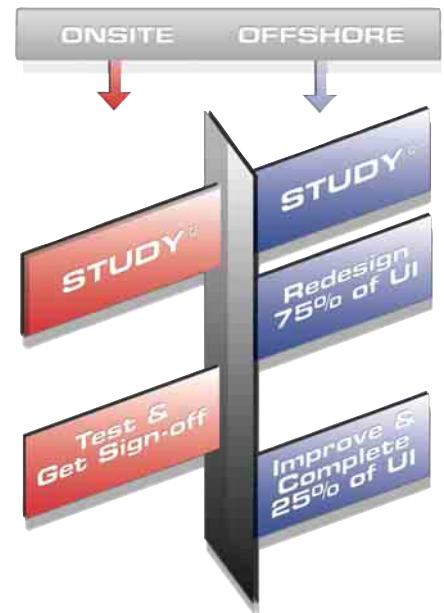
understand the application by participating in development team meetings and reading available product documents.

2. Prototype design (onsite; about 30 percent of the design effort): Frequently consulting with the offshore multidisciplinary team, the onsite Cognizant usability engineer created a prototype user interface.

3. Prototype evaluation (onsite). The onsite usability engineer administered usability tests of the prototype with our client's customers (that is, actual users) in two U.S. cities. Only audio recording was done in these tests conducted at the user site. The usability engineer improved the user interface based on test results and got client sign-off on the design.

4. Complete design (offshore; about 70 percent of the design effort): Currently the rest of the user interface is being designed by the lead usability engineer, who has returned to India after spending two months in the United States. Completing this process in India allows us to put more usability resources to work (including the person who conducted the offshore study) to quickly complete the HCI design project. During this part of the process, we will also obtain user interface evaluations through client reviews and through peer reviews by the multidisciplinary offshore (that is, India-based) usability team.

One interesting thing that happened in this phase was the administration of a remote usability test! The client wanted further evaluation of the prototype and so administered a couple of more tests. Downloading special software that the client had subscribed to, the Cognizant usability engineer "participated" in these tests remotely.

Turning the Challenges into Clients' Advantage

Offshore usability that involves significant efforts in a country where labor costs are lower brings cost savings to buyer organizations. However, offshore usability itself is not automatically advantageous when the quality of the user interface is a major concern for the client. In fact, we've seen that it can pose some big challenges. For offshore usability to work, the offshore vendor, at a minimum, needs to have a trained usability team and must work with an effective onsite-offshore model. Thankfully, if these requirements are met, clients do get a much more meaningful interface than they would otherwise. And in a rare scenario where the offshore team has world-class usability engineering skills and applies a tightly coupled onsite-offshore model, the client can get the double advantages of a user-centered interface and financial benefits.

Project Example

Cognizant Usability Group believes that the user interface architecture—often comprising menu struc-
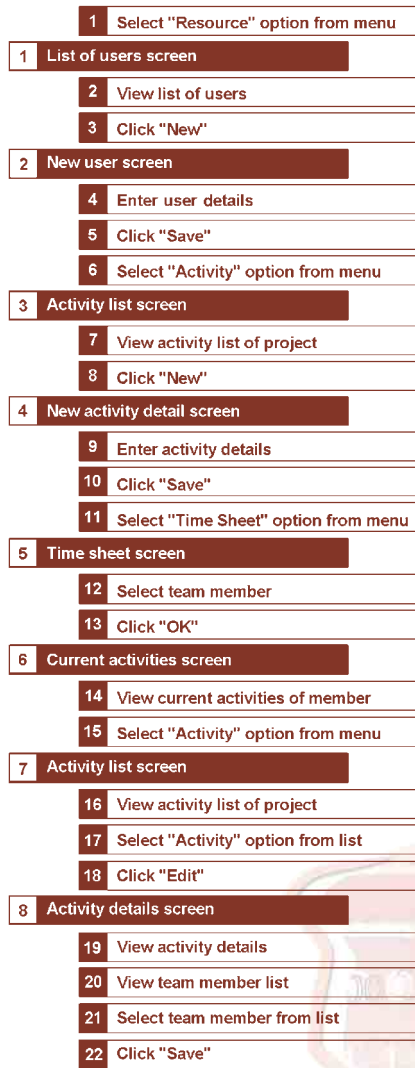
1	Select "Resource" option from menu
1	List of users screen
2	View list of users
3	Click "New"
2	New user screen
4	Enter user details
5	Click "Save"
6	Select "Activity" option from menu
3	Activity list screen
7	View activity list of project
8	Click "New"
4	New activity detail screen
9	Enter activity details
10	Click "Save"
11	Select "Time Sheet" option from menu
5	Time sheet screen
12	Select team member
13	Click "OK"
6	Current activities screen
14	View current activities of member
15	Select "Activity" option from menu
7	Activity list screen
16	View activity list of project
17	Select "Activity" option from list
18	Click "Edit"
8	Activity details screen
19	View activity details
20	View team member list
21	Select team member from list
22	Click "Save"

Figure 2. An example dialog from the original user interface.

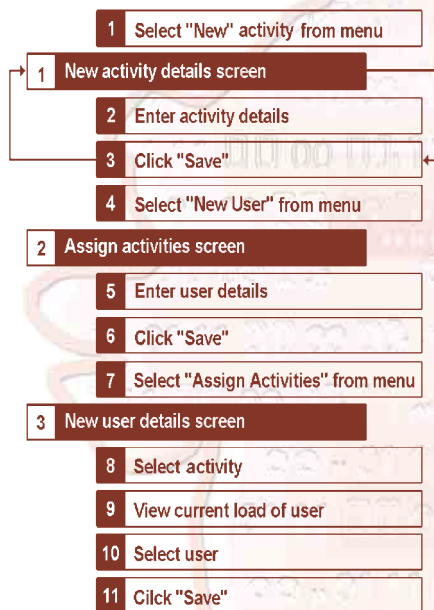| 1 | Select "New" activity from menu |
1	New activity details screen
2	Enter activity details
3	Click "Save"
4	Select "New User" from menu
2	Assign activities screen
5	Enter user details
6	Click "Save"
7	Select "Assign Activities" from menu
3	New user details screen
8	Select activity
9	View current load of user
10	Select user
11	Cilck "Save"

Figure 3. Dialog outline as redesigned.

tures and dialog structures—is most important and fundamental and must be designed first. Only after the user interface architecture is decided do we start working on other aspects of design.

This approach has helped Cognizant develop high-performance interfaces for its North American and European clients. In redesign projects, the productivity improvement has been as high as the 50 to 200 percent range, and even up to 500 percent and higher for individual tasks. We followed this approach in testing and redesigning the user interface for a project management Application Service Provider (ASP) Web site. Consider a scenario in which a project manager needs to create 10 activities and assign those activities to 10 team members weekly for 24 weeks (the duration of the project).

Original User Interface: In the foregoing project, the original design required 22 steps and eight screens for a project manager to create and allocate activities. This task must be repeated for each activity. Figure 2 shows the sequence of steps and screens required with the original design.

Redesigned User Interface The steps and screens required with Cognizant Usability Group's redesign are illustrated in Figure 3.

In this figure only Steps 2 and 3 and Screen 1 must be repeated for each activity to be created. All users can be created in the same screen (Screen 2), and all assignments can be completed in another single screen (Screen 3).

Resulting Business Value

The number of steps required to complete the pre-

ABOUT THE AUTHOR

Pradeep set up India's first usability lab in January 1999 at Cognizant Technology Solutions' Madras development center. He currently leads the organization's usability team. Pradeep has worked mostly on projects for companies in North America and Europe, contributing to the design or redesign of user interfaces for business applications in vertical markets such as insurance, banking, healthcare, transportation, and retail. Pradeep is founder and chairman of CHI South India, the ACM-chartered chapter that is focused in India's equivalent of Silicon Valley: Bangalore, Madras, and Hyderabad.

ceding task was reduced from 220 to 29, and the number of screens that the user needed to navigate through was reduced from 80 to 12. Suppose it takes a conservative two seconds for each step and two seconds for each screen download, in both designs. For a project duration of 24 calendar weeks, we estimated that a project manager would spend four hours with the original design, whereas the same user would spend only 0.5 hour with the Cognizant redesigned user interface, all other things being equal. This means that the user organization would potentially gain an eightfold increase in productivity for that task over an interface developed without HCI input.

Such dramatic potential productivity improvements were also estimated to come from the many other tasks and scenarios we addressed in this application's interface design. Besides, we expect many other benefits to be realized, such as a sharp decrease in (1) the number of user errors; (2) the learning curve, thereby eliminating or reducing hassles and expenses related to user training; and (3) the size of help and manuals.

Conclusion

At this time, most software companies in India are a long way from user-centered design. When these companies begin focusing on users, software that comes from India will not only be technically strong and bug-free but usable as well. In this way, HCI promises to make a great contribution to India's growing technology industry.