

Institutionalising HCI – the challenges in India

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1. Human-Computer Interaction Design

Human-Computer Interaction (HCI) is informed by many fields, but particularly by computer science, cognitive psychology, design, human factors and information sciences. There are many descriptions of HCI, but the following definition of interaction design will serve us well: "Interaction design is a design discipline with a unique focus on harmonizing the behaviours of products with those of humans." [4] In the modern context, it often happens that these products have a significant component of software within it.

HCI itself must be still considered to be a nascent field. The issues that matter in the context of design of interactive devices and systems are still new to us. Our understanding has improved greatly as we have gained experience in the last twenty-five years, but only time will tell if we have already identified them all as yet. The claim of those who profess to already 'know it all' is similar to the bravado of the six blind men who knew the elephant. In this context it becomes important to consider the maturity of organizations that are involved in the development of interactive products and systems.

2. Usability Maturity in India

The Usability Maturity Model (UMM) [1] provides us one possible measure of the progress of HCI capabilities of a company. The UMM describes the maturity of the company in terms of various levels and gives indicators for each level. Table 1 summarizes the levels of the UMM and their indicators.

Table 1: levels of usability maturity and their indicators [1].

Level	Indicators
Unrecognised	(no indicators)
Recognised	Problem recognition, performed processes
Considered	Quality in use awareness, user focus
Implemented	User involvement, human factors technology, human factors skills
Integrated	Integration, improvement, iteration
Institutionalised	Human-centred leadership, organisational human-centeredness

Note: The darker lines under Unrecognized and Implemented levels indicate the current barriers in the Indian IT industry.

A company would typically follow the following path through the levels in the UMM:

A company is considered in the **Unrecognized** level if most people in the company believe that there are no usability problems in its products and investments in developing HCI skills are not warranted.

A progression to the **Recognized** level is typically unsystematic. Occasionally, an employee reads a book or attends a seminar and takes the initiative. More often, a disaster strikes – a client rejects a job or a product fails in the market – before the problem is recognized. Confusion reigns at this level and nobody is sure where the problem was and how to solve it. This level is marked with possibly sincere, but haphazard attempts to resolve the usability issues of the problem cases.

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A company moves to the **Considered** level when it starts making systematic financial investments. This happens either in terms of hiring HCI consultants on specific projects or by inviting professionals to conduct training.

A company moves to the **Implemented** level when it realizes that it needs to use HCI skills on an on-going basis and sets up a specialized HCI group. This group has or develops the necessary skills and brings in systematic involvement of users. Typically, such a group handles projects which have 'critical UI issues' and, usually, where the client is willing to pay explicitly for this involvement. At this level, the company has the capability of producing usable products, but it does not use this capability consistently in all projects.

A company becomes **Integrated** when its HCI activity becomes mainstream and routine for all projects, not just for critical projects. An integrated company usually sets up feedback loops and knowledge sharing mechanisms to ensure continuous process improvement. At this level the company consistently produces usable products.

A company would be considered **Institutionalized** when it starts considering itself as a human-centred solutions company rather than a technology company. This change of vision needs to be driven by the top leadership of the company. A company at this level not only consistently produces usable products; it produces premium products which are desirable to its users.

In this path to maturity, and given the current context in India, two level changes are hardest to achieve:

Unrecognized to Recognized: Moving from the Unrecognized level to the Recognized level represents a major cultural change for a technology company. In the past, technology has been a major strength of the company and was always sufficient to deliver what a client asked for. However, the very success of technology and its wide-spread use has changed the world. This change is not obvious to an 'industry-insider' in the sense water is not visible to the fish. It is important to consciously recognize that success of the past is the very reason why the future needs to be different.

Implemented to Integrated: Once a company recognizes that they have a problem, it can usually figure out how to solve it. It makes investments (on training or consultants) and moves to Considered. If it can see the value, it sets up a specialized HCI group and moves to

Implemented. This is where they run into the next major barrier. Moving to from Implemented to Integrated requires a dual challenge. Firstly, it is a significant change of scale - it is not the relatively simple matter of hiring a small group of people any more. HCI skills need to be a part of each project. Estimates of the amount of HCI effort required in a mature operation vary from 5% to 15%. That can be quite a task for a company with 5,000+ people and 500+ projects annually. Secondly, being integrated means investments into ongoing process improvement, something which will strain already limited HCI workforce.

3. The HCI Maturity of Indian Software Companies

Following is a brief review of the last fifteen years of the HCI profession in India:

1990-1995 - The Dark Ages

In the mid nineties, the only Indian software companies that employed professional user interfaces designers were multimedia content developers. However, these companies were really not the 'mainstream'. Meanwhile, many professionals from non-IT / CS backgrounds were migrating to a software career. Large software services companies typically had extensive training programmes to induct new employees. A few of these companies did have a course on graphical user interfaces in their training schedule, but the quality of these courses was often poor. HCI contents were rarely taken seriously or applied in projects.

1996-2000 - The Net Years

The dot-com boom attracted a few talented and largely self-taught professionals into the HCI fold. In the second half of the nineties, many of the early multimedia companies had evolved into mature web and e-learning operations with active interface design and information architecture groups. Some of these would have been at the Implemented level of UMM, while others at the Considered level.

Around this time, international companies set up software development centres in India. Some of these also set up usability groups, consistent with their organizational structures elsewhere. Many of these companies would be at the Implemented level of UMM.

The dot-com bust towards the end of the nineties

brought many young, creative professionals into the software service industry. A few medium-sized software service companies in India began making investments in HCI around this time. They recognized that the web was increasingly becoming an important medium of software delivery, and delivery on the web needed significant design inputs. For an estimated 10% of Indian software companies, this was the transition from Recognized to Considered. But most of the Indian software industry was at the Unrecognized level till the end of the nineties.

Things were pretty bad in the academic world. IIT Bombay started two formal courses related to HCI in this period – but it was, to my knowledge, the only university in India doing so at that time.

2001-2005 - The Transition

The last five years have seen a significant transition in terms of acceptability of HCI in India in the industry, community and academia.

The few software services companies that started out early crossed through the Implemented level and are today 'on the verge' of the Integrated level of the UMM. In these companies, some geographical locations and some verticals always have significant HCI inputs in all projects. The HCI practice within these organizations is rapidly becoming mainstream. Some process improvement is already visible in these companies. Also in this period, we saw a couple of international companies offering services in HCI through their Indian operations. Meanwhile, a few of the larger software services companies moved from Unrecognized level to the Considered and Implemented levels in these five years. Increased awareness and business demands are an important cause for this transition.

In the area of education, some universities became active in this field. IIT Bombay started additional internal courses as well as training programmes for working professionals. A course on HCI was launched as a part of the BE in IT curriculum by the Pune University. Two years ago, the National Institute of Design started two related masters programmes – the Software and User Interface Design and the Information and Digital Design.

The HCI community also became active in the last

five years. A mailing list of Indian HCI professionals was formed in the year 2001 [5]. The membership of this group has since grown from about 200 at the inception to about 750 today. Other special interest mailing lists have since been formed. The South India chapter of Association of Computer Machinery-Special Interest Group on Computer Human Interaction (ACM SIGCHI) was formed in 2001. Since the year 2001, the chapter organizes Easy – the first annual conference related to HCI in India.

Last two and a half years have seen activities pick up in particular. The Indo-European Systems Usability Partnership – a EU funded project – allowed for organization of a series of seminars and culminated in the first peer-reviewed conference on HCI in India the IHCI 2004. Interaction Designers Group (IxDG) has had several face-to-face meetings. There are plans to form additional ACM SIGCHI chapters, a chapter of the Usability Professionals Association (UPA) and possibly a national body of professionals.

Looking Ahead – the Next Five Years

This is where I stick my neck out and hazard a prediction.

Looking at the current momentum, I expect the maturity process of HCI in the Indian industry to continue to move forward. By the end of this decade, the top 25-30% of the Indian software companies should have moved to an Integrated level of the UMM. This implies that each of the products that they deliver will necessarily get process-driven HCI inputs. It also implies that these companies will continuously improve internally and claim a premium for their services and products. At least the next 50% of the companies would have moved to an Implemented level. A fringe bottom quarter companies may remain below this level.

Some signs of this transition are already visible. New job announcements are continuously posted and large companies are hiring almost continuously. A 25,000-people strong software company plans to grow its HCI group from a current strength of 80 people to 220 by mid-2006. Another 40,000-strong company reportedly plans to set up HCI related groups in multiple locations across India and move

from its current strength of about 100 to 260 in one year. The number of workshops that IIT Bombay has been invited to conduct has gone up from four in 2001 to ten in 2005. Several universities are planning new courses and programmes related to HCI.

Eric Schaffer [7] suggests that in Moore's 'technology adoption lifecycle' [6] as applied to HCI, we were in the 'innovators' stage in the 90s, the 'early adopters' in the 2000s, and will move to the 'early majority' in the near future. Whichever way one looks at it, it seems that HCI will have a significant role to play in the next few years in the Indian software industry. If it turns out, the impact on the industry itself would be dramatic. The Indian software services industry has already moved ahead from the perception of being 'cheap, outsourcing destination of largely low-end work' to being 'providers of complete solutions and services in a highly process-driven, professional environment'.

HCI inputs can help the industry move ahead in its course. It can improve the usability and desirability of the delivered products – thereby improving customer satisfaction and increased return-business. It can help better identify expressed and latent user needs, thereby stabilizing user requirements and reducing costs and risks. It can help pro-actively identify innovative business opportunities and improve margins in fixed-bid projects.

With increasing penetration of computing devices, the relatively small domestic Indian market for software products is also expected to take off in a big way. There HCI design skills will be core for the success of these operations. There is of course the possibility that, like many other things, the future will brush off this stream as a fad that promised a lot and delivered little around the turn of the last century. And there are indeed several challenges to be overcome before much of the potential is realized—but things look bright as of now.

4. Challenges

These are the key challenges facing the HCI community in India:

Formal Education

Formal education, or the lack of it, is an important reason why there is so little awareness about HCI in

India. Even today, very few engineering students have the option of taking HCI courses. More courses and programmes along with the 'pull' from the industry are needed to make a difference in the area of education.

Lack of Skilled People

The field of HCI has widely adapted many techniques from several disciplines. There are techniques for understanding users and analyzing their needs, as well as techniques for design and iterative usability evaluation. Though not exceptionally hard or numerous, these skills need to be learned systematically before they can be used reliably and confidently. Estimates of the number of HCI professionals India needs vary from a modest 40,000 to a high 400,000 within the next few years [2]. But even the smaller figure is much higher than the currently estimated community strength of about 1,500 professionals in the country. This could well be the biggest challenge and the hardest to circumvent. There is a need to increase the number of trained people as well as the need to develop new, integrated techniques that work well with few HCI professionals and much support from other disciplines.

Client-Centred vs. User-Centred

The well-established 'client-centred' approach to software development rather than 'user-centred' approach used in HCI is a major challenge in the context of software services companies. Customers can not, and usually do not specify most HCI requirements up-front. But their latent needs show up as development progresses, usually too late to apply appropriate HCI techniques. Even traditional customers are, however becoming increasingly aware of usability issues and will either reject the product after development or suggest many changes. The first client disaster is the usual wake-up call for many companies towards building awareness.

Techniques Don't Suit the Indian Business Model

Current techniques extensively rely on close and continuous contact of the HCI design team with the users. The business model of Indian software companies relies on distributed development, with the bulk of the work being done off-shore. The people involved in the on-site components of projects typically are involved in marketing or

project management activities and are often disinclined to do HCI related tasks. Indian software companies are very process driven in their software engineering processes. However, current HCI techniques have not been well-integrated in software engineering. There have been a few experiments at training business analysts in HCI techniques or hiring local usability resources. More experimentation and experience sharing is required, particularly in the area of integration between HCI and software engineering.

Lack of Established Business Proposition

HCI activities will become sustainable only if the business is able to convert the skills into profitable revenue. Economic Times predicts that India will have software business worth US\$ 8 billion by year 2010 [3]. Arguably, if HCI skills could push the industry up the value chain, the number can potentially be much more. But potential does not get realized into the bottom line automatically unless entrepreneurship can harness it well.

5. Conclusion

HCI skills give the software service companies the potential and the opportunity to move up the value chain and claim larger premium on services. Technology product companies can gain large

market-share by applying user-centred design methods in product development. Indian HCI community needs to develop appropriate skills and resources to overcome the challenges in the emerging business environment.

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