Localising HCI Practice for Local Needs

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Through our research and collaborations with usability practitioners and HCI researchers funded by European Union projects in India and China, together with other interactions, we have previously proposed a model for the global institutionalisation and localisation of HCI and usability practice. The model envisages three elements: the redefinition of HCI in the local culture, the embedding of HCI in local national organizations and the consequential roll-out of localized HCI practices. In this paper we represent the model and discuss detailed issues that will support its implementation. In particular we provide a critical review of the literature on culture, specifically with reference to its use within HCI. The issue is not to attempt to enforce some canonical form, but rather to highlight some of the ongoing controversies about some of the concepts and methods currently being employed in the field. Following this we explore issues relating to both whole life cycle issues of user centred design and the more specific issue of user based evaluation. In relation to user centred design we debate how best to involve clients and users in a development process that works according to the off-shoring model. In relation to the localisation of usability evaluation we explore research relating to different approaches in a number of cultures and context and present a model providing summary guidance for method selection in differing countries / cultures..

Culture, Localisation, Institutionalisation, User centred design, Usability evaluation

1. LOCALISING USABILITY PRACTICE FOR LOCAL NEEDS

Across the globe, local people have their own concepts of knowledge and their own forms of information communication. It is important that they should be able to shape their use of interactive systems without the risk of losing their culture and identity. Cultural differences have the potential to affect both the *product* (e.g. website, mobile phone, software application) and the *process* (e.g. requirements capture, usability evaluation) of interactive systems development. In relation to the *product*, cultural differences in signs, meanings, actions, conventions, norms or values raise challenging issues in the design of usable localized artefacts. In relation to the *process* of development, cultural differences potentially affect the manner in which users are able to participate in design and act as subjects in user based studies.

Across the world the number of usability professional is growing significantly. Through a wide range of engagements with usability practitioners during our EU funded projects in India and China (Smith, Gulliksen, and Bannon, 2005, Smith et al., 2007) it is clear to the authors that there is a considerable appetite to learn about

Western HCI case studies in the expectation that these can be implemented locally. However there are two problems to overcome:

- a) Firstly a holistic understanding of HCI is necessary across the practitioner base in order for the most effective tool or technique to be successfully selected and implemented – this implies a much broader 'education in HCI' amongst practitioners rather than just 'training in tools'.
- b) Secondly the cultural and organisational differences between countries and cultures mean that HCI tools and techniques that have been developed in Western countries may not be most effective in developing countries. What is required is the localisation of methods to meet local requirements.

We have proposed a model for the international 'institutionalisation of HCI and usability', as the key way to ensure that HCI is properly developed and implemented across the world (Smith, Joshi, Liu, Bannon, Gulliksen, and Li, 2007).

Institutionalisation needs to exist both in academia (so that effective teaching and research can be supported) and industry (so that interactive developers and usability engineers can understand

and implement the ideally localised principles and practices.

This institutionalisation has three elements:

- firstly the redefinition of HCI and usability practice in the local country / culture – for the usability evaluation process this involves further validation and extension of the model proposed in Table 1.
- secondly the embedding HCI in local national organizations – this involves taking ownership of the redefined HCI within local countries / cultures such as through national computer societies, usability professional associations and academia
- finally the roll out of usability practice in industry – so that fully effective interactive products can be deployed with a global IT industry

In practice these elements will occur in parallel (and indeed all have started) but the critical issue is to ensure sufficient feedback between the elements. Indeed the model accommodates the fact that the practical implementation of usability informs the redefinition of HCI. It is not just a research led process, but one that benefits from both theoretical research and practical implementation.

Figure 1: International ‘institutionalisation of HCI and usability’

In this paper we discuss some detailed issues that will support the implementation of our model.

To set the institutionalisation in context we critically start by providing a critical review of the literature on culture, specifically with reference to its use within HCI and usability as this is necessary to understand the issues underpinning cultural institutionalisation. The issue is not to attempt to enforce some canonical form, but rather to highlight

some of the ongoing controversies about some of the concepts and methods currently being employed in the field. Following this we explore the wider issues relating to both whole life cycle issues of user centred design and the more specific issue of user based evaluation.

2. DIFFICULTIES WITH CULTURE

There has been a practical interest among sections of the HCI community in examining how some of the principles and methods developed in North American and European research communities apply to other parts of the world. On the face of it, one might expect that certain methods for performing, say, “user-centred design”, might not work in quite the same way in a rural area of China as they do in a metropolitan area of Chicago, for example. Issues such as “saving face” and not criticising the “researcher” or interviewer might be an issue, as we will discuss later in the paper. In recent years, this area of what has been termed “cross-cultural HCI” has grown. This is an interesting area for examination, but at the same time we believe that there are a number of potential pitfalls for aspiring researchers in the area, as we have noted in an earlier paper (Smith, Gulliksen, Bannan, 2007). In this paper, we extend this discussion, taking a look firstly at the issue of dimensions of national culture.

The concept of culture is one that is central to our ideas of the diversity of human society. As the anthropologist, Alan P. Fiske notes: “A culture is a socially transmitted or socially constructed constellation consisting of such things as practices, competencies, ideas, schemas, symbols, values, norms, institutions, goals, constitutive rules, artifacts, and modifications of the physical environment” (Fiske, 2002). The understanding of different cultures has been the province of anthropologists who have attempted to understand different human societies through spending time living with members of the society, learning their language, and participating in their daily life, and rituals. This method of understanding has become known as participant observation, and the reports on these different cultures, ethnographies. Again, to quote Fiske: “The best way to study a culture is for researchers to learn it pretty much the way informants do, by observation and imitation.” (Fiske, 2002). It would appear self-evident that different cultures would have ways of perceiving and acting in the world that may differ, dependent on their upbringing and their adaptation to that part of the natural world where they live, be it the Antarctic or Equatorial Africa.

In more recent studies in the area of international business and in global software development, there

has been a renewed interest in the topic of cross-cultural comparisons focussed on national identities, such as for instance, comparisons of North American culture vs. Indian or Chinese cultures, and how such differences might affect the structure and functioning of organizations in general and work activities and practices in particular. While agreeing to the fact of distinct differences in ways of working across different parts of the globe, we would urge some caution as to how these differences are conceptualized and formulated. For one thing, there is often a too-ready identification of these cultural differences with national identities. It is well to remember that national identity is, conceptually, not a very well-grounded psychological sociological or anthropological concept. For instance, countries such as India are made up of many different ethnic groups, with distinct languages and cultures, so attempting to characterize an "Indian" mentality or approach is problematic in the extreme. Also, assuming that one can identify a culture through attributes identified through individual survey responses is fraught with problems.

For example, one of the most well-known and cited set of dimensions used in cross-cultural studies in the organizational and global software engineering literature is that of Hofstede (1991, 2002) whose work is based on survey data from a large global sample of IBM employees. Based on this data, Hofstede's (1991) conceptualised culture as 'programming of the mind', in the sense that certain reactions were more likely in certain cultures than in other ones, based on differences between basic values of the members of different cultures. He proposed that all cultures could be defined through three dimensions:

- power distance (PD), the degree of emotional dependence between boss and subordinate,
- collectivism / individualism (IC), integration into cohesive groups versus being expected to look after him/her self,
- femininity / masculinity (MF), which could be interpreted as toughness versus tenderness.

In later research he recognised that, for Western cultures there was the additional important dimension of uncertainty avoidance (UA), the extent to which members feel threatened by uncertain or unknown situations, and for Eastern cultures, long-term Confucian orientation, which represented a philosophy of life that was prepared to sacrifice short-term results for long-term gain.

Many applied scientists have seized on this data as an instrument for developing specific tools to cater to specific sets of values on Hofstede's dimensions.

However, while welcoming the interest in understanding the heterogeneity of working practices in organizations globally, we would like to caution researchers in these applied fields of the host of difficulties with the approach adopted by Hofstede, both at a conceptual and methodological level. Here we just touch on a few issues with Hofstede's model (a more detailed critique is forthcoming) while later in the paper we will examine some of the work published using this approach.

Within the organizational studies field, Hofstede's formulations have been the subject of extensive critique. Criticisms of this approach include:

- culture is seen as a never changing, monolithic concept,
- cultural groups are seen as homogeneous, while the possibility of diverging subcultures is ignored,
- actors are allocated to one culture at a time, while different cultures are seen as being mutually exclusive.

The wholesale adoption of this approach by certain software engineering researchers probably has more to do with the relatively straightforward way these concepts can be operationalized and data "captured" using easy-to-apply survey instruments, than to any real engagement with the underlying organizational "theory".

A general critique of Hofstede's work can be found in the paper by McSweeney (2002a), including a response by Hofstede (2002), and a reply by McSweeney (2002b). However, of more specific focus in this paper is the critique by Fiske, following on from the critical meta-analysis study of Oyserman et al. (2002). As summarized by Fiske, the conclusion is:

"On the whole, much of the research looking for effects of IND (Individualism) and COL (Collectivism) does not yield very meaningful or very consistent results, most of the effect sizes are not very large, some are in the wrong direction, and very few, if any, have been replicated using diverse scales. The big picture is that research does not support the theory that East Asian COL produces a psychology that contrasts with the psychology of NA (North American) IND. This is the discouraging news that Oyserman et al. (2002) brought us."

Thus one fundamental problem is that one of the basic dimensions of national cultural difference as posited by Hofstede is not empirically or conceptually sound. Yet this dimension has been accepted by a host of researchers in the HCI and GSE fields as the basis for further work. There are many further issues with cultural studies that use

questionnaire data as their basis for extrapolation and interpretation. As Fiske so trenchantly notes:

"A more fundamental epistemological problem is that all of these methods rely on verbal responses. The use of rating scales, free responses, or interviews is appropriate only to the extent that one conceptualizes culture as declarative semantic or episodic knowledge. Most contemporary theories posit, and fieldwork confirms, that culture consists of diverse, loosely connected constituents, only a few of which are articulable. The core of culture consists of practices and competencies, needs, motives, emotions, institutions and constellations of relationships, and artifacts and technologies. Most of the intangible constituents of culture generally are not accessible to consciousness, reflection, or explicit linguistic expression. People simply are not aware of these aspects of their culture and cannot report them, even in terms of their own behaviours and preferences. Studying most of these aspects of culture through self-report is worse than useless; self-reports are likely to be distorted, biased, and confabulated representations. The core of culture is procedural competence, not abstract propositions." (Fiske, 2002).

Critiques of the reification of national cultures have led to a number of alternate accounts of culture. Some focus their attention on the many different forms of "culture" - professional, organizational, etc. - that may affect local practices. Others develop more nuanced interpretations of the culture concept itself - moving from a focus on the concept as denoting a set of pre-programmed stereotypical behavioural responses to an understanding of the dynamics of interaction within and across professional, organizational and national boundaries. In this view within global software engineering, for example, in order to obtain a richer understanding of cultural influences of knowledge management in global teams, it is necessary to investigate actual work practices in their social (and cultural) embedding.

In accord with interpretivist approaches, we propose a much broader understanding of culture: we see culture as a shared web of meanings that shapes roles and interpretations, and is dynamically (re)negotiated by the actors in the course of their daily work. Hence, we are more interested in the actors' interpretations and related processes of sense making, than in the definition of cultural particularities.

Let us now look at some of the other approaches that have been taken to the "culture" concept. A number of other researchers have attempted to define the various dimensions that underpin culture

through empirical research. Hall (1976) distinguished cultures on the basis of a way of communicating along a dimension from 'high-context' to 'low-context'. A high-context communication is one in which little has to be said or written because most of the information is either in the physical environment or within the person, while very little is in the coded, explicit part of the message. Hall distinguishes ways in which culture defines time, with the concept of monochronic and polychronic time. In monochronic cultures, time is divided into linear segments, and can be measured and controlled. Individuals in such cultures also tend to focus on doing one thing at a time (Hall and Hall 1987). In comparison, in polychronic cultures, human interactions are more valued over time and material things. Individuals in these cultures are comfortable juggling a variety of tasks at the same time and consequently time schedules are flexible and only serve as a rough orientation.

So we can see that there is no lack of theoretical underpinning for cross-cultural usability, there is a lack in explicit demonstration that such theories are actually transferable to our discipline. However Smith, Chang, and French (2003) undertook studies in China to actually measure the extent to which Hofstede's dimensions affected perceived usability of websites. Results showed that although some of Hofstede's dimensions were statistically relevant others were not. Furthermore not all preferred levels of the dimension were as Hofstede's analysis might indicate.

3. USER CENTRED DESIGN IN A GLOBAL CONTEXT

Having explored key aspects of the literature and theories underpinning the cultural localisation and institutionalisation of HCI and usability we now turn to the issue of user centred design as the fundamental framework for usable interactive systems development.

Traditionally the theoretical development within user-centred design has mainly occupied itself with the development of tailored systems for well-defined work tasks. Cases in which iteration, involvement of users, multidisciplinary design is pretty straightforward. But user-centred design in a global context means new challenges. Previous quality goals of usability become a lot more complex and broaden to consider factors, such as accessibility, reasonable from an economic point of view, and cultural and linguistic adaptability of systems. At the same time the user population becomes broader and a lot more heterogeneous. Clearly the need for user involvement in the development process increases, but at the same

time the need for standardized solutions and common solutions also increases.

We adhere to a definition of user-centred systems design (UCSD) outlined in Gulliksen et al (2003). Therein UCSD is defined, encapsulating everything from tools and techniques to business and organizational factors. But it is indeed much more than this. One of the main characteristics is a required change in *attitude* from all stakeholders involved in the development work. One of the central issues when applying UCSD in a global context is how the concept is perceived and appreciated. From our experiences it is much easier to undertake the principled guidelines and process steps than to adopt the general philosophy that a deep understanding of UCSD actually means. The global context challenges traditional views of UCSD in various ways:

- Developing for the general public means that there is an increasing need for localization or even individualization, as the software penetration in all parts of the world is constantly increasing. Web 2.0, mobile applications and increased software and hardware technologies provides new opportunities, and challenges traditional general assumptions based on standardized software use in office environments.
- Developing for a different culture than the developers own culture poses challenges in terms of understanding how to support that particular culture. This is valid for among other things the offshoring of development, where the mere distance in time, place and culture put high demands on a formalized development process or costly adaptations to local conditions.
- Development roles, organizational structures, procurement and acquisition processes as well as experiences and skill levels all influence the ability to conduct UCSD. Usability professionals have become a clearly established role in most Western countries (Boivie et al, 2006; Gulliksen et al, 2006) but for example, in the Asian context design and developer roles shoulder these responsibilities to a much larger extent.

Developing for the global context also needs a focus on sustainability and social responsibility in entirely new ways. The technology must be made much more affordable, the user population's preferences and requirements broadens as we meet entirely new challenges spanning from the very young to the very old, addressing all potential physical and cognitive capabilities as well as supporting the widest possible range of learning deficits and illiteracy.

4. LOCALISATION OF USABILITY EVALUATION

Having explored, albeit briefly, the whole life cycle issue of UCSD we now turn to perhaps one of the most investigated issues in relation to culture and usability - that of the more specific issue of user based evaluation. As long ago as 1996, Herman (1996) noted that the results of user-based testing indicated that cultural effects exist, and that they exert a strong influence on the outcome of user interface evaluation. In addition he recognized the need to modify 'Western' usability evaluation methods for application in the Far East. Since then a number of other researchers have reached the same conclusions (Evers (2001), Yeo (2001) and Oyugi et al (2008)), particularly in relation to evaluation methods that seek to elicit users' attitudes through the use of contextual inquiry type think-aloud methods and structured interviews.

Cultural differences potentially effect usability evaluations in multi-dimensional ways. Differences can occur as a result of cultural differences inherent *within different cultural user groups*, with differing groups potentially reacting differently to individual evaluation methods. Differences can also be evidenced as a result of cultural differences *between users and evaluators*.

4.1 Cultural differences between users and evaluators in usability evaluation

Vatrapu and Pérez-Quinones (2006) present a controlled study investigating the effects of culture on the effectiveness of structured interviews in cross-cultural contexts (Indian / Anglo/American) finding that participants found more usability problems and made more suggestions with the Indian interviewer than with the Anglo-American interviewer. Similar results are echoed in Clemmensen and Plocher (2007), where they carried out a pilot study and chose users and evaluators from Denmark and India. They specifically focused on conducting all possible pairing of test users and evaluator pair. Having a local evaluator testing local users seemed to be fastest and the best way to find culturally specific problems with localised test applications.

It is clear therefore that usability tests should be undertaken by moderators who are from the same cultural background as the users themselves. However using local moderators in combination with foreign developers affects the ability of the local moderator to comprehend the rationale, selection of usability method, context and overall purpose of the test. To overcome these problems it is not unusual for the foreign designer to travel to the location and observe the conduct of the local usability tests, to provide advice and to observe and take notes. This procedure, however,

significantly increases the cost of testing but results in improved quality of usability evaluation.

4.2 Cultural differences inherent within different cultural user groups in usability evaluation

Research into cultural differences relating to user-based studies has been ongoing for many years. Nakakoji (1994) highlights important cultural issues that would need to be put into consideration when migrating software to Japan finding that Japanese were not happy with brainstorming sessions and that it was culturally unacceptable to challenge managers' ideas in public. These findings were supported by Herman (1996) who reported behaviour in the Eastern culture whereby it was considered culturally unacceptable to criticise the designer directly openly as this may cause the designer to lose face.

Many cultures, particularly in Asia and Africa, demonstrate difficulty with Western developed contextual inquiry methods, particularly those with probing. Lim and Usma (1998) carried out a summative usability evaluation of public information kiosks in Singapore finding a mismatch between the objective assessment feedback and the subjective assessment feedback. Yeo (2001) describes a study that examined the efficiency of the global-software development lifecycle technique. An American English spreadsheet was adapted for Bahasa Melayu literate speakers, a cultural group in Malaysia, using think-aloud user based evaluation, questionnaires and interviews. Again, he found that users were reluctant to provide critical negative comments. This reluctance was because they wanted to 'preserve face' of the designer and also because they showed respect for hierarchy.

Chetty (2005) describes a research project that was undertaken in rural South Africa where a telemedicine software prototype was implemented. The project involved a mixed group of participants from the university and the local community. It is noted that during the evaluation phase which was carried out by a Cuban doctor and a Xhosa nurse, cultural factors may have played an important part. Both participants 'did not criticise' the prototype but 'leaned towards the positive in all their suggestions'. Chetty attributes this reluctance to criticise to the fact that both Cuban and Xhosa cultures view criticism as a sign of disrespect.

Oyugu, Dunckley and Smith (2008) report two separate empirical studies of a number of well-known techniques with UK, African and Indian users. In the Indian study three different methods (think-aloud, think-aloud with probing and post-usage interview) were selected for investigation with two user groups (UK and Indian). In fact all

users were resident in the UK but the Indian users has only recently arrived in the UK and their levels of acculturation was low as determined through the Suinn-Lew Asian Self Identity Acculturation (SL-ASIA) scale (Suinn, Ahuna and Khoo 1992). As determined by the number of useful pieces of usability information obtained, post usage interview performed worst for both Indian and UK users. Similarly think-aloud with probing performed best for both user groups. However for Indian users the improvement of think-aloud with probing over think-aloud alone was much less marked when statistically analysed.

Although there is comparatively less supporting research, there is evidence to suggest that Indian users in particular have some difficulty in adapting readily to highly structured task-based testing. This is supported by Chavan's (2005) work on Bollywood where a far richer scenario is presented to the user compared to Western methods. Both the interview and think-aloud only methods, being ones without evaluator interruption, seem to allow much more flexibility in user's interpretation of the required tasks. With contextual inquiry / probing method user interaction is far more interrupted and this may inhibit flexible interaction. This is potentially in accordance with India's supposed polychronic culture as defined in cultural models, in which multiple tasks are handled at the same time, and time is subordinate to interpersonal relations. It is possible that 'think-aloud with probing methods' reinforce monochronic interaction. We can also speculate about the effect of the differences in uncertainty avoidance.

In further related in Kenya, Camara et al (2009) compared the co-discovery usability method and the retrospective protocol method with both Kenyan and UK users, finding that the data collected from the Kenyan users using the co-discovery method to be much richer as compared to that collected using the retrospective protocol method and a probing method. The suggestion being that co-discovery was more suitable to the Kenyan collectivist culture.

In Namibia (Africa), Winschiers (2001) describes exploratory research based upon a computerised tutorial system for students. Similarly to Indians, Namibians have a culture of non-criticism and it is considered impolite to criticise someone's work in front of them. The culture also demands that the culturally established authoritarian hierarchy is respected at all times. In order to overcome the authoritarian gap, Winschiers used peer-to-peer evaluation in comparison and integration with other methods. The outcome of the peer-to-peer evaluation differed dramatically from other methods, as the students were approached by their

peers, there was a willingness and freedom to speak freely.

This paper has been written for a global, as much as an Indian, audience but the authors would wish to recognise and address (as far as we are able) the particular contribution to the global understanding of these issues from Indian based researchers and practitioners. Indeed since our involvement in the Indo European Systems Usability Partnership (IESUP) between 2002 and 2004 and first All-India Human-Computer Interaction Conference (Prasad, Smith, Joshi and Ahmed, 2005) much work has been achieved.

The contribution comes from both practitioners based in both international and locally based usability consultancies (e.g. HFI) and researchers / academics based in universities (e.g. IITB, IITG) and research institutes (e.g. C-DAC), sometimes working in collaboration with international partners in funded projects (e.g. <http://culturalusability.cbs.dk>).

In common with work in China, significant outcomes in Indian based research relate to the specific nature of localised interaction either in local language script, with particular devices or user groups (e.g. Yammiyavar and Kate, 2009, Katre, 2008). Furthermore work is on-going into the relationship between HCI and software engineering in Indian industry (e.g. Joshi, 2007)

For the practicing usability engineer and for interactive systems developers the implications of all these culturally determined issues are considerable. International interactive product developer may need to use different methods to evaluate the product in different regions / with different users. This in itself may be problematic as results from separate studies will not be directly comparable.

4.3 Guidance on global usability evaluation methods

When providing guidance to usability engineers and international interactive product developers there are a few key issues on which there is little doubt:

- **Test locally.** It is clear that user evaluation / testing should take place in the local context. Using immigrant users initially from a local culture but who happen to be based in the country where the product is being developed is not appropriate. When placed in a new cultural situation, users may undergo a process of acculturation which is defined as the social and psychological integration of individuals with the target language group (Spolsky, 1989. This occurs as the dominant

host culture absorbs to a certain extent minority immigrant culture (Suinn, Ahuma and Khoo, 1992). Even though the alternative of engaging in international travel is highly expensive, undertaking usability tests in the culture of the software developers with immigrant users from other culture is not to be trusted.

- **Test with local moderator.** Furthermore, usability tests should be undertaken by moderators who are from the same cultural background as the end users themselves. This may not be easy as the development of the usability profession is variable globally. In Asia (India, China etc) there is now a fast growing usability community, but in other areas (such as Africa) this may not be so and it will be difficult to select appropriately skilled local people as usability moderators. In such circumstances it will be necessary to select, train and manage local moderators very carefully.

Although the above two factors are generally agreed within the international usability community, going further we need to consider the type of evaluation / testing method to be employed and its suitability to the target culture. Here there is less general agreement but a growing body of knowledge is emerging as evidenced in the previous section. In an attempt to structure and classify how cultural differences affect usability evaluation a number of interrelated issues emerge.

- **Ability to criticize / loss of face** This is a recurring feature in many reported studies and with reference to models of culture it would seem that the problems evidenced in the above studies relate to the effects of Hofstede's dimensions of power distance and collectivism. The difficulty in this situation may be compounded in areas of high uncertainty avoidance. In such situations methods such as co-discovery between a local moderator and a single user may work. Alternatively it may be necessary to involve peer-to-peer interaction in a collective workshop setting.
- **Appropriateness of sequential tasks / effects of polychronic cultures** Although there is less documented evidence relating to these issues, it seems to be emerging that users in polychronic countries find greater difficulty with strictly task based testing, particularly if integrated with the probing style of contextual inquiry. In such situations much richer, more generic problem based scenarios may be required allowing the users far greater flexibility in the way in which users are required to interact with the product.

Whilst acknowledging the dangers inherent in over simplification, and acknowledging the debate we presented in Section 2 concerning all the difficulties associated with culture, but also in recognising the need to provide practical guidance to interactive product developers, Table 1 presents an overview of some of the key factors that are relevant in major geographical regions. It indicates some tentative suggestions as to methods that might be considered suitable in each case. Before adopting the guidance it is of course necessary to remember the need to understand the typical user group in each region. A software developer working for Microsoft in Bangalore, India may have more in common in relation to his or her interaction with an interactive product with software developers in the USA rather than his or her close neighbours living in a poor neighbourhood of outer Bangalore. With all these caveats in order to simplify analysis six methods are provided:

- **Task based think aloud.** As commonly practiced in US / Europe this method adopts the contextual inquiry approach with local user engaging in a series of clear problem based tasks with a local moderator
- **Task based think aloud with probing.** This is a variant of the above method where the local moderator is more active in the evaluation process asking questions of the user as appropriate. Examples of the method include DUCE.
- **Scenario based think aloud.** Here the user is provided with a richer and higher level problem scenario (e.g. Bollywood) that will enable local users to provide feedback to the local moderator
- **Record and think aloud.** Using this 'retrospective protocol' method users interaction is uninhibited by both the need to think-aloud at the time of interaction or the probing of the local moderator. Instead the sessions are recorded and the local user engages in the think-aloud / reflection process based on the recording after the evaluation session.
- **User / moderator co-discovery.** In this approach the local user and local moderator collaboratively explore the interactive product in an attempt to reduce barriers (power distance) between user and moderator.
- **Peer to peer co-discovery.** In order to reduce loss of face and the effects of power distance in this method co-discovery is undertaken by pairs or groups of users with very little moderator involvement. In this workshop approach usability

information can be obtained in real-time or on completion of the interaction sessions.

Table 1: Key factors and usability approaches in key geographical regions

	Ability to criticize / loss of face		Appropriateness of sequential tasks
	<i>Power Distance</i>	<i>Collectivist / Individualist</i>	<i>Polychronic / Monochronic</i>
US UK Germany	Low	Individualist	Monochronic
Brazil East Africa Arab c'tries China	High	Collectivist	Polychronic
India	High	Collectivist / Individualist	Polychronic
Possible Preferred Methods			
US UK Germany	Task based think aloud Task based think aloud with probing User / moderator co-discovery		
Brazil East Africa Arab c'tries China	Scenario based think aloud Record and think aloud User / moderator co-discovery Peer to peer co-discovery		
India	Task based think aloud Scenario based think aloud Record and think aloud User / moderator co-discovery		

5. SUMMARY

In summary, for HCI and usability to be socially responsive and economically effective in a global software development community it needs to adapt to the needs of the local societies, both to individuals who interact with the artefacts that are produced and with the development communities who produce them. Of course this redefinition does not need to start from scratch, but neither is it appropriate to replicate untested methods that may be successful elsewhere. In order to achieve this redefinition both indigenous and global approaches are required, involving critically a collaboration between them. There still remains much to be done to achieve these aims.

This may be particularly so in the field of interaction design, as an extension of HCI, involves a more nuanced approach to issues of design thinking, and allows for ideas from the design disciplines to influence the more engineering-oriented, traditional HCI approach. Again, many of the Western-oriented approaches to interaction design may require modification when adjusted to other environments. However, it is important to note that this is not a one-way process of assuming the Western model as some "ideal" which is then tailored to local circumstances.

It is also the case that we, in the West, need to be confronted with our mistakes and our problematic assumptions. We need to be open to learning new ways of learning how to think about, and collaborate with others, based on the very rich traditions of, for example, Indian and Chinese thought as to how to understand the essence of design thinking, how to appreciate form and context, how to learn about mindfulness and clear thinking, and how to collaborate and converse with others. In an era where sustainability has become a key goal in design thinking, we in the West have as much, if not more, to learn from the East as they have from us. In this sense, the general field of "design thinking" that the field of IxD has brought into more traditional HCI allows for a rich exploration of these distinct ways of thinking in different traditions, hopefully to the betterment of both.

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