

# *Working Paper*

**Designing for the cultural “other”  
- A global perspective on ICT and illiteracy**

**By**

**Janni Nielsen**

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Institut for Informatik

Handelshøjskolen  
i København

Howitzvej 60  
2000 Frederiksberg

Tlf.: 3815 2400  
Fax: 3815 2401  
<http://www.inf.cbs.dk>

Department of Informatics

Copenhagen  
Business School

Howitzvej 60  
DK-2000 Frederiksberg  
Denmark

Tel.: +45 3815 2400  
Fax: +45 3815 2401  
<http://www.inf.cbs.dk>

## **Designing for the cultural “other” - A global perspective on ICT and illiteracy**

### **Motivation and background of project**

The process of globalization is opening new windows for Danish initiatives. The requirement for innovation and development of new areas as a consequence of the globalization will lead to radical changes and the IT businesses need to take active part in the development. But in order to understand and explain the globalization process we also have to understand the limitations. One such limitation is found in the global digitalization of information- and communication processes. This global development requires, from the world citizens, literacy in use of computers. The majority of the world populations are illiterates, they are not only technical illiterates but also illiterates in the traditional sense: they cannot read and write, however, the global ICT development largely disregards the problem with illiteracy and cultural differences. It seems that a future area of growth for the Danish IT business with their specific competencies may be to strengthen the user oriented and interdisciplinary approaches to design and development of ICT applications - targeted to specific cultural groups and the illiterates - in developing countries and also to large groups of immigrants in the developed world.

India is an example of the global structural changes. India has developed an impressive ICT industry and has a very high level of expertise in software engineering. India's government has a vision for e-democracy and have implemented e-government systems, which also address the rural populations. But the Indian population is very large and the potential users are highly diverse groups of which many are illiterate<sup>1</sup>. Denmark has an IT industry that supplements India's, e.g. a strong expertise in e-government<sup>2</sup>, and ICT for the agriculture. Denmark has a long tradition for cooperation between IT developers, researchers and users and is strong in interdisciplinary approaches to development and design of ICT applications. Denmark also has a tradition for a human centred design, and usability is seen as a competitive factor. In India usability is on the agenda in only few IT companies, and it is also new to the academic world (Pradeep Y. 2004).<sup>3</sup>

Copenhagen Business School, department of Informatics has for the last 18 months been involved in the establishment of a Euro-India Centre. The departments research group on human-computer interaction(HCI) has prioritized HCI work in the Asian world for the last 4 years (Clemmensen 2004, Nielsen Janni 2004, Nielsen, Clemmensen and Yssing 2002, Levinsen, K. 2002, Nielsen, Lene and Gregers Koch 2003). The wish for a collaborative network has come about as a result of meetings and discussions between researchers from especially India and Denmark and also from Great Britain and Sweden. The first Indian conference on HCI in December 2004 and the initiative from CBS, department of Informatics in May 2005 where an Indian – European workshop was held, created the basis for this network application.

### **Purpose and focus of the research network**

The purpose of the application is to establish a research network within Human Computer Interaction with the aim of exchanging knowledge of and share experiences on:

- methods and techniques for design and development of culturally sensitive ICT applications for illiterates and for people from different cultures
- design of user driven interfaces and software applications which can be used by illiterates, and by people from different cultures
- and to build knowledge and competences relevant to e-government applications in a

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<sup>1</sup> During the 2005 Indian HCI conference the hosts estimated between 400-500 million illiterates in India

<sup>2</sup> the Ministry for Science, Technology and Development finds that resistance is the third greatest barrier against use of IT in the Danish Municipalities (the study did not include analyses of usability of the applications) (2005)

<sup>3</sup> The first Indian conference on Human Computer Interaction was held in December 2004

### **Relevance of research network**

This possibility for a collaborative research network between India and Denmark is a special opportunity. India has experience with design for different cultures, has implemented e-applications and identified problems with design for diverse groups of users who are both IT-illiterates and traditional illiterates. Bringing this knowledge and experiences into play with the Danish tradition for interdisciplinary approaches to user-oriented design create a unique setting. With the research network we may:

- with India as “laboratory” investigate the cultural bias in our HCI methods and tools
- together with researchers from India develop tools which will be better fit to cultural contexts and conditions
- through cooperation with India learn about cultural context for ethnic groups in relation to central authorities
- focus on e-government because there is a parallel problem space of “cultural distance” between central authorities and many ethnic groups also in the Western world/Europe as a consequence of the large immigration
- through our collaboration with Indian researcher on “cultural other”<sup>4</sup> acquire knowledge contributing to the development of e-government applications in Denmark/EU which will reach ethnic groups
- offer IT businesses new methods and techniques which will be valuable in their development of applications for their markets in Denmark and globally
- achieve a collaboration with researchers and businesses in EU who develop methods and techniques of relevance to ethnic groups

The network also includes HCI experts from UK and Sweden, who have extensive knowledge of and experience with the international HCI research field/HCI in India. The cross-national knowledge sharing will hopefully give the network qualified insights and place us in a position where we may pursue a future project proposal in EU. The success criteria is a proposal which goes beyond our network and it’s agenda, and also includes IT businesses and other countries e.g. in Central America, and China, to whom bridging the gulf between IT, culture and illiteracy is important.

### **Expertise in the network**

The challenge and the advantage in the Danish-India network lie in the cultural diversity where the strength of India is an engineering and computer science perspective. The strength of Denmark is interdisciplinary user oriented design embedding the user perspective throughout the development process. The collaboration requires a sensitivity of context, an openness to and mutual respect for the cultural other participants, and it also requires the willingness to dialogue.

The Danish contribution to the network comes from Copenhagen Business School, Dept. of Informatics. The six participants from the research group on Human Computer Interaction are headed by professor Janni Nielsen. Their expertise is the interdisciplinary approach to human centred design, with a solid grounding in HCI methods and techniques. The e-government research group contribute with extensive knowledge of globalization and e-government, besides a profound knowledge and experience with Indian culture. This group includes professor Kim Viborg Andersen, Professor Mogens Kuehn Petersen and assistant professor Helle Zinner.

The Swedish contribution from Univ. of Uppsala is headed by professor Jan Gulliksen. He has extensive knowledge of both the European and the Nordic HCI research and will also

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<sup>4</sup> here we use the concept of cultural other to refer to a technical illiterate and/or a functional illiterate and/or persons with different national/cultural backgrounds

contribute with his knowledge of the IT industry in India.

The contributions from Great Britain is a system development approach to HCI. This contribution is headed by professor Andy Smith, Thames Valley University, who also brings to the network invaluable experiences from his yearlong collaboration with Indian computer science and HCI chapters.

The Indian contributions come from different institutions. Professor Pradeep Yammiyavar from Indian Institute of Technology, Guwahati, brings to the network essential expertise in design of visual interfaces. From Mumbai, Indian Institute of Technology, comes expertise in Industrial Design where Ass. Professor Anirudha Joshi combines this with experimental work on new methods. IIT in Mumbai will also be the base camp in India for the network. Finally Dinesh Katre, head of Center for Development of Advanced Computing(C-DAC) under the Ministry of Communications and Information Technologies contributes know how and knowledge of low cost Multimedia design for villagers – and the rural e-government applications.



### **Applications for diverse population of user groups**

E-government in India is a broad concept covering financial governance, democracy and service to the inhabitants: health, education, agriculture etc. The technology is there, however, experiments have shown there is a gulf between the intended use of a technology and the actual use because “neither Development nor Quality Assurance Process consider Usability from the requirement phase or the pre-implementations phase (Jani R. and Badave V., 2004) (Singh and Agrawal 2004). One solution explored by the Indian Government has been to set up electronic kiosks in remote areas and let the electronic information process be handled by and through a kiosk operator - who may be a local administrator.

India is divided into states, a state is divided into districts and districts are divided into blocks. A block may consist of 40-50 villages and a block administrator may be miles away – geographically, and mentally – from the individual farmer from a remote village who wants to ask experts in Delhi about the black spots on his crop. “In India language, context, culture change in every few kilometres” (Parmaar et al, 2004). The administrator may know nothing of the knowledge field in questions and the expert in Delhi may never have visited the remote area of the remote state in question. Villagers may have no concept, nor understanding of computers and networks – and the technology makes no sense to them. The individual “user” becomes dependent upon the operator (Parmar V. S. and Wani P., 2004), and questions and answers may suffer from the administrators’ handling. Besides, information is power and the role of the administrator as gatekeeper of technology and interpreter and handler of information may undermine the intended technological enhancement of democracy because gate keeping may develop into a very powerful (and misused) position.

Illustration: example of an e-government web site: Rural Planner



This web page may be activated through mouse over. This means that a text bubble occurs when the user/operator moves the cursor over an object on the screen. In this case he moves it over the tractor in upper left corner, and a text pops up.



If the user/operator moves the cursor over the tree several items become visible: people, the health station, a text in a black bubble and a red arrow, which point to a menu bar on the right side. The user/operator is requested to key user id, password and entry (location) where he can choose between district, block, gp or village and finally may select to see rainfall for given periods.

It has been suggested that e-government services become personalized, and experiments have been carried out with “personalized services through touch screen kiosks” to the illiterate villagers. But there are problems with “establishing identity of person and verification” (Katre 2004). In one experiment potential illiterate users were asked to choose a combination of images, 7 images for username and another 7 images for user identity. There was no problem in getting users to choose among the many different visual images of which there was great variety in style and size. However, a few days later the users did not remember all the visual images they had chosen nor the sequence in which they were chosen<sup>5</sup>.

### **Culture and Cognition**

There is a digital divide between those who can read and those who can not, those who speak English and those who do not (Yajnik, 2004). Different solutions have been suggested and prototypes developed; ” interactive speech interfaces (Girija, P.N., 2004) and special navigational assistance such as “signboard system, vocal agents or natural language processing dialogue” (Panwar V. and Pradeep Y., 2004).

However a main problem seems to be the relation between the culture of Information and Communication Technologies and cognition of everyday life. The villagers had no problems reflecting on rain, clouds, grey skies, sun etc. in the concrete experiences of everyday life, But when these objects were transformed and visualised on a computer screen, they did not recognize them and were not able to talk about them when interviewed.<sup>6</sup> They were concepts, visualised, but still abstract - not concrete experiences like seeing the black spots on the crop.<sup>7</sup> “We do not exactly know the information need and information seeking behaviour of the rural populace” (Singh & Agrawal 2004), and we do not know their reasoning nor their perception of the ICT applications they are introduced to.

Context is embedded in cultures and differences in cultural contexts constitute differences in cognition (Barry and Dasen, 1974). This understanding has to be taken one step further, because research has shown that cultures may use different cognitive tools for perception and reasoning and there are culture specific differences in the way that people think and reason. (Nisbett R., 2003). A logically true statement may be true in English, but not in Hindi, or Chinese and in Japan, Shakespeare’s play Hamlet is dramatized from the revenge motive as oppose to Hamlet in Denmark which is build up around the suicide of Ophelia.

The cultural context of cognition raises a number of questions in relation to the global IT development. How do we design and develop IT applications that embed an understanding of the cultural context? How do we design and develop to an illiterate population and how do we test and evaluate the illiterate user’s interaction with the computer? These questions are significant as illiteracy is not restricted to India. It is a global problem and the threat of IT, dividing the world into those who have access and those who do not, makes these questions highly relevant.

### **User oriented Design – a framework**

Denmark has a long tradition for a human centred approach to design of e-applications and usability is a key issue. The Danish research is part of the Scandinavian tradition of involving

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<sup>5</sup> Bigger pictures will stand out among smaller pictures shown on a screen, and a teacup shown on a light green background will stand out among pictures of landscapes. The users chose what initially captured their attention – even though it may have had no relevance to their everyday life and embedded no specific meaning. Lack of meaning makes it difficult to remember, not to mention having to remember in sequences of seven.

<sup>6</sup> Personal communication, Dinesh Katre, CDAC

<sup>7</sup> This may be difficult to understand for academics, because abstract concepts and meta-reasoning is the grounding in our lives. But a reasoning and thinking based in the concrete experiences of everyday life will not understand what it means to understand the world on the basis of meta-reflection. To everyday reasoning meta-reflections are unreal. To deal in concepts and detached abstract reasoning is mainly taught in a formal educational context, e.g. the school.

<sup>10</sup> methods and techniques that are familiar to all the network participants

users in development of IT systems (Ehn Pelle, 1993, Bødker 2000). As IT-technologies have become part of everyday life, and an essential tool also for knowledge work, the involvement of users has taken on new and less involving forms. Dialogue Design (Nielsen Janni, Dirckinck-Holmfeld Lone and Oluf Danielsen 2003) is one such approach where users (knowledge workers) are still the basis for the development, though they see no need to be so directly involved in the design and development process. Client-centred design is another approach, which explores both the clients' and the users' needs and visions through dialogues during the process with the aim of integrating the perspectives (Ørngreen R., Nielsen J. and Karin Levinsen 2004). The rationale is that a user-oriented project may result in true user design. But if the clients' technological level, competencies and capacities are not constituting variables in the decision process, the system may fail.

This development in the field of human-computer interaction goes hand-in-hand with the unfolding of a methodological theoretical framework. The user, or more specific the human being is understood as a constitutive factor in the interaction, and therefore in the design of the interaction, and in the techniques and tools developed for investigating, analyzing and testing the systems. It is a user perspective that draws on the understanding that the interaction with the computer is mental – not physical. Computers interact directly with our cognitive processes and as such influences how we think. But the mental interaction is not isolated from context, hence studies of human-computer interactions must include studies of context, and methods and techniques must embed the interaction as well as the context in which it takes place.

The questions of cultural embeddings are significant in relation to HCI, because cultural context is also embedded in the methodological framework we work within and in the techniques and tools we apply. The HCI field fails to consider the role of culture in the methods and techniques (Smith A. & Yetim F., 2004) but HCI methods and techniques do not escape a cultural bias. The traditional HCI methods and techniques have developed along with the IT industry and are based in western thinking. They build on the assumption that

- users have an abstract conceptual understanding of computes and the digital network
- interfaces are primarily text
- users have no conceptual problems with understanding what is written on the screen – nor that it is also visible thousand of kilometres away on another screen
- users masters the keyboard
- users can write - and read
- users can engage in meta reflections on the interaction

But what if the user population is technically illiterate? What if they are functional illiterates, that is they cannot read and write? There is a cultural bias embedded in the traditional HCI methods and techniques and we need to rethink the methodological basis and develop culture sensitive user oriented methods.

### **Empirical and experimental**

The collaboration will be empirically driven and the foundation is rural and illiterate populations of India. The network will share knowledge on e-government solutions already applied, which will serve as basis for analysis of cultural and cognitive understandings embedded within. Potential it-applications will be explored, and experimental low-key prototyping is part of this effort. It is the HCI studies which grounds the work and the network will share knowledge on and experiences with the use of different methods and tools, which will serve as basis for analysis of cultural biases embedded.

To allow the network to build knowledge and competence in design and development for the cultural other – HCI driven field studies needs to be conducted. The start will be the traditional physical field studies, which will serve as basis for design of experimental HCI tools and techniques. But how we may work from a user perspective, how may a dialogue unfold when it does not give any meaning to ask directly for the (potential) users' needs? Seen from an IT and engineering perspective it is not possible to speak meaningfully of a

technology push. Because there is no practice to study. It seems to us that new ideas, innovation and suggestions to new artefacts must be looked for elsewhere. The networks approach is the everyday life of human beings who live in a context and act in time and space, and this embeds a radical shift from a technology push.

The complexity of the India scenario allows for and necessitates highly creative approaches to development from a user perspective and offers a unique possibility: a people push. This implies that the network collaboration needs to be framed by a grounded theory approach where praxis and theory mutually inform and condition each other (Strauss and Corbin 1996). This approach may help reveal cultural biases embedded in IT applications and may open for new design and developments of new HCI methods and techniques as well as new applications. But the design and development needs to be based on experimental prototyping just as techniques and tools for test and evaluation of the human interaction with the computer/other ICT artefact has to be developed on an experimental basis. Confronting existing techniques and tools e.g. contextual enquiry, cultural probes, scenario development, the technique of engaging persona, iterative prototyping, design of icons and graphical (dynamic) interfaces to the applications<sup>10</sup> with explorative and experimental approaches may lead to innovative designs.

The network is aware that identification and selections of potential rural village depends upon Indian e-government initiatives in given geographical areas. At present Indian Institute of Technology in Mumbai is conducting contextual inquiry into illiterate rich-shaw and car taxi drivers need for it-applications to support them in their daily work. Center for Development of Advanced Computing (C-DAC) under the Ministry of Communications and Information Technologies are looking at ways to share knowledge of cultural inheritance with remote villagers. It is expected that new applications will be implemented and final decisions will be taken when the network is in work.

### **Activities**

The network is expected to run for 3 years and will be organized around seminars, explorative and experimental tasks and smaller workshops. There will be two seminars per year, one in India around November-December and one in Denmark around May-June. All researchers are expected to participate. The function of the seminars is to enhance dialogue around themes and identify common tasks to be undertaken in periods between the seminars and to report on progress. Workshops are for smaller groups who have undertaken a cross-cultural research tasks e.g. field studies, experimental design and tests, theoretical-methodological work.

Potential themes for the collaboration have been proposed for seminars and workshops:

- user populations and user needs (multi-ethnic groups)
- IT applications for illiterates
- cultural otherness/cultural cognition
- culturally sensitive methods and techniques
- experimental designs of digital interaction for illiterates

Other activities envisioned are:

- Exchange of faculty to intensify research collaboration
- Exchange of HCI courses for master students and PhDs
- Explore possibilities for collaboration with private companies with a view to EU funding
- Danish and European HCI industry seminars on developing for the cultural other
- International research contributions to a cultural perspective on methods and techniques in HCI