DOMESTICATING THE DESKTOP

DESIGN PARAMETERS FOR A POST-LITERATE GUI

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ABSTRACT

Although ICTs are being experimentally deployed at a number of locations in South Asia, more successful interventions appear to involve certain deformations and adaptations of modular ICTs to suit the needs of new rural users. This process of domesticating standard, average, normative, urban and globalized technologies, usually employs three common strategies:

1. community rather than individual ownership
2. human-mediated rather than direct access
3. multiplex rather than text-intensive formats

Contrasting the aural, oral, visual, corporeally stylized, multiplex, collective, and interactional quality of popular forms of media in rural India, with simplex, monologic, textually-intensive bureaucratic kind of ICTs, we suggest that alternative audio-visual forms must be invented by project planners, personnel and users through the transcendence of existing ideologies of technology, literacy and social hierarchy.

Keywords
Desktop, GUI, ICTs, Illiteracy, Bureaucracy

SURVEYING ICTs FOR DEVELOPMENT[?]

Over the last five years, several rural sites in India have become testing grounds for the use of Information and Communications Technologies (ICTs) for developmental ends. Project planners hope that rural information networks will allow knowledge, services, money, and certain kinds of information products to flow easily across long distances, from one public access information center to another. Each village node might have multiple institutional identities, serving as a virtual community center, bank, medical resource, government counter, matrimonial bureau, public library and educational resource center all at once. Should these diverse pilot projects prove successful, one might look forward to seeing them replicated in almost a million villages across the subcontinent, resulting in the rapid transformation of a relatively underdeveloped countryside into a dense matrix of information networks connecting rural communities to one another, to urban centers, and to the world at large.

Unfortunately, these ambitious projects have met with variable success. Initiated and administered by diverse agencies including research organizations, district governments, and rural development NGOs, both with and without international expertise and advice, several projects have had difficulty in achieving their minimum operational objective: to actually provide reliable connectivity at village information centers. As we shall see, however, other projects have gone on to devise new services and business models, which innovatively adapt desktop computers, and emerging networking and communications technologies to match local social, educational, governance, business needs. Through a discussion of specific case studies we shall describe how such initiatives offer, for example, agri-produce auction prices at various local markets, the registration of public grievances or complaints against the district administration, the online processing of various government forms and certificates, online classified advertisements including matrimonials and local weather information, in addition to offline services such as desktop publishing and computer orientation and training. In some cases, the difficult problem of affording non-English speakers and illiterate groups access to these services is solved through the personal mediation of the individual manning the kiosk or information center. In other cases, loudspeaker announcements, FM broadcasts and audio-

enhanced screen interfaces have been invented to afford such access.[1]

In all these cases, we observe that these innovations involve a certain deformation and adaptation of modular information and communications technologies to suit the needs of a new set of users, for whom these technologies were not originally designed. This is the process that we seek to capture through the term *domestication*.[2] The divergence between the cultural assumptions, linguistic practices, and information-communications needs of most rural communities in India on the one hand, and the ideologies always already inscribed into ICTs available off the shelf and around the world entails a difficult negotiation, and is the source of new innovations in the field. This paper seeks to characterize the tendencies, preferences, and even ideologies operating on both sides, in order to evolve a new program of technology design, development, and deployment, which might better serve rural communities in India, and, through extrapolation, the rest of the developing world.

ICT AS A TERM OF ART

A number of alternative terms to describe contemporary social and technological phenomena have already been thrown up over the last quarter of the 20th century, including computing, the PC revolution, information technology, digital technologies, new media, Internet and networking in general. We prefer the category ICT, for it is able to encompass all these forms, while also including satellite-based systems of global positioning, sensing, imaging, and information visualization, as well as older forms of communication and media, such as the telegraph, telephony, radio, television, and film. The category does not derive from any particularistic cultural, technological, advertising, or marketing milieu, and may therefore be used for a fine-grained cross-cultural comparison of the particular terminologies, ideologies, and specificities of comparable phenomena. Thus we may identify, for example, the use of 'AOL Keywords' in the U.S. and 'DoCoMo' in Japan as context and culture-specific deployments of broadly similar ICT resources.

In particular, the category of ICT may be preferred over the concept of 'New Media,' a chronotropic coinage indexically grounded in the early 1990s, that sought to force a rupture with the past ("this changes everything!"), which quickly proved unjustified, now that that the novelty of its objects is tired. The distinctions between Old and New Media have proved increasingly hard to maintain, theoretically, historically and even chronologically,[3] especially in the face of their increasing convergence.[4] By contrast, the term ICT allows us to acknowledge the fact that innovation and evolution in the field is continuous and on-going. We may now evaluate the ways in which particular communities construct their own landscape of political, economic, social, and technological practice, using older as well as newer media, analog as well as digital devices, wired as well as wireless connectivity (see also [3]).

Having amalgamated vast heterogeneities into this vast superordinate rubric, it may soon become necessary to once again resolve ICTs into different constituent sub-groupings, for particular descriptive and theoretical ends. Over the last three decades of the twentieth century, as ICTs came to be mass marketed for industrially developed economies, it became possible to distinguish two principal product trajectories for computational devices: (i) the desktop computer and (ii) the mobile phone. The desktop computer may itself be striated into the office workstation, the gaming device, and their amalgam, the home computer. An uncertain intersection of the desktop computer with mobile devices has resulted in the Personal Digital Assistant (PDA) or Handheld computer. Appearing over the horizon, now, is the prospect of immersive, pervasive, or ubiquitous computing, which might give rise to a new and distinct genre of computational products. Notwithstanding this variety, and the cases under discussion here represent attempts to specifically use the desktop computer, as well as its attendant functionalities in rural environments.[5]

LESSONS FROM INDIA'S TECHNO–LANDSCAPE

Here we describe several deployments of ICTs in India in order to extract certain general principals regarding the manner in which these technologies are conceptualized, designed, deployed and used by and for rural populations. These cases have been selected as most representative or illuminating from a set of almost one hundred ICT initiatives documented by the author in collaboration with

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[1] Several limited surveys, ethnographic and quasi-ethnographic accounts on the use of information technology in rural India already exist, see [2], [14], [23], [24], which have since been used in other synthetic and comparative accounts, including [8], [9], [10], [28].

[2] Note that our use of the term *domestication* contrasts with Rogers and later understandings of the *diffusion* of technologies (see [18] and [32]), an approach, which takes adoption of technology as a variable, to be gauged against the technology itself, assumed to be a constant.

[3] Think for example of Thomas Standage's book, *The Victorian Internet*, of which all one might want to know is already contained in its fetching title. In many cases the telegraph was the first public utility, the first networked ICT, and the first digital format [11].

[4] Convergence itself, that fantastic marriage of Silicon Valley with the Valley of Dreams is perhaps better thought of in terms of the mutual interplay of media, than their undesirable sandwiching.

[5] The Simputer, incubated out of the Indian Institute of Science Campus in Bangalore, represents an innovative standard within the Handheld computer trajectory, and necessarily, therefore, falls out of our present discussion.

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Bureaucracy, Governance, and Rural Telecenters

The Gyandoot project in Dhar district of western Madhya Pradesh consists of 31 information centers (*soochanalaya*-s), operated by *soochak*-s, who were selected and trained from among the unemployed educated youth of the village. The project was initiated by members of the Indian Administrative Services (IAS) in consultation with various *gram panchayat*-s (village self-governing bodies), which paid for the equipment and space for these information centers from their own development funds. The *soochak* mediates between local citizen-consumers and the hardware, providing access to the Gyandoot extranet, which is hosted and managed at the headquarters of the district administration. Visitors pay nominal fees to the *soochak* for the diverse on and offline services he or she provides.

As in many other cases, the computerization and networking of governmentality in Dhar proceeds as if it were the vivisection of a corporate body, temporarily revealing the ideological foundations of its functioning, before they are hidden from view once again under the folds of routinized practice, now albeit electronically-enabled. The Gyandoot Project has developed an important e-governance protocol, tellingly called the *shikayat*, or complaint. For a fee of Rs. 10, rural citizens may select from a predetermined menu of 30 different kinds of complaints, which together cover a wide range of citizen-consumer to government interactions in rural areas. These include for example: the absence of a school teacher; the death of a head of cattle that may require a government veterinarian; the malfunction of a public hand-pump that must be repaired, and so forth. The Hindi / Urdu term *shikayat* literally means 'complaint,' in the sense of either 'having a score to settle' or 'telling on someone to someone else.' My guide through the district explained that the public usually interacts with the government by first making a request to a local body. If no responses are forthcoming, a follow-up request might be made at a supra-local office. When that fails, a complaint may be made at the district level. The *shikayat* system bypasses these intermediate and futile steps, allowing citizens to make request / complaints directly to the district administration.

It is noteworthy that the menu of services provided by Gyabndoot is almost entirely determined by the range of possible forms of interaction that the rural citizenry is likely to have with the government. These services nearly always involve the creation, transmission and receipt of documents, usually to and from government agencies. In other words, these rural information centers are really only capable of offering transactions with financial and administrative bureaucracies, despite the fact that the everyday lives of most rural citizens are *not* organized by their relationship with a bureaucracy or a network of bureaucratic institutions.

The Cultural (Re)Imagination of GUI

The 'Hole-in-the-wall' (HITW) project initiated by Sugata Mitra and his research team at NIIT involved breaking open a hole in the wall dividing his team's research labs in New Delhi from an urban slum right next door. A networked computer was installed behind this new window, along with a trackball to provide a limited control and access to it. Video-cameras captured many hours of young children aged 6 to 16 watching the screen, playing with the device, and gradually learning to manipulate the machine's Windows-based Graphical User Interface (GUI).

Mitra's team documents – but does not sufficiently examine – the fact that children playing with the trackball quickly develop their own vocabulary for the principal elements of the GUI. The arrow-shaped cursor dragged across the screen by the trackball is imagined as a needle (*suwee*), perhaps repeatedly puncturing the fabric of the screen. This needle allows them to visit various websites, which are referred to as channels (*chenal*), based on the metaphor of satellite cable television. Most interestingly, perhaps, the hourglass shaped icon that turns over and over to indicate that a new applications will take some

time to load, is perceived as a double-sided drum (*damaru*), which is often used in street performances to gather round a crowd of children and to generate anticipation for an event or happening about to take place. While conventional western users are marking the time taken for a website to load or for an application to boot up, with a rotating hourglass, whose cycles are akin to the tapping of one's foot in impatience, a child in New Delhi hears a drum role in his mind's eye, and is flushed, perhaps, with an excitement similar to the signature chimes of an approaching ice-cream truck.

The striking phenomenon observed here is the manner in which a single GUI gives rise to two alternative structures of metaphor – the desktop metaphor set already familiar to us, as well as the new metaphor set spontaneously generated by children from urban slums. Even when confronted with phenomenologically and interactionally identical environments, icons, and experiences, different user groups may therefore interpret them in radically divergent ways. The children's metaphor set, and the desktop metaphor subtend on either direction from the same graphical information, but do not coincide or overlap in the mind of the same user.

This case offers us a number of important insights. First, of course, we learn that children from the slum and the street can teach themselves and one another to use a GUI. Second, given that they learn how to do so in the absence of any command of English – or indeed literacy itself – their navigation of the GUI surface must rely almost entirely on spatial and iconic cues. Third, they *read* the GUI in terms of their own reference frames, including their knowledge of their own cultures of play, and prior experiences of media and technology, Television in particular. The desktop metaphor works for them only in as much as its graphic form is consistent and coherent – the metaphor of the desktop *per se* in fact falls out, to be replace by their own imaginings.

Community Narrow/BroadCast & RadioBrowsing

A community development project in Nepal has built a tall tower atop a hill site, from where public service information and announcements are made using a microphone and loudspeaker. This modern-day version of a town crier or muezzin call represents the most basic form of oral / aural / audio communications infrastructure, which is nevertheless still extraordinarily userful in those underdeveloped or remote regions of the world where electricity, connectivity, and even radio coverage may be lacking. A further innovation on this form of 'narrowcasting' may be seen at the M. S. Swaminathan Foundation's project in Pondicherry, wherein local weather, tidal and navigational information is downloaded from the GIS data available from a U.S. navy satellite, and then publicly announced from loudspeakers strung up at the beaches of a backwater lagoon from where local

fishermen head out into the high seas. A UNESCO supported 'radio-browsing' initiative in Kothmale, Sri Lanka, is attempts to integrate community radio with internet access. A high-speed internet connection was placed in a rural community radio studio, and the local audience was invited to phone in requests for information or search. These questions and their answers are then broadcast to the entire community over the airwaves.

In each of these cases, a form of community narrow or broadcasting, when combined with networked connectivity, allows textual information to be mediated and disseminated through oral / aural means. This configuration also affords vastly enhanced access to networked information resources, which lowers the per capita cost of the infrastructure, while also creating a local community of audition, response, and usage around the communications installation. Older, wired, analog technologies (a microphone and loudspeaker) work together with newer, wireless and digital resources (GIS, GPS, Remote Sensed Imagery) in order to respond to the particular communications and transactional needs of local groups.

These experiments demonstrate that when we construct a richer landscape of ICT networks, which intersect with and layer upon one another, these can reinforce and reinscribe the possibilities of one in relation to another. Such a patchwork of heterogenous networks, further complicates the question of *who* is connected and *how*. In the case of the Kothmale Radio Browsing initiative, for example, those sending in requests for online searches,

may certainly be said to be networked. But is this not also true of all those who participate vicariously by listening? Should we not say that they have been involved in passive audio browsing? The success of these initiatives in ensuring effective outreach to rural users through aural narrowcast and feedback mechanisms also suggest that telecenters might similarly enhance their accessibility for rural users by offering more audiovisually intensive, expressive, and interactive environments.

POPULAR VS. BUREAUCRATIC ICTS IN RURAL INDIA

In each of the cases described above, existing technologies are reformatted or reconfigured or reinterpreted, either by project personnel or by end users themselves. This is the process of *domesticating* standard, average, normative, urban and globalized technologies, and recreating them in alignment with local expectations, desires, and preferences. These cases also reveal three common strategies of domestication, which allow modular off-the-shelf technologies, to be used in rural India:

1. *community* rather than individual use, access, and ownership of infrastructure
2. *human-mediated* rather than direct access to hardware, network and information
3. *multiplex* aural / oral, visual, and interactive formats preferred over text-intensive formats

The Bureaucratic Character of Desktop Computers

The deepest ideological structures of conventional networked technologies can come into sharper focus in contrast with the preferences of rural users, whether in India or in any other part of the developing world. A moment's reflection will reveal the extent to which personal computers, for instance, derive their guiding assumptions from bureaucratic practices, which are used to manage and organize text-artifacts. These include managing *spread-sheet*s, organizing *files* into *inboxes* and *outboxes*, creating, sharing and exchanging *documents*, *searching* catalogues, *browsing* collections, using *books*, often strewing them all over the *top* of one's *desk*.

Max Weber identified bureaucratic practice and authority with the written recording of 'administrative acts, decisions, and rules… even in cases where oral discussion is the rule or is even mandatory.' 'The combinations of written documents and a continuous organization of official functions constitutes the "bureau." ' as such [30]. Writing at about the same time as Weber's reception in the U.S., Herbert Simon describes 'memoranda and letters, paper-flow, records and reports and manuals' as the 'artificial kind of memory' that regulates administrative behavior, and which is constitutive of its 'nerve tissue' [19]. On account of the conventionality, modularity, ubiquity, hegemony and global presence of such forms of ICTs within corporate environments around the world, we may describe these as *Standard Average Bureaucratic* (SAB) approaches to ICT [29].[6]

The identity between the *bureau*, French for writing desk, and the *desktop*, has always been hiding in the light. To say that the desktop computer is the artifactualized excrescence of bureaucratic practices, is no more than to provide a gloss or definition that re-cognizes this forgotten identity. This is why, contrary to the exaggerated claims and prophecies regarding the death of the desktop metaphor, or its impending transcendence by three dimensional, kinetic, spiral, and other psychedelic environments [25], the desktop metaphor is in fact never going to fade away – precisely because it is the virtual doppelganger of bureaucratic principals, organization and functioning in the world.

In our view, the desktop metaphor does not simply refer to the organization of "text artifacts on a two-dimensional flat display" (Vijay Chandru, personal communication), but also to the underlying principals governing informational flows through systems, institutions, and individuals, which are themselves ordered and organized by the logic of modern bureaucracy. The metaphor of the desktop incipiently structures the kinds of content and services that become available upon and through it, whose core will always remain the creation and dissemination of text-products, bookkeeping, and the flow of official memoranda.[7]

The Legacy of Popular ICTs in Rural India

The modest number of desktop computers being used in rural India presents a striking contrast with the wild popularity of a host of other kinds of ICTs, which have populated the rural countryside through the 20th Century. The aural, oral, visual, corporeally stylized, facially expressive, and multiplanar quality of the most *popular* forms of ICTs in rural India, may be distinguished from the *bureaucratic* kind of ICT represented by the personal or desktop computer. A brief review of the subcontinental career of these technologies will help us understand how the process of domesticating newer ICTs seeks to realign these newer technologies with older practices of technology production, consumption and use already well established in the landscape of rural India.

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[6] Whorf first proposed the thesis that a common set of ideologies were embedded in the linguistic practices of western European languages, whose commonalities he chose to describe as a set, i.e. *Standard Average European* (SAE).

[7] As briefly suggested above, computing on handheld devices represents a hybrid of mobile and desktop product lines, and may therefore offer applications that mimic either ideal type. Another hybrid, the home computer, of course, similarly affords alternative GUIs, in particular gaming environments, which can be relatively immersive in character.

The Indian Film Industry, one of the oldest in the world, was commercially producing and screening silent movies through a complex distribution network in small towns and large villages by the early 1920s. In the early days of sound, the first 'talkies' were graded according to the proportion of realtime that they afforded an aural channel – 30%, 50%, and so forth. But the term 'talkies' was a misnomer, for in India sound was first used not to provide speech, but rather to allow the insertion of musical items, effectively creating Indian Film as a specific tradition of world cinema.[8] Even after the advent of 100% talkies by the 1930s, which contained audio channels for song and dance as well as for dialogue – most commonly scripted in Urdu or Hindustani – these films continued to appeal to vast audiences within and without India, many of whom could not understand a word being said.

This form of ICT has always been structured through a multilayered lamination of complementary languages of body rhetoric, exaggerated facial expression, standardized genres of plot and personality, and indeed, song-and-dance, which together and in parallel induce a full communicative or media experience. These multiple semiotic channels of Indian film has allowed wide audiences of wide linguistic, educational, regional, and class diversity to collectively partake of a common media experience. Their multiplicity allows a lamination of several layers of redundancy-of-message, ensuring that aficionados from Tashkent to Dar-e-Salaam – not to mention those large sections of the audience within India that doesn't speak Hindu / Urdu / Hindustani – always know exactly what is going on.

The potpourri quality of Hindi and other regional language traditions of Indian Film, which borrowed from extant classical as well as folk forms of theater, song and dance, proved foundational in the creation of a new culture of mass media, which Radio and Television programming could draw upon, reflect, magnify, and expand. Radio shows featured film music requested by mail, interviews with film personalities, and serial dramas, all of which anticipated soap operas, dramas, and music videos first on the state run television broadcast channel Doordarshan from the early 1970s, and once again from the early 1990s, when cable-TV exploded onto the Indian ICT horizon. The advent of consumer video players in the early 1980s, moreover, served a new vehicle of dissemination for Film, through Video Nights in Kathmandu [12] as well as many points further south of the Himalayas.

Unlike contemporary forms of networked technologies, Indian Film took root across India without state intervention or assistance, through the enthusiasm, efforts,

and many financial failures of early producers, promoters, and distributors. While it is true that the talkie represents a diversion, a sensuous escape from everyday work life, rather than a supplement to it, there is also another important factor at work here: Indian Film did not discriminate against those who were not literate or who could not understand the highest registers of Urdu / Hindi. Rather, its visuality and visual rhetoric made a new proficiency of those potential deficiencies. This is the design challenge facing those of us who are working to establish desktop machines in rural areas, for we must attempt to bring a multiplex and audiovisually intensive character to an essentially incommensurate platform, one which presents extraordinary recalcitrance to such domestication.

Indian Film and its derivates are not the only ICTs to have been accorded a ready reception in rural India. The case of telephony reinforces our thesis that ICTs can be enormous successful – not to mention profitable – so long as they transcend barriers of textual-dependency and acculturation through aural / oral and interpersonal means. Beginning in 1986, Sam Pitroda, India's high-flying advisor to the prime minister for telecommunications in the mid-1980s, stewarded the introduction of privately owned and operated long-distance Public Call Offices (PCOs) – telephone booths manned by an attendant, who would issue an electronically-generated receipt for the call time and associated charges [17]. This innovative business model ensured that telecommunications infrastructure indeed became accessible to all persons who could afford to pay for it, for such access could now be paid for in discrete and microquantitized and microcosted units. The PCO revolution that ensued owed its success to the creation of a viable business model out of pre-existing practices of collective ownership and access to rural ICTs. From the 1960s on, state-sponsored utilities would initiate service at the office or residence of the village *panchayat*, or village self-governing body. The first radios, television sets, and even telephone connections were often provided to the head of the *panchayat*, under the assumption that the resource would be – at least in theory – available to the community at large.

The booth attendant also mediates between the telecom network and the retail user, effectively training or acculturating the first time user to the semiotic of the technology – telling dial tones from ringing tones from busy signals, learning how to dial, remembering to say hello, and so forth. Even today, many innumerate users simply give the booth attendant a slip which has their number already written on it, preferring to rely on him to dial it in correctly, rather than being liable for wrong numbers and other mistakes. In this way, the emerging desktop-based information center model is genealogically

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[8] The term 'songies' has not, to my knowledge, been used in India, or in theoretical literature in this field.

and functionally linked to preceding telephone kiosk models.[9]

The Inevitability of Domestication

In view of our understanding of the divergence between popular and bureaucratic kinds of ICTs, we need no longer ask why the desktop computer is not setting rural India afire. We need rather ask why the desktop machine continues to serve as the platform of choice for rural connectivity projects?

Sadly, most of the pragmatic answers to this question are immediately apparent: (i) desktops represent a standardized, hegemonic, modular, economy-scaled, and off-the-shelf means for remote computational activities, as well as networked access, with appropriate levels of computational power; (ii) the establishment of desktop machines at rural locations can have the effect of creating bureaucratic institutions, institutional networks, and related transactions, processes and flows around them, where these never existed before; and (iii) as a consequence, they enhance the penetration of the state machinery, or the reach of modern corporate organizations which seek to work in the rural sector.

The increasing prevalence of this medium for networked access and computational work, therefore, will continue to require that project planners, personnel, operators and users transcend ideologies of technology, literacy and hierarchy already always inscribed into this format. In turn, they will continue to jerry-rig this platform with alternative audio-visual interfaces, services, and resources occurs, which allow relatively simplex, monologic, and textually-intensive content to be translated into relatively sensuous, interactive, multiplex, and mixed media transactions.

At the same time, of course, they may also contribute and collaborate towards the design, development, and standardization of coming generations of mobile, tactile and pervasive forms of computing that might present less resistance to the everyday forms of life and workflow already extant in rural South Asia.

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[9] The PCO revolution, as well as the advent of Satellite Cable-TV, have actually served as inspirations for companies working to network information centers in rural India. N-Logue, for example, a rural Internet and Telephony Service Provider, designed its business model on the assumption that such information centers would function more or less like PCOs, with individual computer operators manning installations, while Local Service Providers (LSPs) would function like Cable-TV operators, providing technical and service assistance to these information centers.

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