

Designing Interactive Systems for Development: Rethinking System Fundamentals

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Designing interactive systems is, more often than not, an engineering project situated on top of a traditional computer platform. A number of powerful design methodologies have been put forward to support these engineering projects and to enhance the usability, responsiveness, and capabilities of the resulting system. For instance user-centered design, contextual inquiry, and participatory action research all (in one way or another) position the end user of the system in the center of the engineering activity and privilege their inputs, requirements and backgrounds.

Interactive system design for communities in the Global South can benefit from these user and context oriented approaches especially as:

1. The users and the designers or engineers are likely to have less shared cultural backgrounds and, thus, the designers are more likely to make false assumptions or bad choices if they are not careful.
2. The existing body of scholarship and practice is mostly focused on design and system development for people in the Global North and thus our existing set of design primitives and engineering solutions already pre-position a particular context.
3. The platforms and tools of design and engineering themselves also already have within them normative elements that are informed from or assume as relevant the Global North.

It is this last point that calls us to rethink system fundamentals.

Personal Computer or Shared Public Computer

Sharing of technologies is a ubiquitous behaviour among most of the planet's people. These common acts of sharing by end-users are motivated by disparate reasons. To be sure, especially in low-development settings, sharing is commonly a product of income-poverty, weak infrastructures, scarcity or want. But even in these contexts – especially in these contexts – technologies are culturally programmed for sharing. A visit to a small rural village in the North of Ghana, the family home to a personal friend, makes the point. Here all technologies, regardless of their conditions of ownership, are shared: bicycles, a diesel moped, and the village water pump. In particular, information and communication technologies are universally shared amongst these village inhabitants: the radios and televisions crowded around by neighbours anxious to follow a

broadcasted football match and the few mobile phones in private ownership shared generally on a cost-recovery basis. The only computers in the village are shared on a for-profit basis at the modest local cybercafé.

If scarcity is the mother of sharing in this village culture and community is the father. Consider Figure 1 (Left), where more than a dozen members of the community crowd to share an experience with the computer. To be sure they are sharing the artefact itself, the personal computer (not very personal in this case). But they share other elements of the encounter – the expertise of the young man typing, the directions of the teacher looking on, and the encouragements of the rest.



Figure 1 (Left) Many users for one computer. (Right) Students share a computer even in the presence of plenty of unused machines.

Scarcity of the personal computer, perhaps a reality, is still not a complete account of the end-user sharing depicted in Figure 1 (Left) but it is even less of an explanation for the sharing represented in Figure 1 (Right). In the foreground three students crowd around a single computer even in the presence of plenty of available machines; each could, should they have wished, worked individually on their own machine.

Experiments with sharable software systems, multiple mice, split screens, etc., have continued to question the *personal* side of personal computers.

The Desktop Metaphor

The operating systems of today's computers are all designed around a "desktop" metaphor. This is true for Windows as much as it is for Mac OS and indeed Linux (command line interfaces notwithstanding). This metaphor we all know, informed by some sort of corporate workflow, positions "folders" within a tree-structured organization the leaves of which site "files". And other elements of the desk framework appear throughout. More broadly the WIMP design – Windows, Icons, Menus, and Pointing devices – entail design decisions and contexts that again seem informed by workflow or cultural experience of corporate office settings. An example of how elements of the WIMP interface entail Global North assumptions, yet can be appropriated in the South, is provided by the Hole in the Wall project of Sugata Mitra and colleagues. Here computers are situated in rural or urban slum areas of India and their use by people with no formal computer training is studied. The appropriation of Windows iconography to local

experience is telling. For example, users confronted with the windows hourglass icon signifying a time delay referred to it as *damaru*, the drum attribute of Shiva. The arrow pointer becomes a spear.

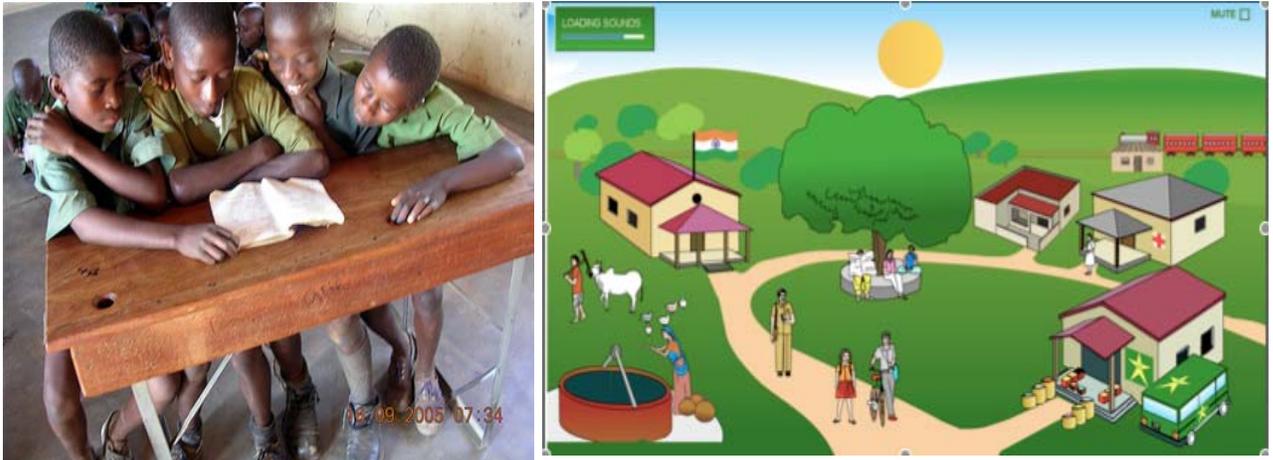


Figure 2 Desks and the deskless “village” metaphor from TARahaat.

Researchers have explored alternatives to the desktop metaphor and WIMP interface. For instance new metaphors based on the local village, time, family, agriculture, even religion have been contemplated.

QWERTY Keyboards

Finally, consider the principle input technology for a computer, the QWERTY keyboard. We know, in fact, that this system is not efficient for keying of English (e.g. compared to the Dvorak keyboard) but how about for those non-Latin graphed languages? Furthermore, in many low-income settings print literacy may be enjoyed by only a minority of the population. Thus the QWERTY keyboard and print based software may exclude users from many opportunities.

Experiments in multi-literate, audio and icon based interfaces, and alternative language keyboards have made progress but more work is required.

Conclusion

Designing interactive systems for the Global South requires us to question many of the fundamental design and engineering solutions that are embedded in our computer platforms – from the desktop metaphor to English and print literacy biases embedded in keyboard and software design to the *personal* computer itself which often excludes robust shared usage.