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Research Article

Why Don't People Use Nepali Language Software?

Abstract

We have been concerned about the low levels of use of software localised to Nepali and conducted a survey to find out just how widely the Nepali software platforms were being used and what determined their use or otherwise. We carried out interviews across Nepal to analyse this, using grounded theory. Nepali software is not widely used, and we found two areas which accounted for this. Firstly, the interface was difficult to use because keyboards were not marked in Devanagari, and because the translations were thought to be too formal and Sanskritised. Secondly, users worked as socio-economic groups, wanting to use the same interface as those around them so as to share knowledge and data. The English interface is valued more highly, with the Nepali interface only valued for those in rural areas who could not understand English. We suggest various actions that could be undertaken to overcome these barriers to use.

Introduction

Nepal has had access to software localised to Nepali since late 2005. This software has been freely distributed, but it seems not to have been used. Microsoft launched the Nepali Windows Language Interface Pack (LIP) in November 2005 at a flamboyant ceremony. Madan Puraskar Pustakalaya (MPP) had launched a basic capability to generate content in Nepali in Unicode with keyboard drivers and fonts a couple of years earlier, and then launched Nepalinux in December 2005, very shortly after the launch of the Windows LIP. In meetings following these releases, people said that interfaces working in Nepali were interesting but not important, that working in English was preferable. Initially, we attributed this to the speakers' personal competence in English and their own preferences, but we repeatedly heard that the Nepali language software, both the Windows LIP and Nepalinux, was not being used and was not likely to be used. Nepali language software seemed to be seen as an interesting novelty, and not the useful tool that we had expected. Had we been wasting our time? Should we plan future projects to support other languages of Nepal, or would that also be a waste of time?

We talked to people involved in the survey during 2006 by Orion (2007) for Unlimited NuMedia, the Microsoft partners in Nepal. They confirmed our observation, though much of the actual report they wrote was devoted to a competitor analysis of Nepalinux versus Windows LIP, focusing on commercial aspects like packaging. But the report also gives much useful comment on interface details. We know that content in Nepali is popular; the blog www.mysansar.com is widely read by the diaspora and attracts many comments—sometimes more than 60 per post-

ing. It is written in Nepali Devanagari, and about half the comments in response are in Nepali, with about half of those in Devanagari and the other half in transliterations in the Roman script. There are other blogs and online newspapers, and of course, all Nepali-language newspapers and journals are computer typeset in Devanagari. We will come back to the technologies underpinning this content later and see that there are choices here that are driven by reasons other than technical merit.

But our main interest is in localised software. How and why people choose to use localised versions of software has not been the subject of much investigation. It seems to be assumed, as we had, that localisation is a good thing, and it is only the lack of adequate localisations that stands in the way.

Indeed, there are very good grounds for believing that localised software is in demand. Software used in developed countries like France, Germany, and Japan uses the language of the country. Microsoft and many other companies sell more than half their software outside the United States, most of it in languages other than English. The ERP supplier SAP delivers in 30 languages,[1] while Microsoft delivers Windows XP in 24 languages,[2] with LIPs in at least 52 other languages[3] (though another Web site says only 27). Every year there are several major commercial conferences about software localisation, like Localization World and the LISA conferences. The very existence of the Localisation Industries Standards Association (LISA),[4] with its commercial membership fees, points to the vibrancy of this market and the commercial demand for localised software products.

However, it was noted by Ken Keniston, in the early 1990s, that Microsoft's Windows was available in Faroese for a community of less than 50,000 speakers, while it was not then available in Indian languages that had hundreds of millions of speakers. Clearly, there was more going on than simple commercial imperatives, as discussed by him under the rubric of "Language, Power, and Software" (Keniston 1999). In his introduction he notes,

the language in which computing takes place is a critical variable in determining who benefits,

who loses, who gains, who is excluded, who is included—in short, how the Information Age impacts the peoples and the cultures of the world . . .

before going on to show how this works out in South Asia. Languages and their support through technology is highly political, with some languages dominating and others marginalised. This is starkly evident in Pakistan (Rahman, 1996), where the official language, Urdu, is the mother tongue of only around 11% of the population, but well supported, while Punjabi, spoken by 44% of the population, is deprecated and unsupported.

At the time of developing the Windows LIP and Nepalinux, Nepali had been the sole official language of Nepal, and that was why Nepali had been supported with technology. But why wasn't it then used?

To understand this we need a short explanation of the computer encoding of writing. A writing system (e.g., Sampson, 1985; Rogers, 2005) is represented in three places in the computer:

- on the screen or printed page where you would recognise it as normal writing,
- on the keyboard where each character (or part character or "glyph") of the writing is given a key position so that typing sequences of these enables you to communicate with the computer, and
- internally within the computer as its "character code" for storage and communication.

It is the internal coding within the computer that must be standardised if data are to be shared; while this happened for the European languages using the Roman alphabet many decades ago, it only really happened for Indic writing systems with the coming of Unicode in 1991, though the Indian standard, ISCII, is an excellent forerunner. Until 1991, users of computers had to improvise and make private arrangements, typically focusing on the external representations of font and keyboard, and letting the decisions about these drive the internal representation. These ad hoc internal representations are re-

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1. *http://www.sap.com/solutions/business-suite/erp/hcm/pdf/BWP_SB_Global_Solutions_Without_Boundaries.pdf accessed on 14 November 2008.*
2. *http://www.microsoft.com/globaldev/DrIntl/faqs/LIPFaq.mspx accessed on 14 November 2008.*
3. *http://www.microsoft.com/unlimitedpotential/programs/llp.mspx accessed on 14 November 2008.*
4. *See www.localisation.org*

ferred to in this article as "pre-Unicode" or "8-bit." Unicode (2007), which requires 16-bits per character, has now become the widely adopted international standard, though, as we will see, this adoption is not yet established in Nepal.

The older 8-bit true type fonts have been used for many years, and are still used, for the printing of newspapers and journals and desktop publishing, and in the production of official government documents. But this use is very limited, and the presence of localised software platforms and office applications should have led to regular and widespread everyday use of Nepali language software. Something more puzzling than mere politics is taking place.

We thus decided to conduct our own survey. The Orion survey had been in and close to the capital; we needed to know what the situation was in rural areas away from the capital and its immediate environs and away from places where people will have learned English.

We wanted to know to what extent Nepali versions of computer operating systems (Nepalinux and other localised variants of Linux, and the Windows LIP) are used. What are they used for? What prevents their usage?

We start by outlining the research methodology for our survey, and then our findings in the following sections. Our findings puzzled us, and they led us to seek theoretical accounts of our findings in the next sections and to look for measures we could take to encourage the uptake of Nepali language software, described in the two penultimate sections. In the concluding section, we look at the wider relevance of our findings and at other research questions that should be investigated.

Methodology and Structure of Survey

To study the use of Nepali language software, we followed the qualitative methods of Oates (2006), Punch (2005), Creswell (1994) and many others. A basic technique of qualitative methods is "coding." Passages of data, collected as field notes or recordings during observation or interviews, are analysed, and one or more significant aspects of the data are noted and coded. These codes could simply be numbers, but we prefer the style of using descriptive phrases, verb phrases where possible. We followed the grounded theory method of Charmaz (2006),

based on Strauss and Corbin (1998). The basic idea of Charmaz's approach to grounded theory is to progressively focus in on the area of interest, gathering small quantities of qualitative data using structured interviews and/or observations, analysing this, and then on the basis of this analysis and the theory that emerges, collect further data, followed by grouping and abstracting codes. To analyse our data, we used the standard software package NVIVO 7. While we worked bottom-up, in the sections that follow, we present our findings top-down; the bottom-up analysis has been described in an internal project report (Ghimire et al., 2007).

We chose our respondents by strategic cluster sampling, using the list of people who had been trained in the localised platforms, or had had sustained contact with them, using information supplied by FIT Nepal and by MPP. Respondents were selected from limited geographical areas to make the most of the travel we would need to undertake: to urban parts of Kathmandu; rural areas close to Kathmandu (Sankhu, Panauti, Bungamati); the mid-west Terai (Bhairahawa, Butwal); the mid-west hills (Palpa, Tolka, Majhgaon, Chandrakot); and Pokhara city. We also did some opportunistic sampling, getting to interview two cybercafé operators, one IT professional and one language teacher.

Altogether, we conducted 51 face-to-face, semi-structured interviews, each lasting 15–30 minutes. Interviewees were given the option of speaking in Nepali or English. This fieldwork was conducted by Ganesh Ghimire, a Nepali speaker and anthropologist, and by Maria Newton, an English speaker and social linguist. Most interviews were in Nepali and recorded, so the quotations later are translated. Field notes were mostly in English.

We would have liked to have been able to survey more widely, particularly in the far west, near Nepalganj, and in the east, but both time and budgets did not permit this. Nevertheless, we did sufficient survey work to feel that we obtained important and significant conclusions.

We asked all people interviewed about their use of computers at work and for personal use, and their exposure to the Nepali language in the computer. That led to details about their computer usage and motivations.

From the demographic data we collected, we classified our respondents into five sets as a function of their use of Nepali language software and also

Table 1. Distribution of Sample by Usage and Occupation.

Occupation	Regular	Previous	Attempted	Prospective	Non-users	Total
IT Professional			1	7		8
Teacher	2	5		2	1	10
Social Mobilizer		4	3	3	1	11
Cyber café operator		1			2	3
General user					4	4
Librarian	2		1	1		4
University Student	3					3
Other Professional		1		3	4	8
Total	7	11	5	16	12	51

classified them by occupation. The distribution of these is shown in Table 1.

Regular users currently have a Nepali interface installed and use it regularly; previous users installed a Nepali interface, but after a period of time deleted it; attempted users tried to install a Nepali interface, but encountered problems and gave up; prospective users viewed a demo or received training for a Nepali interface, but did not install it; while non-users have not used or viewed a Nepali interface. The teachers were either school teachers or college teachers; the social mobilisers worked in NGOs or at telecentres. We made no particular effort to achieve gender or age balance. There were 37 men and 14 women in our sample—the youngest was 16 years old and the oldest 78, with an average age of 30.33.

In coding the interviews, two major areas of influence on the usage of Nepali software emerged. A lot of the interviews focused on aspects of the human computer interface, and this is discussed in the section after next. More interesting for us were the socio-economic factors that influence the use or otherwise of the Nepali software, and that is what is described in the next section.

Socio-economic Factors

Group Identities

The initial impact of computers to Nepalis is that they are Western/Northern and not for Nepalis. The brand image on computer cases and screens uses Roman characters, any writing on the packing is in Roman script, and worst of all, as delivered in Nepal, the keyboard has Roman characters on it and no Nepali or Devanagari. This raises an identity problem—that the computer is not part of the Nepali way of life.

Before this survey, we had frequently heard, when working with illiterate people, that computers were not for them. Then, in a school in Godavari, near Kathmandu, we saw again this perception of a boundary between potential users and computers.

Working with a computer, using a particular language and particular technology to support that language, declares an identity, the membership to a particular group. It also determines who within the larger society you can communicate with and do business with. The writing on the computer equipment, particularly on the keyboard and screen, declares broadly whether the person has a Nepali or an English (or other language and culture) identity. We will refer to these groups as the N-group and the E-group. Such groups are clearly valuable as communities of practice (Wenger, 1998) and as a means of sharing knowledge about the use of the computer, though we are not sure whether this is what is sought, or whether the desire to form groups is an expression of the collectivist nature of South Asian society. Hofstede (1991) ranks India at about midway between collectivism and individualism, but does not cover Nepal.

Within the N-group we need to identify two subgroups, depending on whether they have adopted Nepali technology based on older pre-Unicode technologies or have adopted a more recent software technology that is Unicode compliant. We call these,

respectively, the NP-group and the NU-group. Those in the NP-group talk of "choosing a font." In Nepal, this font is typically Preeti, though many other fonts are also available, each of which then determines both the internal coding for Nepali and the keyboard layout. How this works technically was described by Hall (1998b).

Initial Membership of the Group

Training is important in determining initial group membership, and the thoroughness of the training will determine how firmly inducted the person is into the group. Three of our respondents commented on the advantages of teaching the Nepali interface to complete beginners. A linguist from Kathmandu explained:

It's good for people who are trained in Nepali that don't have exposure to English . . . For people like us who have already started to use one system it becomes difficult to switch over, unless we see some drastic change in use, something very different from what we're using at the moment, if the utility value is very high, in such cases. But for the beginner it's good. It might be easy for someone who has not used English version, who would like to start fresh with the Nepali system itself.

A student similarly commented:

If you target the first-time users then they'll have a base. It's a better option because we've seen the real cases and I think that's a good idea . . . anyone who's beginning to learn computers is good option for targeting. Because convincing people who've been using computers for years and years to change is a very, very difficult thing.

This training clearly traps the recipient into the relevant group, in this case, the N-group.

Most access by the public to computers is through Internet cafés, where the computers invariably are in English. The cybercafé operators we interviewed were interested in and sympathetic to Nepali language interfaces; one operator had tried installing the Windows LIP, but had soon removed it because it was bad for business. Similarly, the social mobilisers in the telecentre in Sankhu had installed the Windows LIP on one machine and had even tried teaching people to use the Nepali interface, but had then abandoned the idea. This dominant availability of English interfaces, without any choice to use Nepali, locks people into the E-group, and forces new users to be inducted into the E-group.

By contrast, the two teachers who are regular users (see Table 1), along with their students and colleagues, work at Phulchowki Primary School in the rural Godavari hilly area to the south of Kathmandu. We installed a network of computers with Nepali interfaces in the school, followed by a 10-day training program. The training focused on one group of students and teachers and included introductory tuition for: computers and hardware configuration; open office documents, spreadsheets, drawing and presentation; and educational packages and games. The only computers they have access to are these computers, so they have no choice of interface language—it must be Nepali. The students and teachers of the school have continued to use the Nepali interfaces and are locked into the N-group.

Reinforcing the Groups

One of the librarians we interviewed was from the Nepali book department of a large library in Lalitpur. The department had one computer, with an option for operating with Windows XP or Nepalinux, which had been installed two months before our interview. The librarian used Nepalinux only for book cataloging purposes; all other admin work was done in Windows, since this is what she had been trained to use and felt familiar with. She demonstrated the book cataloging system, accessed via the Nepali version of the Firefox browser (though we do not understand why any browser could not then be used), and mentioned that she was not familiar with the menus and only used the book cataloging input screen. She had not been trained in Nepali Firefox or Nepalinux. Finally, she commented that if training was given to the whole workforce in Nepalinux and they learned how to use it properly, then she would use it for other work.

The government officer from Lalitpur tried both Nepalinux and Windows LIP independently from his workplace. He explained that if he used them at work, he would be the only person in his office using a Nepali interface. He thought that there would have to be an institution-wide decision to deploy Nepali interfaces before he would be able to use it regularly in his workplace. His view was that this decision must be made at the policy making level.

Both the librarian and government officer did not receive any training, and it is clear that they would be unlikely to regularly use the Nepali interfaces unless their colleagues also did so. We see here the im-

portance of the social or organisational group being completely either an E-group or an N-group.

The Government already mandates Nepali and other languages of Nepal as official languages to be used in government business, though the aid agencies (which wield much economic power in Nepal) work and communicate with the government mostly in English. People wanted the government to take action to mandate particular technologies: Unicode for information representation, and possibly open source software.

> When we think of implementation the truth is that it will have to be first endorsed by the decision-making level. And these people don't really understand IT. That means, if we do in our own interest, we can. This thing, here, it is being done only because of my personal interest, those people don't understand at all. Otherwise the government must tell to do like this in future.

The government agency that would have to make these decisions, or at least advise the government to make them, is the High Level Commission for Information Technology (HLCIT), and we have, outside of this study, noted a reluctance of many organisations and individuals to make decisions. This is risk-averse behaviour, surprising given that India has been rated by Hofstede as one of the countries with the lowest uncertainty avoidance index.

Potential membership of the group is determined by educational background, particular fluency in English, with membership continuing as long as there are the means to do so. Denying access to computers in one language forces a person into a group of the other language. Historically, this has meant forcing people into the English group. One device that could be employed would be to apply pressure the other way by denying access to computers working in English.

Valuing Some Groups More Than Others

It appears that membership of the E-group is more desirable than the N-group, that the N-group is only for those who cannot make the E-group. This is reminiscent of caste hierarchies of South Asia, and social class in the UK.

We found many value judgments about the English and Nepali interfaces, summarised in Table 2.

The most extreme form of this came from an academic who was also a member of HLCIT:

Table 2. Three attitudes to the localisation of computers in Nepali, showing the number of people in sample who exhibited them.

"Nepali interfaces good for people with limited English"	115
"Nepali interfaces good for people in rural areas"	77
"Learning to use an English interface is an ambition"	66

> I have daughter and I will not ask my daughter to use the Nepali interface because I want my daughter to be good in English . . . because I want her to go abroad and do well. And I want my daughter to see the Nepali and Hindi cartoon, she has to see this "Friends" serial and English serial, she has to see the great English novel. So I don't think that will be more popular in city area to be very honest. But in remote area it is required because in remote area people will be more willing to use it.

Membership of the E-group is clearly seen as conferring economic and social advantage. Similar worries concerning ambitions to learn English were also expressed by six other respondents, including the telecentre social mobilizer from a rural town in the Kathmandu valley:

> Yeah I liked, but when we used Nepali windows that time I feel we are going to forget English language because we have to learn English language, we think so . . . If we use Nepalese language in computer then we may be going to forget English, so we have to use English language. We just used Nepalese language for teaching woman computer knowledge, and that time it is so easy to learn for them because they have a lack of education . . . They couldn't memorise English words, so they feel easy to learn computer by Nepalese language.

However, almost half of the respondents saw positive benefits of N-group membership. For example, a Windows user similarly commented about Nepalinux: "Since I've been using Windows XP for a long time it feels more comfortable, but having something localised also feels good."

A Linux LIP user explained:

> It's good to be able to be in touch with your language because ever since you started using com-

puters you've been using them in English. It's confusing at times, you see an error message and you think for a while "What does it really say?", but it's still fun to use it . . . But the thing is rather than targeting Nepalinux or anything that is based on Nepali, my thought is that you should go out of Kathmandu because they need more Nepali or localised content than in Kathmandu.

However, note the final comment that the N-group is for others. As seen in Table 2, a total of 15 respondents mentioned the significance of localisation for people that have a limited ability with English. The telecentre social mobiliser from the rural area in the Kathmandu valley explained:

Some people aren't able to use computers even when they have desire to do so. Motivating by clarification on "What can be done using computers" is necessary. Some don't have enough time to come and use computer. Some don't understand English, and some don't know how to read. This is the reason why female participation is so low here, if they could use it in Nepali, maybe more number of them will come here.

Seven of these 15 respondents, all notably living in urban locations, focused their comments on people in rural areas with a limited ability in English. The division into E-group and N-group users is also seen as coterminous with the urban-rural geographical divide. In Nepal, 85% of the population lives in rural areas. The linguist quoted earlier also told us:

It's good for people who are trained in Nepali that don't have exposure to English . . . And then there will be many recipients for this, especially in the rural areas. In the city areas it may not be, but in rural areas there'll be a lot of takers for this. Well if you go to my village maybe they'll be more happy with the Nepali system of operating, rather than the English system of operating.

Similarly, the academic quoted earlier, who is a specialist in e-government, highlighted the importance of localisation in rural areas:

What I realised is one of the barriers of using e-governance is the language . . . Because in Nepal only 8–10% of people know English and the remaining people only know their Nepali languages. And the frustrating thing is everything is in English, like in Windows XP and Linux everything is in English. And when we want e-governance to be

used by people in the rural area the first barrier is the language.

Despite this majority viewpoint, a few people were positive about localisation for other reasons. A radio station operator from the Kathmandu Valley explained:

Now we felt it's necessary to give training of Nepali version computers with the help of other international organization. What we have seen is we are very behind in the Nepali Literature, because in this location nobody uses computers in Nepali version, here the Nepali language and literature is going to be extinct. That's when we give trainings we emphasize on Nepali.

Here the argument is for the healthy survival of the Nepali language.

Membership of the English group, or at least the ability to join that group, was seen as giving economic advantage, since English is the language of international business. The economic advantage of being fluent in English has recently been given a twist in Nepal, as UN missions have been expanded and sought English-Nepali translators and interpreters, paying people who were fluent in English more than twice what they had previously been earning.

Problems Communicating Between Groups and Within Groups

What do people use computers for? It was clear that one use is for asserting group identity "because others in the group or institution use them." An important use is for establishing a Web presence, and here Unicode is essential for Nepali. Until less than 10 years ago Web sites in South Asian languages had either to be done as graphical images or with an 8-bit pre-Unicode font downloadable from the Web site (Hall 1998a). The blog site www.mysansar.com (referred to earlier) used Unicode, though there are other blog sites that use 8-bit codes.

However, much use is economic, to exchange data with business partners, typically between authors/journalists and publishing houses. A journalist and banking officer from Lalitpur explained:

Nepalinux is good program, I personally liked it. But it has font problem. In publication houses mainly they use Preeti, Kantipur so it's not worthy for Nepali computing. Mostly we used pre-

Unicode fonts so we used Windows for it. Main problem is unavailability of fonts for official uses like preparing letters and documents.

What this respondent refers to is the choice between the NP-group and the NU-group. At present, in Nepal, there are a reasonable number of Unicode fonts: Mangal from Microsoft, as well as Kalimati, Samanata, Thakya Robinson, and Kanjirowa, and Madan recently released by MPP. A number of Web sites appear to list many more Unicode fonts, but nearly all of these lead nowhere. The contrast made by our respondents is with 8-bit pre-Unicode fonts for which there are many, each with its own associated internal codes and keyboard layout. When exchanging data with others, they would all need to have all fonts installed, and switching text between fonts requires rekeying or the use of a conversion tool if such exists.

While there is an issue of insufficient fonts, it is not lack of fonts that is the critical factor. A social mobiliser in the Terai explained that Unicode was taught to telecentre instructors, but it created a problem because other groups, such as editors and newspaper offices, use pre-Unicode fonts, so they switched back to teaching the instructors with Preeti. A Web designer in Pokhara explained that their company Web site has been done in Unicode for the past three years; however, they use pre-Unicode fonts for all other work because other groups, such as local journalists and news reporters, use pre-Unicode fonts. For the Web site, they also write in pre-Unicode fonts and convert to Unicode.

Publishing houses and newspaper publishers use older versions of software like PageMaker, which are not Unicode-compliant but can lay out text in the pre-Unicode 8-bit fonts. Thus, when they receive copy from their journalists and authors, they expect it in a particular 8-bit font. Hence, the pressure noted above for telecentres to support pre-Unicode fonts and encodings, a practice presumably replicated in all personal computers that writers might have. The media industries are particularly notable for using outsourcing where standard character codes for information exchange are important. The current practices trapped in the past are an impediment to progress.

Human–Computer Interface Factors

Keyboards
One of the earliest problems we noted in our survey was that the keyboards at the Phulchowki school in Godavari had Roman characters on it, and no Devanagari. This meant that when the users came to type, there are no memory aids on the computer itself, though there were keyboard layout charts on the wall. There are three putative standards for keyboard layout, though this was not picked up in this survey: one based on the traditional Remington typewriter, one on phonetic similarity with English, and a recent "scientific" one based on frequency of key uses and key sequences. Of course, if the keyboard is "phonetic" and the user knows English, they are helped to find the right key through this phonetic association. In spring 2008, HLCIT called for proposals for a standard Nepali keyboard layout, and received two proposals: one from the author of the "scientific keyboard" and another from a group of students that was later withdrawn. To this, they must add other well-established layouts, as well as the Indian Inscript keyboard, but they do not appear to have a clear policy of how to evaluate these.

The most significant barrier to usage is this complete absence of keyboards marked in Devanagari—it seems that the technology providers, being competent in English and familiar with the "phonetic" keyboard layout, are unable to see this as an issue. A single standard layout clearly would help here.

Translation Quality
Many criticisms were made about the Nepali interfaces, particularly the translations used. Criticisms were constructive and accompanied by recommendations on how it could be changed and improved. The government officer from Lalitpur suggested transliterations from English into Nepali script:

> Main things for me translating the command word "Cut" into "Katnuhos" in Nepali may not be useful for me. As for example I have already learnt Cut, Copy, Paste and sometime I will be confused searching Cut in Nepali interfaces. So it should not be translated which are common and those terms are generally mixed up in Nepali speaking.

Similarly, an IT professional from Kathmandu also expressed difficulties with a command word being translated into Nepali:

The interface was a little difficult. 'Cancel' if you use to write 'radda garnuhos,' I'm just giving an example, there are so many words like that, and during that time I used for first time . . . it was confusing . . . For 'cancel' putting 'radda garnuhos,' it sounds awkward. It should have English.

A Kathmandu librarian, who has been using Nepalinux for two years for his work, thought it was possible to improve the wording of the command menus in another way. He said, "Your command words, I mean there's a few you could have made easier. You could have put simple Nepali."

Difficulties in using the Nepali versions of the computer were frequently attributed to inappropriate terminologies. Much of this comment seems to have been conditioned by prior experience with English interfaces, though it does have some cogency in that the form of Nepali appears to be "Sanskritised" and formal, or at least is open to that charge. We have heard this elsewhere in discussions about documents written by aid agencies in English, then translated into Nepali. There clearly is scope for improved translations, making them more informal and colloquial, with the specialist terminology closer to the English.

Sanskritisation

Many respondents commented on the interface being confusing, with the language used containing uncommon words, being too traditional, formal and Sanskritised.[5] Most could not explain precisely why they found the terminology hard to understand but simply described it as "difficult," "confusing," "uncommon," "unfamiliar," "formal," "traditional," "from Sanskrit," "too literal," "too direct," and "too technical."

For example, a journalist and banking officer from Lalitpur explained:

> I used it, not used but typed in it. I have used all its function because I am a writer. Some of the words like "radditokari" and "anuprayog" seem to be the unusual ones. They look like they have been directly borrowed from Sanskrit and that makes Nepali even more difficult than English. It's supposed to be for the people who don't know

English but some of the things are insufficient for Nepali users.

The Kathmandu librarian discussed the necessity of some Sanskrit language and explained that users would become familiar with it in the same way they are familiar with government terminology, which is often derived from Sanskrit. He gave the examples of the words for government 'officer' ~ 'adhikari' and 'National ID' ~'nagarikata,' with which people have become familiar, despite the words being derived from Sanskrit.

The Nepali Interfaces

Four respondents commented that it may be possible to learn to use a Nepali interface after some practice. A secondary school teacher from the midwest hills explained: "We do not use these kind of words in daily life, but if I used Nepalinux for a long time then it would be easy."

One of the student Nepalinux users explained how he learned to read the menus:

> Menus also, firstly when I started it, it used to be a guess "that thing was there in English and it could be this," But now I'm pretty used to it. I can find things now. Before I used to have some difficulties even finding the right application in the menus, but I got used to it in say two-three hours. Because literally the translations, whatever is translated it does mean that, 'text editor'— 'patha sampadaka.' It's pretty easy if you relate it literally.

The government officer from Lalitpur tried both Nepalinux and Windows LIP independently from his workplace. He found the Nepali interface difficult to adapt to and part of his reason for trying it was in order to access Nepali Unicode. He did not receive any training, and it is clear that he would be unlikely to regularly use the Nepali interfaces unless his colleagues also did so.

Prior Exposure to English

Others stated that they were "already familiar with English versions," "already familiar with the English terms," "already familiar with an English environment" or that they found the Nepali interface "more difficult than English." For example, the radio station operator from rural Kathmandu explained:

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5. We later see Srinivas's sociological use of the term "sanskritise" for adoption by lower caste Hindus of the customs of higher castes. For him "sanskritisation" was aspirational and positive. Here "sanskritisation" is negative; the aspirational language is no longer Sanskrit, but English.

"I had seen the Nepali interface of computer, but I felt a little uneasy because I previously used computer in English interface."

Prior exposure to English interfaces seems to be important in causing users to be critical of the terms used in the Nepali interfaces.

But this was not the case in Phulchowki, where this very lack of knowledge of English and prior experience of English interfaces led to the success of the Nepali interfaces, which felt quite natural to them.

One of the teachers at Phulchowki school had rarely used computers before. He commented that it was easier to read the Nepali menus than the English ones and that it was faster and easier to learn the Nepali terminology. He also commented on the children, noting that those who were not already familiar with computers learn the Nepali more easily:

> We have got training of Nepalinux of 10 days from MPP. Now we can prepare official letters and students mark sheet in Nepali. As their medium of study in school is Nepali, they feel easier to learn computer in Nepali. In ours it's not necessary to tell in English, all these computers are in Nepali, now what to say is these people grasp more quickly in Nepali as they read more Nepali. We didn't teach them as "Application" from the beginning so they understand it as "Anuprayog."

Training

The other respondents in the survey had had a different experience from the Phulchowki teachers in three critical ways: they'd had minimal training; the Nepali system was only installed on one (or occasionally two) computers out of a room of five or six available ones; and their users had had prior exposure to English interfaces.

For example, two telecentre social mobilizers reported trying to use Windows LIP for users with a limited ability in English. As volunteers at Sankhu telecentre, they ran three-month introductory computer courses for middle-aged women. In one particular batch, the women initially learned with an English interface, giving them some previous experience with computers in English, but halfway through the course, Windows LIP was installed on two computers in a room containing six, making it impossible for the whole group to use the Nepali interface. The two social mobilizers reported mixed reactions to the benefits of the Nepali interfaces: the

women learned more quickly in Nepali, but had difficulties understanding the Nepali words. Trainees would only choose to use a Nepali interface if an English one wasn't available. One of the trainers also mentioned that she found the Nepali terminology difficult, more so than English. The trainers themselves were new to the Nepali interfaces and were uncertain about how to explain the Nepali interfaces to other people.

Contextualising Our Findings

What we have observed resonates with well-established phenomena observed in sociology and sociolinguistics (e.g., Scott, 2006). Humans form diverse social groups that can be very different from each other. These groups perpetuate themselves through education and other enculturation practices, and are bound together by legal agreements that require certain behaviour, by economic practices that bring mutual advantage, and by informal social networks of family and friends that reinforce preferences, beliefs, and behaviour.

However, social and economic arrangements are constantly evolving and changing in response to other groups and changing external circumstances. An excellent account of the subtle way these changes come about is given by Karl Polanyi (1944) in his book *The Great Transformation.* Polanyi is concerned with the rise of the market economy and with debunking myths that this is, in any sense, "natural." What Polanyi does show is that economic arrangements have been deeply embedded in social arrangements, until, with the advent of the market economy, this relationship became inverted, and social arrangements became subservient to economic arrangements. In our investigation of the use of Nepali language software, we have seen that the economic choice of pursuing a career outside Nepal has led to the social choice of learning and working in English, as well as to the technical choice to use computer interfaces in English. The technical choice has been driven by labour market concerns.

We need to look in more detail at what is going on. Of relevance to us in South Asia are caste groups, where, seemingly, people are irrevocably born into a caste and must remain there. However, Srinivas observed and documented some level of mobility between castes, where a community belonging to one caste can adopt the rituals and

speech patterns of a higher caste and thus slowly assume membership in that higher caste. Srinivas called this process *sanskritisation* from the use of Sanskrit in the rituals of higher caste Hindus. This desire to move to a higher caste is a form of collective social aspiration, mirrored in our study in the move to use English, where the language used replaces the rituals as the outward manifestation of group membership.

At the moment, there are around 6,000 distinct languages worldwide, but there is also a lot of concern that these languages are disappearing (see, for example, Nettle & Romaine, 2000), unless some language maintenance activity is undertaken. Harold Schiffman has written: "If language maintenance does not occur, there can be several results. One is language death; speakers become bilingual, younger speakers become dominant in another language, and the language is said to die."[6]

This change by a community to speak a different language is known in sociolinguistics (e.g., Wardhaugh, 1992) as *language shift.* Historically, language shift happened coercively when populations were required to use the official language and forbidden to use their mother tongue, as, for example, in Britain with the Welsh language in the 19th century. Often today, the shift happens under more subtle pressures, as, for example, with Telegu speakers in New Zealand (Kuncha & Bathula, 2004) and Tamil in Malaysia (Schiffman, 1995), where the pressure is to adopt some more dominant and useful language, in both these cases, English.

The pressures for a language shift to English are great. English has a *diglossial* relationship with Nepali, with respect to the developmental aid for Nepal, and, in some sense, English has a similar status in Nepal as in India, where English is the language of the courts and of Parliament (see Wardhaugh, 1992, pp. 90–96, 357–358). In Nepal, though, it is Nepali that is the language of parliament and the courts, with its own diglossial relationship with the hundred other languages of Nepal. English is the language of tourism (though by no means all tourism) and the wealth that it brings. English is also the language of higher education for its access to scientific literature and economic opportunity in employment abroad.

Could it be that the preference of Nepali speakers for English interfaces is part of language shift in Nepal toward English? We know of large segments of Nepalese society where a complete shift from a vernacular language to Nepali has happened, and know a few cases where English is replacing Nepali as the language of the home. If there really is a shift happening from Nepali to English, then the provision of Nepali language interfaces is a necessary maintenance activity, but clearly on its own is not enough.

Language shift is a special case of a wider socio-economic phenomenon called *social interaction* by its most prolific theorists, William Brock and Steven Durlauf (e.g., 2001a,b). In order to account for behaviour like voting and racial prejudice, economic theorists had turned to ideas of critical mass from physics and epidemiology from medicine. This was taken up, in the mid 1990s, by Brock and Durlauf who summarised the area of interest as:

> By social interaction, we refer to the idea that the utility or payoff an individual receives from a given action depends directly on the choices of others in that individual's reference group, as opposed to the sort of dependence which occurs through the intermediation of markets. This type of spillover is an example of a classical nonpecuniary externality (. . .). When these spillovers are positive in the sense that the payoff for a particular action is higher for one agent when others behave similarly, the presence of social interactions will induce a tendency for conformity in behaviour across members of a reference group." (Brock & Durlauf, 2001a, Introduction)

This theory has been applied to social agglomeration, technology choice, personal and group preferences, behaviour of political parties, social pathologies, and the evolution of scientific theories (Kuhn, 1996), but not as far as we know to language shift, though it clearly applies.

What is interesting for us here is the application to technology choice, and in particular, to the way inferior technologies can be adopted. Arthur (1989) gives an account of how, during the development period when rival technologies are being used by early adopters and improved as a result of this early experience, chance events can favour the final domi-

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6. *Lecture notes on Language Shift, at http://ccat.sas.upenn.edu/~haroldfs/messeas/maltamil/node2.html accessed 13 November 2008.*

nance of one technology, even if it is inferior. While the situation of the adoption of Unicode versus 8-bit encodings of Nepali Devanagari is not exactly the same, it does show that arguments about technological superiority do not necessarily succeed.

At the moment, the extra utility of using 8-bit code—resulting from the externality of other users of the same code—is significantly higher than the extra utility of using Unicode. If there is to be a shift to Unicode, it must be in the context of significant improved utility through other users also adopting Unicode. There is a "critical mass" issue here. The usual example of this is the telephone: a phone is of no use if you are the only user, or if there are only a few users, but becomes very useful when most people have one. In Nepal, we are observing the increasing utility of using the outdated 8-bit codes as people migrate to just one of these, the Preeti font; this will make any shift to Unicode much the harder.

Future Work

How Can the Situation Be Improved?

We see then that Nepal is trapped in the culture of using English language interfaces, with Nepali content written in Devanagari and produced using archaic and inadequate technologies. While we might believe that the growing clear benefits of working in Nepali, using Unicode, would prevail in the long term, will it? The longer history of computing in India, where there has not been any large move to local language computing, does not reassure us. But we can do something about this.

At the very least, we must address those usability issues of the interface. We saw that the translations used are not an issue for people who are new to computing and have their first experience in Nepali, but we must also consider converting users from English to Nepali (and making the conversion easier) in response to the many criticisms of the translations. And we must select a standard keyboard layout and make keyboards marked in Devanagari widely available at prices competitive with Roman keyboards. Roman keyboards are very cheap in Nepal, just a couple of hundred Nepali rupees each (let's say US$3), though their quality is very low indeed and they may only last a year or less. And, of course, we must brand our computers in Nepali, not English.

To support the use of the Nepali interfaces we need to give comprehensive training to the trainers, the telecentre operators, and the private IT training establishments. If this could be backed up by a typing tutor, and good training manuals, so much the better. Here, we note that the 8-bit Preeti font owes some of its success to the Typshala typing tutor, based on characters from the Ramayana.

We need to encourage a "critical mass" of people using Nepali interfaces, hoping that the sheer mass of numbers should attract new users. We should install computers in areas where there is no strong draw from English: in rural areas, in government schools where the medium of instruction is Nepali, as well as in government offices. Making all computers in any installation work exclusively in Nepali and removing any choice to switch to English would reinforce this.

We should persuade the government to adopt Unicode, so that at least they work to modern standards. To support this, it is essential that more Open Type fonts of high quality are created to give a clear and wide choice for publishers of all kinds. Here, Nepal may be helped by developments in India, since Nepali is written in Devanagari as is Hindi. However, the investment in font creation in India can be very low, perhaps less than a quarter of what is really needed for a high quality font. Further, Devanagari for Hindi has some differences from Devanagari for Nepali, which can make it feel different and alien to Nepali readers—this came out strongly in the Orion survey. There is also the issue of the use of an extended Devanagari character set to cover other languages in Nepal, and the need for "wide spectrum" fonts. It may be that the only way forward is for Nepal to create its own fonts.

With the adoption of Unicode, we must also press all large users of computers to adopt Nepali language systems. With the projected large-scale introduction of computers into national government, there is a golden opportunity, but as noted earlier, there is a marked reluctance to make decisions here.

We have a serious problem with the publishing industry, which is locked into page make-up software that is old and not Unicode compliant. We suspect that much of this old software is pirated. However, as IPR laws are enforced, the publishers will need to purchase software and could then choose Unicode-compliant software, or at the very least, create a market that page make-up software suppliers could respond to. Alternatively, we could

nurture the development of open source software to fill this clear need.

We would like to foster a positive appeal for computing in Nepali, but we see here that perceptions and values need to be changed. Maybe what is needed are campaigns similar to those mounted against smoking and in favour of road safety. Perhaps what we need are iconic endorsements and product placements in popular movies. These are all techniques that use social interaction to influence social movement.

If we really can establish the case for software localisation as an effective measure for preserving languages, we would hope to influence language policy in Nepal and elsewhere to this effect.

Further Research Needed

All of the measures described in the previous subsection need to be validated in terms of their effect, viewing their introduction as action research. We should build a social interaction model, along the lines of Brock and Durlauf, and use the action research to develop this model for this application, hoping later to apply it to decisions about localisation for other languages in Nepal.

Our sample size was small at 51; just interviewing more people would generate more insights into the social processes taking place. However, as noted, we should also broaden our coverage geographically across Nepal and also outside Nepal into neighbouring regions where Nepali is widely used, like Sikkim, northern West Bengal, Bhutan, and northern Uttar Pradesh, Uttaranchal, and Himachal Pradesh, and also into the widespread Nepali diaspora. In spreading our survey coverage, we should also broaden our questioning to explore why people want to use Nepali language interfaces to computers. Increasing survey size would open up the possibility of supporting hypotheses, such as the correlation of language preference with socio-economic membership, expecting to find statistically significant results.

A group of people that is particularly important are those who produce localised software or who advocate its production. Why do they wish to do this? Is their language endangered? What is their concern? This survey should be spread across the whole of South and Southeast Asia and wider afield to embrace projects like the PanLocalisation project funded by IDRC and the work of the LRC in Ireland.

Why do some funders support work on localization while others do not? Our own experience is that, in spite of rhetoric concerning the inclusion of minority groups into the democratic processes, funders do not see language as an issue.

The choice of language is clearly related to aspirations of people, but these aspirations and the wish to help themselves advance can be expressed in other ways. One way is the use of computers in schools, as explored by Pal et al. (2007); another is the choice of English-medium schools. The issues and concerns underlying software localisation seem to be closely related to those of mother-tongue education, and we need to analyse the writings in this area and reconcile these with the desire of parents for English-medium education. What does this mother-tongue education debate tell us about software localisation choices?

Conclusions

We have seen how, in Nepal, recently released local language software has not been taken up for a range of reasons. These reasons broadly divide into two areas: the actual human-computer interface of the software and the socio-economic environment in which the software is used. While the human–computer interface must be improved for hygienic reasons, the motivational socio-economic factors will be critical. Government can do much through its procurement policies, but other factors that trap users in English software, such as out-of-date, pre-Unicode publishing software, must be rooted out and corrected.

The situation across South Asia is very similar to that in Nepal (Hall, 1998a). We can conjecture that the same will be true across much of Africa. Equally, we conjecture that the cures will also be the same. It would be very instructive to see some complementary study in Africa, in both anglophone and francophone countries. We know that the colonial regimes of France and England were very different. Could this difference also lead to differences in the adoption of local language software?

We attempted to account for behaviour using Hofstede's cultural model; this failed in both risk-aversion and collectivism-individualism. While the concepts seem appropriate, the classification of South Asia, as typified by India, seems suspect. Hofstede's data is based upon the survey of individ-

uals within IBM. The very fact that they work for IBM must, we believe, have already changed them in some degree. His data may represent urban Nepalese educated through English, but could not represent the rural Nepalese of limited education with whom we are also concerned.

Instead, we have given a theoretical account of the group behaviour and preferences for English devaluing Nepali computing, then relating this to traditional social arrangements based on the socio-economic theory of social interactions and the sociolinguistic theory of language shift. We saw that the utility of a language or technology choice is influenced by the choices of those in the surrounding community, leading to a critical mass phenomena, where, if enough people adopt a particular choice, the rest will follow.

But we also saw that much more research is needed. We are still left with many open research questions to explore the reasons underlying the acceptance or rejection of localised software. ∎

Acknowledgments

References

Arthur, W. B. (1989). Competing Technologies, Increasing Returns, and Lock-in by Historical Events. *The Economic Journal,* 99, pp. 116–131.

Brock, W. A., & Durlauf, S. N. (2001a). Discrete Choice with Social Interactions, *Review of Economic Studies,* Volume 68 no 2. pp. 235–260.

Brock, W. A., & Durlauf, S. N. (2001b). *Interaction-based Models,* in Handbook of Econometrics Volume 5 Edition 1, Elsevier.

Charmaz, K. (2006). *Constructing grounded theory.* Sage Publications.

Creswell, J. W. (1994). *Research Design: Qualitative and Quantitative Approaches.* Sage Publications.

Ghimire, G., Hall, P., & Newton, M. (2007). *Evaluation of Nepali Language Software.* First version, summer 2007. Report of Nelralec project.

Hall, P. (1998a). 'Vernacular Software in South Asia: what happens now and what is needed.' *WG9.4 conference,* Bangkok, Thailand, March 1998.

Hall, P. (1998b). 'Designing of Code Tables with application to Nepali,' *Journal of Global Information Management,* Volume 6, No. 4, Fall 1998, pp. 5–14.

Hofstede, G. (1991). *Culture and Organisations, Software of the Mind.* McGraw-Hill.

Keniston, K. (1999). 'Language, Power and Software,' in *Cultural Attitudes Towards Technology and Communication.* New York: SUNY Press.

Kuhn, T. S. (1996). *The Structure of Scientific Revolutions.* Third Edition. University of Chicago Press.

Kuncha, R. M. & Bathula, H. (2004). *The Role of Attitudes in Language Shift and Language Maintenance in a New Immigrant Community: A Case Study.* University of Waikato Language Institute, Auckland Centre, New Zealand Working Paper 1, April 2004. http://www.crie.org.nz/research_paper/H.Bathula_WP1.pdf

Nettle, D., & Romaine, S. (2000). *Vanishing Voices. the extinction of the world's languages.* Oxford.

Oates, B. J. (2006). *Researching Information Systems and Computing,* South Asian Edition. Sage Publications.

Orion. (2007). *Evaluation Study of Nepalinux and Nepali Windows XP.* Final Report. January 2007. From Unlimited NuMedia P. Ltd., Kathmandu.

Pal, J., Lakshmanan, M., & Toyama, K. (2006). "My Child Will Be Respected": Parental Perspectives on Computers in Rural India. *ICTD2007, International Conference on Information Technologies and Development,* IEEE Conference Proceedings December 2007, Bangalore, India.

Polanyi, K. (1944). *The Great Transformation. The political and economic origins of our time.* Beacon Press, 2nd paperback edition, 2002, with introduction by J. Stiglitz.

Punch, K. F. (2005). *Introduction to Social Research; Quantitative and Qualitative Approaches.* Second Edition. Sage Publications.

Rahman, T. (1996). *Language and Politics in Pakistan.* Karachi: Oxford University Press.

Rogers, H. (2005). *Writing Systems. A linguistic approach.* Blackwell Publishing.

Sampson, G. (1985). *Writing Systems. A linguistic introduction.* Hutchison.

Schiffman, H. F. (1995). Language Shift in the Tamil Communities of Malaysia and Singapore: The Paradox of Egalitarian Language Policy originally published as 'Language Loss and Public Policy, I' Garland Bills (Ed.), *Southwest Journal of Linguistics,* Volume 14, Nos. 1–2.

Scott, J. (2006). *Social Theory. Central Issues in Sociology.* Sage Publications.

Srinivas, M. N. (1962). *Caste in modern India and other essays.* Bombay: Media Promoters and Publishers Pvt. Ltd.

Strauss, A., & Corbin, J. (1998). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory.* 2nd Edition. Sage Publications.

Unicode. (2007) *The Unicode 5.0 Standard.* Addison-Wesley.

Wardhaugh, R. (1992). *An Introduction to Sociolinguistics.* 2nd Edition. Blackwell.

Wenger, E. (1998). *Communities of Practice: Learning, Meaning, and Identity.* Cambridge.