



Studies in
Hausa Language,
Literature and Culture
The Sixth Hausa International Conference

Centre for the Study of Nigerian Languages,
BAYERO UNIVERSITY, KANO

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Ba a yarda a sake buga ko watsa wani sashe na wannan littafi ba, ta kowace irin hanya, sai tare da rubutaccen izini daga kamfanin da ya buga shi.

ISBN: 978-125-870-5

Bugawa:

Ahmadu Bello University Press Limited, Zaria,
Kaduna State, Nigeria.

Tel.: 08065949711, 069-879121

E-mail: abupresslimited2005@yahoo.co.uk

Website: www.abupress.org

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Hausa and Information and Communication Technologies (ICTs)

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Introduction

Information and communications technologies (ICTs) is a term which is currently used to denote a wide range of *services, applications, and technologies*, using various types of *equipment and software*, often running over telecom *networks*.

ICTs include well known telecom *services* such as *telephone, mobile telephone and fax*. Telecom services used together with computer hardware and software form the basis for a range of other services, including *email, the transfer of files* from one computer to another, and, in particular, the *Internet*, which potentially allows all computers to be connected, thereby giving access to sources of knowledge and information stored on computers worldwide.

Applications include *videoconferencing, teleworking, distance learning, management information systems, stock taking; technologies* can be said to include a broad array ranging from 'old' technologies such as *radio and TV* to 'new' ones such as *cellular mobile communications*; while *networks* may be comprised of copper or fiber optic cable, wireless or cellular mobile links, and satellite links. *Equipment* includes telephone handsets, computers, and network elements such as base stations for wireless service; while *software* programmes are the lifeblood of all these components, the sets of instructions behind everything from operating systems to the Internet.

Thus services as basic as telephones are at issue, as well as applications as complex as "telemetry", for example, to remotely monitor water conditions as part of a flood forecasting system. Indeed, *many services and applications can be made available as soon as telephone service is provided*: the same type of technologies that are used to transmit voice can also transmit fax, data, and digitally compressed video.

The importance of ICTs is not the technology as such, but its enabling function in access to knowledge, information and communications: increasingly important elements in today's economic and social interaction.¹

¹ European Commission, *Communication from the Commission to the Council and the European Parliament; Information and Communication Technologies in Development. The role of ICTs in EC development policy*; Brussels 14.12.2001; COM(2001)770 final;p.3)

The Digital Divide

Thus it is generally acknowledged that the information and knowledge age is here, and has in-fact been with humankind since the last decades of the second millennium. This age has been characterized largely by the dominance of two movements both related and in the service of an age-old human preoccupation: capitalist accumulation. Economic globalization and the new ICTs are seen as the engines of contemporary global economy driving a new information world order in which most of the continent of Africa is not faring too well. Market logic largely drives the currents in these two movements and it is a real concern that the new information and knowledge society, rather than close the development and poverty gap, might in fact aggravate it; thereby, reducing the dividends of global capitalism. The notion that ICTs are pre-eminent for faster development especially in the underdeveloped South is pervasive and momentum is gathering on a global scale to support the development, diffusion, use and appropriation of ICTs in knowledge-poor countries and regions in Africa and Asia in particular.

There is little doubt that historians of civilizations will acknowledge the information revolution of the late twentieth century as having introduced significant changes in the nature of human interactions and relations between peoples and nations. Globalization and its driver the new ICTs have taken the world by storm and their message of change is being trumpeted loudly from a multiplicity of podiums by a growing band of important personalities and organizations. All major global organizations including the United Nations through some of its major agencies, bilaterals and even national governments, notably the group of eight most industrialized countries popularly referred to as the (G8), are extolling the virtues of new information and communication technologies. They are seen as harbingers of prosperity as they can guarantee access to global markets, enable direct foreign investment, and e-commerce. ICTs have already created a new world order of digital 'haves' and 'have nots' separated by what is popularly called and referred to as the digital divide. Much contemporary effort is being geared towards reducing this divide, improving and spreading digital dividends to the information, knowledge and by extension, material-poor of the world. A multitude of efforts and projects are currently underway to bring information and communication technologies to the developing world because of the belief in their transformative potential.

In the late 1980s and 1990s, the notion and movement for ICTs was just starting a slow trickle in sub-Saharan Africa among isolated NGOs and a few nodes in universities and specialized institutions. Many development actors, governments and a sizeable proportion of social thinkers were convinced of the utter lack of wisdom (some would even go as far as to say irresponsibility) of investing in ICTs when other more deserving and acutely pressing and perhaps life-threatening areas of action such as health, education and agriculture were still

in dire need. This is the dilemma, for instance, facing the Jigawa State Government's (Nigeria) massive investment in ICT infrastructure and services in an extremely rural State in 2004. It was generally felt that the continent was unprepared, not yet ready, for ICTs; a feeling which still persists today even among very educated, well placed and arguably well informed Africans. This in a way is at variance with expressions of faith in ICTs that they can support the necessary transformation in Africa and other developing countries. In a 1999 study provocatively titled "Can sub-Saharan Africa claim the 21st century," the World Bank President, James Wolfenson proclaims in the preface that "information and communications technology offers enormous opportunities for Africa to leap frog stages of development." World leaders regularly espouse this position and the newest proposal for Africa's development, the New Partnership for African Development (NEPAD) advanced by eminent African leaders recognizes the central role of technology in the prospects for the continent.

Data to confirm these positions and affirmations is however scanty and some argue that emerging pictures suggest that far from spreading benefits, ICTs are spreading unequally and these "disparities exacerbate existing disparities based on location, gender, ethnicity, physical disability, age and especially, income level, and between 'rich' and 'poor' countries," (Bridges.org 2001).

Modern ICTs - especially the internet - have been responsible for increasing the amount of and rate at which information is shared and knowledge is disseminated. Furthermore, these ICTs are time and location independent, with especially the internet having the capacity to provide information that can be accessed worldwide, devices that facilitate the dissemination of information, and a tool for the establishment of linkages between stakeholders working towards the same goal, yet based in regionally-diverse areas. While the main push and pull drive in ICTs is towards seeing the technology in business, entertainment, politics and information sharing, African languages are considerably left out of this race. In particular, languages with unique pronunciation characteristics that are not easily encoded for the web and thus internet access. Hausa language happens to fall into this category.

African Languages and the Digital Divide

The issue of African languages and the digital divide was brought out forcefully during the International Conference on African Languages in a Digital Society, held October 22-25, 2001 at the University of Zurich, Switzerland. During the conference a series of workshops on applications of information and communication technologies to African languages were held to brainstorm the progress that has been made in enabling a wider application of African languages in the information age. The workshops created a space for informal exchange between participants. The need for such brainstorming becomes all the more

pressing when we consider that not a single African language, not even Arabic with a wider user base than any indigenous language in Africa, appears among the top 10 languages used on the Internet, as indicated by Table 1.

Table 1: Internet Users by Language, September 2004

Language	Users	Penetration	World Users	Language %
English	286,642,757	26.1 %	1,098,654,265	35.3 %
Chinese	105,736,236	8.0 %	1,321,669,200	13.0 %
Japanese	66,763,838	52.2 %	127,853,600	8.2 %
Spanish	55,887,063	14.5 %	386,413,200	6.9 %
German	54,234,545	56.6 %	95,893,300	6.7 %
French	36,412,050	9.7 %	375,164,185	4.5 %
Korean	30,670,000	41.0 %	74,730,000	3.8 %
Italian	28,610,000	49.3 %	57,987,100	3.5 %
Portuguese	23,058,254	10.3 %	224,664,100	2.8 %
Dutch	13,657,170	56.6 %	24,125,950	1.7 %
Top 10	701,671,913	18.5 %	3,787,154,900	86.3 %
Rest	111,259,679	4.3 %	2,602,992,587	13.7 %
World	812,931,592	12.7 %	6,390,147,487	100.0 %

Source: <http://www.internetworldstats.com/stats7.htm>

Thus English continues to be the most dominant language on the internet – thus creating a barrier for millions of non-English speaking users of the internet, especially from Africa. This global medium therefore serves to exclude a huge number of people whose languages are not represented either by ICTs in general, or Internet in particular.

Within this context, one of the more focused attentions given to the issue of African languages and the digital divide was by Don Osborn (2001) who suggested that there are a number of interrelated issues to consider in a comprehensive discussion of African languages and ICTs, which one might broadly characterize as including:

- *structural issues* (e.g., basic physical access to the technology, technical problems),
- *socio-linguistic factors* (issues relating to orthographies, literacy, multiplicity of languages and dialect variation within languages, and attitudes about languages),
- *economic considerations* (lack of resources, other priorities in using ICTs for development), and
- *political concerns* (what effect would validating linguistic diversity in the new technologies have on divisions in a society).

Further, according to Don Osborn, for using the special characters on computers and the internet there are several approaches:²

1. For African languages of the first category that use the Latin alphabet of European languages there are no special technical problems to working with text, production of web content, or even software localization. This is especially the case for languages like Swahili, Somali, and many in Southern Africa that use only ASCII characters (i.e., no accents). Even languages such as Sango that use several accented characters common to major European languages can be readily used in word-processing and on the web (see for example <http://sango.free.fr/>).
2. For African languages with their own script, such as the Ge'ez used in Ethiopian and Eritrean languages or Tifinagh used in Tamasheq and Berber, special coding is necessary. This process is already well advanced for Arabic, and is not unlike what has been or is being dealt with for the several non-Latin alphabets used across much of Eurasia. In the case of Ge'ez, apparently several font + keyboard packages are available raising the problem of mutually incompatible systems and the desirability of some sort of standardization, as explored in <http://www.punchdown.org/rvb/email/UniGeez.html>. For Tifinagh some fonts are available. Other less widely used alphabets such as N'ko and Vai are virtually non-existent in information technology. In any event, unlike the case for languages using extended Latin alphabets, there are no shortcut solutions either you have the full orthography in text (or image file), or you substitute a transcription or transliteration in Latin characters.
3. However, many African and most West African languages in their officially adopted orthographies use the Latin alphabet with a few extra or different characters/letters or less-common digraphs to represent sounds not found in major European languages. The extended alphabet adopted by many countries for their maternal languages had its genesis at a conference of African language experts held in Bamako in 1966.

He suggests that for using the special characters on computers and the internet there are several approaches:

- (a) The "correct" one. That is, in a word processor to have a font that includes these characters. There actually seems to be a growing number of such fonts, often created to meet specific needs on a local level or as part of a commercial line of multilingual software. Unfortunately they and the keyboard arrangements for them are generally incompatible.

For the web, that means being able to have these added characters in a text with a standard code for each character, a single code set including these, and some standard set of glyphs on the receiving end that a browser would call up to represent them. Unicode is proposed as a solution to this (as well as to the lack of standardization for word-processing). However it is not there yet as you might find, depending on how your browser handles Unicode (utf-8), in looking at the Fula (Peulh, Pulaar), Ewe, Kabye, and

² Don Osborn, "The knotty problem of using African languages for e-mail and Internet", *Balancing Act*, Issue 69, 2001.

Maninka versions of the Universal Declaration of Human Rights at <http://www.unhchr.ch/udhr/navigate/region.htm>. If you get a lot of empty boxes in the texts then you can see why people still are using workarounds such as below to create and share text in these languages.

- (b) The “old-correct” or obsolete one. That is, for some languages such as Bambara, Ewe, or Fula (Pular/Fuuta Jalon) some digraphs or accented characters used in European languages were employed before the special characters of the extended alphabet were officially adopted (e.g., “ny” or “n tilda” for the “n with left hook”; “o accent grave” or “underlined o” for the “open o”; “dh” for the “hooked d”). It lets one produce and present text, but is not satisfactory to those who have learned in and/or are used to using the current orthography. Also, accents might be confused with tone indicators used in texts for some of the tonal languages (Bambara, Yoruba).
- (c) The substitute solution: Use something that stands for the special characters. For instance use capital letters in place of the special characters (e.g., “E” for the “open e”). An example in Bambara can be seen at: http://callisto.si.usherb.ca/~malinet/index_ba.html. Another example is digraphs for modified consonants, such as “d” or “k” for the “hooked d” and “hooked k” as is the approach used for text in a Hausa page (see esp. the part named “Mawallafan Littatafan Hausa”: <http://www.gumel.com/Littatafan-Hausa.htm>). Yet another is to substitute similar-looking letters from other alphabets, such as the Greek letter “β” for the “hooked b” used in Fula and Hausa.
- (d) The “little image file” solution where little image files are used for the special characters inserted as needed in the text. This is very cumbersome except for short texts. A site where that was done, for Bambara, is http://www.djembe.com/bambara_1.cfm. A Wolof learning site uses a little image file to help readers ascertain whether their browser can read the letter “eng”: <http://users.mildura.net.au/users/mjackson/Language/Sounds.htm>
- (e) The “big image file” solution. Where text in proper orthography is turned into image files (.jpg or .pdf), usually for the web. One example for Fula (Pulaar) is at the bottom of the page at http://africandl.org/fuuta_lib/aan_pulaar-eng.html; another is the Declaration of Human Rights in Bambara at <http://www.unhchr.ch/udhr/lang/bra.htm>. This solution is sometimes also used for languages written in non-Latin alphabets.
- (f) The “whatever works easiest” (or “fast & dirty”) solution. That is, just use the closest standard Latin letter for each special character (e.g., “e” for the “open e”). This was done with Bambara at: <http://www.bok.net/pajol/index.ba.html>. Examples for Hausa include <http://www.unhchr.ch/udhr/lang/gej.htm> and most of the site <http://www.gumel.com/>. The advantage is that it gets the material out there in readable form quickly, rather than working on the technical solutions or settling on a substitute solution. As a consequence, it is the method apparently used most for e-mail in African languages (and even sometimes in the case of French text, which some e-lists/groups and at least one e-newsletter disseminate without accents). The disadvantage, of course, is that many words can thus be misread.
- (g) “Hybrid” solutions are a mix of a couple of the above. For example, Wolof text at <http://www.bok.net/pajol/index.wo.html> uses accented characters but not the letter “eng.” And two sites with Fula (Pular/Fuuta Jalon) deal in different ways with the transition from the old transcription to the new, the one cited in (b) above and <http://www.ibamba.net/pular/default.htm>.

A combination of these approaches was taken by Russell G. Schuh when designing his Hausa Grammar pages hosted at the University of California, Los Angeles campus. As stated on the website,

Designer's comment: Probably too "non-technical" for the taste of Hausa specialists and professional linguists. The primary intended audience is beginners in Hausa and people (linguists and others) who want some basic information about Hausa without having to wade through dense prose descriptions and details, as important as they might be. I have occasionally included links to "Technical notes" on details which a learner could probably get along without knowing but which, nonetheless, fill important gaps in the basic description.

The medium of the World Wide Web forces choices that are not optimal for language description. In particular, I do not mark tone and vowel length for the most part. The web environment still does not provide a convenient way to display non-standard characters. About the only way this can be done without placing the burden on users to install special software on their individual computers is to create examples containing special characters as graphic objects. Inclusion of all the necessary graphic objects not only causes web pages to load much slower than pure html files, but creation of all those objects is exceedingly time consuming and tedious. The latter consideration is the main reason for my choosing to prepare the grammar, at least initially, without marking tone and vowel length for the most part. One can also rationalize this decision by noting that the standard Hausa orthography does not mark these distinctions, and moreover, in my experience, marking tone and vowel length is only a minimal aid in getting the average Hausa student to actually learn to produce these features of the language with any accuracy!

http://www.humnet.ucla.edu/humnet/aflang/Hausa/Hausa_online_grammar/grammar_frame.html

Thus the implications and use of African languages, particularly those with non-Unicode characters such as Hausa attracted a lot of interest and debates on various fora on the Internet, especially the discussion lists of *a12n-forum* <http://lists.kabissa.org/lists/archives/public/a12n-forum/msg00000.html> and *Hausa charsets & keyboards* at <http://www.quicktopic.com/8/H/>, both initiated by Donald Z. Osborn.

The *A12n-forum*, established 21 March 2002, for instance, was intended to be a means to facilitate information sharing about use of African languages on computers and the internet. Subsequent discussions covered a wide range of topics ranging from practical applications, to policies affecting language and ICT. Hausa language is given a significant attention in the forum.

Don Z. Osborn, who runs the discussion list, explained at another forum, that creation of web content as we usually see it (text-based, sometimes sophisticated graphics) requires much in time and resources. One cannot create significant amounts of content very quickly, especially in the case of African languages, as there is a lack of available human and monetary resources to apply to the task. In any event, the dynamic here is by its nature slow: the proportions of

the languages on the Internet change, but gradually. Some expect that these proportions will continue to approach an approximation of the current percentages of speakers of languages in the world. But that assumes relatively comparable written traditions and available resources - conditions that don't hold for much of Africa.

For the case of African language text content on the Internet, therefore, it would seem to be especially important at this point to assure that ground is not "lost" in this process, and that can be done by:

- Supporting existing efforts.
- Improving coordination and collaboration between the actors (a and b require communication)
- Adopting and adapting Unicode.
- Seeking to put texts already published (e.g. literature in African languages) on the web.

The last point is worth clarifying: since some years ago there have been "classics" published in African languages (generally with parallel text in a European language) and monographs with African language content for limited audiences. Why not put all of them on the web? In short order there would be content of an uncontested quality on the web, and this literature would be made accessible to a new generation of readers. And this would represent a powerful African presence on the Internet to encourage the others.

However, while the discussion list remains that – a place on the Internet to share ideas and often report tentative field work findings relating to African languages and ICT, there is little by way of efforts in localizing the Internet for Hausa use.

ICT and Hausa—the Three Dimensions

There are three broadways in which ICTs interface with the Hausa language. First is the *orthography* of the language, particularly the specialized "hooked" characters of *k*, *d*, *ɓ* and their capitals of *K*, *D*, *B*. Second is the presence of services in the language on the Internet – the biggest ICT of all, and third is the way the language *interfaces* with the Internet

Hausa Orthography and Computer Keyboards

Before the widespread availability of the IBM Personal Computer (PC) in about 1989 at least in Hausa speaking areas of northern Nigeria, the Apple Macintosh computer was the only personal computer available – and even then only to very few individuals. The Macintosh's clear advantage was its ability to

use True type fonts which enabled it to render a near-typeset quality to printed documents – a far superior physical appearance than even the best electric or electronic typewriter of the time. One of the fonts that came bundled with the Macintosh's was a variation of Lucinda Calligraphy, which the early Hausa computer typesetters discovered could be used to represent Hausa character sets that were not available at the time. Thus when the font is used to write b, d, and, k their appearance could be passably accepted as Hausa intonation *ḃ* (ḃ), *ḏ*, (ḏ) and *ḕ*, (ḕ) as shown in Fig. 1.

Hausa	Lucinda Calligraphy
ḏ, ḕ, ḃ.	<i>ḏ, ḕ, ḃ.</i>
D, K, B.	<i>D, K, B.</i>

Fig. 1: Font wars – Hausa characters on computers

The problem, of course, was that Lucinda Calligraphy was an *italic* font, and documents produced with it tended to have an *italicized look*. So even characters that had nothing to do with the “hooked” character end up getting hooked. Let me illustrate with an example of the expression, *dakin kawarta* (her friend's room).

Normal font	Lucinda Calligraphy	Hausa font
Dakin kawarta	<i>Dakin kawarta</i>	Dakin kawarta
	Daḕin ḕawarta	

Thus using Lucinda Calligraphy was just an interim measure and clearly a better solution has to be sought. This came with the boom in what became known as “business centers” throughout northern Nigeria in the late 1980s.

By early 1990s business centers, initially with electric typewriters (with “memory”) started to emerge with computers particularly in Kano. Some of the early computing pioneers were Amstrad PCW dedicated word processors that seemed to suddenly open up a whole new world to a generation brought up on Olympic typewriters. The transition to “proper” computers in the form of the early 386s that pervaded the Kano markets in the early 1990s opened up the Hausa literary establishment to a faster mode of processing information, and created a boom in the development of “business centers” – places where computer typesetting and telephone services were offered. Eminent Kano pioneer business

centers that emerged in this era included *Abacus Computer Services* (1988) *Midtown Business Services* (1991) and *City Business Center* (1990).

Abacus pioneered the Arabic typesetting industry in Kano and thus made it possible for the earliest *prayer* genre books to appear in the market. This was made possible by Abacus being the first to acquire the DOS-based *Universal Word* program which included Arabic language module in its multi-lingual structure. Interestingly, despite this availability of Arabic typesetting, Hausa *Ajami* was not openly adopted as a script on the computer by writers at the time.

Perhaps the biggest role in the production of the *soyayya* genre was played by City Business Center, located right in the heart of the Kano city, and about five blocks away from the Gidan Dabino publishing house along the same street. The focus of City Business Center — cheap, cheerful and flexible — is on Hausa writing which was later expanded to include Arabic typesetting. To date, the City Business Center has typeset more than 400 of such books and their associative forms.

However what really transformed the Hausa and ICT, particularly literary process — spearheaded by the *soyayya* genre — in Kano was the availability of Windows 3.x software. Windows 3.1 became available world-wide in April 1992. With it came a whole raft of features that made its predecessor Windows 3.0 (released in May 1990) positively archaic. Windows 3.1 came with support for TrueType font technology, and suddenly it became possible to produce good-looking manuscripts that at last begin to look like *real* printed books! So much was Windows held in awe that its default font of *Arial* used by the crude resident word processor *Write*, was automatically used by business center operators and unchallenged by the authors who were only too happy to see their works better produced than on typewriter. Until then WordPerfect 5.0 had been the predominant Dos-based word processor. Its default *Courier* font — especially printed crisply on a laser printer — merely made an ugly typeface more tolerable. Windows changed all that to such an extent that the basic word processor in Windows, *Write*, was universally used by most of the earlier Hausa authors — simply because of its *Arial* font!

With the availability of more powerful machines in mid-1990s (by 1995 the common computer configuration was 486DX2-100/ capable enough of running Windows 95), the availability of more powerful Windows word processors (*Microsoft Word* remained dominant among computers in Kano) and the realization that the fonts can be added to the system, the Hausa literature went into an overdrive. Hitherto the production of Hausa literature was, from its infancy, institutionalized.

The outburst of information technology in the early 1990s is the wake-up call for the silicon breed and the formation of urban defense league guerillas ready and willing to emphasize that urban is good, desirable and a way of life.

Whether motivated by greed and tinsel or desire to contribute their widow's mite to Hausa literature, the floodgates opened and the result was literally thousands of publications (all self-sponsored) many with cheerfully gaudy cover art work with a liberal use of decorative fonts. Incidentally, except for few centers, Adobe (then Aldus) *PageMaker* and *Microsoft Publisher*, two leading desktop publishing packages, were largely ignored, perhaps because of their steep learning curves. The result was cut-paste-cut style of straightforward word processor printout that characterizes the poor finishing of most of the early *Kasuwar Kurmi* Hausa literature genre—the ones to embrace ICT in Hausa writing.

This development, where there was no absolute dedicated Hausa word processor, convinced few of us of the need for collaborative efforts in Hausa software development. Although we were aware of the Windows SDK (Software Development Kit) which enabled us to “go behind the hood” of Windows operating system and at least alter the dialogue boxes and convert them to Hausa, nevertheless we had wanted a more elegant solution.

So in 1993 we established a small task-force comprised of two programmers, two linguists and two writers and one systems analyst — all computer nerds. The codename for the word processor we wanted to develop was *Marubuciya* which the colleague (the main programmer) had already started working on since doctoral student days at Sussex University. Indeed a tentative prototype of the *Marubuciya* was developed which was shown to interested linguists sometime in 1994 in Kano and was well received.

The initial development of the Hausa word processor was done with Microsoft Visual Basic 1.0 which was rudimentary and reflected on the prototype first Hausa word processor, *Marubuciya*. What we needed was sponsorship to purchase the a more powerful programming language (e.g. Borland C++ Microsoft C++, or Visual Basic Professional), font design packages (such as Fontographer, Fontmonger) as well as development time in the form of a sabbatical to concentrate on the various aspects of the word processor (the core programmer, the linguist to develop the spell-checker, an artist to guide on its appearance and a writer to write the manual). The idea was that *Marubuciya* will be targeted at secondary school leavers who lack the linguistic exposure to properly understand the complex command structure of more sophisticated word processors like Microsoft Word and WordPerfect (then available). Our preliminary survey did show the vast majority of the business center operators on the Hausa literature scene in Kano were from this sampling frame. However despite attempted contact, no one was willing to sponsor such venture in Kano so we gave up, and disbanded the team.

However, not ready to give up totally, I decided to pursue a strand of project — font development — to its logical conclusion. This is based on the fact

that any TrueType or postscript font can be used by any application in the Windows environment. The required font development platform — Fontographer 3.5 — was acquired through the good will of some American friends (which I gathered later cost well over \$300!) and I set to work.

To develop the Hausa font I needed to work with a template. This presented two questions before the font could be created. First, which font to convert to Hausa? Second, which keyboard characters to “kill”?³

A breakthrough (and in science there is always a “lucky break”!) came in the form of contact with American Summer Institute of Linguistics (SIL) based in Texas, United States. The SIL has developed a series of phonetic typesets for essentially academic use in mid 1990s based on International Phonetics Association (IPA) guidelines. The IPA fonts were first generation of SIL Encore Fonts — scalable outline fonts for both Macintosh and Windows systems. They contained every base character, diacritic, and suprasegmental mark prescribed by the International Phonetic Association, including the 1989/90 Kiel Convention revisions. The variation of the same font in three styles provided a choice. The fonts all released 1993 were SILDoulosIPA-Regular (based on Times New Roman), SILManuscript IPA-Regular (based on Courier style), and SILSophiaIPA-Regular (based on Arial/Helvetica/Prestige, and what actually later became a version of Arial Unicode from Microsoft).

The font contained three Hausa hooked characters; but curiously enough, the SIL fonts do not have capitals for the lowercase letters (at least in these apparently first versions of the fonts released in 1993⁴). Moreover, to use the Hausa characters, you must use Alt and a sequence of numbers on the keypad section of the keyboard — 6 (Alt + 186), k̄ (Alt + 251) and d̄ (Alt + 235). This was too cumbersome, especially to those not familiar with computers. Thus the first task was to “bring out” the fonts into a more accessible keyboard location.

To adapt the SIL font to “proper” Hausa font, with the hooked characters out in the open from the arcane recesses of Alt+, I decided to adapt Times New Roman. Although the choice of TNR was quite arbitrary, nevertheless there is a rationale for the choice. In the first instance, it is a body typeface, meant for body text writing. It is also a serif font (with the curly bits at the end of the stems), so it is easier to read.

³ Later, about three professionally produced Hausa fonts became available to us. The first was simply called Hausa, and developed at the University of London. This uses alt + key to produce a hooked character; for instance alt + k gives k̄. The second font was AfroRoman, which uses a series of Unicode character codes to produce the hooked characters.

⁴ The three fonts were apparently “shareware versions”, with the full set (containing upper cases) sold, via an order form included in the package, for \$100 at the time.

As for which characters to “kill”, that was easy enough; *k*, *d*, *b* with the capitals all went away to make room for *ƙ* *ɗ* *ƙ* and their capitals. I initially contemplated destroying “p” — until I saw how Panshekara and Panisau (suburbs in Kano) were spelt. The initial resultant font was named *Rabiat*, a name with a specific maternal sentimental value to me. The first version was rather crude, and clearly reflected the fact that it was developed by a non-artist. The process involved loading the font into Fontographer and artistically working on the stems of the necessary characters create the hooks for the upper cases of { [|. The lower cases were simply transplanted from the SIL font into a new TNR.

Rabiat TrueType font was meant to be used in pure Hausa writing where the “killed” keyboard characters would not certainly be used. It was released in Kano on 10th February 1995. Its lower case keyboard layout is shown in Figure 2.

`	1	2	3	4	5	6	7	8	9	0	-	=	Backsp
Tab	ƙ	w	e	r	t	y	u	i	o	p	[]	\
Caps	a	s	d	f	g	h	j	k	l	;	'	Enter	
Shift	z	ɗ	c	ƙ	b	n	m	,	.	/		Shift	

Fig.2: Keyboard map for *Rabiat* TrueType font (*rabiat.ttf*) showing Hausa characters

However, feedback indicated an increasing number of Hausa literary works that include English words either in quotation or in Enghausa form (e.g. Khammes' *Matsayin Lover*, and Balaraba Ramat Yakubu's *Badariyya* which reflected the urban Hausa combined usage of English and Hausa speech pattern). This led to a need to revise *Rabiat* font.

Still using the same Times New Roman as a template, this time I round I decided to kill off square ([, D d) and curly ({, K k) brackets; the tilde (~, ƙ); and pipe filter (| B) — the assumption being that these characters are not used in any form of writing — on the keyboard to obtain the six Hausa typefaces. This involved first using the versatility of Fontographer move the two available characters (ƙ and d) from the SIL package to the Times New Roman template (*times.fog*) in Fontographer, and then transplanting D B K from *Rabiat* font. Thus in the keyboard positions of these non-alphabet characters were substituted with

the six Hausa hooked characters. The result was name *Daneji*.⁵ A copy of its keyboard layout is shown as Fig. 3.

`	1	2	3	4	5	6	7	8	9	0	-	=	Backsp
Tab	q	w	e	r	t	y	u	i	o	p	D	d	\
Caps	a	s	d	f	g	h	j	k	l	;	'	Enter	
Shift	z	x	c	v	b	n	m	,	.	/	Shift		

Fig. 3: Keyboard map for *Daneji TrueType font (daneji.ttf)*

Both *Rabiat* and *Ibtissar* TrueType fonts were not perfect, but as first versions, they served the purpose for which they were intended to serve without the cumbersomeness of a whole software development team. Further, the Hausa hooked characters are in plain view – with the necessity of Alt+ combinations. The City Business Center in Kano was the first to adopt both the *Rabiat* and *Daneji* fonts and it has helped in producing the proper accentuation in the Hausa typesetting. More development efforts needed to be done to perfect the fonts. For instance, there are no italic, bold or bold italic weights for these two Hausa fonts. Thus when using them in these weights, you have to rely on the on-screen interpretation of the base fonts.

Another limitation was also lack of decorative typeface in Hausa font medium. Most users ask for Arial which is used as display type. This, however, came in the form of Arial Unicode in 2000 and was bundled with Microsoft Office 2000. This font, which is over 20 MB in size, contains virtually every major language character codes, including Hausa. As with all the other professionally developed fonts, the “hooked” Hausa characters are located behind arcane Alt + key combinations. The full codes for Arial Unicode Hausa characters are shown in Fig 4.

⁵ *Daneji* is an area in Kano city, Nigeria. Later the font was renamed, and commonly available both in Nigeria and on the Internet as, Dr. Abdalla Uba Adamu, a purely narcissistic choice of name, in the absence of any other name at the time!

Arial Unicode and Hausa codes (2000)			
Character	Code	Character	Code
Ɓ	0181	ɓ	0253
Ɗ	018A	ɗ	0257
Ƙ	0198	ƙ	0199

Fig 4: Arial Unicode Hausa characters and codes

Further, the Arial Unicode font is quite heavy – making documents produced with it quite large. As the main targeted users do not have the capabilities to compress their documents (using either PKzip, popular at the time, or WinZip and WinRAR), again using this font was not a particularly elegant solution. Thus in the end the variations of Rabiati and Daneji fonts were predominantly used in Hausa writings in northern Nigeria.

However, sometimes in 2003 a company started advertising what it called KONYIN keyboard (www.konyin.com) which it was claimed contain all the Nigerian alphabets, including Hausa. The keyboard driver software uses proprietary source codes to generate all the identified unique alphabets. However, at \$100, and the knowledge that keyboards need to be replaced after sometime, it becomes a very expensive option for many Hausa users. A long term cheaper option (even though still steep at \$300) would seem to be offered by Unitype Global Office (<http://www.multilingualbooks.com/globaloff.html>) software that acts as an enhancement to Microsoft Office 97/2000/XP that adds text entry and visual keyboard display in over 100 languages to Microsoft Office suites, including Hausa.

Ajamization of Hausa keyboards

The medium of Hausa orthography via ICTs is the keyboard representations of the language. Yet in all discussions of Hausa orthography, it is often forgotten glossed over that Hausa language is expressed in two forms—Romanized Latin alphabet, and Arabic alphabet. In either of these two scripts, specialized characters unique to the Hausa language needed to be accommodated in a modernized typesetting. Thus Hausa language writers wanting to use Arabic characters as ajami face double difficulties –that of Arabic keyboard, and of course the representations of at least two “hooked” Hausa characters, ɓ and ɗ, not

present in Arabic keyboard layouts. The Hausa hooked characters of *k* and *d* are represented in Arabic.

Perhaps the most general intrinsic difficulty for users of Arabic on the Internet is the multiplicity of character sets. Arabic text is cursive, and the written form of Arabic letters varies according to their position in the word. Moreover, Arabic letters are written right-to-left whereas Arabic numbers are written left-to-right. The difference in directionality between Arabic and Latin text, and the frequent need to combine Arabic and Latin text on the same line necessitates a system that can handle bi-directional text. Other problems exist with regard to the searching and indexing of Arabic texts, representation and transport, and the display of Arabic features. One of the most detailed explanations of the problems of *ajami* on computer keyboards was offered by Nikolai Dobronravine, of St. Petersburg University, Russia, who observed, at H-Net Internet discussion circle in November 2002 that

1. *Hausa Ajami Vowels*. I have had some difficulties with the /e/. The dot under a letter must be thicker than a diacritical dot. If the vowel is long, the combination of a "ya" (with or without diacritical dots) plus the slanting "red alif" over it is even more difficult to handle. An additional sign (with different positions of the "ya") seems a better solution than e.g. the combination "ya"+vertical "fatha", as in some publications. In some texts the long vowel u/o is marked both over and below the line with a "damma" (two signs with a single letter). The long i is marked with a "kasra" plus a sign described as "subscript left half-ring" in the IPA terminology (similar to "Polish hook") to the left of it, both written under a letter. Such symbols are found in some Arabic publications of the Qur'an. I do not know whether they have been used in any computer fonts. The modern digraph (a "waw" plus a "sukun") used for /o/ seems to be a simple combination, so no additional sign is needed.
2. *Hausa Ajami Consonants*. Two sets of problems: a) glottalized consonants; b) labialized and palatalized.
 - a) *glottalized consonants*
 - a1. "hooked d" in Roman script. In a few early colonial texts corresponds to a "dal" with a diacritical dot under it. The sign is included in the Unicode chart.
 - a2 "ts" May be represented by the "emphatic Ta" with three dots. The sign is already used in the Unicode fonts.
 - a3 "hooked b". May be written with an additional dot under that of a "ba" The sign is included in the Unicode chart. But the combination /b'e/ may be a technical problem. Another variant: a "ba" with three more dots under the first one.
 - a4 " 'y ". Usually written with three dots below the letter. A common sign in Perso-Arabic except the final/isolated position. One more variant is found in Hasanah Ahmadu Sufi Kano's "Haske mai-yawa" (Kano, 1978): a digraph, an "ayn" with three dots over it plus "ya". The sign with three dots is found in Malay, so not a problem.

b) labialized and palatalized

Both labialized and palatalized consonants may be written down with three dots under the letters, either with additional "waw"/"ya" or without them. The most

common letters are “kaf” with three dots over it, “qaf” with two more dots above, and “ayn” with three dots over it. All these are found in the Unicode chart. One more variant has been found in two manuscripts of “Wak’ar tuba”: instead of dots, a “damma”-like sign is placed under the letter (cf. Vowels). The third variant with a madda sign over the letter is seemingly simpler than the other two. Besides A and B, a “c “ (/c/) may be marked as “shin” with an additional dot under the letter (Western Hausa, indicated by John Philips and added to the Unicode chart).

<http://h-net.msu.edu/cgi-bin/logbrowse.pl?trx=vx&list=h->

[hausan&month=0211&week=b&msg=Uv7praDUTnMadEdkay8TZg&user=&pw=](http://h-net.msu.edu/cgi-bin/logbrowse.pl?trx=vx&list=h-) November 2002

Interestingly enough, the Arial Unicode font released with Microsoft Office 2000 does include characters for ajami, as shown in Figure 5.

Ajami	Roman
ظ	ts
پ	b
ش	ch
ق	k
ط	d

Figure 5: Arial Unicode Hausa Ajami

This will clearly supplement the attempts made by ajami researchers such as Lee Pearce, Valentin Vydrine, Nikolai Dobronravine, Kamal Mansour, Jacob A. Dyer III and Charles Becker in ensuring that Hausa ajami is effectively presented on the Web.

Hausa and Representations on the Internet

The second area of interface between Hausa and ICT was the services provided by Hausa language websites on the Internet. This is one area where there is a great lack. Despite the massive amount of Hausa literature, yet very little of it was represented on the Internet. So far only Gumel (www.gumel.com) and Bisharat (www.bisharat.com) have significant Hausa contents. Bisharat uses both non-Unicode and Unicode (with hooked letters), while Gumel relies on non-Unicode Hausa characters.

Other websites are geared towards providing services in Hausa related products – education and books. For instance, the site by Russell G. Schuh of the University of California, Los Angeles, provides lessons in grammar and culture of the Hausa, essentially for those wishing to have a basic idea of Hausa language and culture. Others are either family sites (e.g. www.dantatafamily.com which focuses attention on the [antata mercantile family in Kano) or culture sites set up by individuals (e.g. www.hausanet.com, www.kanoonline.com, www.dandali.com), when funding for maintenance of the sites dries up, the sites are often hijacked. For instance, www.hausanet.com has been hijacked by www.biafranigeria.com. Similarly, www.hausavoices.com has lapsed and no longer exists. A Hausa women's site, Mujahida at <http://mujahidah.htmlplanet.com/> exists to provide Muslim Hausa women news from around the world.

Other resources seemed to be available to linguists such as Bargery's Online Hausa-English (39,000 words) and English-Hausa (4,600 words) vocabulary (<http://maguzawa.dyndns.ws/>) developed by Nakamura Hirokazu Sule, Bunkyo University, Kofar Hausa - Online Hausa-English-German dictionary by Franz Stoiber, University of Wien (<http://www.univie.ac.at/afrikanistik/oracle/KofarHausa.html>), Alan King's Hausa grammar sketch at (www.cirelink.com/alanking/modals/documents/do-g-hau.htm), and WebVerbix On-Line Conjugator for Hausa (www.verbix.com/languages/hausa.shtml).

At the moment, the only source of indigenous Hausa literary classics on the Internet is the initiative of the Abubakar Imam Foundation (Zaria, Nigeria, 2004) which led to the establishment of www.abubakarimam.com, a screenshot of which is shown in Fig. 6.



Fig 6: "Zauren" Abubakar Imam Website

The site contains virtually all the books written by Abubakar Imam, and are downloadable as PDF files.⁶ To overcome the Unicode problems with the Hausa texts of Abubakar Imam's books, it became necessary for us to scan each page as a jpg picture file and then virtually stitch the whole lot as a single book. The eBooks section is shown in Fig 7.

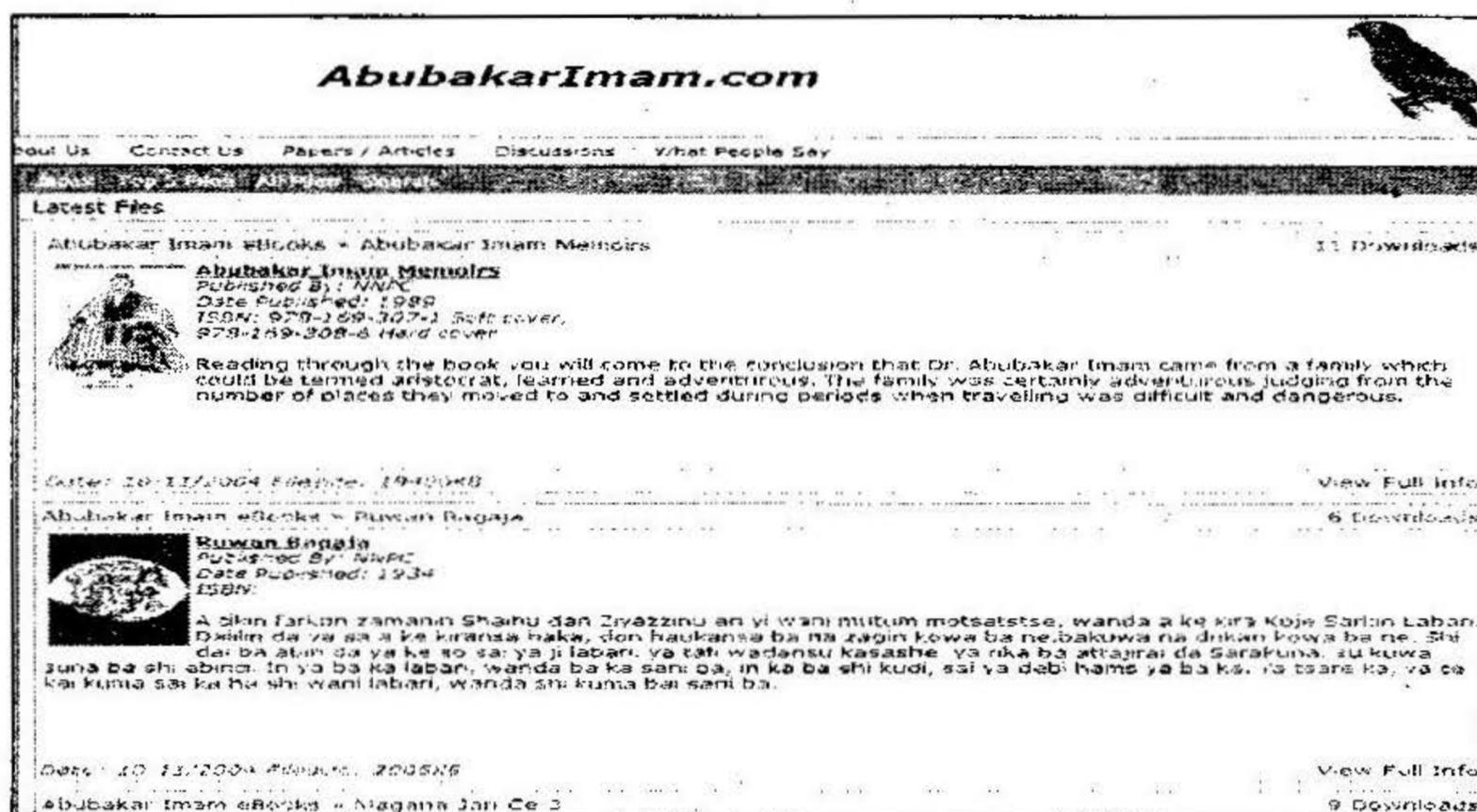


Fig 7: Free downloads of Classical Hausa Literature from Abubakar Imam eBooks page

Of the few Hausa books freely available on the Internet, one of the most historic must be R. Sutherland Rattray's monumental ebook *Hausa Folk-Lore Customs, Proverbs, Etc* (Oxford, The Clarendon Press, 1913) at www.sacred-texts.com/afr/hausu.htm and <http://www.marcusgarvey.com/wmview.php?ArtID=547> and reposted at http://www.dandali.com/Hausa_Folklore.html). This translation by R. Sutherland Rattray was begun with his five-year study of the Hausa language, written and verbal. The original manuscripts were written in Arabic and transposed into the Hausa vernacular. This transliteration was aided by Maalam (sic) Shaihu, learned in the translation of Arabic which was essential to this collection of Hausa tradition and folklore. The stories are presented in much the same way as Aesop's fables. These legends explain the origin of the spider, the cause of thunder, and how the wasp got its small waist. These fables personify morals and principled custom by using characterizations such as witches, chiefs, beautiful maidens, orphans, hunters, and giants.

Even the Holy Qur'an has assumed an Internet Hausa presence where an organization in Saudi Arabia called the King Fahd Complex for the Printing of the Holy Qur'an (Matattarar Buga Al-Kur'ani Mai Girma ta Sarki Fahad) has a

⁶ I am part of the development team of the website, together with Salisu Usman Danyaro and Ibrahim Sheme.

multilingual site with Hausa content. The entire Qur'an with an additional font for the late Alhaji Sheikh Abubakar Gumi Hausa translation (via a special downloadable font) is available at www.DivineIslam.com. The opening pages of Surat Al-Fatiha and the language modules of the viewer are shown in Fig. 8.

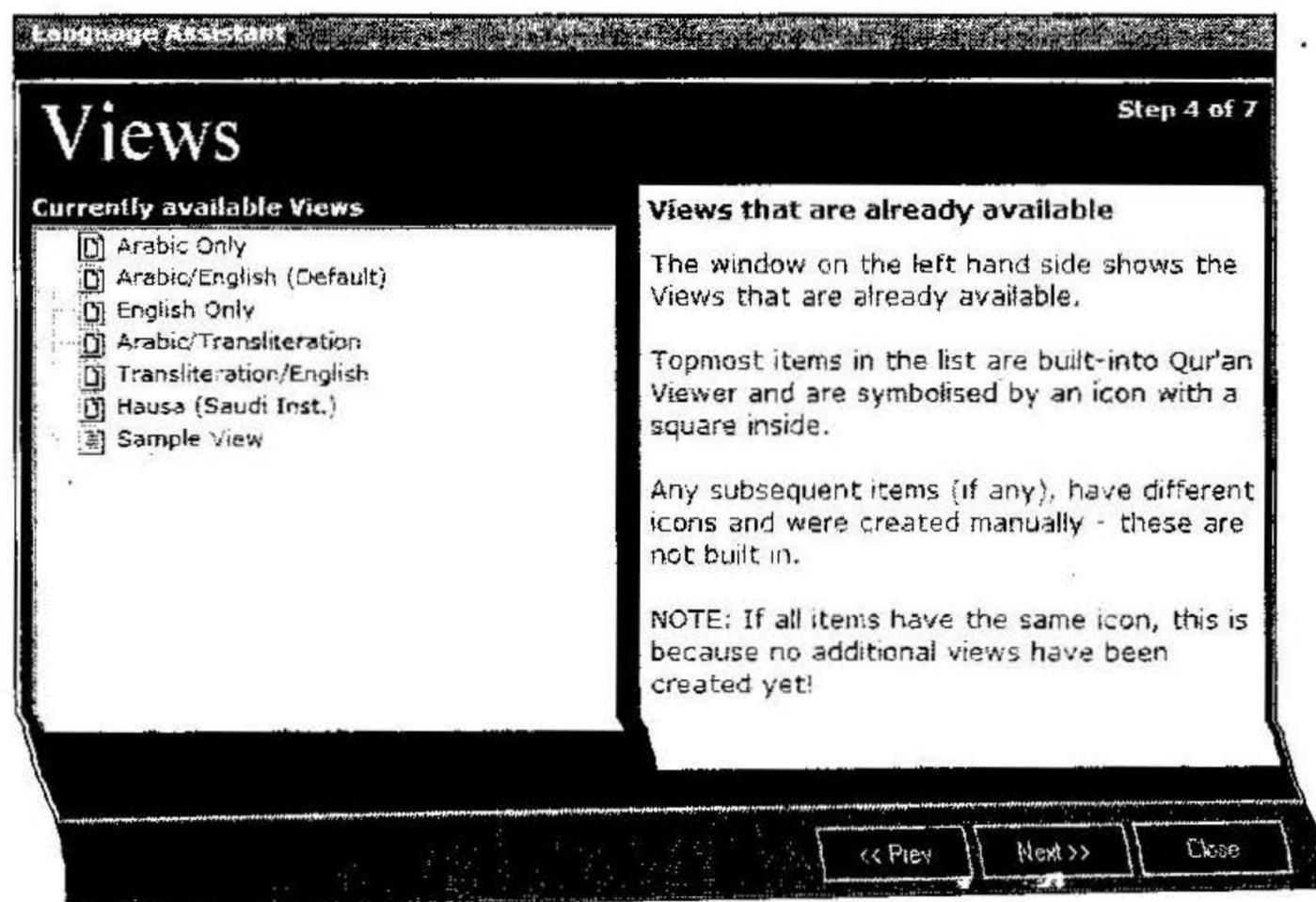
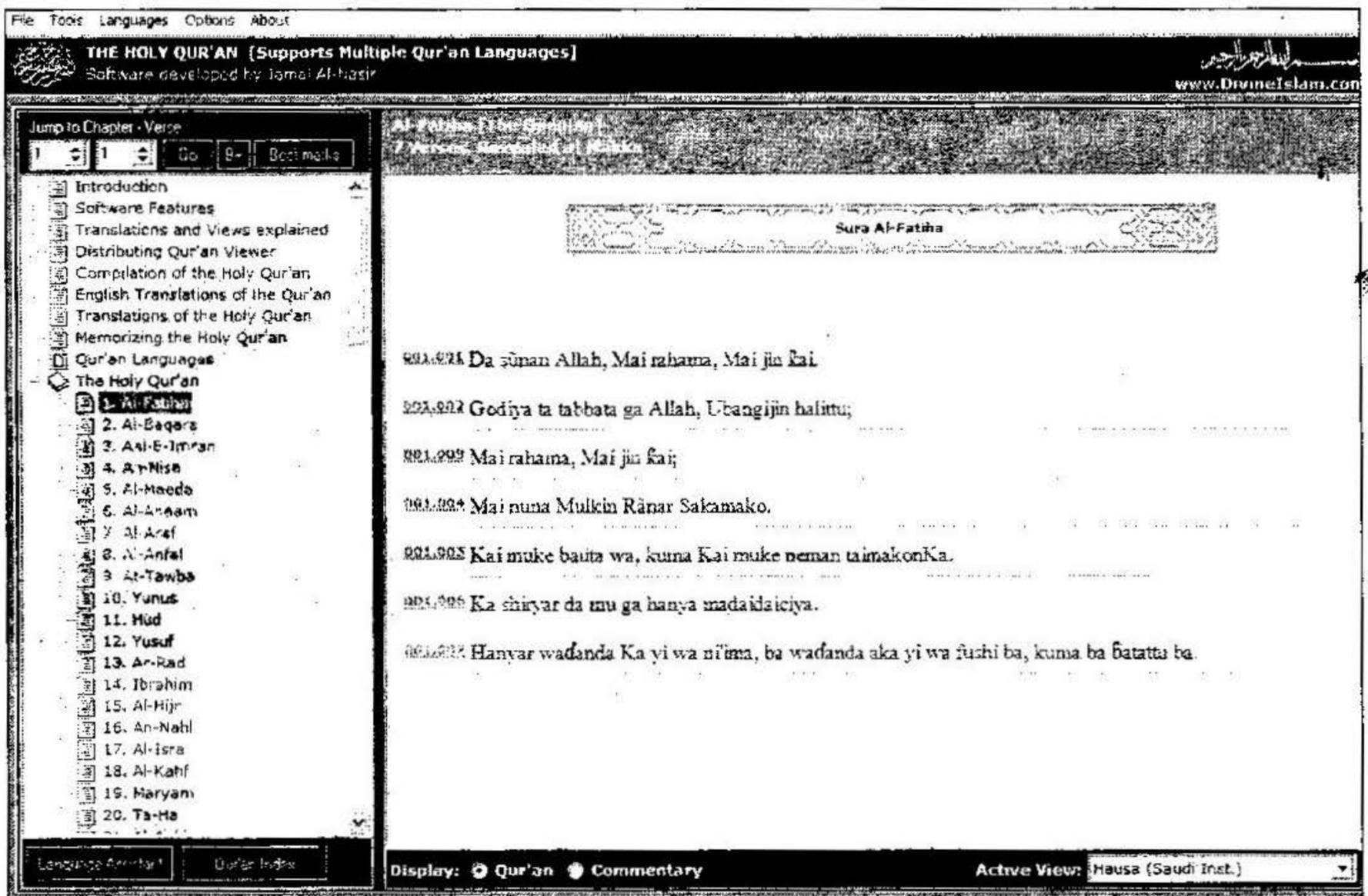


Fig. 8: Changing views of the Holy Qur'an—Hausa version

The Holy Qur'an viewer thus becomes the first Internet available version of the Holy Qur'an in Hausa.

And while the "Kano Market Literature" as the Contemporary Hausa Novel is so contemptuously labeled by some critics, nevertheless it was of sufficient social force to warrant a whole website in which many of the 869 available novels are carefully catalogued by Graham Furniss and Malami Buba at the School of African and Oriental Studies, London. The opening page of the online catalog (<http://hausa.soas.ac.uk/>) is shown in Fig. 9.

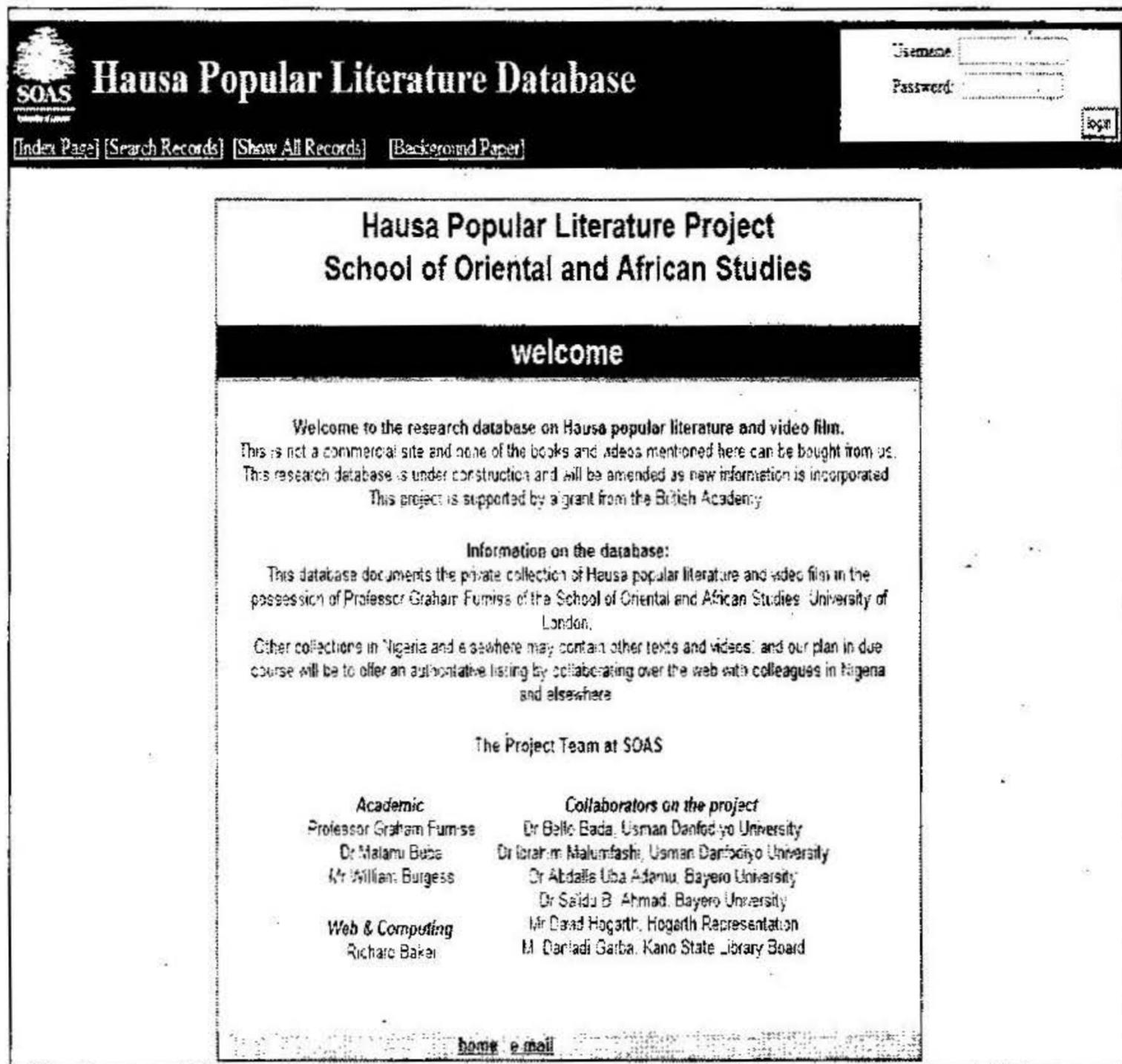


Fig. 8: Online Contemporary Hausa Novel Database Catalog

The Internet additionally provides a forum for the creation of cyber communities, and Hausa is represented, albeit on a low scale in this direction. Starting from September 1999, (the Internet itself became available in Nigeria in 1998, and only in Abuja and Lagos before painfully coming to Kano in early

2001) individuals started forming communities on Yahoo! Groups facilities.⁷ These enable anyone to set up a group containing between two to 2 million or so members, and rapidly enough became the main medium through which “cyber *kauyuka*” were formed, with Hausa surfers forming groups that cover a variety of interests. Table 2 shows the distribution of these groups on the Yahoo! groups network.

Table 2: Hausa Cyber communities hosted by Yahoo! Groups

YAHOO! GROUPS					
http://groups.yahoo.com/group/name_of_group/					
S/N	Group	Focus	Date Created	Members ⁸	Messages
1.	Hausa	Hausa language and culture.	Sep 24, 1999	66	161
2.	Hausadahausawa	Hausa culture	May 14, 2001	46	284
3.	Finafinan_Hausa	Hausa films	Aug 31, 2001	397	10,006
4.	Marubuta	Contemporary Hausa writers	Sep 4, 2001	96	1,032
5.	Kabo_Air_Nigeria	Kabo Airline Crew	Dec 8, 2001	03	0
6.	Mujalla	Hausa films	Dec 20, 2001	08	0
7.	Finafinan_hausa	Hausa films	Apr 19, 2002	43	76
8.	Matasa ⁹	Muslim Hausa culture	Apr 28, 2003	53	1,064
9.	Tarbiyar Iyalan Hausawa	Hausa families	May 7, 2003	24	168
10.	Fadagroup ¹⁰	Actors and actresses (general)	Dec 31, 2003	06	08
11.	Nurul-Islam	Muslim Hausa youth	Feb 21, 2004	103	1,130
12.	Finafinan-Hausa	Hausa films	Mar 29, 2004	37	47
13.	Kyan Gani	Hausa women	Apr 22, 2004	07	87
14.	M-PEG	Hausa films (editing)	May 7, 2004	17	05
15.	Hausas	Hausa culture	Jun 17, 2004	05	01
16.	Abubakar_Imam ¹¹	Classical Hausa literature	Jun 24, 2004	10	15

⁷ The MSN communities—a rival facility offered by Microsoft—does not seem to attract Hausa surfers because there are no Hausa communities currently on the MSN groups network.

⁸ Members and number of messages for each group as of Sunday 12th December 2004.

⁹ This group and Nurul-Islam (No 11) rely almost exclusively on a single member who, virtually on a daily basis, downloads and reposts various news items from Islamic websites around the Internet.

¹⁰ This group was formed to discuss film actresses from any category of film, not just Hausa home videos.

¹¹ This is in addition to the main website for Abubakar Imam at www.abubakarimam.com.

YAHOO! GROUPS					
http://groups.yahoo.com/group/name_of_group/					
S/N	Group	Focus	Date Created	Members ⁸	Messages
17.	Wasikarhausa	Hausa language and culture	Jul 2, 2004	02	01
18.	Mawakan-Hausawa	Hausa traditional music	Aug 19, 2004	24	43
19.	Rubutattun_Wakokin_Hausa	Hausa poetry	Sep 2, 2004	10	17
20.	Harshen-Hausa	Hausa language	Sep 2, 2004	03	0
21.	WritersForumKano	Hausa film scripts	Oct 25, 2004	22	77

It is interesting that almost all the identified Hausa-focus discussion groups—all using Hausa as the medium of exchange, although with occasional English language posting—on the Yahoo! network tend to devote their attention to either culture or entertainment, with Hausa home videos taking a significant portion of the messages. It is also significant that about half of the groups were formed in 2004 – clearly indicating a greater availability of Internet facilities in northern Nigeria, as almost all of these groups were formed by individuals resident in Nigeria.

Web browsing in Hausa – Localization process

The third area in which Hausa and ICT interface, especially on the Internet is the localization of web browsers in Hausa language. Indeed the two efforts so far made in this area seemed to be independently initiated. The first was the localization of the free Wikipedia Encyclopedia (<http://www.wikipedia.com>) in Hausa (http://ha.wikipedia.org/wiki/Main_Page). Some of the suggested topics requiring writers for the encyclopedia entry included (taken directly from the site):

- Duniya - دنيا
- Nijeriya
- Kwara
- Kano
- Amirka
- Islama - اسلام
- ilmi - علم
- kimiya - كيمياء
- wata
- ajami - عجمي

Obviously such initiative will only provide a predominant view of Hausa language and culture. For instance, those who are aware of this initiative would

use the Hausa they are familiar with, and this will probably end up being standardized “Internet Hausa”. Further, Islam is likely to feature more prominently in any discussions about Hausa, despite the quite large number of Hausa Christians. It is possible, therefore, for the entries to exclude chunks of the Hausa population who are not necessarily part of the “mainstream”.

However the most far-reaching effects of the localization of Hausa on the Internet is the adaptation of Google search engine to various languages, including Hausa. Even artificial languages like Klingon (used in Star Trek Television series) and Hacker (created by hacker communities) are represented on Google search strings. This process, as with Wikipedia strategy, is based on a number of volunteers willing to register and translate the various search strings into their language. Of Nigerian languages, only Yoruba (84% completion) and Hausa (18%) are represented. Clearly more efforts needed to be made if Hausa language is to be fully represented on the Internet in this way. This is because, as pointed out by Don Osborn,

(...an) issue related to the browsing issue is localization of the search engines - Google actually has Hausa on the list of languages in which it foresees localization. A problem here is how they will handle Unicode characters in the search engine interface. Anticipating this a bit, Andrew Cunningham developed a feature with a popup keyboard for the Hausa “hooked” letters (it works, you can search a word with a hooked letter that is on the Bisharat site and find the page).

Ultimately localization of Hausa and other languages of the region will need some sort of concerted effort. (Don Osborn, 07 Nov 2002, <http://h-net.msu.edu/~hausu>).

This concerted effort is certainly needed in the case of localizing Google to Hausa language. Table 3 shows how far the task has gone.

Table 3: Google in Hausa – Stages of Completion

Google	
Task	% Complete
Google Main Search Site	18%
Google Main Site Help Pages	1%
Google Toolbar	14%
Google Toolbar Installer	17%
Google Toolbar Resource Files	0%
Google Toolbar Help Pages	1%
Google Wireless	0%

The developers of the search engine were helpful in providing guidelines to prospective translators in order to make the translations less academic, and more attuned to common speech. As indicated in the guidelines:

Tone

It is very important to us that all translations maintain the appropriate Google tone. Our site in English is written in a tech- and web-savvy, upbeat and friendly style. We want all our non-English content to reflect this style; however, we recognize that what is considered polite and appropriate varies by culture. Therefore, we want the translator to understand the English content and style first, and then rewrite it such that the tone is maintained within the framework of the particular language/culture.

General rules:

1. Don't use a heavy, staid, or arrogant tone; translations should be upbeat and friendly
2. Avoid awkward or unprofessional wording
3. Try to capture the essence of the message. Don't translate literally or word-for-word.

Specific Guidelines

1. Do not translate proper names or product names. Examples of these include "Google" and "SafeSearch".
2. Google has a function, "I'm Feeling Lucky" that presents a particular translation challenge. The function takes the user immediately to the first result for a search -- so, a user selects "I'm Feeling Lucky" when they are willing to take a chance that Google's first result will be what they are looking for. The phrase in English has a specific tone -- daring, confident, and playful. This has been a hard phrase for people to translate. If you can't come up with a way to translate this phrase while preserving its tone just leave it in English.

Overall Translation Guidelines (<https://services.google.com/tc/guidelines.html>)

Many volunteers used this guideline in translating that percentages done in localizing Google in Hausa, shown in Table 4.

Table 4: Translation of items by Volunteers in Localizing Google search engine

Phrase in English	Phrase in Hausa
English	Turanci
The "IM_FEELING_LUCKY™" button automatically takes you to the first web page returned for your query. An "IM_FEELING_LUCKY" search means less time searching for web pages and more time looking at them.	Alaman "IM_FEELING_LUCKY™" zai koma wurin na farkon na sunayen dandalin da zaka sami ansan tambayarka. Amfanin alamar "IM_FEELING_LUCKY" yana rege lokacin neman sunaye da zaka sami ansan tambayarka.
The query is too long to process. Try using a shorter query.	Ka yi dogon turanci a wajen neman bayani. Ka takaita.
TOO_LONG_WORD is too long a word. Try	Idan ka ga an rubuta

Phrase in English	Phrase in Hausa
English	Turanci
using a shorter word.	TOO_LONG_WORD ana nufin kalmar da ka yi amfani da ita ta yi tsawo. Ka yi amfani da gajeriyar kalma.
IGNORED_WORD (and any subsequent words) was ignored because we limit queries to MAXIMUM_NUMBER_OF_TERMS words.	IGNORED_WORD (da kuma wasu kalmomi da suka biyo bayan wannan bayani) ana nufin ba mu yi amfani da kalmar ba saboda muna takaita yawan kalmomin da a ke amfani da su so, kada su wuce kalmomi goma MAXIMUM_NUMBER_OF_TERMS.
No pages were found containing NOT_FOUND_WORD.	Babu shafin da aka samu wannan kalma, watau NOT_FOUND_WORD.
IGNORED_WORD is a very common word and was not included in your search.	Wannan kalma IGNORED_WORD ana yawan amfani da ita ainun, saboda haka ba mu yi amfani da ita ba wajen nemo maka abin da ka ke so.
GOOGLE always searches for pages containing all the words in your query, so you do not need to use PLUS in front of words.	Manema ta GOOGLE tana amfani da dukkan kalmomin da ka rubuta don nemo maka abin da ka ke so a ko ina. Saboda haka ba sai ka rubuta PLUS, a gaban wasu kalmomi a cikin abubuwan da ka ke nema ba.
The AND operator is unnecessary -- we include all search terms by default.	Ba sai ka rubuta kalmar AND ba. Muna amfani da dukkan kalmominka in mun ga sun dace.
The word LOWERCASE_OR was ignored in your query -- for search results including one term or another, use capitalized UPPERCASE_OR between words.	Kalmar LOWERCASE_OR ba a yi amfani da ita ba wajen neman abin da ka ke so. In har kana son ka rubuta ta, to yi amfani da manyan bakake kamar haka: UPPERCASE_OR
Tip: In most browsers you can just hit the return key instead of clicking on the search button.	Haske, ko abin lura: Yawancin lalube da ake a "internet" ana iya amfani da makunnin da aka rubuta ENTER, a jikin na'urarka mai kwakwalwa (computer). Ba sai an yi amfani da makunni da aka rubuta SEARCH ba, wanda yake cikin shafin da ka bude.
Results	Yawan sakamakon da aka samu.
GOOGLE Search	Manema ta GOOGLE
I'm Feeling Lucky	Ina jin na taki sa'a.
Your search - SEARCH_TERMS - did not match any documents.	Abin da ka ke nema, watau - SEARCH_TERMS - ba mu same shi a ko ina ba.
details	karin bayani
Search Tips	Haske, ko karin bayani. kan lalube a "internet."

Phrase in English	Phrase in Hausa
English	Turanci
About	Bayani akan
Sponsored Links	Filin tallace-tallace da sauran irinsu.
Category	Fanni
Categories	Fannoni
Search only in CATEGORY	A duba bayani a cikin fannin CATEGORY
Search the WEB	A duba wasu shafunan na "internet", watau WEB, ba sai lalle shafin da ke bayani a wannan fanni da ake dubawa ba.
Description	Bayanin kamannin abu.
Cached	Shafin da aka ajiye shi (ko za a iya ajiye shi) a na'ura mai kwakwalwa (computer) don amfanin gaba.
GOOGLE 's cache is the snapshot that we took of the page as we crawled the web.	Wannan shafin GOOGLE ta samo shi ne lokacin da take lalube cikin duhu a shafunan "internet"
GOOGLE is not affiliated with the authors of this page nor responsible for its content.	Babu abin da ya hada GOOGLE da wadanda suka rubuta sako ko bayanin da ka nema a wannan shafin, kuma ba ruwanta da abin da ke kunshe ciki.
Try your query on the entire web	Gwada nema a dukkan Faffadar Yanar Duniya
Search the entire web from the START_LINK_TO_GOOGLE_HOMEPAGE GOOGLE_WORD home page END_LINK_TO_GOOGLE_HOMEPAGE!	Binciki Yanar-Duniya daga START_LINK_TO_GOOGLE_HOMEPAGE GOOGLE_WORD shafin farko END_LINK_TO_GOOGLE_HOMEPAGE!
Try your query on:	Gwada nema daga
Sorry, no content found for this URL	Yi hakuri, babu shafi da ya kunshi wannan URL din
Content removed at the request of the site's publisher	An chire shafin da izinin wanda ya wallafa
Result Page	Sashen Sakamako
Previous	Na baya

After registering with the service, and using the guidelines provided, I translated about five search strings, as shown in Fig. 9.

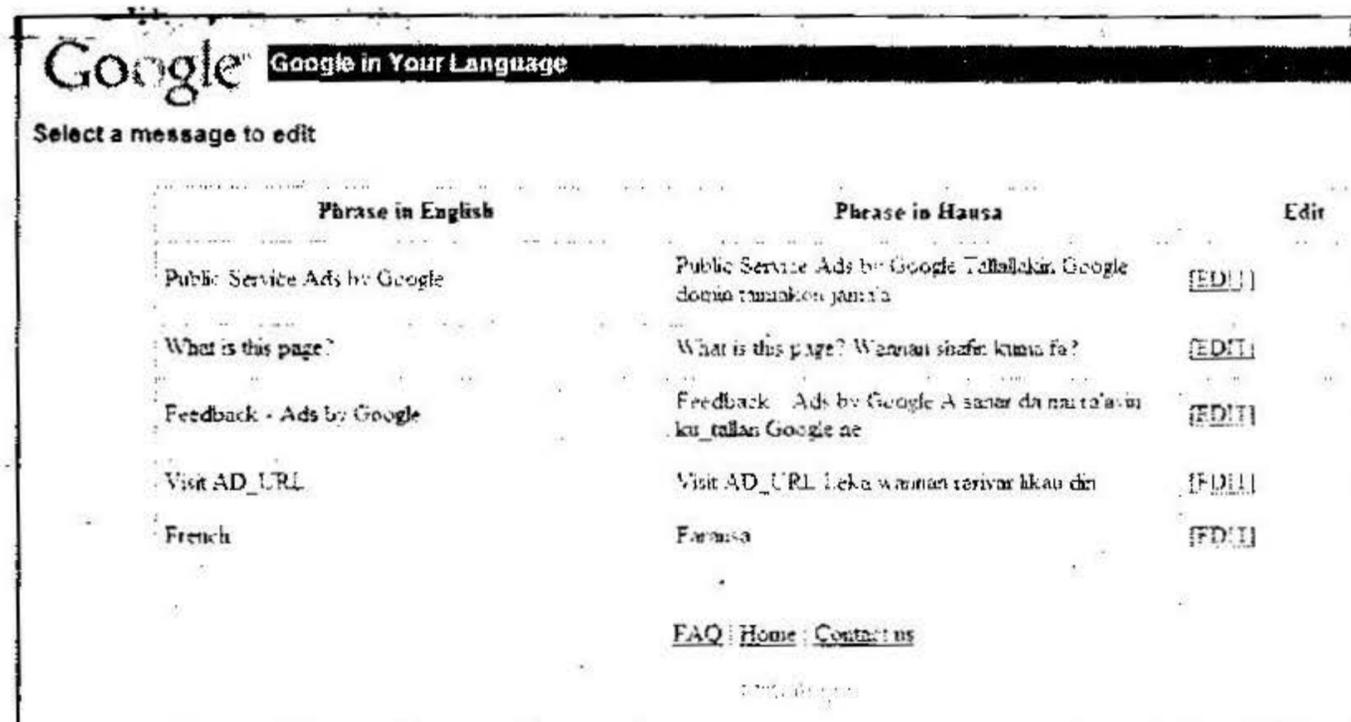


Fig 9: A.U. Adamu's translation of Google search strings

Conclusions – The Future

The main strategy of effective representation of Hausa on the Internet and other ICTs is through collaborative efforts of individuals and organizations to agree to commonalities of interfacing, language usage and removing or at least standardizing dialectical differences. Two encouraging happenings are in the offing. The first is the continuing effort to create a truly Hausa word processor. Although the effort was abandoned in 1994, another effort was made in 2004 by Muhammad Alimu (alimumohammed@yahoo.com, and mohammedalimu@hotmail.com) from Kano, Nigeria. His efforts led the Hausa Word 1.6 developed using Microsoft's Visual Basic 6.0. The opening screen of the word processor is shown in Fig. 10.

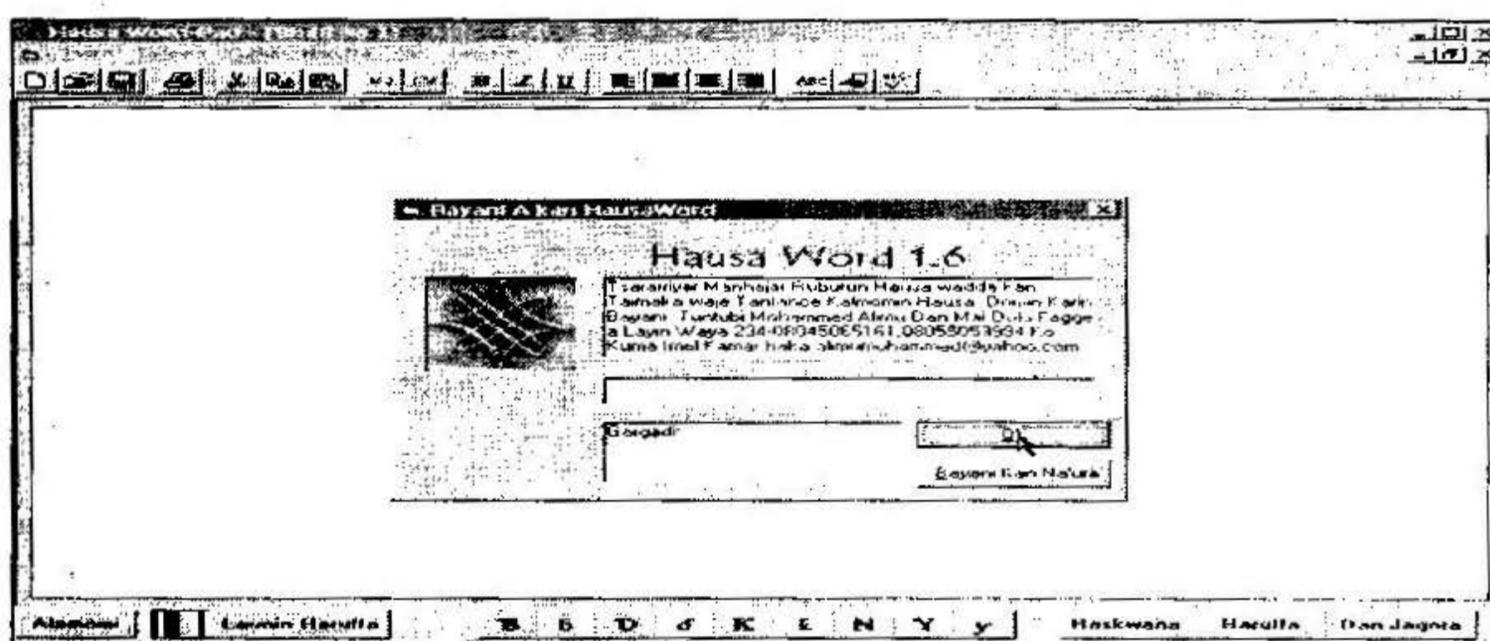


Fig 10: Opening screens of Hausa Word 1.6 (Kano, Nigeria)

Further efforts needed to be made to compliment these initiatives. So far the Hausa Word uses AfroRoman font set, which is solves the problem of Unicode access to Hausa characters. So far Alimu Muhammad has no specific plans for the marketing of the Hausa Word, since it is still at development stage.

The second stage of the localization of Hausa on the Internet is via open source efforts such as those offered by Wikipedia and Google. These require again concerted efforts to ensure inclusiveness and standardization. This can only happen if those with a stake in ensuring the presence of Hausa on the Internet perceive the project to be worthwhile enough to assemble a development and standardization team.

Further, the localization, of both Wikipedia and Google in Hausa, makes a series of fundamental assumptions about the Hausa surfer. Those with access to Internet at a level to enable them to comfortably contribute to the localization process are most likely outside Nigeria, and may not have the time, or feel they are competent enough (a common enough feeling among Hausa non-specialists of any discipline when making forays into another discipline) to undertake the localization; or in cases of those born outside Hausaland (both in Nigeria and overseas) may not be aware of the current Hausa usage of certain terms. Those who may be competent enough to localize may not have access to Internet at a level to make it worthwhile, despite the increasing availability of Internet cafes and broadband access to Internet.¹²

Further a question that was raised at the H-Hausa Discussion list on Friday 8th November 2002 was the extent to which Hausa literate in computers and Internet would actually seek for *Hausa* interfaces when searching for materials on Internet. This was actually what discouraged us from further development of Hausa word processor in 1994. Those literate enough to use computers at professional level would probably feel more comfortable in English language interfaces and dealing with English language materials; while those who may wish for Hausa language materials may not be literate or competent enough in using computers and the Internet. It is likely that the heavy-duty materials on the Internet may remain in at least English language, and the process of providing local alternative is indeed a big challenge to Hausa speaking users of the Internet.

Microsoft seems to accept this challenge with its aggressive pursuit of the localization process, at least for its operating systems and other software programs. As indicated in a news report,

After Swahili, Microsoft will now turn its hand to translating its software into Wolof, which is the most widely spoken native language in Senegal. According to the managing director of the Senegalese "Agence informatique de l'État" (AIE or State informatics agency), the agreement was given by the multinational's president for Europe, Africa and the Middle East...Linguists and specialists in the Wolof language from Senegal will be involved in the project. According to the chief executive of the AIE, the costs involved will "not exceed what we are

¹² In Kano there were about 120 Internet cafes by December 2004, none of which uses dial-up; and most networked to the then largest ISP, Megatech (www.megatech.com).

currently paying for licenses . The agreement signed will also cover use of Microsoft products by all areas of the public service. Source: Senegalese News Agency (APS), 25/10/04. http://www.aps.sn/artfiche.php?page=&id_article=3220. Microsoft s'engage à traduire ses logiciels en Wolof (officiel).

Beside Wolof, Yoruba, Hausa and Amharic had all been slated as possible linguistic candidates for localization. This initiative is via the Local Language Program which has already resulted in a Hindi version of Microsoft's software, and there are plans to make Windows and Office available in nine additional languages spoken in India by 2005. The biggest challenge, as Microsoft press releases do admit, is the different dialects spoken within the same language cluster—which bring up the issue of standardization. Clearly then Hausa has a very bright and prosperous future on the Internet.