Global and local dimensions of emerging community languages support

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Abstract

The changing immigration patterns and increasing number of migrants from Africa provide public libraries with new challenges for providing equitable library services to their communities. Current trends in the development and provision of electronic multicultural library services indicates the need for public libraries to engage with their local culturally and linguistically diverse communities and cooperatively develop solutions to resourcing and service delivery problems. The development of solutions for African communities involves the exchange of information, resources and knowledge between libraries and other service providers. The paper suggests that future electronic multicultural library services projects need to develop multilingual content infrastructure solutions to assist in ethnic community web publishing.

Opening remarks

Australian migration and settlement patterns have undergone a shift within the last five years with increasing numbers of immigrants from African countries.

African immigrants, along with other new and emerging culturally and linguistically diverse (CALD) communities present public libraries with a complex set of difficulties. The African communities have small populations concentrated in metropolitan regions, and a smaller number in rural areas working as seasonal laborers.

These immigrants come from countries, where multiple ethnic groups and languages are the norm. English literacy levels may be low or non-existent, depending on whether their country of origin is within anglophone Africa, i.e. an African country where English is either a national language or a common trade language, and upon the amount of formal education they have received in the past.

Additionally, literacy levels in their first language may be low. This is partly influenced by the degree of formal education they have received in the past. It is also influenced by the official standing of their language in their country of origin. The inclusion of a language in a national or regional school curriculum is a political decision and governed by a country's language policy. Some of our new arrivals speak languages that have been ignored or in some cases suppressed in their country of origin.

Orthographic considerations add further complexity to the situation. Although some languages are well documented, others have received little or no attention, and may not have a written form. Of those languages that have a written form, the orthographies that were devised may have changed over time.

A further issue for public libraries is the availability of printed materials in these languages. Limited opportunities to acquire materials in a language prohibit any possibility of developing traditional collections in these languages.

At the same time, these CALD communities show very low levels of language shift, increasing the likelihood of the need for provision of language services.

Traditionally, multicultural collection policies tie decisions on establishment of, funding for, and discontinuation of language collections on population levels of languages spoken in their municipalities derived from census data. Collections are developed for the numerically larger CALD communities.

A recent review of multicultural library services within the ACT highlighted new and emerging CALD communities as a priority needs area, that the library service needs to address (LoBianco 2003). The ACT review departs from standard public libraries' approach in that service provision isn't tied to demographic indicators, but rather to the needs of a CALD community for services.

The ACT review incorporated a consultation phase with ethnic community organizations, and services providers in the Australia Capital Territory.

The 2001 Victorian guidelines on multicultural library services, the ACT review[1] and a forth coming toolkit for establishing multicultural library services, prepared by the National Library and Archives of Canada (2003), stress that providing multicultural public library services is more than just providing collections in languages other than the national languages.

Towards Electronic Multicultural Library Services (eMCLS)

The internet and access to online resources have had a profound effect on the provision of public library services in Victoria. Public libraries have been able to develop websites to promote their library services and provide online access to their catalogues. New services utilising online resources have developed. Within the Victorian context, such initiatives include access to full text databases (Gulliver), refereed web resources (Hot Topics) and online reference services (Ask-a-librarian)[2]. However, existing online services tend to be English language based.

Victorian public libraries helped pioneer library services designed for culturally and linguistically diverse communities. Victorian librarians wrote the first international guidelines for multicultural library services, which were influenced by the 1982 Victorian *Standards for multicultural public library service.*

Multicultural library services are often considered as special or discrete library services. Decisions relating to these services are often taken in isolation to other parts of a public library service. Multicultural library services consist of a range of collections, services and programs. Collections may include books, magazines, newspapers, videos, CDs, audio cassettes, VCDs and DVDs.

Such collections are bound by a series of limitations: demographic, logistical and financial. It is only feasible to develop collections for a discrete number of CALD communities. The budgets for establishing and maintaining LOTE collections are limited. This forces libraries to develop collections in languages that have a larger population base. It is also necessary that books and other media can be easily sourced and purchased.

In effect this means that a small number of large language communities will have access to library materials in their language. The languages supported by public library services reflect the demographic makeup of the local community. It is not feasible to support traditional library collections for smaller or emerging communities.

The Internet provides libraries with an opportunity to develop responsive services to their CALD communities. Resources in many languages are becoming available on the internet, and it is possible for libraries to leverage this content in order to extend their multicultural library services.

In the initial stages of multilingual Internet access in public libraries a number of trends were visible:

- Library services concentrated on providing Internet access in their key languages. These languages were most often, the same set of languages that the libraries provided traditional collections for. Since 1998, a small number of public libraries have begun to explore the use of the Internet for emerging CALD communities.
- The initial focus was on enabling workstations to support viewing of web pages in target languages. Typing in these languages and use of interactive components and communication services has been a low priority.

In theory, multilingual Internet access should not be simply an extension of existing LOTE collections. The Internet creates the possibility of developing services that are responsive to the changing demographics of our communities. We can provide access to electronic resources in many languages we are unable to establish traditional library collections for.

Additionally, it is possible to develop services that are individually tailored. It becomes possible to offer access to language resources to individuals or families who are isolated by distance. If it is technically feasible to display a particular language on a web browser, then it becomes feasible to cater for an individual or small community as easily as it is to cater for a larger community.

Although the possibilities the Internet offers are unfolding before us, there are obstacles to a universal and accessible service; these include technological barriers.

Currently, we have a situation where libraries are able to provide much more sophisticated and extensive online services in English. Electronic multicultural services are slowly developing and are still at an early stage of development.

Two IFLA satellite conferences[3] in 1997 and 2001 have begun to explore the issues relating to technology and multicultural library services.

Key projects have developed that explore some of the possibilities of the Internet for providing access to multilingual information. Notable among these were FINFO in Denmark[4], Queens Public Library's WorldLinQ[5] in the United States, and the Victorian project, Open Road[6]. These projects can be considered as prototypes. They illustrate some of the potentials and pitfalls of providing access to multilingual information.

These projects were initial steps in developing electronic multicultural library services (eMCLS). They reflect a mid-90s paradigm and were conceived at a stage of LOTE internet development where it was feasible to build web directories in other languages. The growth of the internet has made the development of some of these projects cumbersome, resource hungry and inefficient.

There is an ongoing international dialogue about the nature, requirements and scope of the next generation of eMCLS. Current projects are limited in their scope and are not capable of providing the level of access to online information resources that would benefit and enrich our CALD communities. Multilingual versions of many of the basic tools used in the location and provision of English language online resources need to be developed.

The IFLA satellite conference in Århus, in 1997, saw the promise of the internet for multicultural library services as a paradigm shift in service provision (Bringsværd 1997)[7]. In hindsight, what we have seen unfolding was not a "new paradigm", but rather the co-option of the internet into the older, established patterns of service provision. The internet was just one more medium among others. Libraries used the internet to mimic their existing collections, concentrating on, and resourcing, the community languages that libraries already collected in and provided services for.

The "new paradigm" of electronic multicultural library services should be based on the principles of universal access and linguistic rights; that everyone should be able to see their language and culture reflected in the resources available on the internet. It would involve public libraries developing a content infrastructure that would facilitate their CALD communities' participation in an online environment.

The development and enhancement of multilingual public internet access services (MPAS) and eMCLS is crucial to the role of libraries as gateways to multilingual information and resources. Consequently such services are key elements in improving and extending services to our CALD communities.

Electronic multicultural library services can be divided into four broad areas:
- Multilingual public access services.
- Development, promotion and access to collections, services and programs. This can include the use of technology to facilitate access to, and development of, traditional collections, services and programs. Alternatively, it can refer to the development of multilingual electronic collections, including ebook collections and full-text databases.
- Multilingual and multicultural electronic reference services.
- Professional development resources.

The Danish project *Kvinde*[8] was developed by the Danish Central Library for Immigrant Literature. Kvinde is a portal for information and resources for women, aged from 20 to 35 years, from non-Danish backgrounds. The site contains a range of diverse formats including articles, dialogues, questions and answers and links to web resources. The topics covered include: education, employment, health, marriage and relationships, pregnancy and birth, parenting and settlement information (Kragh-Schwarz 2003). It is a mix of life-style and settlement information, and an example of libraries not only pointing to internet resources but also developing and hosting content.

One outcome of the ACT review was a pilot project for multicultural family storytimes, with five local CALD communities, the Mon, Pacific Islander, Ethiopian, Kurdish and Korean communities. For some of these communities, it was not possible to locate existing resources. As part of the project the communities created or translated children's stories into their own languages, and in some cases translated into English. One long-term possibility would be to digitize these story collections and make them available on the internet.

After the development of the second stage of the Open Road project in Victoria, the focus of the project shifted, looking at ways of using the internet to provide and support services to small and emerging migrant communities. For some language groups there is a very limited amount of material available. For some of the language groups in Victoria, there are no

available resources on the internet. There has been a growing awareness that for libraries to provide access to resources in these languages, resources would have to first be created.

Electronic multicultural library services need to be community focused, engaging with CALD communities via a community development framework. The use of technology allows libraries to respond to emerging CALD communities and participate in capacity building within these emerging communities. Underlying the future developments of electronic multicultural library services, is the awareness of public library services' roles and responsibilities within their local communities.

The ACT review highlighted the need to plan and develop services on the "degree and nature of need" rather than on simple demographic profiles.

For the staff of the Open Road project, in some cases this has meant stepping beyond the Victorian library scene, and engaging with specialists within Australia and overseas, including software developers, literacy workers, linguists and ethnographic field workers. It has meant engaging with ICT projects in developing countries, and with international standards bodies.

It focuses on the dream that *any* person can go into *any* public library and access online resources in *any* language. Underlying the development of Kvinde, the resource development projects in the ACT and the realignment of the Open Road project, is the awareness that public libraries are community resources and need to proactively engage with their communities.

Multilingual Public Access Services (MPAS)

Electronic multicultural library services offer possibilities for service provision to new and emerging communities. Central to any eMCLS are the issues centering on the provision of public internet access in a multilingual environment. In this context MPAS can be considered as a core component of eMCLS.

Most current implementations of electronic multicultural library services focus on two aspects of eMCLS: multilingual public internet access and multilingual resource location tools.

Multilingual Public Access Services include, but are not limited to:
- Multilingual public access workstations (MPAWS). The computers are set up for multilingual use of the internet and multilingual word processing.
- Multilingual resources location tools, including web directories and search engines.
- CALD community web publishing content infrastructure (including multilingual community web development workstations).
- Support structures and services.
- Training programs, including basic internet and information literacy classes designed for specific ethnolinguistic communities.

The crucial elements of the next generation of MPAS are community engagement, awareness, support, training and a multilingual content infrastructure to facilitate multilingual resource development by libraries and CALD communities.
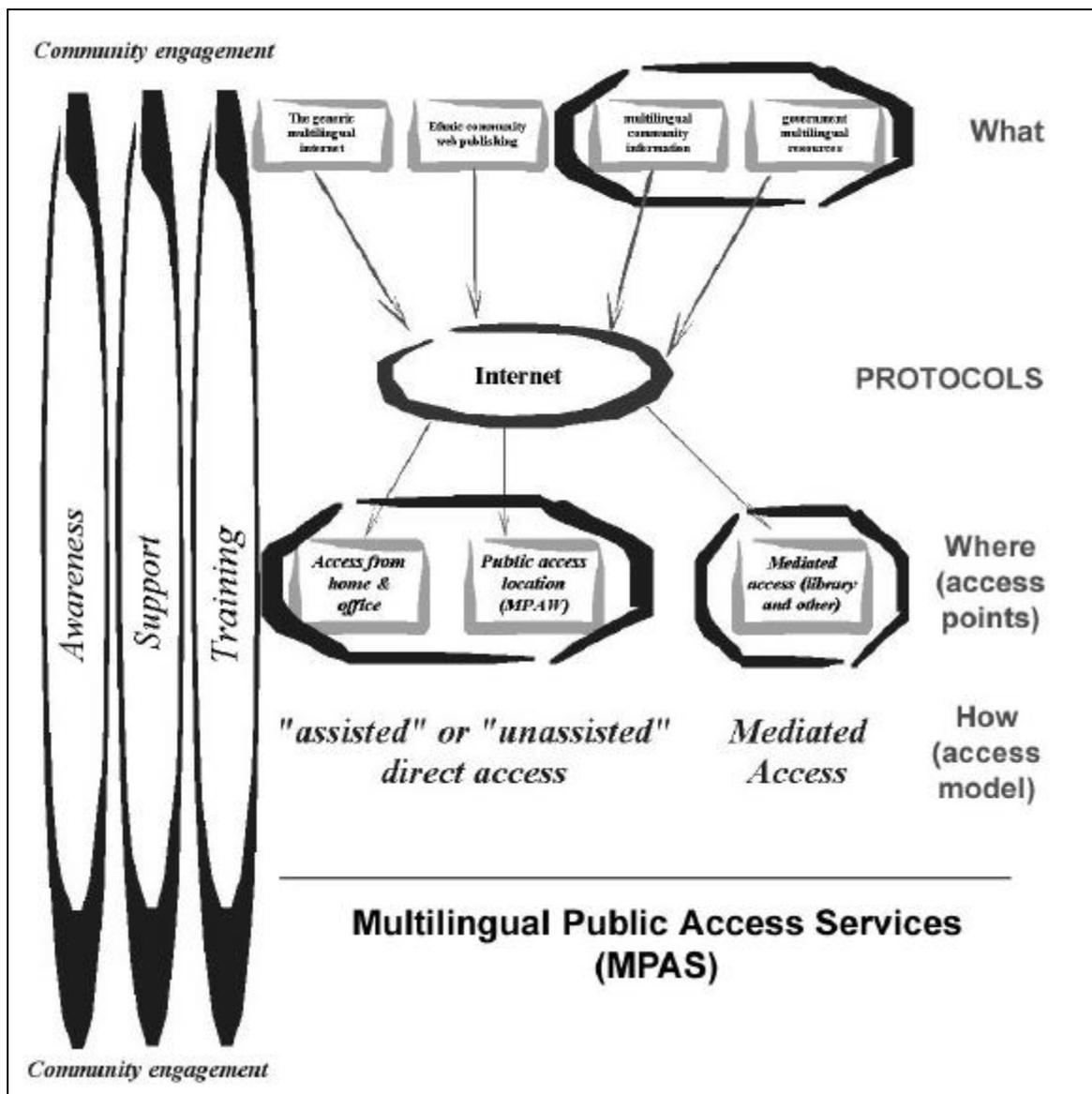
Possibilities

Migration from Africa, the Middle East and Central Asia is increasing, bringing new languages to Australia. Although new and emerging CALD communities are presenting public libraries with technical and service provision challenges, they also offer public libraries new service provision opportunities.

These new immigrants and refugees present a complex set of difficulties and challenges, which traditional multicultural library services are ill suited to. The development of traditional multicultural library services for these new and emerging CALD communities is not feasible. For some languages, there is limited publishing in the country of origin. It may also be difficult to locate and develop a working relationship with reliable distributors from

the country of origin. The barriers to acquiring materials, and in some cases the lack of availability of appropriate materials, prohibits the development of a quality collection.

The only practical and efficient method of providing services to these communities is through the use of electronic multicultural library services. The Public Libraries Unit, State Library of Victoria, has been experimenting with service models for the third stage of the Open Road project. The project's emphasis has shifted from its original focus and we are now working closely with members of two small, emerging CALD communities.

The Dinka (*Jieng*) and the Nuer (*Naath*) are Nilotes from Southern Sudan. Many of the Nuer and Dinka have migrated to Australia indirectly. Some may have come from refugee camps in Kenya, Uganda and Ethiopia, or may have been internally displaced within Sudan and left the country via Northern Sudan. Some may have come to Australia via Egypt and other intermediary countries. Some of the young men may have come as individuals, having been separated from their families at a young age.

Within Melbourne, the Dinka are concentrated in the western suburbs, while the Nuer are concentrated in the Eastern suburbs.

Currently, Dinka and Nuer use of the internet is conducted in English or Arabic. We have been providing technical assistance, to members of the Dinka and Nuer communities, to facilitate the development of web sites in their languages. Currently, two websites are under development:

- Agamlö Online [http://home.vicnet.net.au/~agamlong/], a Dinka language website, and
- Naath Online [http://home.vicnet.net.au/~naath/], a Nuer language website.

These are the first websites in their languages in the world. Both websites are being developed in compliance with W3C accessibility and internationalization guidelines.

The first component of Agamlö Online, was a digitized anthology of poetry [9]. The poetry sub-site was marked up with XHTML 1.0. An XML DTD for multilingual poetry archives (OR3:P-Arch) is under development as part of the Open Road project. Once this DTD is finalized, the Dinka poetry anthology *"Maany"* will be converted to this XML format.

Agamlö Online will also include material on the language and culture of the Dinka, including language guides for beginners, grammar notes, glossaries, and collections of traditional stories and folktales.

Naath Online is being developed as a repository for resources and books for *Thok Nath* (Nuer language) literacy courses. The internet provides an efficient mechanism for the dispersal of literacy materials to Nuer communities scattered around the world.

Both websites have been developed as resources to assist with language and cultural maintenance. The sites have drawn intense interest from the transnational Dinka and Nuer communities.

The initial development of the websites focused mainly on language issues relating to input and rendering. The first stage was a survey of software and font solutions for these languages. The only input and font solutions that could be located were developed by the Sudan office of SIL International. The keyboard layouts were developed for use with Tavultesoft Keyman, a

software utility for designing and using keyboard layouts on the Windows platforms. The initial software developed by Tavultesoft was designed to handle the complex input rules required for Lao. Keyman allows a developer to create a keyboard layout for any language.

The SIL Dinka and Nuer fonts were 8-bit TrueType fonts based on legacy encodings. The fonts had been generated using the SIL Encore font system. The generated fonts had poor hinting and although suitable for printing, were not ideal for computer screen display.

At this stage, SIL's Non-Roman Script Initiative (NRSI) team were preparing to move from the legacy character sets, used by their project teams, to Unicode. Over time, SIL's linguists, literacy workers and other field workers and their IT support teams will migrate to Unicode.

It was decided that Agamlö Online and Naath Online should use Unicode rather than the legacy encodings available. There were a number of reasons for this decision. Current software and operating systems have native support for Unicode, and new tools and utilities becoming available would be Unicode based. Currently, no software has built-in support for the Dinka and Nuer legacy encodings. Additionally over time, high quality Unicode fonts, which are more suitable for screen display, will become available.

The minimum requirements for developing the Nuer and Dinka websites were the availability of:
- Input methods or keyboard layouts that supported all the characters needed by Dinka and Nuer;
- Fonts containing a repertoire of characters that included all the characters in the Dinka and Nuer alphabets; and
- A font rendering system to allow the characters to be correctly displayed.

No existing Unicode keyboard layouts were available. It was necessary to develop a keyboard layout for the websites' editors to use.

Dinka alphabet

The next step was to precisely determine the characters used by the Dinka language. Discussions, with local Dinka teachers were supplemented with information provided by linguists in Kenya and Sudan. Additionally, the Open Road team participates in a number of mailing lists hosted and administrated by Bisharat, an ICT development project in Niger[10]. These include:
- A12N-Collaboration;
- Unicode-Afrique;
- A12n-forum; and
- A12n-entraide.

Additionally, Bisharat administers four language specific fora:

- Ghanaian languages and ICT;
- Hausa charsets and keyboards;
- Igbo language and ICT; and
- Yoruba language and ICT.

The Dinka language uses the Latin alphabet. The Rejaf Language Conference (1928) developed a uniform orthography for a number of Southern Sudanese languages (Dinka, Bari, Latuko, Shilluk, Nuer, and Zande).

The current Dinka orthography deviates from the Rejaf orthography through the use of diacritics to indicate "breathy" vowels.

Dinka Characters

A Ä B C D Dh E Ë Ɛ Ë
G Ɣ I Ï J K L M
N Nh Ny Ŋ O Ö Ɔ Ö
P R T Th U W Y

a ä b c d dh e ë ɛ ë
g ɣ i ï j k l m
n nh ny ŋ o ö ɔ ö
p r t th u w y

The Dinka alphabet, like many other African languages, differs from many European languages through the use of a small set of extended Latin characters. Dinka uses the following extended Latin characters:

- U+0190 LATIN CAPITAL LETTER OPEN E and U+025B Latin Small Letter Open E
- U+0194 LATIN CAPITAL LETTER GAMMA and U+0263 LATIN SMALL LETTER GAMMA
- U+014A LATIN CAPITAL LETTER ENG and U+014B LATIN SMALL LETTER ENG
- U+0186 LATIN CAPITAL LETTER OPEN O and U+0254 LATIN SMALL LETTER OPEN O

Dinka also uses a diaeresis with six vowels (a, e, open-e, i, o and open-o). All of the required characters exist as single characters in the Unicode character set, except for the upper and lowercase open-e and open-o with diaeresis.

Ë ë Ö ö

These four characters require the use of a base character and a combining diacritic (U+0308 COMBINING DIAERESIS). For the correct display of combining diacritics, it is necessary to use smart fonts and an appropriate font rendering system.

Nuer alphabet

Nuer Characters

A A̱ Ä B C D Dh E Ë
Ɛ Ë̱ Ë̱ G Ɣ I I̱ J K L M
N Nh Ny Ŋ O O̱ Ö Ɔ Ɔ̱
P R T Th U W Y

a a̱ ä b c d dh e ë
ɛ ë̱ ë̱ g ɣ i i̱ j k l m
n nh ny ŋ o o̱ ö ɔ ɔ̱
p r t th u w y

The Nuer alphabet contains a similar set of characters to the Dinka alphabet. The key differences in the alphabet, is the Nuer's use of an additional diacritic below certain vowels.

The Nuer alphabet contains twelve characters that do not exist as a single character in the Unicode character set. These Nuer characters need to use the U+0331 COMBINING MACRON BELOW and U+0308 COMBINING DIAERESIS diacritics.

A̱ a̱ Ë̱ ë̱ Ë̱ ë̱ I̱ i̱ O̱ o̱ Ɔ̱ ɔ̱

In the case of two letters, it is necessary to use a base character followed by a combining macron below and then a combining diaeresis.

Technical Dimensions

Keyboard design issues

Once the character requirements of Nuer and Dinka were identified, it was possible to design a keyboard layout to facilitate typing in these languages. Sample text and HTML files were developed, which would allow us to test font and software solutions for these languages.

The initial Dinka keyboard layout (DLIA Dinka Unicode keyboard layout) was the first of a series of keyboard layouts for African and Australian Indigenous languages[11]. Later, a modified version of the keyboard layout was developed to accommodate the orthographic requirements of both Dinka and Nuer. The most recent version of this dual language layout is *Southern Sudanese v. 2.1*. A new version is under development. This new version will add support for the current orthographies of Bari, Otoro and Shilluk. These keyboard layouts have been designed to facilitate typing in English with occasional need to type in a Nilotic language. Separate layouts have been developed to facilitate typing only in Nilotic languages: *DLIA Dinka 2.0* and *Southern Sudanese 3.0*. These Nilotic languages only keyboards were designed to facilitate typing large amounts of material in these languages.

The following broad guidelines shaped the development of the keyboard layouts:
1) Keyboard layouts should be based on Unicode rather than on legacy character sets. The use of Unicode would ensure compatibility with new software and operating systems.
2) Keyboard output should be normalized. The keyboard layouts are intended to be used for web development and interactive use of the internet in minority languages. The World Wide Web Consortium (W3C) recommends the use of Unicode Normalization Form C (NFC). Where practicable, keyboard layouts should use NFC.
3) When non-NFC keyboard layouts are designed using combining diacritics, sequence checking should be designed into the keyboard layout in an attempt to ensure Unicode Normalization Form D (NFD) output. The keyboard layout should restrict the user from typing an invalid character sequence.
4) The keyboard layout should be designed to accommodate the users' expectations of how to type in the desired language. When established keyboard layouts exist for legacy character sets, these designs should inform the design of the Unicode keyboard layout.
5) There is no one right keyboard layout. Keyboard designs should be based on usability of the layout and the intended use of the layout.
6) Where possible, key assignments should be based on:
   a) the shape of the character; or
   b) the phonetic value of the character.
7) If the appropriate key is already in use, the key should be assigned based on position to preferred key.

Martin Hosken (2003) divides keyboard layouts into two categories: mnemonic and positional. Mnemonic layouts are based on the characters printed on the keycaps, while positional layouts are based on the relative positioning of the characters to each other. It is possible to extend the number of characters that can be typed on a physical keyboard by using: modifier keys, dead keys, operator keys or candidate windows (Hosken 2003).

Since the keyboard layout phase began, Microsoft has released a tool for developing keyboard layouts for Windows XP. This tool has a number of limitations that impact on the design of keyboard layouts. Firstly, it is not possible to build sequence checking into the keyboard layout. Secondly, for Nuer and Dinka and other languages, where NFC output is a mix of precomposed characters and base characters with combining diacritics, it is necessary to only use combining diacritics and not use precomposed forms. This makes it impossible to produce NFC output. Likewise, without sequence checking it would not be possible to guarantee NFD output for Nuer.

Fonts and rendering technologies

Many writing systems around the world require complex and sophisticated font rendering technologies. Sharon Correll (2003) identified some of the complex elements:

- Contextual placement of combining diacritics, and diacritic stacking;
- Contextual shaping, where the shape of a character depends on its position relative to other characters. For example, the isolated, initial, medial and final versions of Arabic characters;
- Ligatures. It is common in many writing systems two or more characters to be represented by a ligature.
- Reordering and splitting. In Indic scripts, vowels are rendered relative to a consonant.
- Bidirectionality. The Arabic, Hebrew and Syriac scripts are written right to left. If Arabic numerals or words written in other scripts are included within an Arabic sentence, it is necessary to embed left to right text within right to left text.

For Dinka and Nuer, it is necessary to be able to display certain base characters with U+0331 COMBINING MACRON BELOW and U+0308 COMBINING DIAERESIS.

Standard TrueType fonts and their rendering systems are unable to position the diacritic relative to the base character; instead the diacritic is positioned absolutely with respect to the area occupied by the base character.

In practical terms, the position of the combining diacritics with the base character is something of a hit or miss proposition. If you are lucky the diacritic may be centered over a lowercase base character. For wider lowercase characters the diacritic will be noticeably off centre to the right, while for narrow lowercase characters, the diacritic will be off centre to the left.

For Dinka and Nuer, somewhat acceptable results are achieved for lowercase open-e and open-o when using a combining diaeresis. Unfortunately for uppercase characters the diacritic overstrikes the uppercase characters.

The COMBINING MACRON BELOW (U+0331) is approximately suitable for medium width lowercase characters, but it is positioned to far to the left of the LATIN SMALL LETTER I. Uppercase characters tend to be wider than their lowercase equivalents. Thus the COMBINING MACRON BELOW (U+0331), while being somewhat acceptably positioned for lowercase characters, it is poorly positioned for the uppercase characters.

Currently there are two solutions to this problem. Both solutions require the use of "smart fonts". The first solution is the use of OpenType fonts. OpenType fonts are an extension to TrueType fonts that allow information required for glyph positioning and glyph substitution to be included in the font. So it is possible to create an OpenType font that has information for the placing of combining diacritics relative to a base character or relative to another diacritic (when diacritic stacking is required). But these fonts also require system level rendering support. The OpenType solution on Windows requires two additional components: OpenType Layout Services (OTLS) and Uniscribe (the Unicode Script processor). The weak point is Uniscribe, which provides APIs and shaping engines that allow software to format and display complex scripts.

To use combining diacritics successfully, not only do you need an appropriately designed OpenType font, you will also require a version of Uniscribe that has been developed to support the Latin script as a complex script and the use of combining diacritics. There are many versions of Uniscribe, and different operating systems and applications ship with different versions. Microsoft Office 2003 introduced a version of Uniscribe that has support for combining diacritics in the Latin script. Earlier versions do not have this feature. The key problem is that MS Office 2003 uses a private version of Uniscribe; it does not update the system version of Uniscribe. This means that other applications that use Uniscribe will not be able to use combining diacritics effectively. It is currently unknown when Microsoft will release an updated version for the operating system. Internet Explorer will work correctly with the updated version of Uniscribe, but since the system version is not updated, Internet Explorer is still using the old version.

An alternative rendering system is the open source Graphite rendering system that was initially developed by SIL International. Graphite consists of the graphite rendering system and graphite enabled TrueType fonts. Graphite was developed by SIL International in order to provide Unicode support to minority languages that required sophisticated rendering and were not being supported by other developers.

All the script processing instructions are embedded in Graphite tables within the Font. Each font is a self-contained program that the rendering system uses. SIL has developed a series of prototype applications that are Graphite enabled. There are also projects under way to develop Windows and Linux versions of graphite enabled Mozilla. Alpha and Beta versions are available. Current test fonts, like the Doulos SIL Regular beta font have both Graphite and OpenType tables in the font, allowing the font to be successfully used with software using either the Graphite or OpenType text layout features.

One barrier to the provision of MPAS in Nuer and Dinka is the availability of web browsers that can correctly display Nuer and Dinka text. Current web browsers used by public libraries are not suited to Nuer and Dinka, but will have to do until libraries have access to, and install, web browsers that have more advanced rendering capabilities. The second issue is availability of appropriate fonts. Currently, the only suitable font for Dinka and Nuer is Doulos SIL Regular, a beta OpenType and Graphite enabled font produced by SIL

International. Even with standard TrueType fonts, there remain issues about access to fonts with the necessary characters and with the correct variant glyphs.

Glyph variants

One of the key principles of the Unicode standard is that Unicode encodes characters rather than glyphs.

Another important factor in locating suitable fonts for Dinka and Nuer, is that of glyph variation. Variant glyphs are alternative visual representations for the same Unicode codepoint. Different languages may have differing typographic traditions and depict characters using different glyphs. The diagram below indicates some of the Variant glyphs that may effect font choices for Dinka and Nuer.
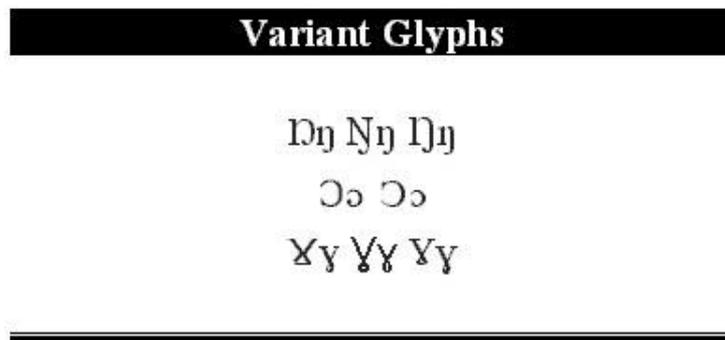
The most significant glyph variation, is the variation between the glyphs for the LATIN CAPITAL LETTER ENG (U+014A). The variations for the other characters are not significant for Nuer and Dinka.
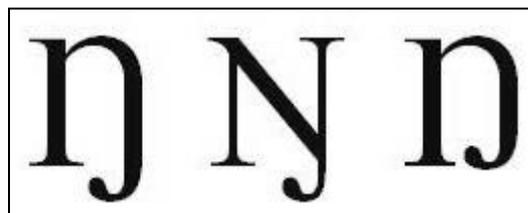
African letters tend to use the first version illustrated above, which appears like a larger version of the lower case character. The second version is used in other languages such as the Northern European Saami languages and is also used by the Yolngu languages of the Northern Territory.

Different fonts will use different versions of the glyph. *Arial Unicode MS* uses the first version illustrated above. *Code 2000* uses the second version, while *Times New Roman* uses the third version. This limits the choice of fonts available for Nuer and Dinka. *Code 2000* is an OpenType font that has all the characters and features required by Nuer and Dinka. Unfortunately it does not use the correct glyph for LATIN CAPITAL LETTER ENG (U+014A).

The use of one variant glyph, in preference to another, in a font, is a font design issue rather than an encoding or character set issue.

Conclusion

Future directions for electronic multicultural library services need to be based on community engagement; cooperatively developing services and resources within the local CALD communities.

The development of electronic multicultural library services will play a key role in the provision of resources and services to our CALD communities. The Open Road team's collaboration with members of the Melbourne Dinka and Nuer communities is indicative of the possibilities that eMCLS could provide.

The reality is that the average public library isn't in a position to assist their CALD communities in the manner and degree that the Open Road team have assisted on the Agamlö Online and Naath Online websites. What is necessary is a content infrastructure, including web development toolkits, that is optimized for our smaller and emerging CALD communities. In addition to this, centralised support services are necessary. The support services would provide the libraries and community organisations solutions to a range of issues including input and display problems.

There are indications from within some of the African community organisations that they do not feel existing service providers are meeting the needs of their communities. At least one community organisation is developing an internet and IT training program for its community, and developing a web directory of quality web sites and electronic resources for its community. Public libraries need to engage with their emerging communities and cooperatively work towards solutions with these CALD communities. Failure to do so will make libraries less relevant to these communities, because these CALD community organisations will develop their own solutions.

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Endnotes

[1] At the time this paper was written, the ACT review had not been published publicly. Comments on the review are based on a final draft of the review and a briefing paper supplied to the CASL working group on electronic multicultural library services by the ACT representative on the working group.

[2] Gulliver, Hot Topics and Ask-a-librarian are components of Victoria's Virtual Library [http://www.libraries.vic.gov.au/].

[3] IFLA satellite conferences

[4] FINFO: http://www.finfo.dk/

[5] WorldLinQ: http://www.worldlinq.org/

[6] The Open Road web directory [http://www.openroad.vic.gov.au/] and the Open Road project homepage [http://www.openraod.net.au/].

[7] Internet and Technology as a "new paradigm" URL ?

[8] An introduction to Kvinde [http://kvinde.finfo.dk] was published in ….

[9] http://home.vicnet.net.au/~agamlong/poetry/

[10] A12N gateway (Bisharat): http://www.bisharat.net/A12N/

[11] http://www.openroad.net.au//languages/files/