

Localisation of Information and Communication Technologies in Cameroonian Languages and Cultures: Experience and Issues

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Abstract—In this paper, we raise the problem of adapting Information and Communication Technologies (ICTs) in local languages of Cameroon. This work is a contribution to the reduction of digital and language divides. It also paves ways for the usage of such technologies to local populations who don't understand this technological language. We first discuss and highlight several concerns about the localisation of ICTs. Afterwards, we address some challenges and issues to computerize cultural and linguistic features, and indigenous knowledge (IK) for national languages and cultures in Cameroon. As case study, we describe our experience in localising an open source editor for the Yémba language, within the of Rural Electronic Schools in African Languages Project. Because Cameroonian languages are based on the same basic alphabet, this qualitative research is extensible to other languages.

Keywords—Culture, Digital divide, ICTs, Language divide, Localisation, National language.

I. INTRODUCTION

Despite the rapid adoption of Information and Communication Technologies (ICTs) such as software, web sites and cell phones in day-to-day activities, the greatest challenge remains the adoption of these technologies by the local populations in Africa and in Cameroon in particular. Cameroon is endowed with about 250 local languages[1][2]. Unfortunately, the languages of communication in these technologies are all except these local languages. As a consequence, the local populations see ICTs as gadgets designed for the few who understand the inbuilt languages of communication.

The majority of Africans, mainly those in the rural areas, can only communicate in local languages, and hence cannot use a computer. They barely manage to master the keyboard of a telephone. Those who understand the language of the technology are able to use them, while the illiterates in the inbuilt language are unable to fully enjoy the benefits that the technology brings[4]. In [5], the authors advocate the writing and adapting of a software system to a specific culture. They emphasize that, successful software systems must be written; so that adapting them to a culture can be done easily. This is the idea of internationalisation/localisation in which software is built in such a way that localising it to another language and other cultural preferences can be done easily, possibly at runtime by reading a user's profile. In [6], it appears that ICTs are adaptable cultural western products. Therefore, they

include the ideologies of the target languages and cultures while influencing their users. To correct this bias, [7] and [8] think that we should make computing technology available, understandable, and participable for everyone regardless of culture, gender, age, income, language, degree of disability, or ethnicity. But, [9] think that the non-moulded user in the designer's culture must not be part of a bandwagon process, from imported models of the western society. In fact, all universals such as ICTs are after all used locally.

The rest of this paper is organized as follows. Section II addresses the Internationalisation/Globalisation/Localisation processes. Section III is devoted to an overview of Cameroonian national languages and cultures, and their presence in ICTs. It is focused on a specific Cameroonian language i.e Yémba. Section IV is related to the methodology of our field experience within the Rural Electronic Schools in African Languages Project, specifically on the Yémba language. We focus on the localisation process in the Cameroonian national language and culture, the challenges and the issues. We also discuss and highlight several concerns about the localisation of Information and Communication Technologies for the national languages and cultures of Cameroon. Section V and VI deal with the integration of Yémba cultural features in ICTs and computational results respectively.

II. INTERNATIONALISATION/GLOBALISATION/LOCALISATION

Internationalisation (I18N in abbreviated form) is defined as the process of developing applications that can easily be converted to operate in different cultural or linguistic environments [10].

Globalisation (G11N in abbreviated form) is the process of designing and developing applications that are meant to be used in multiple cultures.

Localisation, of course, has several definitions relating to the adaptation of computer applications and/or the content of computing to the linguistic and cultural realities of a particular country, region, or national community [11]. Localisation (L10N in abbreviated form) is the process of converting applications to operate in a specific cultural environment, which extends beyond the local language to aspects such as beliefs, customs and ethics of a society. For [12], the localisation process reasonably consists of two main stages. The first step

is the translation of language resources to reflect the local language. In this stage, all language resources and features such as menus, commands, help texts, etc. are translated to the local language. The second step in localisation adjusts software to local cultural habits. Here, the application is adapted to reflect local customs. If the application is already internationalised, this stage may be unnecessary, since changes such as special sorting algorithms, may have already been met during the development stage. For symbolic features such as the currency or the comma delimiter, the application may simply inherit configuration from the operating system. Localisation thus, is the process of customizing your application for a given culture and locale. Localisation, Internalisation and Globalisation are illustrated in Figure 1.

Thus, localisation is both a linguistic and software technology problem. It is a linguistic task because the translation requirement is not simply the substitution of one body of text by another. It is also a linguistic problem because many software packages capture and manipulate text that has been supplied by the users. Among these software packages are word processors and database management systems. In using these packages we are frequently required to match text. What constitutes an acceptable match depends upon the language. Localisation is also a software technology problem because we must be able to organize the software so that the linguistic components be isolated and can easily be replaced. This leads to the consideration of how standard software packages like window management systems, word-processors and database management systems are constructed where the assumptions about a particular natural language and culture are embedded. In the quest for wider computer access, many authors have stressed the need to accommodate users whose first language is not English. We believe localisation can contribute to the reduction of digital divide and language divide.

III. CAMEROONIAN NATIONAL LANGUAGES AND LOCALISATION

The writing of Cameroonian national languages is based on the General Alphabet of Cameroon Languages [3]. The Cameroonian alphabet is a subset of the International Phonetic Alphabet [13]. The General Alphabet of Cameroon Languages has permitted to write many Cameroonian national languages. Without loss of generality, this work is based on the Standard of Yémba (SY) spoken in the west region of Cameroon [14]. Yémba is the language of trade, education, mass communication and general everyday interaction between Yémba people, whatever their dialects of the language might be. According to the World Atlas of Languages Structures (WALS), Yémba national language WALS coordinates are: 5 25' N, 10 5' E [15].

Prior to the localisation of ICT, Yémba language and culture had never been widely used in the domain of modern technology in general, and computer technology in particular. [16] presents a website dedicated to Yémba language learning tools. This website contains a Yémba Wikipedia, a very basic Yémba online editor, and offers a possibility to translate common English, German, Czech, Spanish, Italian and Chinese words and expressions into Yémba. A vocabulary of computer terminology in Yémba language was addressed within the RESAL project[17]. Selected terms from this vocabulary is shown in Figure 2. This primary work paves the way to the

development and localisation of a word processing in Yémba language. Hence, even though these earlier efforts provided useful background materials, the localisation of word processing tools for Yémba language and culture demands more than mere translation of computer terms into Yémba [18]. The project necessarily demanded the creation of Yémba equivalent terms, which involves application of scientific strategies and principles for technical-term creation.

IV. METHODOLOGY AND DESIGN

The localisation results in solving many issues from linguistic aspects to hardware and software ones, including Cameroonian main cultural features to be integrated to the localized editor environment. We identify some of the problems and addressed them.

A. Terminological issues

Language problems are often caused by terminology. Whenever English language software is translated to a local language, decisions are taken on mapping from English terms to local terms. Inevitably, some measure of arbitrariness is attached to this procedure. In consequence, some aspects of localised software may appear stranger to the local audience than the English (foreign language) original. This goes some way toward explaining why many users when faced with a choice between a localized (fully translated) application and an English-language original, express a preference for the latter [19].

B. Some Yémba cultural features

Due to contacts with the peoples of diverse origins, the Yemba people, today more than before, are exposed to the influence of several cultures. But they remain strongly attached to their intrinsic cultural values. These cultural values which are sometimes also characteristic of other Grassfields peoples are attested, among others, through the language, the arts such as culinary art with the food called "Kwaa nzap"¹, the social practices such as the "exit of twins", as well as the space and time management modes. With particular regard to time management, we can notice that in the Yemba culture, the week has eight days, not seven as in the Gregorian calendar. No specific date marks the beginning of the week [20]. Per week, each village has one or two sacred day(s) during which some kinds of activities are forbidden.

C. Linguistic issues

The development of Cameroonian languages in the direction of technological development has suffered over the years due to the use of English as the language of technology. Hence, many of the English terms used in nowadays word processors do not have corresponding Cameroonian terms. It is necessary therefore to develop terms that can convey the meanings of the original English terms to the Cameroonian user.

¹The "Kwaa nzap" is a specific and popular food of the Yemba people. It is obtained from cook pounded cocoyam. It is accompanied with vegetables.

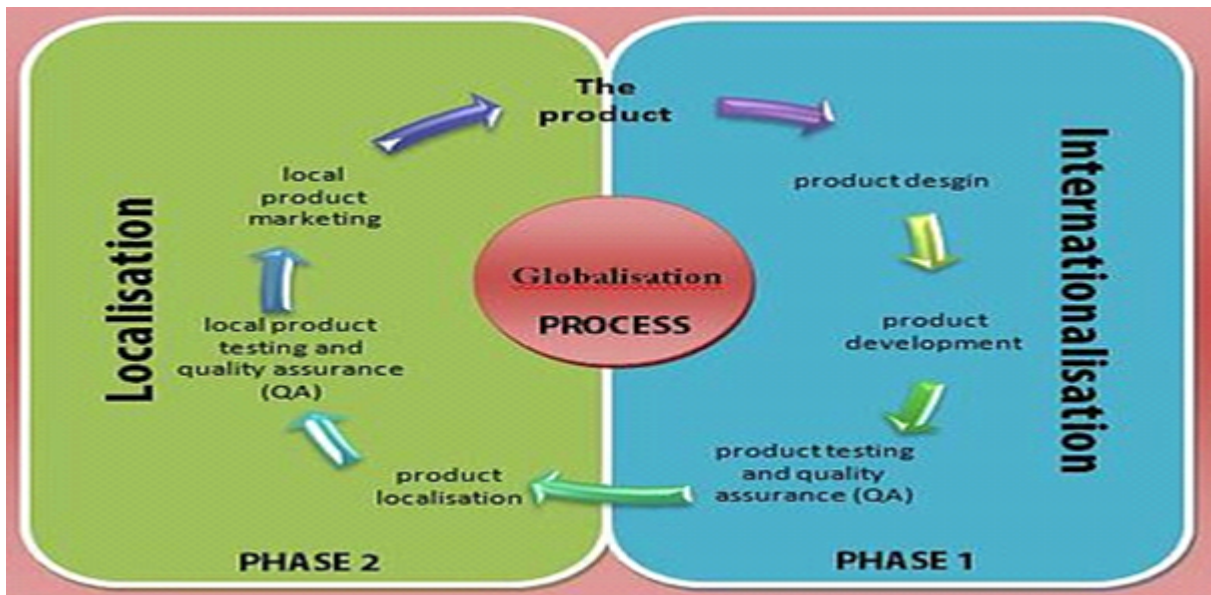


Fig. 1: The globalization process (based on a chart from the LISA website)

D. Hardware issues

The localized word processor must support the character set of Cameroonian languages and must be configured to present numbers and other values in the local format. Localizing a word processor might require adding a new spell checker that recognizes words in the local language. We use the Keyboard GoingKompuyta (Figure 3) to make support of the character set of Cameroonian languages.

E. Software issues

There are varying degrees of localisation. Yet there are no obvious criteria for guiding the appropriate level of localisation. Evidence from our study of localised word processors shows that original menu shortcuts (such as Ctrl+C for 'Copy') are consistently retained rather than changed to accord with localised menu commands. In [21], the assumptions underlying this decision are obscure but may presume that retaining shortcut consistency across localised versions is beneficial to local users. Even this strategy can lead to anomalous results. Shortcut keys are often mnemonics for the English command names, e.g., Ctrl+N for 'New', Ctrl+O for 'Open' and Ctrl+S for 'Save' and Ctrl+P for 'Print'. When mapped to a localised Yémba version of the 'File' menu, these mnemonics are inappropriate yet this set of shortcut keys from the English context are retained. This contrasts with the other set of application shortcut keys. Alt+F (mnemonic in English for 'File') invokes the File menu in such examples illustrate a fundamental tension within localisation efforts, the need to change interface characteristics while attempting to maintain consistency [21].

V. INTEGRATING YÉMBÁ CULTURAL FEATURES

To integrate Yémba cultural schemes into the localized editor (Figure 4), we need to tackle the shallow level of localisation defined by [22] as composed of the following areas:

- Colour schemes
- Pictures and images
- Sounds
- Historical data
- Hand signals
- Symbols
- Product names and acronyms.

All these issues have different meaning in a different cultural context. But to the best of our knowledge, these cultural features are not formalized at all, except the date, time and days representation issues.

VI. COMPUTATIONAL RESULTS

Our experience required expertise from three key areas: (i) linguistics, (ii) language technology, (iii) computer science. Command keys that have international status are not subject to localisation. Their commands have a mnemonic connection to the visual appearance of the letter and are not related to the usage of the command name in some languages [21].

Word processors vary considerably, but all word processors support some basic features. Our localized editor supports the following basic features:

- insert text: Allows to insert text anywhere in the document.
- delete text: Allows to erase characters, words, lines, or pages as easily as you can cross them out on paper.
- cut and paste : Allows to remove (cut) a section of text from one place in a document and insert (paste) it somewhere else.
- copy: Allows to duplicate a section of text.

Word in English	Localized Word in Yémba
File	Ŋkaŋa menu
New	Eshwī
Open	Letsō'
Save	Lepā
Save as...	Lepā le ...
Page layout	Atana
Print	Lefōk
Quit	Letō
Edition	levho
Cancel	lepike
Cut	Lezā'
Paste	Levet
Copy	Lelōk
Delete	Lepik
Search	Lefa'
Search the next	Lefa'a pááté
Replace	lekumne
Go to	Leguə
Select all	Letsō' ŋkwa
Hour/date	Nihū/ale'é álā'
Format	Efa'
Font	Ŋkia
Display	Lepete
Status bar	Ŋkaŋa eshū
Help	letswiite
Help contents	Menu atsiite
About	Á ne

Fig. 2: Selected Yémba terms for the editor

- page size and margins :Allows to define various page sizes and margins, and the word processor will automatically readjust the text so that it fits.
- search and replace: Allows to direct the word processor to search for a word or a phrase. You can also direct the editor to replace one group of characters with another everywhere that the first group appears.
- word wrap : The word processor automatically moves to the next line when you have filled one line with text, and it will readjust the text if you change the margins.
- print: Allows to send a document to a printer to get hardcopy. Our localized word processor supports additional features that enable a user to manipulate and format documents in more sophisticated ways. These full features are:
- file management: Many word processors contain file management capabilities that allow you to create,

delete, move, and search for files.

- font specifications: Allows to change fonts within a document. For example, you can specify bold, italics, and underlining. Most word processors also let you change the font size and even the typeface.
- spell checker : A utility that allows to check the spelling of words. It will highlight any words that it does not recognize.
- WYSIWYG (what you see is what you get): With WYSIWYG, a document appears on the display screen exactly as it will look when printed.

The use of this editor will faced many other factors shown in [23] who proved that other essential aspects intervene such as dialectal variations, inter-comprehension level between neighbored languages, the writing systems used,the orthography and the terminology.

VII. CONCLUSION

Most ICTs are designed and developed by researchers and designers who unintentionally apply their cultural values and systems of thought while designing and developing computer applications like word processors. This results in that, users who are culturally different from the researchers and designers might have difficulty to use these computer applications. In this work, we have localised an open source editor in the Yémba language. This can contribute to fill the gap between computer programs designers/developers, and end-users whose language is Yémba. In fact, it will be of use within the RESAL project and mostly in rural primary schools for the teaching of/in local languages. The localized editor is extensible to other Cameroonian and African languages; thus offering to speakers of these languages a tool to easy production of documents in their language.

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Fig. 3: Keyboard GoingKompuyta for Cameroonian national languages

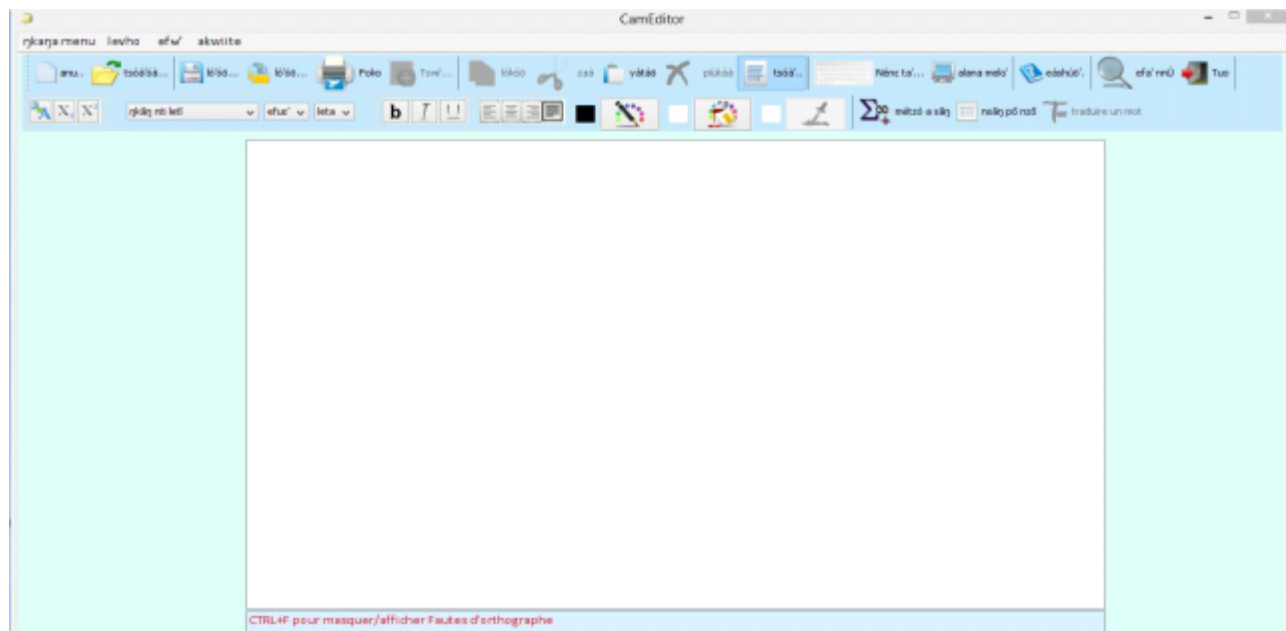


Fig. 4: A bilingual (French and Yémba) main interface of the localised editor

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