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Localisation of Mobile Phone Technological Terms: A Case Study of Yorùbá Language

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Abstract
The dominance of the English language in Nigeria is one of the major linguistic outcomes of the colonial period. Despite its status however, only about half of the population are literate in English (NBS, 2010), thus making Nigerian languages very important mediums of communication. Various studies (Owolabi 2006, Adegbija 2004) have noted the underdevelopment of Nigerian languages especially for specialised domains like Information Communication Technologies (ICTs) and have called for their development to enable speakers benefit from the affordances of digital devices and services. Despite the considerable developments in languages like Yorùbá, it has limited digital language resources that in turn disenfranchise its speakers from being able to participate in the digital space. This paper examines the principles and strategies in the development of Yorùbá terminology for digital technologies. Data for the study was sourced from Yorùbá native speakers[1] whose competencies qualify them as both creators

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and end users of meta-language in Yorùbá. The data were analysed to determine the strategies used to derive terminology for mobile phone technology and the criteria for selecting the most appropriate terms. The study demonstrates a collaborative synergy between both the users and the (linguistic) experts to produce Yorùbá equivalent terms that followed the principles and strategies of Yorùbá metalanguage, and that is also acceptable to the end users. It recommends the mainstreaming of the localised terminology for wider use among users, and as such promotes the participation of Yorùbá in the digital space.

Keywords: localisation; digital; metalanguage; standardisation; Yorùbá; users; experts.

1. Introduction

The dominance of the English language in Nigeria is one of the major linguistic outcomes of the colonial period. Thus, as a colonial linguistic heritage, the status of English as official language is demonstrated by its use in government, commerce, media, and as the language of instruction in education, among other functions. Despite its status however, only about half of the population are literate in English (NBS, 2010), thus making Nigerian languages very important mediums of communication for the greater majority of the population that are not literate in English. By its increasing global dominance, English has also come to attain a larger status as the language of the Internet and the digital space in Nigeria. This development has left out a significantly large population of speakers of Nigerian languages whose languages are not adequately represented in the digital space. Owolabi (2006) notes the underdevelopment of Nigerian languages especially for specialised domains like Information Communication Technologies (ICTs) while Adegbija (2004) called for their development to enable speakers benefit from the affordances of digital devices and services. Despite the

considerable developments in languages like Yorùbá, it has limited digital language resources that in turn disenfranchise its speakers from being able to participate in the digital space.

This paper examines the strategies and techniques employed by Yorùbá users in the development of Yorùbá equivalents for a compilation of terms in English for digital technology and use of mobile phone devices with a view towards standardisation. In section 2, the use of Nigerian languages in the digital space is discussed in general and the use of Yorùbá in particular. In section 3, the methodology that guided the compilation of the terms in English and selection of language consultants is presented, followed by an analysis of the data based on the strategies and techniques in Yorùbá Metalanguage, Volumes 1 and 2 (1990, 1992). Section 4 discusses the findings while section 5 presents some recommendations and conclusion.

As a major characteristic of the 21st century, digital technology has facilitated globalisation and an emergence of a digital culture. Information Communication Technology carries very important content into the language people speak (Osborn, 2010:1). The challenge is for promoters of local languages and cultures to achieve the active participation of native speakers in a digital space that is largely dominated by English. El Zain (cited in Osborn 2010) notes, that when information and communication technologies are not available in a given local language, the opportunity to produce and disseminate local content on the Internet is reduced. Consequently, the chances that the culture conveyed by that local language will be shared and made accessible to its speakers and researchers who would like to study it are also minimised. Hence, the intervening efforts of linguists, through language engineering and other linguistic means, guarantees that the influence of English as the dominant language of the Internet is mediated by the local users.

It is in this sense that localisation as an intervening linguistic response becomes highly essential.

According to Osborn (2010), localisation involves the translation and cultural adaption of user interfaces and software applications, and the creation of Internet content in various languages and the translation of content from other languages. His 'PLETES' model identifies Politics, Linguistics, Economics, Technology, Education and Sociocultural factors as key interacting factors in a localisation ecology. In his view, localisation takes into consideration several other matters, such as factors necessary for localisation, including a standardised orthography, locale or indigenous data, as well as organisation and resources to accomplish localisation in the more technical sense (Osborn, 2010:12). In the long term, therefore, it involves promotion of localised software and ensuring its adoption by the user community.

2. Nigerian Languages in the Digital Space

Nigeria is one of the fastest growing telecommunications markets in Africa with the introduction of mobile Global System for Communications (GSM) in 2001. The market subscription has grown over the last fifteen years, from 866,782 lines and a tele-density (number of telephones per 100 people) of 0.73% in 2001 to 152,123,172 active lines and a tele-density of 108.7% as at November 2015. Mobile GSM contributes the largest share of 98.5% to telecommunication services compared to mobile CDMA (1.36%) and fixed lines (0.12%) (NCC, 2015). With subscriptions of over 150 million (NCC, 2015), Nigeria is the continent's second largest mobile market after South Africa, even though low levels of market penetration persist, having only attained 25% of its market potential (World Statistics, 2012). On the other hand, the literacy rates are not as encouraging. The national adult literacy rate in English and in

any language was 57.8% and 71.6% respectively (NBS, 2010). In other words, more than one third of the population, about 68.5 million are not literate in English, while over one quarter of the population, about 46 million are not literate in any language.

With the increasing awareness of digital technology and mobile telephony across the socioeconomic strata, it has become increasingly important to accelerate the localisation of digital terminology in Nigerian languages. Sectors of the economy like the banking and telecommunications sectors now provide customer service in Nigerian languages on their mobile platforms in recognition of the limitations of meeting the needs of their clients in English, and to widen their market reach. Further evidence of development that supports the use of Nigerian languages in the digital space include preloaded support for predictive input and menu text in local languages by mobile phone device manufacturers like NOKIA (now Microsoft, 2014). More recent developments include the inclusion of some Nigerian languages on the Swiftkey keyboard, a predictive text application that allows, and corrects user's texts in various languages. Similarly, search engines on the Internet, such as Google now provide crowd-sourced automated translations, while mobile phone manufacturers such as NOKIA include some Nigerian languages in the translation of their User Guide content. The company was the first phone manufacturer to introduce Nigerian languages as an option on their mobile phones (Business Insider, 2014). The translation was automated using Human Language Technology (HLT).

However, preliminary observations to this study suggest that the provision of information on products and services in local languages by mobile technology providers and telecommunications operators is yet to translate into any significant increase in the presence of these languages in the digital space or increase the number of participants in both the

technological and digital domains that use local languages. As a solution to increasing digital resources in local languages, Adegbola (forthcoming) canvasses for HLT systems that are based on data-driven systems in contrast to rule-based systems. According to him, rule-based systems which 'are computer systems in which human knowledge engineers explicitly elicit knowledge from human domain experts and code such knowledge manually based on some knowledge representation formalisms', have been found to be 'laborious, time-consuming, expensive, susceptible to human error, and produce results that may not be scalable to languages other than the ones they were specifically designed to address'. In contrast, in data-driven systems, 'the computer system is made to interact with large volumes of data generated in a given knowledge domain so that relevant domain knowledge can be autonomously extracted from the data' (Adegbola, forthcoming). However, data-driven systems require large volumes of language resources that is, large corpora of digitised documentation of everyday communication events in either written or spoken forms or both. Such a system and approach to localisation of the metalanguage of specialised domains supports the perspective of language adopted in this study in which the language practices of users (native speakers) constitute the data for experts (linguists) to analyse and come up with standardised terminology.

It is against this background that the need to localise and standardise digital terminology for speakers to participate in digital contexts has become an imperative. Osborn (2010) also highlights the importance of producing manuals and instructions in languages other than the original (which is English in most cases) that is clear and consistent for users who may need to make reference to them. To translate its operating system (OS) for its web browser into several languages, Mozilla works with localisation teams whose task is to express technological terms

for a computer OS and mobile phone OS in different languages (The Economist, 2014); while Microsoft achieves the same feat through its Local Language Program (LLP) for the localisation of its Windows Operating System (OS) in African languages, and Yorùbá is one of the languages (Adegbola, 2011).

This study examines the development of terminology in Yorùbá for the specialised domain of mobile technology. Using the strategies and techniques identified in earlier studies, it analyses data sourced from local users towards a standardised compilation of terminology for the features, functions, and use of digital mobile phone devices. The study is also a follow-up to an earlier study that examined the adequacy of localisation of digital terminology in Yorùbá generated through a HLT rule-based system.

2.1. Yorùbá in the Digital Space

Yorùbá is spoken by over 40 million people in Nigeria, parts of West Africa, and is a language of religion in a number of countries in the Americas and the Carribbean. It is one of the few Nigerian languages that has undergone standardisation and benefited from research efforts on localisation of terminology for specialised domains. Earlier works on metalanguage creation in Yorùbá including *Ede Iperi* (Yorùbá Metalanguage) Volume I (Bamgbose, 1992); and Volume 2 (Awobuluyi 1990); were in response to the need to widen Yorùbá's domains of language use and they provide a background to this study. Another publication, the *Quadrilingual Glossary of Legislative Terms* (1991) by the Nigerian Educational Research and Development Council (NERDC) covers three major Nigerian languages namely Hausa, Igbo and Yorùbá, with English as the source language.

Most of the localisation works in Yorùbá apply the principles, strategies, and techniques for generating

metalinguistic terms espoused in the early studies of Yorùbá metalanguage, Awobuluyi (1992) and Bamgbose (1990). Olateju (2004) accounted for the appropriateness of terminology deployed in political discourse and programmes in Oyo and Ogun states in south-western Nigeria by identifying such strategies as borrowing, coinages and semantic extension, among other techniques. Ofulue (2010) examined the adequacy of digital and mobile phone terminology using data drawn from a mobile phone manual in Yorùbá and the principles and strategies for developing metalinguistic terms as criteria for the analysis. The limitations of rule-based systems may explain the inadequacies observed in the HLT based machine translation of a NOKIA phone manual in Yorùbá (cf. Ofulue 2010).

The earlier efforts in Yourba metalanguage also form the background for Adegbola's et al (2011) paper on the localisation of Microsoft's MS Vista as a means to improve the quality of human-computer interaction for Africans, particularly in the MS Vista environment, and 'to widen the domains of use of the Yorùbá language' (2011: 7-8). According to them, the study was the first time that Yorùbá would be used in the domain of modern technology in general, and in computer technology in particular. Through the application of scientific strategies and principles for technical-term creation of metalanguage in Yorùbá, a glossary of computer terminologies in English was compiled and their Yorùbá equivalents were created. Adegbola et al (2011) achieved the localisation of the MS Vista operating system for the Standard Yorùbá language through formulation devices such as composition, semantic extension, description, coinage and borrowing, as well as derivational tactics such as pre-fixation and compounding for nominalisation. Adegbola et al (2011) was a response to the lack of terminology for computer technology domain. Similarly, the current study is a response to

the need for terminology in Yorùbá for the domain of mobile technology and devices.

3. Theoretical Approach

The works of Bamgbose (1990) and Awobuluyi (1992) on the development of metalanguage continue to provide a useful template for research carried out in Yorùbá language engineering. However, while their principles and strategies for developing Yorùbá metalanguage provides a useful background, the glossary of terms did not include any mobile technology terms since it only emerged in Nigeria about a decade later. The present study therefore bases its analysis of the data on Yorùbá equivalents of a glossary of digital terminology on the application of these principles and strategies. Specifically, the study applies them to determine the processes employed in the creation of equivalent terms and the principles of translating meta-language as criteria to determine their appropriateness.

4. Methodology

The methodology adopted for this study involves a compilation of a glossary of 50 frequently used terms for features, functions, and actions associated with mobile technology and devices in English. In line with the notion of language users as viable sources of data, the Yorùbá equivalents were generated by three (3) language consultants whose proficiencies were demonstrated by their profession as media practitioners who use Yorùbá professionally; native speakers; and who are proficient in the use of mobile digital devices. The media sector was selected as the primary sector in view of the role it plays in information dissemination and mass communication in the local languages. The language consultants were representative of the use of Yorùbá on radio, television, and print media. A randomly selected sample from the data were analysed for strategies

employed, the principles for developing metalinguistic terminology, and the selection of appropriate terminologies.

5. Analysis

The data was organised based on the principle of relatedness of the terms for ease of reference and analysis. Based on the data three equivalents in Yorùbá from the three language consultants are provided for each English term. Where two of the entries are same, only one is selected for analysis. In applying the strategies and techniques for Yorùbá Metalanguage, the principles of self-explanation, explicitness, and reasonable length served as a criteria for the most appropriate term (Bamgbose, 1992). A summary of the data analysed in this section and the selected terms are presented in table 1 in the appendix.

5.1. Strategies for Creating Technical Terminology

The terms produced by the language consultants showed similar patterns in the strategies used for creating them (cf. Bamgbose, 1990, Awobuluyi 1992) and were analysed accordingly. The strategies include the morphological processes of semantic extension, description, borrowing, composition, nominalisation, and compounding. They in turn were variously applied to the base form of an existing word as the starting point, from which new words were derived or created e.g.

(1) Text message / SMS

Base word: tẹ̀ ‘to press or type’’
Derivations: àtẹ̀jíṣẹ́ ‘that which is typed and delivered’
àtẹ̀ránṣẹ́ ‘that which is typed and sent on an errand’

(2) Select/Options

Base word: yàn ‘to select/choose’
Derivation: àṣàyàn ‘choosing selection’

(3) Key/keypad

Semantic extension involves the extension of the meaning of existing words in a language while compounding refers to the combining of two or more existing words to create a new word.

Key/keypad

a. Semantic extension, e.g.
   key - kọ́kọ́rọ́
   pad - àtẹ ‘tray for display of things’;
   òṣùká ‘head pad for a load bearer’

b. Compounding e.g.
   key - ẹyọ ọ̀rọ̀; àmì ọ̀rọ̀
   keypad - àtẹ ọ̀rọ̀; àtẹ (àmì) ọ̀rọ̀; *òṣùká kọ́kọ́rọ́

It is important to note that ‘òṣùká kọ́kọ́rọ́’ fails the principle of naturalness and accuracy of translation. The translation of ‘pad’ in ‘keypad’ as ‘òṣùká’ is misleading because the function of head pad and a keypad are quite different and so the term is not as appropriate as ‘àtẹ’ which is also the term selected for the computer term, ‘chart’ (cf. Adegbola et al, 2011).

(4) Mobile Phone

Two sets of processes were employed in the creation of an equivalent term for ‘mobile phone’ in Yorùbá. The first involves semantic extension and nominalisation, a noun formation process involving deletion and pre-fixation. The second involves the processes of borrowing of a word from English and making it conform to Yorùbá’s phonological structure; and description which involves describing the English term on the basis of its attributes, e.g. function/purpose, manner of application, appearance, etc.

a. Semantic extension, e.g.
ẹ̀rọ - machine; device
ẹ̀rọ ìbára ẹni sọ̀rọ̀ lórí ìrìn; ẹ̀rọ ìbánisọ̀rọ̀
bá + ẹni + sọ̀rọ̀
with someone speak/talk
Deletion: bá + 'ni + sọ̀rọ̀
báni + sọ̀rọ̀ = bánisọ̀rọ̀
Prefixation: ì + bánisọ̀rọ̀ = ìbánisọ̀rọ̀
pref talk with someone 'act of talking with someone'
ẹ̀rọ + ìbánisọ̀rọ̀ = ẹ̀rọ ìbánisọ̀rọ̀
'machine,device' 'act of talking with someone' 'mobile device; mobile phone'

b. Borrowing + description, e.g.
borrowing: phone - fóònu
description: mobile - alágbèéká; àgbéká
mobile phone = fóònu alágběká; fóònu àgbéká

The term, 'ẹ̀rọ ìbára eni sọ̀rọ̀ lórí ìrìn' fails the first principle of composition which is that of length thus making 'ẹ̀rọ ìbánisọ̀rọ̀ alágbèéká' or 'fóònu alágbèéká' more appropriate terms for 'mobile phone'.

(5) Call/missed call/flash

Description, composition, and compounding were used as strategies in creating the equivalent terms for 'flashed calls' and 'missed calls'. Composition involves the stringing of two or more words to make a phrase or sentence while compounding involves the combination of two or more words in Yorùbá.

a. Call - (V) pè
(N) ìpè - ì (prefix) + pè
b. Missed call- ìpè àìmọ̀ (lit. unaware call)
ìpè àìgbọ́ (lit. unheard call)

ìpè fòó (lit. passed* call; jumped* call)
ìpè tí a kò jẹ́ (lit. call which is not answered/picked)

Note that although 'ìpè fòó' meets the principle of length, the implied meaning 'passed call' and 'jumped call' inaccurately suggests that the call was 'passed up' or deliberately avoided by the receiver of the call. The translation, 'ìpè tí a kò jẹ́' created through the composition of a noun and a relative clause, fails the first principle in composition, which is length (cf. Bamgbose, 1992). While all the three suggested equivalents appear to align with the principle of composition using base forms, 'ìpè àìmọ̀' and 'ìpè àìgbọ́' are closer to the sense of a 'missed call'.

c. Flash - composition and compounding:
ìpè fìrí (call that is quick like lightening)
ìpè olobó (call that prompts)
ìpè ṣáká (call that is brief)

The sense of 'call' with the main attribute of a very short duration ('flash' or 'flash call') is reflected in all three translations, 'call' being the base word. However, the second attribute that it is intended to be prompt but not necessarily to be responded to, is reflected only in 'ìpè olobó'. The appropriateness of this selection may be determined by the extent to which it is understood by the end users.

(6) Text message (SMS) / Write text

The strategies of description and nominalisation involving pre-fixation and deletion were employed to create the equivalents of 'text message' and 'write text' in Yorùbá.

a. Text message/SMS
- Description: àtẹ̀jíṣẹ́; àtẹ̀ránṣẹ́

àtẹ̀jíṣẹ́ = (prefix) à + tẹ̀jíṣẹ́
tẹ̀ + jẹ́ + iṣẹ́
type/press deliver/go on errand

Deletion: tẹ̀ + j'íṣẹ́
type/press deliver errand
tẹ̀ + jíṣẹ́

Nominalisation through affixation (pre-fixation):
(prefix) à + tẹ̀jíṣẹ́ = àtẹ̀jíṣẹ́
(àtẹ̀jíṣẹ́: that which is typed and delivered = text message/SMS)

àtẹ̀ránṣẹ́ = (prefix) à + tẹ̀ránṣẹ́
tẹ̀ + rán + ní + iṣẹ́
type send on errand

Deletion: tẹ̀ + rán'ṣẹ́
type/press send on errand
tẹ̀ + ránṣẹ́

Nominalisation through affixation (pre-fixation):
(prefix) à + tẹ̀ránṣẹ́ = àtẹ̀ránṣẹ́
(àtẹ̀ránṣẹ́: that which is typed and sent on errand = text message/SMS)

Both terms are suitable choices because they are self-explanatory, clear, and of reasonable length.

a. Write text/message/SMS - Description:
write text- kọ àtẹ̀jíṣẹ́
kọ àtẹ̀jíṣẹ́
Write text
write message/SMS- kọ àtẹ̀ránṣẹ́
kọ àtẹ̀ránṣẹ́

write message/SMS
write message/SMS- tẹ ọ̀rọ̀
tẹ ọ̀rọ̀
type word
* àkọsílẹ̀

The term, 'àkọsílẹ̀' will not be an appropriate option because it is a noun and suggests the idea of 'a record of something' or 'what is written'. It is more of an entity (like a noun) than an action (like a verb).

(7) SIM / SIM Card

The strategies of borrowing and compounding were employed to create the Yoruba equivalents of 'SIM card'.

SIM Card - borrowing + compounding: káàdì oníǹkan
káàdì síìmù

káàdì oníǹkan - káàdì + oníǹkan = káàdì oníǹkan
card + owner = owner's card; user's card

káàdì síìmù - káàdì + síìmù = káàdì síìmù
card + SIM = SIM Card

The term, *káàdì síìmù*, is already in use by local users.

(8) Save/Phone Memory/Memory card

The strategies of nominalisation involving pre-fixation, description, compounding, and semantic extension were employed. Semantic extension involves extending the meanings of existing words in Yorùbá.

a. Save - tọ́jú
pamọ́
fi sí ìpamọ́

tọ́jú 'keep'
pamọ́ 'protect/save'
fi sí ìpamọ́ - fi + sí + ì (prefix) + pamọ́

let/leave in -ion protect
-ty save
-ing keep

Nominalisation through affixation (prefixation)*:

fi + sí + ìpamọ́
let/leave in protection
safety
keeping

Among the three suggested equivalents, 'tọ́jú' and 'pamọ́' appear to be more lexically suitable and more syntactically flexible than 'fi sí ìpamọ́'.

* While *ì* is prefixed in 'ìpamọ́', it is realised as suffix in English, as in the English words protect*ION*, safe*TY* and keep*ING*.

a. Phone Memory - description and compounding:
àkópamọ́ ẹrù orí fóònù
semantic extension and compounding: àká ìrántí
description: aṣèpamọ́
àkópamọ́ ẹrù orí fóònù -
àkópamọ́ ẹrù orí fóònù
the protected/saved load/content on/head phone
= 'the protected/saved content(s) on phone'

àká ìrántí - àká ìrántí
barn memory = ' memory barn'
aṣèpamọ́ - a + ṣèpamọ́
a + ṣe + ì (prefix) + pamọ́
a + do + ion/-ty/-ing + protect/save/keep
a + ṣe + ìpamọ́ (nominalisation by prefixation)
(sg.) one who does protection/safety/keeping
that which does protection/safety/keeping

Note that it is only 'àkópamọ́ ẹrù orí fóònù' that has retained the borrowed form of 'phone' -'fóònù'. Conversely, 'àkópamọ́ ẹrù orí fóònù', though having meaningfully deployed the techniques of description and compounding, the output is rather long, thus failing the first principle of composition (cf. Bamgbose 1992). 'Aṣèpamọ́' is descriptively accurate, but it does not retain the borrowed form, 'fóònù' that identifies the 'owner' (as suggested by the agentive morpheme/prefix *a-*) whether its man or machine, while the semantic realisation of 'àká ìrántí' 'memory barn' refers to the technical functionality of both 'phone memory' and 'memory card' rather than to its restricted reference of 'phone memory'. Thus, a combination of 'Aṣèpamọ́ + orí fóònù' appears to be a viable choice for 'phone memory'.

b. Memory card - borrowing and compounding:
   káàdì àpamọ́
   borrowing and description: káàdì àpamọ́ fún ìrántí
   " " " káàdì abáni fi pamọ́
   semantic extension and compounding: àká agbára
   káàdì àpamọ́ - káàdì + à + pamọ́
   card -ing keep/store
   -age store
   káàdì + (merge)àpamọ́
   card keeping/storing = 'keeping card/storing card'
   card storage = 'storage card'

   káàdì àpamó fún iranti –
   káàdì + à + pamó + fún + ìrántí
   card -ing keep/store for remembering/memory
   káàdì + (merge) àpamọ́ fún ìrántí
   card keeping/storing for remembering/memory
   = 'storing card for remembering/memory'

káàdì abáni fi pamọ́ -
káàdì + a + báni + fi + pamọ́
card -ing help one to keep/store
káàdì + (merge) abáni + fi + pamọ́
card helping one to keep/store
= 'card helping one to keep/store'

àká agbára - àká agbára
barn power
àká (ti/fún) agbára
barn (of/for) power
= 'barn of power'

From the three suggested Yorùbá equivalents for 'memory card', 'àká agbára' is the only option which does not capture the idea of 'storage' or 'keeping' for phone memory. 'Card' is the base word/form realised as 'káàdì' through borrowing. However, 'káàdì àpamọ́' derived through borrowing and compounding seems to be the most suitable, while 'káàdì àpamọ́ fún ìrántí' and 'káàdì abáni fi pamọ́' though having made use of the base word, fails the first principle of composition (cf. Bamgbose 1990, Awobuluyi1992). Both 'àká ìrántí' and ''káàdì àpamọ́' are viable choices.

(9) Charge/Phone Charger

a. Charge (V) –
composition/description and compounding: fikún agbára
fún lágbára
fi agbára sí
gbaná sára

fi kún agbára - fikún + agbára
add to/augment power

= ‘add to power, augment power’

fún lágbára - fún + lágbára
fún + ní + agbára
give to in/of power
= ‘give power to’

fi agbára sí - fi + agbára + sí
put power to/in/into
= ‘put power into’

gbaná sára - gbaná sára
gba + iná sí + ara
receive fire/electric power into body/main part
=‘receive power into main part’

The strategy adopted in all the four options here is the derivation of compounded forms from a verb. However, as a verb, ‘charge’ retains an active rather than passive state/form. Thus, only ‘fikún agbára’, ‘fún lágbára’ and ‘fi agbára sí’ capture this active state/form, while ‘gbaná sára’ though active, semantically suggests that something/someone is receiving something rather than giving. A combination of parts from the suggested equivalents is another option, ‘‘fína sí’ ‘put power/charge to’.

b. Phone Charger-
description and compounding: èlò àfikún agbára
ẹ̀rọ afagbára
okùn ìgbaná

èlò àfikún agbára - èlò à fikún agbára
tool -ing add to power(electric)
èlò (merge)àfikún agbára
tool adding to power(electric)
= ‘tool adding to power (electric)’

ẹ̀rọ afagbára - ẹ̀rọ a fagbára
ẹ̀rọ a fa + agbára

device -ing pulls/draws power(electric)
ẹ̀rọ (merge) afagbára
device pulling/drawing power
='device pulling/drawing power'
='device (which) pulls/draws power'

okùn ìgbaná - okùn + ì + gba + iná
cord/rope/string -ion receive fire/power(electric)
okùn + ì + (deletion/merge) gbaná
cord/rope/string -ion receive fire/(electric) power
okùn + (deletion/merge) ìgbaná
cord/rope/string reception of fire/electric power
= 'cord/rope/string for the reception of (fire/electric) power'

The same principle as in (9a) also applies to its nominalised form in (9b). Thus, 'elo / a-/i-fína sí' is a nominalised derivative of 'fína sí' through pre-fixation.

(10) Select/options

a. Select - yàn
ṣà yàn
mú kan
yàn - choose/select
ṣà yàn - make/select choice
mú kan - choose one

The translation of *yàn*, *ṣà* and *mú* is clearly consistent with the base form 'choose'. 'Yàn' actually seems to be the most stable word in this set of terms and could pass for the right Yorùbá alternative to 'select'.

b. Option - àṣàyàn
*wọ̀ fún /ẹwù
kí lò ń fẹ́

àṣàyàn - à + ṣà + yàn
-ion select choose
(merge) à-ṣà + yàn
selection choose
àṣàyàn = 'choosing selection'
'selection of choice'
'(selection of) option'

*wọ́ fún /ẹwù
*kí lò ń fẹ́

**wọ́ fún /ẹwù* and **kí lò ń fẹ́* fail all the principles of metalanguage creation. On the other hand, both 'yàn' and 'àṣàyàn' are consistent with the principle of base form and derivational strategies and therefore can be used as Yorùbá equivalents for 'select' and 'options'.

6. Discussion

As a characteristic of effective translations and as was also highlighted by Adegbola et al (2011), new terminologies should convey the meanings of the English terms, and at the same time be meaningful to the local end users. The approach adopted in this study, demonstrated a collaborative synergy between both the users and the (linguistic) experts to produce Yorùbá equivalent terms that followed the principles and strategies of Yorùbá metalanguage, and also acceptable to the end users. Although the use of only three language consultants may be viewed as a limitation, their competencies as native speakers and professionals in the everyday use of the language for radio and television programming validated the reliability of the data and points to the qualitative value of the study. The further analysis that the data were subjected to, can only enhance the quality of the output of the process of metalanguage

development. It was also interesting to observe that these users employed strategies and techniques following the Yorùbá Metalanguage (1990, 1992). The main aspects of variance lay in the choice of existing words to serve as base form equivalents, especially in terms of how well they conveyed the meanings of the English terms. Second, was adherence to the principle that gives consideration to length of a composition. While there was the tendency for the language consultants to provide long derivatives or collocations, the availability of more than one option made the process more objective, and the output more authentic, and gave the researcher a range of options.

In comparison, automated translations tend to violate the principles of developing terms that make for consistency, naturalness, (with the language patterns) and accuracy. This is especially true of rule-based systems and for which Adegbola (forthcoming) advocates data-driven approaches to automated translations. In line with data-driven approaches, the benefits of the approach adopted in the present study allows for the inclusion of users' creativity. Adegbola argues that more accurate automated translations can be achieved if they are data-driven using data obtained from everyday use of the language in varied communicative events. This is what the language consultants represent in this study. From the results, the collection of data from a group of users (language consultants) who possess the appropriate competencies, and a linguistic analysis based on strategies and techniques of Metalanguage creation is a viable model for standardisation that can be scaled up to generate a comprehensive glossary of terminology for digital-technology.

7. Recommendations

Based on the findings, and in line with Adegbola et al (2011), this study recommends a multidisciplinary and team approach to

the development of terminology for specialised domains in Yorùbá that will comprise users and experts. The use of corpora that comprises users' everyday communicative practices should be pursued. In line with their recommendations, such corpora should include media content, e.g. newspaper texts, radio recordings, television materials, classroom instructions, students' assignments and various official communication events that are documented in writing such as deliberations in parliaments, court proceedings and government policy pronouncements.

In contrast to previous studies, the present study sourced technological terms for mobile technology from among Yorùbá native speakers, who by virtue of their profession in broadcast media are both creators and end users of the language. Such an approach demonstrates and justifies the viability, on a larger scale, of a team approach with users as the main sources of data instead of as end users alone.

It also demonstrates an approach aimed at standardising specialised terminologies following the strategies and principles for developing metalangauge in Yorùbá. It is therefore recommended as a template for evaluating and standardising metalanguage terms in Yorùbá.

Since a 'digital ecology' will produce an information ecosystem' in which the nature of relationships existing among such factors as the production, distribution, storage, accessibility, ownership, selection and use of information is understood (Osborn 2010), it is important that the overall intervening efforts from stakeholders in this context be all-encompassing. Therefore, this study recommends a critical action plan towards standardisation to promote the acceptance and mainstreaming of these terms into everyday use. Further field testing and subsequent acceptance of the terminology evaluated in this study into the dictionary of the Yorùbá

language will serve this purpose and further establish their general usage among Yorùbá users of mobile phone technology.

8. Conclusion

A major contribution of this study to localisation efforts in Yorùbá is its analysis of terms in the specialised domain of mobile technology. As this study has shown, the Yorùbá equivalents of the terminology originated from native-speaker users themselves, and the terms have generally been found to follow the principles and strategies of developing metalanguage in Yorùbá. It is in this regard that the study differs from previous studies in its perspective of the role that users play vis a viz the experts in contrast to an approach in which the expert (e.g. linguist) is the sole creator of terms. Such an approach underscores the important contribution that users make to language development. It will also facilitate acceptance user-derived terminology in contrast to terminology developed by the experts. The study also demonstrates the viability of Adegbola's (forthcoming) call for the development of digital language resources in Yorùbá that are drawn from everyday use of the language to facilitate data-driven approaches.

Localisation of mobile phone technology projects can facilitate the bridging of existing 'digital divides', particularly where African countries are lagging behind in the context of ICT for development (ICT4D). With a digitally-driven renaissance among Internet and mobile technology users facilitated by the growing numbers of computers and portable digital devices and the growing rate of mobile Internet subscription in Nigeria and around the world, the need for the localisation of ICT terminology becomes more critical. To this end, future research should explore well- mapped action plans in the direction of the localisation of ICTs and mobile technology, and appropriate steps taken in those regards.

Appendix: Table 1: Summary of Analysed Data and Selected Options

SN	LIST	ENGLISH	TRANSLATION 1	TRANSLATION 2	TRANSLATION 3	SELECTED OPTION
1	50	Digital device	èrọ ìgbàlódé	èrọ ìgbàlódé	èrọ kánmọkánmọ	èrọ ìgbàlódé
2	19	Mobile phone	Èrọ ìbára ẹni sọ̀rọ̀ lórí ìrìn/fóònù alágběká	fóònù àgbéká	èrọ ìbánisọ̀rọ̀ alágběká	èrọ ìbánisọ̀rọ̀ alágběká; fóònù alágběká; fóònù àgbéká
3	3	SIM/SIM Card	(Káàdì) oníńkan	Káàdi sîìmu		(Káàdi) sîìmu
	1	Key	kọ́kọ́rọ́	ẹyọ ọ̀rọ̀	àmì ọ̀rọ̀	ẹyọ ọ̀rọ̀; àmì ọ̀rọ̀
	2	Keypad	Òṣùká kọ́kọ́rọ́/ìrọ̀rí fún kọ́kọ́rọ́	Àtẹ ọ̀rọ̀	Àtẹ àmì ọ̀rọ̀	àtẹ (àmì) ọ̀rọ̀
4	17	Menu	Àkójọpọ̀ èlò (orí èrọ)	Àtẹ ànfààní	Àtẹ akóónú	Àtẹ ànfààní
5	30	Phone features	Àyẹ̀wò èlò/ Àwọn àmúlò lórí fóònù	Àdámọ́ fóònù	Àwọn akóónú	Àdámọ́ fóònù; àwọn akóónú (fóònù)
6	25	Phone settings	ìgbésẹ̀ (lórí fóònù)	Agódo ààtò	Ààtò fóònù	Ààtò fóònù
7	44	Select	ṣà yàn'; yàn	Yàn;	Mú kan	Yàn; ṣà yàn
	33	Options	Àṣàyàn	wọ̀ fún/ẹwù	kí n lò ń fẹ́(?)	Àṣàyàn
8		Call (make call)	Pè	-	-	Pè (ṣe ìpè)
	38	Missed call	Ìpè àìmọ̀/àìgbọ́	Ìpè fòó	Ìpè tí a kò jẹ́	Ìpè àìmọ̀/àìgbọ́
	47	Flash	Ìpè fírí	Ìpè olobó	Ìpè ṣáká	Ìpè fírí/ìpè olobó
9	10	Write text	Àkọsílẹ̀	kọ àtẹjíṣẹ	Tẹ ọ̀rọ̀	kọ àtẹjíṣẹ; tẹ ọ̀rọ̀

	9	Text message / SMS	àtẹ̀jíṣẹ́	àtẹ̀jíṣẹ́	àtẹ̀ránṣẹ́ (v. kọ àtẹ̀ránṣẹ́)	àtẹ̀jíṣẹ́; àtẹ̀ránṣẹ́
10	21	Charge	(A)fikún agbára	Gbaná sára	Fi agbára sí i/fún lágbára	Fína sí (fóònù)
	22	Phone charger	èlò afikun agbárá	Okùn ìgbaná	ẹ̀rọ afagbárá	èlò a-/ì-fínasí (fóònù)
11	34	Save	(Ì)pamọ́	Tójú	Fi sí ìpaọ́	Pamọ́; tójú
	23	Phone memory	Àkópamọ́ ẹrù orí fóònù	Àká ìrántí	Aṣèpamọ́	*Aṣèpamọ́ orí fóònù; àká ìrántí
	24	Memory card	Káàdì àpamọ́/ àpamọ́ fún ìrántí	Àká agbára	Káàdì abani fi pamọ	káàdì àpamọ́
12	49	Load (credit/recharge)	ṣe àfikún owó	fowó sí fóònù	Fi káàdì ìpè sí	* n. ìfowó sínú fóònù v. fowó sí(nú) fóònù
	40	Credit	afikún owó	Owó ìpè	Owó ìpè	Owó ìpè
13	15	Browse	Àyẹ̀wo	Ṣàwárí	Wá a jáde /Asàwárí	Ṣàwárí; Wá jáde

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