EXTRAPOLATING LUGANDA TO A MEDIUM OF SCIENCE

A PROJECT PROPOSAL

by

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1. STATEMENT OF THE PROBLEM

Writing on the linguistic emancipation of sub-Saharan countries, the late Dr Kahombo Mateene strongly and rightly opines:

The introduction of African languages as media of instruction must be radical, that is to say, that it must aim at reaching the university, instead of stopping at lower or middle levels.[1]

In anticipation of not only possible but probable dismissive opposition, Kahombo Mateene accurately recounts from history:

We [Africans] are deceiving ourselves to hope that Africa can be better united by the adoption of modern European languages. We must learn a lesson from Latin which after serving as a common language to the intellectual and leading elites of all the European countries of the middle ages, was, during renaissance, kept away by the vernacular languages of diverse nations that existed at the end of the middle ages, these languages are today the colonial scientific languages.[2]

To the question whether any African language or sublanguage (i.e. dialect) can be elevated to a scientific language, the author of this project proposal resoundingly responds in the affirmative.

Consequently, the project problem that presents itself to us is whether Luganda can be propelled to the status of a scientific language in the shortest stretch of time or whether it should be left to its own devices, in which case it will eventually evolve to that status in probably two centuries from 2000.

The overall goal envisioned in the first two phases of the proposed project is to compile **English-Luganda Glossaries of Scientific Terms.** A detailed characterization of the English-Luganda glossaries of scientific terms is to be found in Sec 5.1.

2. FORMULATION OF THE HYPOTHESIS

A well-considered solution to the project problem is that the Luganda language be

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[1]OAU/BIL 1973-1980 *Reconsideration of African Linguistic Policies,* p. 23

[2] OAU/BIL 1985 *Linguistic Liberation and Unity of Africa*, pp. 26-27

terminologically extrapolated with its identity remaining intact. Therefore if the hypothesis that Luganda be extrapolated without impairing its identity should be true, then if a sufficiently powerful arsenal of lexemic affixes were originated, then Luganda would be propellable to a status of scientific language. That requisite arsenal of lexemic affixes is indeed already in place as evidentially documented in:

(i) "Three Glossaries of Extrapolated Luganda"

(ii) "An English-Luganda-English Glossary of Lexemic Affixes"

(iii) "A Luganda-English Glossary of Lexemic Affixes"

(iv) "Luganda Definitions of 300 Luganda Affixes"[3]

In order to promote precise and clear thinking on the hypothesis, let it be formalized by setting

H = df Luganda becomes a medium of science in the shortest stretch of time

A = df Luganda retains its identity

D = df A group of Luganda-speaking scientists coin Luganda expressions for scientific term status

R = df Luganda becomes a medium of science

In consequence, the hypothesis testing formula $[H \wedge A] \rightarrow [D \rightarrow R]$ emerges. We truth – functionally tabulate it below.

[H	∧	A]	⟶	[D	⟶	R]	
0	0	1	1	0	1	0	I
0	0	1	1	0	1	1	II
0	0	1	1	1	0	0	III
0	0	1	1	1	1	1	IV
1	1	1	1	0	1	0	V
1	1	1	1	0	1	1	VI
1	1	1	0	1	0	0	VII
1	1	1	1	1	1	1	VIII

[3]Only papers (i), (ii) and (iv) are, at the time of formulating this Project Proposal, accessible at www.luganda.com

By way of interpreting the formula we can predict all the eight and only eight possible situations in which we may find ourselves. We would wish to assume that A is true throughout, for it is the adjunct to the hypothesis H. We read the formula as:

If [H ∧ A] should be true, then the do-formula D implies an expected result R.

Since A = 1 throughout, we have to deal with only three propositional variables, i.e. H, D, and R; and, hence, eight situations. Let the eight situations be characterized.

Situation I: H = D = R = 0

Luganda fails to become a medium of science if there is no intervention of scientists.

Situation II: H = D = 0; R = 1

But despite lack of intervention of scientists, Luganda can eventually become a medium of science; probably after two, three, or four centuries.

Situation III: H = 0; D = 1; R = 0

On the face of it, this situation amounts to a clear refutation of the hypothesis H, for D = 1.

Situation IV: H = 0; D = R = 1

With the intervention of the scientists, Luganda becomes a medium of science although not in the shortest stretch of time.

Situation V: H = 1; D = R = 0

In this situation, Luganda has the potential of attaining the status of medium of science.

Situation VI: H = 1; D = 0; R = 1

Luganda can become a medium of science even without the intervention of the scientists. A single scientist/linguist could, imaginably, with the backing of the State, effectuate the transformation.

Situation VII: H = D = 1; R = 0

In this situation the hypothesis testing formula is false; such a situation cannot materialize in the real world.

Situation VIII: H = D = R = 1

This is the situation that we cherish, for with the intervention of the scientists Luganda becomes a medium of science in the shortest stretch of time.

The general objective stated above splits into two specific objectives:

(i) to impart Luganda-extrapolative knowledge and skills to a selected group of scientists

(ii) to compile the English-Luganda Glossaries of Scientific Terms in a collaborative effort by the scientists.

This project promises to be the first opportunity to test a paradigm shift in corpus planning (an essential component of language planning) in that serious morphosemantic extrapolation of an already existing African language, let alone a non-African one, has most probably never earnestly been carried out.

3. THEORETICAL FRAMEWORK

For the purpose of formulating the theoretical framework, we propose to employ the following symbols:

(i) Syntactic-formal sentence constituents

S" = sentence (S' = clause)	N" = noun phrase
Vg = verb group	A" = adjective phrase
Adv" = adverb phrase	P" = prepositional phrase

(ii) Syntactic-formal sentence constituents

S = subject	V = predicator ("verb")
C = complement	Adl = adverbial
O = object	

(iii) Universal-semantic roles

Ψ = contactor

Σ = change-bearer/ persister

A = contactee

R = reference

ϕ = causer

Π = Ψ/ Σ

(iv) Universal semantic predicates

Π = absolute predicate

ΨA = essive predicate

ΣR = relative predicate

ϕΠ = causative predicate

(v) Luganda word constituents

B = initial prefix

F = prefix

I = infix

S = word stem

R = word root

H = suffix

L = final suffix

F_{nom} = nominal prefix

F_n = noun prefix

F_a = adjective prefix

W = word

S^+ = nominal stem with geminated initial consonant

(vi) The PEGITOSCA criterion

P = precision of term constituent

G = generativity of word constituent

T = transparency of word constituent

S = systemicity of term constituent

A = acceptability of term constituent

E = economy of term constituent

I = internationality of term constituent

O = objectivity of word constituent

C = consistency of term constituent

The following table shows the syntacto-semantic correspondences which are factored into word-formation such that

S”>S’>W”>W>B/ F/ I/ S/ R/ H/ L.

Formal representation of sentence patterns	Functional representation of sentence patterns	Universal-Symantic representation of sentence patterns
N" Vg	S V	Πε/ σ
N_1" Vg N_2"/ A"/ S_1'	S V C	Ψε_1/ σ_1Aε_2/ σ_2
N_1" Vg N_2"/ Adv"/ P"/S_1'	S V Adl	∑ε_1/ σ_1Rε_2/ σ_2
N_1" Vg N_2"/ S_1'	S V O	ϕε_1/ σ_1Πε_2/ σ_2
N_1" Vg N_2" N_3"/ A"/S_1'	S V O C	ϕε_1/ σ_1[Ψε_2/ σ_2 Aε_3/ σ_3]
N_1" Vg N_2" N_3"/ Adv"/ P"/ S_1'	S V O Adl	ϕε_1/ σ_1[∑ε_2/ σ_2 Rε_3/ σ_3]
N_1" Vg N_2" N_3"/ S_1'/ P"	S V O O	ϕε_1/ σ_1[ϕε_2/ σ_2 Πε_3/ σ_3]

ε = entity

σ = situation

If our enterprise to transform Luganda into a medium of science is to be successful, then we have to be incessantly aware that word-formation essentially consists in packaging sentence meaning into a clause, clause meaning into a phrase, and, finally, phrase meaning into possibly a compound or complex word. In the process of forming expressions for term status, we shall apply the following extrapolated rules:

(i) oku●R●a → F_{pro}●R●a^1/ ●ye, where ●a^1/ ●ye is an aspect marker

(ii) oku●R●a → oku●R●H → F_{nom}●R●H●L, where L = ●a^2/ ●wa/ ●e/ ●i/ ●o/ ●u

(iii) F●S → oku●S●H → F_{nom}●S●H●L

(iv) {F_1●S_1, F_2●S_2} → {F_1●S_1, F_1●S_2} → F_1●S_1●S^+_2

(v) [F●S]" → [F●S]^0 + N_1"/ A"/ Adv"/ P"/ S_1"

[F_1●S_1]" → [F_1●S_1]^0 + [F_1●S_2]

(vi) W → F_{pro}●a●W

(vii) W → F_{nom}●nna●W

(viii) W → F_{nom}●R●a●W

A scientific term T in a given natural language L is defined as an expression W" of a certain meaning Θ plus a function of criteria for term status such that

$T_L = [\Theta_L + W_L" + A_L]$, where $A_L = f(P,E,G,I,T,O,S,C)$

4. METHODOLOGY

The terminological bridge between English and Luganda, ie $[\Theta_E + W"_E + A_E] =$ $[\Theta_G + W"_G + A_G] =$ is designed to be crossed in five distinct moves, namely

(i) PEGITOSCA characterization of T_E

(ii) Morphosemantic and morphosyntactic analysis of $W"_E$

(iii) Determination of morphic correspondences between English and Luganda

(iv) PEGITOSCA synthesis of T_G

(v) Cross-referencing of T_G to other terms

Our exemplification of the terminological transition accords with the PEGITOSCA Criterion.

 Example (i): **poikilotherm**

Internationality is not a binding requirement in relation to **poikilotherm**: consequently, we intend to give full vent to transparency of T_G. **Poikilotherm** is a neoclassical (ie neo-Greco-Latin) formation. **poikilo-** = **-kyuna**; **-therm** = **.bugumu**. ∴ **poikilotherm** = **F.bugumukyuna**; **.kyuna** ≠ **.kyana**; **poikilo-** # **homeo-**; **homeotherm** = **F.bugumukyana**

 Example (ii): NaOH; *Canis familiaris*

Here internationality is a binding requirement (ref the International Union of Pure and Applied Chemistry (IUPAC); the Internationl Commission on Zoological Nomenclature). ∴ "sodium hydroxide NaOH" = **sodiumuhyidroxiidi NaOH**. And *Canis familiaris = Canis familiaris*, and not **Embwa** or even **Embwa emmanyiddwa.**

 Examples (iii): **-illion = ●kadda**

In this case, the key factor for term status is productivity. [*n*-illion = $10^{3(1+ n)}$] = [aka●S●kkadda = $10^{3(1+ S)}$]. Therefore

billion 10^{9} = akabilikkadda 10^{9}

trillion 10^{12} = akasatukkadda 10^{12}

quadrillion 10^{15} = akanakkadda 10^{15}

quintillion 10^{18} = akataanokkadda10^{18}

sextillion 10^{21} = akakaagakkadda10^{21}

septillion 10^{24} = akasanvukkadda10^{24}

octillion 10^{27} = akanaanakkadda10^{27}

nonillion 10^{30} = akendakkadda10^{30}

decillion 10^{33} = akakumikkadda10^{33}

undecillion 10^{36} = akakumimukkadda10^{36}

duodecillion 10^{39} = akakumibilikkadda10^{39}

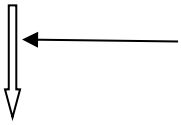
Noteworthy is the word-formation rule $F_1●S_1●S_2^+$.

 Examples (iv): **blunt**

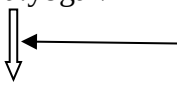
Most probably Luganda does not have a single-morph word for **blunt**. Suppose we wanted to coin one.

obwogi *n* 14 E. "sharpness"

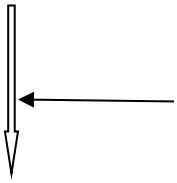
obu.yogi *n* 14



oku.yoga *v* E. "to be sharp"



oku,yaga v E. "to be blunt"



obu,yagi *n* 14 E. "bluntness"

obwagi *n* 14

 Examples (v): **weight** and **mass**

Since the weight vector is equal to the scalar mass multiplied by the vector acceleration, it is imperative to articulate the concepts "weight" (= G.**obuzito**) and "mass" differently. Let "mass" = **obutole** ("being a lump") be the scientific rendition.

 Examples (vi): **small intestine, duodenum, jejunum, ileum, large intestine, caecum, rectum**

To an average native English speaker the above terms are likely to be opaque. Let Luganda turn to German for assistance.

English	German	Luganda
small intestine	der Dünndarm	ekyendagwewele
duodenum	der Zwölffingerdarm	ekyendaggalokkumibili
jejunum	der Leerdarm	ekyendajjeleele
ileum	der Krummdarm	ekyendakkyamu
large intestine	der Dickdarm	ekyendakkwafu
caecum	der Blinddarm	ekyendazzibe
rectum	der Mastdarm	ekyendaggwagi

In the period of coining terms, term-coiners will have the benefit of consulting *A Style Manual for the Extrapolation of the Luganda Language* (SMELL, for short). SMELL, which is in its final phase of preparation, encompasses the following concerns in five parts:

(i) Introduction to Term Coining
(ii) An English-Luganda List of Affixes
(iii) A Luganda-English List of Affixes
(iv) An English-Luganda List of Combining Forms
(v) An English-Luganda List of Conceptual Sets

5. PROJECTS OF A SPECIALIZED LUGANDA PROGRAMME

Although this Project is titled "Extrapolating Luganda to a Medium of Science", it is in point of fact a preliminary part of a much more extensive programme of specialized Luganda development.

5.1 **Phases of the Present Project**

Phase 1 (12 weeks): Imparting Luganda-Extrapolative Knowledge and Skills to Specialists

(1) A reconstructed metaphysical system of the pre-extrapolated Luganda speaker
(2) The force-predicate theory
(3) The PEGITOSCA Criterion

(4) The inflectional morphology of English

(5) The inflectional morphology of Luganda

(6) The lexemic morphology of English

(7) The lexemic morphology of Luganda

(8) The structure of the English sentence

(9) The structure of the English phrase

(10) The structure of the Luganda sentence

(11) The structure of the Luganda phrase

(12) The extrapolative origination of the 300 Luganda affixes

Phase 2 (24 weeks): Compilation of English-Luganda Glossaries of Scientific Terms

- 5000 terms of logic and mathematics
- 5000 terms of physics and chemistry
- 5000 terms of botany and zoology

5.2 Translation of Selected Scientific Texts

5.3 Writing Luganda-Luganda Dictionaries of Science

5.4 Writing Science Textbooks

5.5 Project Cycles for geology, oceanography, astronomy, technology, agriculture, medicine, psychology, the arts and humanities, sports, sociology, political science, economics, law

5.6 Writing a Luganda-language Encyclopaedia

6. BUDGET IN RELATION TO THE PRESENT PROJECT

6.1 Kiingi, K. B. *An English-Luganda Dictionary of Basic Scientific Terms*

6.2 **Science Textbooks**

Nolt, J et al. *Schaum's Outline of Theory and Problems of LOGIC*

Bauer, W & Westfall, G D *University Physics with Modern Physics*

Arms, K & Camp, P S *Biology*

6.3 **Dictionaries**

Borowski, E J & Borwein, JM *Dictionary of Mathematics*

Daintith, J *A Concise Dictionary of Chemistry*

Hamilton, A et al *Luganda-English English-Luganda Dictionary*

UGX (45000 x 6) =UGX 270,000

Bagunywa, AMK et al *Enkuluze y'Oluganda olw'Ennono*

Kiingi, K B *Enkuluze y'Oluganda ey'e Makerere*

UGX (20,000 x 6) = UGX 120,000

Murphy, J D *Luganda-English Dictionary*

The Wordsworth Dictionary of Science and Technology

6.4 **Honoraria**

Highly qualified term-coiners will be paid at the rate of UGX 20,000 for the **original** rendition of an English term, and UGX 20,000 for the **routine** rendition of a cluster of ten (10) English terms. "Acceleration" below provides a good example of a term cluster:

accelerate, acceleration, accelerator, accelerating, acceleration vector, angular acceleration, average acceleration, centripetal acceleration, constant acceleration, instantaneous acceleration, radial acceleration, normal acceleration, tangential acceleration, linear acceleration, Coriolis acceleration, acceleration due to gravity, acceleration in free fall, acceleration in a plane, acceleration in uniform circular motion, acceleration in simple harmonic motion, acceleration of the centre of mass, acceleration of oscillatory motion, acceleration of the current.

Here the honorarium payable would be either UGX 66,000 or UGX 86,000 depending on whether only "acceleration" (= **omwanguwo**) or "acceleration" plus, say, "simple harmonic motion" (= **omwejjululo omutuukanye oguniina"**) is rendered. And we can plausibly infer that

the larger the Luganda lexicon in a sub-field of science grows, the rarer original rendition becomes.

6.5 **Dissemination of Outputs**

Designing a Website

a) Web design UGX (1,300,000)
b) Web hosting UGX (80,000-100,000) per year
c) Domain name registration UGX (200,000-250,000)