

COLLABORATION WITH A GROUP OF TEACHERS

WRITING WORKSHOPS

From May 27 to June 01, 1996, from 27 to 31 January 1997, and again from October 17 to 25, 1997, I directed additional workshops in collaboration with REDENET at the Faculty of Education, Makerere University. I pursued two main objectives, namely, to consolidate the work done with the same participants at the earlier workshops and to embark on writing a bidirectional English Luganda dictionary of natural science (i.e. physics, chemistry and biology) and mathematics for primary and secondary school teachers.

At that junction I had to find an empirically satisfactory answer to the question: "Who should spearhead the actual dictionary writing - the teachers of science and/or mathematics, or the linguists amongst the participants or, rather, should it be a joint effort of the teachers of science and/or mathematics and the linguists from the Institute of Languages and the Department of Language Education, Makerere University?"

In conformity with my contention that the task of elaborating the scientific and mathematical lexicon of any language should ideally be in the province of the scientists and mathematicians themselves, I hypothesised that if all the participants were exposed to Luganda word formation and my extrapolations of it, then the science and mathematics teachers would become more resourceful in the terminological elaboration of Luganda in science and mathematics than their Luganda specialised colleagues.

In 30 hours of consolidation of aspects of Luganda word formation previously treated at the December 1995 workshops I argued and pleaded for further extrapolative moves.

At the December 1995 workshops we had secured the explicit approval of the Luganda-specialised participants of the extrapolation of the suffixes in (18) to form verbs from nominal and adjectival stems

(18) $-w + Ir \rightarrow -wIr$

$-w + UI \rightarrow -wUI$

$-w + Ik \rightarrow -wIk$

$-w + an \rightarrow -wan$

At the May/June 1996 workshop I argued that the adjectivising affix – *nna-* as in (19) should be assigned more load so as to enable adjectivisation of nouns

(19) $-nna + kampala \rightarrow -nnakampala$ 'Kampalan'

$-nna + kenya \rightarrow -nnakenya$ 'Kenyan'

$-nna + ddiini \rightarrow -nnaddiini$ 'religion' 'religious'

The extrapolative move involving *-nna* makes it possible to coin Luganda terms for, say, *humanisation*, *reification*, *deification*, *privatisation* as in (20)

(20) N(*obu* + V(Adj(*nna* + N(*muntu*) N)Adj + *wal* + *y*)

V + *i*)N → 'human' *obunnamuntuwazi* 'humanisation'
 N(*obu* + V(Adj(*nna* + N(*kintu*)N) Adj + *wal* + *y*) V + *i*)N →
 'thing' *obunnakintuwazi*
 Lat.'res' 'reification'

N(*obu* + V(Adj(*nna* + N(*katonda*)N)Adj + *wal* + *y*/V + *i*)N →
 'god' *obunnakatondawazi*
 Lat.'deus' 'deification'

N(*obu* + V(Adj(*nna* + N(*nnyini*)N)Adj + *wal* + *y*)V + *i*)N →
 'owner' *obunnannyiniwazi*
 'privatisation'

N(*ka* + Adj(*nna* + (*kubala*) N)Adj)N → *kannakubala*
 'counting' 'mathematics'
 'mathematician'

Well-meaning sceptics were reminded of their own aversion to *pulayivatayizesoni*, *disentulalayizesoni* and *modanayizesoni* as lugandanisations of 'privatisation', 'decentralisation', and 'modernisation' which are current terms in Ugandan public debate. Their sceptical attitude was assuaged by drawing their attention to a very recent Kiswahili response to the necessity of articulating the concept of privatisation in (21)

(21) N(*u* + V(Adv(*bi* + N(*nafsi*)N+)Adv + *sh*)V + *aji*)N →
 'self' *ubinafsisshaji*

I then coined Luganda terms for 'decentralisation' and 'modernisation' as is shown in (22)

(22a) N(*obu* + V(Adj(*nna* + N(*ntabirowu*)N)Adj + *wul* + *ul*) V + *i*)N →
 'centre' *obunnantabirowuluzi*

(22b) N(*obu* + V(Adj(*nna* + N(*mulembe*)N)Adj + *wal* + *y*) V + *i*)N →
 'modernity' *obunnamulembewazi*

Their accommodation of (22a) amounted to tacit accommodation of the recursive nature of our extrapolated expression formation rules as is shown in (23) including a German example (23d).

(23a) N(*n* + V(tab)V + *o*)N → *ntabirowu*
 'joint at' → 'centre'

(23b) N(*li* + V(*gunjo*)V + *o*)N → *ggunjo*
 'institute' 'institute'

(23c) N(*obu* + V(Adj(*gunjo*) Adj + *wal* + *y*)V + *i*)N →
 'institutional'
obugunjowazi
 'institutionalisation'

(23d) N(V(*ver* + Adj (N(N(V(*wissen*)V)N + *schaft*)
 'to know' 'knowledge' 'science'

N + *lich*) Adj + *y*)V + *ung*)N → *verwissenschaftlichung*

- 'scientification'
- (23e) N(*ka* + (*nna* + N(*kumanya*)N) Adj)N → *kannakumanya*
 'knowledge' 'science'
 'scientist'
- (23f) N(*eki* + V(Adj(V(*sal*)V + *o*) Adj + *wal* + *y*)V + *o*)N → *cut*
ekisalowazo
 'definition'

Without losing sight of the fact that scientists were at a linguistic disadvantage vis-a-vis the linguists just as in the same breath linguists were at a conceptual disadvantage vis-a-vis the scientists, I went ahead to administer the following assessment test "Final Test on the Articulation of Scientific Concepts in Luganda" to the participants after exposing them to Luganda expression formation for the 30 hours.

RESEARCH AND DEVELOPMENT NETWORK

30th May, 1996

EBIBUZO NSALESALE KU NJASANGUZA

Y'EBITEGEERO BYA KANNAKUMANYA MU LUGANDA

1. Yatuukiriza obuwakatirwa obweyambisibwa mu Luganda okwasanguza ebirojja ebiri mu

bisumuluzo by'ebitegeero bino wammanga:

- | | |
|-----------------|--|
| (a) $o_1 h o_2$ | (j) $(o_1 a o_2) j (o_2 a o_1)$ |
| (b) $o_1 j o_2$ | (k) $(o_1 a o_2) \bar{h} (o_2 a -o_1)$ |
| (c) $o_1 v o_2$ | (l) $o_1 v o_2$ |
| (d) $o_1 g o_2$ | (m) $o c (o_1 c o_2)$ |
| (e) $o_1 s o_2$ | (n) $o_1 c((o_2 h Q) v(o_2 h Q'))$ |
| (f) $o_1 m o_2$ | (o) $o f C$ |
| (g) $o_1 i C$ | (p) $o_1 p o_2 \bar{h} o_2 p^- o_1$ |
| (h) $o_1 q C$ | (q) $o_2 g. o_1$ |
| (i) $o a o$ | (r) $o_1 e o_2]m o$ |

2(a) Wandiiika ebikolwa kkumi (10) nga biva mu kuwanvuya

ekikolwa -*kwat*-

2(b) Viisa C ne Q mu -*tuukitir*-

3. Teeka amannya gano wammanga mu mbu zaago:

<i>"Lubuga,</i>	<i>omulyango,</i>	<i>enkula,</i>	<i>omuseetwe</i>
<i>Omumisiri,</i>	<i>omusiri,</i>	<i>ssiringi</i>	<i>amakulu</i>
<i>amalusu,</i>	<i>amaddu,</i>	<i>ebbavu,</i>	<i>emmind</i>
<i>akeediimo,</i>	<i>eggwiso,</i>	<i>eggwiiso,</i>	<i>akatale</i>
<i>ettegula,</i>	<i>akawungeezi,</i>	<i>evvu,</i>	<i>ebbaluwa</i>
<i>gonja,</i>	<i>omugonja,</i>	<i>lumonde,</i>	<i>kawo</i>
<i>evvivi,</i>	<i>effirimbi,</i>	<i>bulangiti,</i>	<i>ebbwa</i>
<i>emmundu,</i>	<i>essuula,</i>	<i>ewuzi,</i>	<i>erangi</i>

wiiki, nsotoka, enku, enkonko, obuto
obutwa, entambi, obulo, eccupa"

4. Laga obuwakatirwa n'enduli ebiri mu bigambo mu kibuuze Ekyokusatu (3).

5. Yiiya oba zuula ebigambo ebigondera PEGITOSCA mu Luganda ebitegeeza bino eby'Olungereza: "stylistics, literature, desertify, devocalise, denazify, Bureau de Change, legalise, thyroid, graphisation, nasalisation, computerisation, nominalisation"

Translation of the Test

Q.1 "Name the affixes which are employed in Luganda to articulate the bonds in the following conceptual formulae" sought to elicit their understanding of the bridge from a concept to an expression.

Q.2 (a) "Write down ten (10) extensions of the verb *-kwat-* 'touch'" and

Q.2 (b) "Derive C and Q from *-tuukirir-* 'occur, happen, be completed/achieved, be perfect' sought to test Luganda word formation.

Q.3 "Classify the following nouns" was meant to test awareness of the Luganda nominal class system.

Q.4 "Show the affixes and stems of the words in Q.3" was meant to test the ability to segment Luganda nouns.

Q.5 "Coin or find Luganda equivalents for the following English terms in conformity with the PEGITOSCA Criterion" would be the threshold in terms of our extrapolated expression formation.

The three-hour test was done in five groups. Each group handed in one set of answers. On a scoring scale ranging from 1 ("very good") to 5 ("very weak") the results of the test were as follows:

	Q.1	Q.2	Q.3	Q.4	Q.5	Average
Group A	5	3	2	4	2	3,2(3)
Group B	5	2	3	5	2	3,4(3)
Group C	5	1	2	5	2	3,0(3)
Group D	5	1	1	3	4	2,8(3)

Group E	3	1	1	1	2	1,6(2)
Average	4,6 (5)	1,6 (2)	1,8 (2)	3,6 (4)	2,4 (2)	

Questions 2, 3 and 4 were very well answered by the linguists (who formed Group E) most probably because that is their academic province. But Q.2 and Q.3 were scored quite well by the scientists which proves that it is possible to strengthen them linguistically. Q.1 exposes a weakness in linking conceptual formalisation with expressional formation. Q.4 reveals that the scientists are still weak in linguistic analysis; but Q.5 suggests that they have attained some kind of parity with linguists. My coinages in (24) were discussed in terms of the PEGITOSCA Criterion.

(24a) *ngeri* 'way(s)'

$N(ka + Adj(nna + N(ngeri)N)Adj)N \rightarrow kannangeri$ 'stylistics'

(24b) *biwandiiko* 'written things'

$N(ka + Adj(nna + N(biwandiiko)N)Adj)N \rightarrow kannabiwandiiko$ 'literature'

(24c) *ddungu* 'desert'

$V(NS(lungu)NS + wal + y)V \rightarrow lunguwaz$ 'desertify'

(24d) *ddoboozi* 'voice'

$V(NS(loboozi)NS + wul + ul)V \rightarrow lobooziwulul$ 'devocalise'

(24e) *-waanyis-* 'exchange'

$(li + V(V(waanyis)V + ir + y)V + o)N \rightarrow ggwaanyisizo$ 'Bureau de Exchange'

(24f) *mateeka* 'laws'

$V(Adj(nna + N(mateeka)N)Adj + wal + y)V \rightarrow nnamateekawaz$ 'legalise'

(24g) *ngabo* 'shield'

$(V)NS(gabo)NS + wal)V + u)Adj \rightarrow gabowavu$ 'thyroid'

(24h) *nnukuta* 'letter'

okunukutawazibwa 'graphisation'

(24i) *nnyindo* 'nose'

'okuyindowaza 'nasalisation'

(24j) *okukompyutawaza* 'computerisation'

(24k) *linnya* 'name'

okunnalinnyawaza 'nominalisation'

(24l) *-naziwulul-* 'denazify'

If the period of exposure to Luganda word formation had been, say, 120 hours and more specialised concepts had been selected for articulation in Luganda, then most certainly the scientists would have outdistanced the linguists.

At the January 1997 workshop we turned to issues of lexicography. After reviewing the Principle of Concept Marking, I introduced the participants to problems of Bantu lexicography.

The participants agreed on writing a bidirectional English-Luganda dictionary of school science and mathematics for teachers, thus holding back a monolingual one for a later date.

In order to ensure reasonable comprehensiveness of the dictionary (50,000 entries) the projected dictionary would not include information on spelling, syllabification, pronunciation, etymology, usage and grammar.

The projected dictionary will be in three parts. Part I will be conceptually arranged with the entries being alphanumerically coded. Part II will contain the already alphanumerically coded English entries arranged alphabetically. Similarly in Part III the already alphanumerically coded Luganda entries will be arranged alphabetically.

The participants argued quite convincingly that this dictionary design will promote their conceptualisation in Luganda and also make the process of learning of specialised terminology in Luganda much easier.

It is clear that obtaining Luganda equivalents for English terms has to be preceded by formation of conceptual sets. There are three interrelated steps of arriving at conceptual sets.

First, I can proceed by the conventional branches of the discipline. For mathematics these could include (25).

(25) mathematics	(<i>kannakubala</i>)
algebra	(<i>algebra</i>)
arithmetic	(<i>kannambala</i>)
geometry	(<i>kannankoloboze</i>)
calculus	(<i>embala</i>)
probability theory	(<i>omutetenkanyirizo gw'obwandiba</i>)
set theory	(<i>omutetenkanyirizo gw'ebikuukuulu</i>)
statistics	(<i>kalojjabungi</i>)
mathematical logic	(<i>kannansonga omunnakubala</i>)
topology	(<i>kannabifo</i>)
trigonometry	(<i>kannansondassatu</i>)
number theory	(<i>omutetenkanyirizo gw'ennamba</i>)

On the basis of the conventional branches of the discipline I can easily be led to fairly well-defined conceptual clusters as in (26) for mathematics.

(26) numbers	(<i>ennamba</i>)
angles	(<i>ensonda</i>)
triangles	(<i>zinnasondassatu</i>)
logarithms	(<i>olugabiro</i>)

circles	(<i>enkulungo</i>)
areas	(<i>ebibangirizi</i>)
mathematical reasoning	(<i>ensongawaza mu kannakubala</i>)
functions	(<i>emikolo</i>)
coordinate systems	(<i>emiyungo ginnabifowanyo</i>)
series	(<i>ennindi</i>)
conic sections	(<i>ensalemu zinnalusogo</i>)
equations	(<i>ebyenkano</i>)
mathematical theories	(<i>emitetenkanyirizo mu kannakubala</i>)
groups	(<i>ebibinja</i>)
formulae	(<i>ebisumuluzo</i>)
integrals	(<i>emigattiro</i>)
operations	(<i>ebikolwako</i>)
tests	(<i>ebigezesa</i>)
theorems	(<i>ebikakase</i>)
probability	(<i>obwandiba</i>)
curves	(<i>engote</i>)
points	(<i>obutonyeze</i>)
mathematical symbols	(<i>obubonero mu kannakubala</i>)
polygons	(<i>zinsondannyingi</i>)
expressions	(<i>ebyogero</i>)
samples	(<i>endegako</i>)
vectors	(<i>ebikongozi</i>)
matrices	(<i>omuzaazi</i>)
sets	(<i>ebikuukuulu</i>)
transformations	(<i>ebikyuko</i>)
rules	(<i>ebifuga</i>)
mapping	(<i>emmapuwaza</i>)
graphs	(<i>empandiikiriro</i>)

Taking equations and angles as conceptual clusters I could exhibit a fragment of part 1 of the dictionary as in (27)

(27) NA 000 angle	<i>nsonda(e-)</i>
NA 001 central angle	<i>nsonda(e) nnantabiro</i>
NA 002 straight angle	<i>nsonda(e-) engolokofu</i>
NA 003 inscribed angle	<i>nsonda(e-) empandiikemu</i>
NA 004 vertical angle	<i>nsonda(e-) y'obulanga</i>
NA 005 negative angle	<i>nsonda(e-) eggaanyi</i>
NA 006 acute angle	<i>nsonda(e-) ensongovu</i>
NA 007 obtuse angle	<i>nsonda(e-) enfufuggavu</i>
NA 008 right angle	<i>nsonda(e) ennesimbu</i>
NA 009 plane angle	<i>nsonda(e-) nnamuseetwe</i>
NA 010 solid angle	<i>nsonda(e-) eggumu</i>
NA 011 degree	<i>digri</i>
NA 012 radian	<i>sekagulu</i>

NA 013 steradian	<i>ssempulubavu</i>
NA 014 equal angles	<i>nsonda(e-) ezenkana</i>
NA 015 alternate angle	<i>nsonda(e-) entobeke</i>
NA 016 corresponding angle	<i>nsonda(e-) ezikiriziganya</i>
NA 017 supplementary angle	<i>nsonda(e-) enzitaanyi</i>
NA 018 subtend	<i>-bojj-</i>
NA 019 exterior angle	<i>nsonda(e-) ey'ebweru</i>
NA 020 triangle	<i>nsondassatu(e-)</i>
NA 021 polygon	<i>nsondannyingi(e-)</i>
NA 022 angle in a semicircle	<i>nsonda(e-) mu kubiri kyenkulungo</i>
NA 023 angle between	<i>nsonda(e-) wakati</i>
two lines	<i>w'enkoloboze ebbiri</i>
NA 024 angle between	<i>nsonda(e-) wakati</i>
two planes	<i>w'emiseetwe ebbiri</i>
NA 025 angle from	<i>nsonda(e-)okuva ku</i>
one line to another	<i>lukoloboze olumu okugenda ku lulala</i>
NA 026 angle of intersection	<i>nsonda(-e-)z'obusalaganiro</i>
of curves	<i>bw'engote</i>
NA 027 angle at the Circumference	<i>nsonda(e-) ku lubugirizo</i>
NA 028 angle of contact	<i>nsonda(e-) y'okwekuusaako</i>
NA 029 angle of elevation	<i>nsonda(e-) y'obuyimufu</i>
NA 030 angle of inclination	<i>nsonda(-e) y'obwesigami</i>
NB 000 equation	<i>kyenkano(e-)</i>
NB 001 quadratic equation	<i>kyenkano(e-) kinnamulabba</i>
NB 002 linear equation	<i>kyenkano (e-)kinnalukoloboze</i>
NB 003 simultaneous equation	<i>kyenkano(e-) kinnalumu</i>
NB 004 conditional equation	<i>kyenkano(e-) kinnakakalu</i>
NB 005 identity	<i>kyenkanonkano(e-)</i>
NB 006 solution	<i>kimerengulo(e-)</i>
NB 007 root of an equation	<i>kikolo(e-) ky'ekyenkano</i>
NB 008 variable	<i>kikyuka(e-)</i>
NB 009 dependent variable	<i>kikyuka(e-) ekyesigama</i>
NB 010 independent variable	<i>kikyuka(e-) ekiteesigama</i>
NB 011 constant	<i>kitakyuka(e-)</i>
NB 012 function	<i>mukolo(o-)</i>
NB 013 equality	<i>kwenkana(o-)</i>
NB 014 homogeneous equation	<i>kyenkano(e-) kinnakikula kimu</i>
NB 015 literal equation	<i>kyenkano(e-) kinnannukuta</i>
NB 016 radical equation	<i>kyenkano(e-) kinnakikolo</i>
NB 017 system of equations	<i>mutegekaganyo(o) gw'ebyenkano</i>
NB 018 exponential equation	<i>kyenkano(e-) ekiwenyi</i>
NB 019 extraneous root	<i>kikolo(e-)ekiwabye</i>
NB 020 inconsistent equation	<i>kyenkano(e-) ekitakwatagana</i>
NB 021 inequality	<i>butenkana(o-)</i>
NB 022 Laplace's differential equation	<i>kyenkano(e)</i>
	<i>kinnamwawulo kinnaLaplace</i>

NB 023 differential equation *kyenkano(e-) kinnamwawulo*
NB 024 to satisfy an equation *okumatiza ekyenkano*

As stated earlier the already alphanumerically coded entries will be alphabetically arranged. In other words, this dictionary will be both a conventional and conceptual one. From either Part II or III, the user can easily find the English or Luganda equivalent term in Part I.