Numeral systems in Ukwunzu

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Numerals tell a lot of stories about the resourcefulness of most African languages. This is because several studies have shown that numerals (at least from 11-1000) are formed through various mathematical and morphological processes. It is through this mathematical means, that languages/dialects are able to form complex numerals from basic ones when the need arises. This paper records, documents and analyses the numeration process in Ukwunzu community in Delta state, where the Olukumi, a dialect of Yoruba (Yoruboid Family) and the Enuani dialect of Igbo (Igboid Family) are both spoken as native tongues. As a result of this peculiar bilingual situation in the community, this study will be both descriptive and comparative. In doing a descriptive study, we looked at the various mathematical and morphological processes involved in the derivation of numerals in both dialects and since both dialects are spoken by the same group of people, we placed both numerals side by side in our analysis to bring out the similarities and differences in their operations. Findings show that both addition and multiplication are prevalent processes in both dialects; thus new forms are derived by adding to the base or multiplying it. Also both dialects favour the vigesimal (base 20) system of counting, where new numerals are derived by adding to or multiplying the base. The study shows that most languages adopt the same universal principle in the derivation of new numerals, though the mathematical or morphological processes involved may vary from one language/dialect to another. The paper observes, in the course of research, that quite a lot has been done on numeration in the Nigerian major languages and that very little work has been done on the minority languages/dialects. The paper therefore recommends that efforts be made to record and document numeral systems of minority/dying dialects, in order to preserve their rich linguistic as well as cultural heritage.

Introduction

Every culture in the world today has a way of counting which is unique to them. This is one of the basic cultural aspects of every language. So far, studies (especially in African languages) have shown that this aspect of the language is not borrowed; rather, when languages have need for new numerals, they derive them from basic ones using some mathematical and morphological operations. As observed by Ajiboye (2013:1), there is no doubt that number concept and number process are parts of human endeavours. This dates back to the origin of human race, thus every race has its system of numbering. Basically, in our African society, before the era of European trade relations with African communities, the people were predominantly farmers, fishermen, hunters, shepherds, and traders who really did not have need to count beyond thousands. However, today most of these cultures like Igbo, Hausa, Yoruba, Efik, and Urhobo, have developed their numeral systems to cope with modern day demands.

For some languages and especially dialects, this advancement has not been possible. The reason being that these languages/dialects have not been privileged to be studied. Thus in the light of modern day demands where counting is now done beyond thousands to millions, billions, trillions and even zillions, speakers of such languages/dialects simply adopt the English language as a means of counting. The academic relevance of numeral system cuts across a wide range of disciplines such as mathematics, history, philosophy, archaeology, linguistics, anthropology among others. From a linguistic stand point, this study focuses on the counting system in Ukwunzu; one of the communities where counting has not been developed beyond thousands. The purpose is to document and analyse the structure of the numerals that exist in the two dialects with a view to further understand the ways in which complex numerals are derived from basic ones. With that, one can therefore reconstruct new numerals using the same procedure.

In examining counting system in Ukwunzu, we shall limit the study to just counting of number; thus, we shall use numerals broadly to mean numbers (such as 1,2,3...) This is to enable us do a detailed study within the limited space involved. To achieve this purpose, this study has been categorized into five sections. The first section gives us an important account of the language situation of the Ukwunzu people. The next section deals with the methodological concern of the

study. In section three, literatures that are related to the topic under discourse will be reviewed. Section four will encompass both data presentation and analysis of numerals in Ukwunzu, after which we shall summarise our findings. Finally we shall conclude the work by offering some recommendations.

A brief background of the Ukwunzu community

The Ukwunzu community is located in Aniocha North Local Government Area of Delta state. Their neighbouring communities are Ezechime on the east, Obomkpa on the north, Idumuje on the west and Onicha-uku in Issele-uku on the south. There are seven quarters that make up the Ukwunzu community, namely; Idumu-afo, Idumu-akwu, Ogbe-agidi, Eko-onicha, Odo, Ogbe-okwe and Inyogo. The population of this area is about 39,526, according to the 2006 population census.

Ukwunzu is a typical example of a community that practices communal bilingualism. Here every member of the community speaks both Olukumi and Enuani. Enuani is the variety of the Igbo language spoken by the Aniocha people of Delta state while Olukumi is a dialect related to the Yoruboid group of languages. Lewis (2009) classifies Olukumi as a Defiod language belonging to the Edekiri of the Yoruboid family of the Niger Congo phylum.

According to the traditional ruler of Ukwunzu, his Royal Highness Oni Christopher Ogoh 1, historically, the Ukwunzu people originally migrated from Ife and settled in Benin. However, during the expansion of the Bini empire across the Niger by the then Oba of Benin, they relocated and settled permanently in their present day location in Delta state. Ukwunzu was formerly called Eko which in Olukumi means war camp; this is because during the expansion of the Bini Empire, Ukwunzu was a war camp. According to the traditional ruler, Olukumi is the native language of the Ukwunzu people; however due to the need to interact and relate with their Enuani neighbours who surrounded them, it became imperative to learn Enuani while preserving their Olukumi. Ever since, every child who is born into the Ukwunzu community speaks both dialects fluently as their native dialects.

Methodology

This section presents information on the population of study, means of data collection and method of data analysis.

Population of study

The study covers the various seven quarters that make up the Ukwunzu community, namely; Idumu-afo, Idumu-akwu, Ogbe-agidi, Eko-onicha, Odo, Ogbe-okwe and Inyogo, with an estimated population of about 39,526. For this study, the purposive sampling method was adopted where two people each were selected as respondents from the seven various quarters. Here we used our own personal judgement to select adult speakers who where within the ages of 50-82. This opinion of the researcher was informed by the fact that during a preliminary survey carried out most people below the selected age bracket could not count beyond 50-100. The selection was done in a way that one male and one female each were chosen from the seven quarters, thereby bringing the number of respondents to fourteen (14). In most cases the researcher selected those respondents whose occupation required their daily use of numerals, such as market women.

Sources of data collection

Data for this study were gathered primarily through oral interview conducted by the researcher on the sample of the population under study. In conducting the interview, respondents were asked to count in Olukumi and then in Enuani dialects of Igbo and their responses were recorded with the aid of a tape recorder. In addition to the primary sources, some other secondary sources such as textbooks, articles and the internet were also consulted.

Method of data analysis

The method of data analysis in this study is both descriptive and comparative. The researcher undertakes a descriptive approach, describes the observable mathematical and morphological process that are involved in the derivation of numerals in both languages. For ease of comparison of the numeral systems of both languages, the data in both languages were juxtaposed. From the descriptive analysis, the areas of similarities and differences between both languages were highlighted.

Review of previous related literature

The formulation and development of any number system constitutes one of the most important bedrocks of mathematics, science and technology. Each of the various number systems is a beautiful creation of the human mind and active will, indeed a real invention. Numbers have been observed to be a universal, traditional aspect of every culture. As observed by Sanusi (1995:13), "...the traditional system of counting in any given speech community constitutes one of the sociolinguistic factors that make up the distinctness and individuality of that speech community as against other speech communities". This observation is further supported by Lean (1992) who from his survey of numeral systems notes that there is no evidence of borrowing in the traditional numeral system of most languages. Similarly, Ahamefula (2013:141) asserts that there were well-established ways of counting and numeral system in use by the Igbos for various activities that revolved mostly around farming, before the coming of the Whiteman.

A numeral is a written symbol used to represent a number. According to Hurford (1981), numeral system is a part of a natural language, primarily devoted to the expression of positive whole numbers. A number is a mathematical abstraction; a numeral is a word or phrase expressing a number. The international scientific (`Arabic') notation provides a universally known, unambiguous means of representing numbers, which gives the study of numeral systems a clear advantage over other areas of language, in which the representation of meaning is problematic. The basic semantic operations relevant to the interpretation of complex numerals (such as *one thousand six hundred and seventy eight*) are addition and multiplication. The simplest way of representing numbers is by using a given symbol for the number one and then repeating it for each successive number. Blazek (1999), states that numerals denote a class of specific group of words expressing quantity. According to Mengden (2010), numerals are the instantiation of numbers used to specify a set. To him, the defining properties of numbers are; first, they are properties of sets, and second, the set of (natural) numbers is a set of elements which form an ordered sequence. Numerals (systemic) possess the following qualities: they constitute the numeral system of a language; correspond to the counting of words that occur in conventionalized counting sequence; are used recursively as basis for the formation of a corresponding form of any other type of numeral (i.e. ordinal, multiplicative, frequentive, etc.). Meng & Guan (2000) distinguishes counting from numerals. Counting seeks to find out the

number of elements in a finite set of objects. It is the action of finding out how many arrangements are there in a particular situation.

Mbah & Uzoigwe (2013) explain that the study of numerals has followed the steps of description, structural analysis and etymological analysis. One of the most popular studies in recent times on the numeral system of the world's languages was carried out by Chan (2010) in which he surveyed the numeral system of over 7,000 languages. There have been several different postulations on the historical development of numbers in different cultures; however, the body part hypothesis seems to have gained much approval by evidence from scientific investigations. Body-part tally systems are found in Australia and New Guinea (Lean 1992). In such a system one hand is used to indicate points on the other side of the body. These points are associated with numbers. These systems almost exclusively have an odd number base and there is one 'highest' or turning point in the counting process, which is the nose in Mian and the other Mountain Ok languages or the base of the neck in Kalam (Pawley and Bulmer 2011). Counting proceeds from the highest point with the other hand on the other side of the body. Whether a speaker starts with the left or the right half of the body typically depends on handedness (De Vries 1998: 409). Counting in the Mian body-part tally system involves pointing or touching the body-part. A right-handed speaker commences with the left thumb, followed by the fingers of the left hand. The numbers one to five are typically expressed with the numerals assembled following the binary system, e.g. *asumâtna* for 'three' and *asúke asúke make* for 'five'. Then counting proceeds up the left side of the body (wrist, forearm, elbow, upper arm, shoulder, cheek, ear, eye, nose) each time adding one, so that one reaches 14 when touching the nose. From there, counting proceeds down the right side of the body (on the way down the right side of the body the pointing is done with the left hand) till the whole procedure ends with the little finger of the right hand and the number 27, which is the highest number. There is no evidence that counting ever went higher than 27 or that other numerals were added to 27 or that 27 was multiplied. This is in contrast to the body-part tally system of Kalam, for example, where such arithmetic operations on the base 23 are possible (Pawley and Bulmer 2011).

According to Hurford (1987), in any formation pattern of a numeral system, bases are those elements with which the smallest continuously recurring sequence of numerals is combined. By contrast, Greenberg (1978: 270) simply says that "a serialized multiplicand is a base. Iloene (2013:149) explains that the fingers and thumbs provided the nature's abacus and informed the

decimal system which allowed most counting system in the history to be based on the number 10. She further notes that different cultural groups have developed and adopted a range of ways of representing numbers in accordance with their needs. Depending on what the base number is, a counting system can be binary (base 2), quaternary (base 4), quandary (base 5), sexagesimal (base 6), octal (base 8), decimal (base 10), duodecimal (base 12), and even vigesimal (base 20). Most relevant in our discussion in the paper are the decimal and vigesimal systems, so we shall just restrict our emphasis to these two. Conant (1983) asserts that the vigesimal numeration is a numeral system in which all derived units are based on the number 20 and the powers of 20. Vigesimal is derived from Latin word vicesimus (twentieth), based on viginti (twenty) that itself descended from a Sanskrit word, vimsatih (twenty). Other related words are vicennial (once every 20 years) and vicenary that has the same meaning as vigesimal. The use of 20 as a grouping (or base) number was used by many cultures throughout our human history (most likely) because people have twenty digits, or the number of fingers and toes. Aztecs and Mayans used a base 20 number system as did almost all Eskimo tribes, some native North American societies, almost all peoples native to Central and South America, and some cultures in northern Siberia and Africa. Nigerian languages that operate the vigesimal system include Ikwere, Igala, standard Yoruba, Ibani, Ijaw, Obolo, Nkoroo, etc. A decimal system is a positional system of numeration that uses the base 10. According to Hurford (1987), anthropologists hypothesize this may be due to humans having five digits per hand, ten in total. There are many regional variations including:

i. Western system: based on thousands, with variants
ii. Indian system: crore, lakh
iii. East Asian system: based on ten-thousands

Historically, its use was first employed by the ancient Egyptians, who invented a wholly decimal system, and later extended by the Babylonians, and also a system of pictorial representation, substituting letters and other reminders with symbols. An English farmer coined the term notch, defined as ten, from the tally sticks of the livestock, a full deep score for every twenty, a half score or notch for ten. Examples of some Nigerian languages that operate in base 10 include; Standard Igbo, Zarma.

Ahamefula (2013:141) observes that the standard Igbo initially operated the vigesimal system; however with the passage of time, the traditional vigesimal system gave way to the decimal system through language planning efforts. He cites Ndukwe (1995) who states that a fairly radical reconstructing of Igbo numeral has been carried out. The traditional vigesimal system was considered by the planning agents as being too cumbersome, and riddled with ambiguities, for effective use in the ongoing modernisation in Igbo society. An alternative decimal system was substituted and claimed to render the Igbo counting system more amenable to technological use, especially as it relates mathematics. This fact is substantiated by the increased call, mostly by linguist and mathematicians to review the numeral system of most Nigerian languages still operating the vigesimal system. It should be noted here that some Igbo dialects still operate the vigesimal system a typical example is the Enuani spoken in Delta state; also Isuochi dialect as cited by Ahamefula (2013).

Mbah & Uzoigwe (2013) (citing Mengden 2010 and Dixon 2002) state that cross-linguistically, numerals comprise of simple and complex numeral expressions. Simple numerals are the earliest conceivable set of numerical expression in a language, and it has mono-phonemic forms with arbitrary phonological shape. In order to express the numerals that exceed 10, the language devices complex numerals. Complex numerals are the numbers that express morphosyntactic constituents of simple numerals. From the foregoing, we can summarize that based on morphological form, there are two types of numerals; basic and derived numerals. Obikudo (2013) avers that there are some mathematical processes involved in deriving new numerals as well as linguistic morphological processes. In her analysis on numeral derivations in Ibani, she names such mathematical processes such as addition, subtraction, and multiplication. The Yoruba numeral system probably has the most lavished numeral derivation with derivation processes ranging from addition, subtraction, division and multiplication (Ajiboye 2013). In Yoruba numeral system, there is a morphological process known as partial copying where only some part of the base is copied (c.f Ajiboye & Dechaine 2004). New numerals may also be derived through the morphological process of compounding. Obikudo (2013:28) explains that compounding may involve a combination of *oji* 'ten' and another numeral. It implies the addition of 10 to another numeral, though without an overt connective.

Okeke (2013:102) compares the numeral system of Nkpor (Igbo) and Gboko (Tiv). He observes that in Nkpor, the first ten cardinal numerals are all simple words, while Gboko has numerals 7

and 9 as complex numerals. In the area of their similarities, he notes that both languages operate the vigesimal system.

Data presentation and analysis

Numerals in Olukumi and Igbo (Enuani)

Table I

Numbers	**Igbo**	**Olukumi**
1	ofu	ọka
2	abua	mezi
3	atọ	mẹta
4	anọ	mẹrẹ
5	ise	meru
6	isii	mẹfa
7	asa	meze
8	asatọ	mẹzọ
9	iteneni	mẹha
10	ili	mẹgwa
11	ili na ofu	ọka le mẹgwa
12	ili na abua	mezi le mẹgwa
13	ili na atọ	mẹta le mẹgwa
14	ili na anọ	mẹrẹ le mẹgwa
15	ili na ise	meru le mẹgwa
16	ili na isii	mẹfa le mẹgwa
17	ili na asa	meze le mẹgwa
18	ili na asatọ	mẹzọ le mẹgwa
19	ili na iteneni	mẹha le mẹgwa
20	ọgụ/oshu	ọgbọn
21	ọgụ na ofu	ọka le ọgbọn
22	ọgụ na abua	mezi le ọgbọn
30	ọgụ na ili	ọgban

31	ọgụ na ili na ofu	ọka le ọgban
40	ọgụ abua	ozi
50	ọgụ abua na ili	mẹgwa le ozi
60	ọgụ atọ	ọta
70	ọgụ atọ na ili	mẹgwa le ọta
80	ọgụ anọ	orin
90	ọgụ anọ na ili	mẹgwa le ori
100	ọgụ ise	ọrụn
101	ọgụ ise na ofu	ọka le ọrụn
102	ọgụ ise na abua	mezi le ọrụn
200	ọgụ ili	ọrụn mezi
300	ọgụ ili na ise	ọrụn mẹta
400	nnụ	ọrụn mẹrẹ
500	nnụ na ọgụ ise	ọrụn meru
600	nnụ na ọgụ ili	ọrụn mẹfa
700	nnụ na ọgụ ili na ise	ọrụn meze
800	nnụ abua	ọrụn mẹzọ
900	nnụ abua na ọgụ ise	ọrụn mẹha
1000	nnụ abua na ọgụ ili	ọrụn mẹgwa
1200	nnụ atọ	ijeli
1300	nnụ atọ na ọgụ ise	ijeli
2000	nnụ ise	ijeli
4000	nnụ ili	ijeli
5000	ijeli	ijeli
1000	ijeli	ijeli

The numerals that were highlighted in the table above are the areas of the numeral system that are significant in this study data. It should be noted at this point that in Ukwunzu, whatever that is beyond what they can count is referred to as *ijeli* (literarily meaning uncountable) in both languages.

Analysis of data

Types of numerals

Like in every language, the numerals of Olukumi and Enuani can be broadly categorised into two classes; namely, basic numerals and derived numerals. The basic numerals are quite few and are somewhat of a closed class. The derived numerals on the other hand are numerous. This class of numerals are open and new numerals are derived from the basic ones through some mathematical and morphological processes. Below is the list of all basic numerals in both languages. Though in real sense whatever remains after the basic numerals are derived numerals thus making them inexhaustible, we shall however highlight few of them for the sake of clarity.

Basic numerals

Table II

Numbers	**Igbo**	**Olukumi**
1	ofu	ọka
2	abua	mezi
3	atọ	mẹta
4	anọ	mẹrẹ
5	ise	meru
6	isii	mẹfa
7	asa	meze
8	asatọ	mẹzọ
9	iteneni	mẹha
10	ili	mẹgwa
20	ọgụ/oshu	ọgbọn
30	*ogu na ili	ọgban
400	nnụ	*orun mezi

The asterisked numbers in the data above indicate that in the language, the numerals are derived ones. Thus, both languages have 12 basic numerals each. However while Igbo does not have a basic form for 30, Olukumi has. On the other hand, 400 is a derived numeral in Olukumi, whereas in Igbo it has a basic form.

Derived numerals

The number 11-19 are typical examples of derived numerals in the Olukumi and Igbo languages as shown in the data below.

Table III

Numbers	**Igbo**	**Olukumi**
11	ili na ofu	ọka le mẹgwa
12	ili na abua	mezi le mẹgwa
13	ili na atọ	mẹta le mẹgwa
14	ili na anọ	mẹrẹ le mẹgwa
15	ili na ise	meru le mẹgwa
16	ili na isii	mẹfa le mẹgwa
17	ili na asa	meze le mẹgwa
18	ili na asatọ	mẹzọ le mẹgwa
19	ili na iteneni	mẹha le mẹgwa

Processes in deriving new numerals

As we have already discussed in the preceding sections, as a means of expanding the numeral system of any language, there are some processes involved in deriving new numerals. These processes fall into two main categories; namely mathematical and morphological processes.

Mathematical processes

In examining the numerals of both languages, we can observe that different mathematical formulas are employed. These mathematical operations include addition, multiplication, addition and multiplication. In the data below, we present some examples of those numerals that depict these processes in both languages.

Addition

As shown in the examples below, this process involves adding something to the base to derive new numerals.

Table IV

Numbers	**Igbo**	**Mathemetical operation**	**Olukumi**	**Mathemetical operation**
11	ili na ofu	10+1	ọka le mẹgwa	1+10
12	ili na abua	10+2	mezi le mẹgwa	2+10
13	ili na atọ	10+3	mẹta le mẹgwa	3+10
14	ili na anọ	10+4	mẹrẹ le mẹgwa	4+10
15	ili na ise	10+5	meru le mẹgwa	5+10
16	ili na isii	10+6	mẹfa le mẹgwa	6+10
17	ili na asa	10+7	meze le mẹgwa	7+10
18	ili na asatọ	10+8	mẹzọ le mẹgwa	8+10
19	ili na iteneni	10+9	mẹha le mẹgwa	9+10
21	ọgụ na ofu	20+1	ọka le ọgbọn	1+20
22	ọgụ na abua	20+2	mezi le ọgbọn	2+20
30	ọgụ na ili	20+10	*ọgban	30
31	*ọgụ na ili na ofu	20+10+1	ọka le ọgban	1+30

From the example above, new numerals are derived in Olukumi by adding basic numbers (1-9) to the base (*megwa – 10, ọgbọn – 20, ọgban – 30* in this cases*)* using the connective *le* (to put on top). It can also be observed that the addition in Olukumi is to the left of the base. For instance the number 11 is expressed as *ọka le mẹgwa* (1+10) not as *mẹgwa le ọka* (10+1). In the case of Igbo numerals, numbers are added to the right of the base (ili – 10, *ọgụ* – 20) by using the conjunction *na* (and). It should be noted that the number 30 (*ọgban*) in Olukumi is not derived, but a basic numeral on its own. This is not the case in Igbo where the number 30 is derived by the addition of 10 to 20. The number 31 in the table above is a case of "complex" addition; this process will be discussed in the next section.

Complex addition

The addition process above (with the exception of 30 in Olukumi and 31 in Igbo) is all instances of simple addition. As shown in our analysis above involves adding one basic numeral (1-10) to the respective bases. However, there are instances whereby more than one basic numeral is

added to the base. This process is referred to as complex addition and these instances are shown in the data below.

Table IV

Nos	**Igbo**	**Mathemetical operation**
32	ọgụ na ili na abua	20+10+2
33	ọgụ na ili na atọ	20+10+3
34	ọgụ na ili na anọ	20+10+4
35	ọgụ na ili na ise	20+10+5
36	ọgụ na ili na isii	20+10+6
411	nnụ na ili na ofu	400+10+1
412	nnụ na ili na abua	400+10+2
413	nnụ na ili na atọ	400+10+3
414	nnụ na ili na anọ	400+10+4
415	nnụ na ili na ise	400+10+5
416	nnụ na ili na isi	400+10+6
431	nnụ na ọgụ na ili na ofu	400+20+10+1
432	nnụ na ọgụ na ili na abua	400+20+10+2
433	nnụ na ọgụ na ili na atọ	400+20+10+3
434	nnụ na ọgụ na ili na anọ	400+20+10+4
435	nnụ na ọgụ na ili na ise	400+20+10+5
436	nnụ na ọgụ na ili na isi	400+20+10+6

Nos	**Olukumi**	**Mathemetical operation**
51	ọka le mẹgwa le ozi	1+10+20
52	mezi le mẹgwa le ozi	2+10+20
53	mẹta le mẹgwa le ozi	3+10+20
71	ọka le mẹgwa le ọta	1+10+60
72	mezi le mẹgwa le ọta	2+10+60
73	mẹta le mẹgwa le ọta	3+10+60
91	ọka le mẹgwa le orin	1+10+80
92	mezi le mẹgwa le orin	2+10+80
93	mẹta le mẹgwa le orin	3+10+80
150	mẹgwa le ozi le ọrụn	10+40+100
151	ọka le mẹgwa le ozi le ọrụn	1+10+40+100
175	mẹrụn le mẹgwa le ọta le ọrụn	5+10+60+100
176	mẹfa le mẹgwa le ọta le ọrụn	6+10+60+100
177	meze le mẹgwa le ọta le ọrụn	7+10+60+100
178	mẹzọ le mẹgwa le ọta le ọrụn	8+10+60+100
192	mezi le mẹgwa le orin le ọrụn	2+10+80+100
193	mẹta le mẹgwa le orin le ọrụn	3+10+80+100

437	nnụ na ọgụ na ili na asa	400+20+10+7
439	nnụ na ọgụ na itenani	400+20+10+9

198	mẹzọ le mẹgwa le orin le ọrụn	8+10+80+100
199	mẹha le mẹgwa le orin le ọrụn	9+10+80+100

The data above clearly shows that more than one unit can be added to the base. As in the case of simple addition, addition proceeds from left to right until everything is added to the highest base. In the case of Igbo however, the reverse is the case addition proceeds from right to left.

Multiplication

Multiplication is another productive mathematical process that is employed in the derivation of new numerals in both languages. This process is shown in the data below.

Table V

Nos	**Igbo**	**Mathemetical operation**
40	ọgụ abua	20×2
60	ọgụ atọ	20×3
80	ọgụ anọ	20×4
100	ọgụ ise	20×5
120	ọgụ isi	20×6
140	ọgụ asa	20×7
160	ọgụ asatọ	20×8
180	ọgụ iteneni	20×9
200	ọgụ ili	20×10
800	nnụ abua	400×2
1200	nnụ atọ	400×3
2000	nnụ anọ	400×5
4000	nnụ ili	400×10

Nos	**Olukumi**	**Mathemetical operation**
40	ozi	20×2
60	ọta	20×3
80	orin	20×4
100	ọrụn	20×5
200	ọrụn mezi	(20×5)×2
300	ọrụn mẹta	(20×5)×3
400	ọrụn mẹrẹn	(20×5)×4
500	ọrụn mẹrụn	(20×5)×5
600	ọrụn mẹfa	(20×5)×6
700	ọrụn meze	(20×5)×7
800	ọrụn mẹzọ	(20×5)×8
900	ọrụn mẹha	(20×5)×9
1000	ọrụn mẹgwa	(20×5)×10

Since both languages operate a vigesimal system, some numerals are derived as multiples of 20. For instance, "*forty"* is derived as "*two twenty".* In both languages, the multiplier is to the right

of the base. In the process of multiplication, two independent numerals are juxtaposed without an overt connective in both languages.

There are quite some areas of differences between the two languages in the way they carry out their multiplication. In Igbo, base 20 (ọgụ) is multiplied till 400 (nnụ) which is also a base in Igbo. Thus any numeral that is a multiple of 20 (ọgụ) and is below 400 (nnụ) is derived by multiplying base 20 (ọgụ). In the same way, any numeral that is a multiple of 400 (nnụ) is derived by multiplying base 400 (nnụ).

Also, Olukumi varies from Igbo in the sense that multiples of 20 that are below base 100 are derived by multiplying base 20. However, when the number is in multiple of 100 (for instance 200,300,400,500 and so on) they are derived by multiplying 100 (which is a derived base itself).

Addition and multiplication

There are some numerals that are derived by the processes of addition and multiplication. Both processes are evident in the examples presented in both languages as shown in the data below.

Table VI

Nos	**Igbo**	**Mathemetical operation**
41	ọgụ abua na ofu	(20x2)+1
50	ọgụ abua na ili	(20x2)+10
51	ọgụ abua na ili na ofu	(20x2)+10+1
61	ọgụ atọ na ofu	(20x3)+1
70	ọgụ atọ na ili	(20x3)+10
71	ọgụ atọ na ili na ofu	(20x3)+10+1
81	ọgụ anọ na ofu	(20x4)+1
90	ọgụ anọ na ili	(20x4)+10

Nos	**Olukumi**	**Mathemetical operation**
41	ọka le ozi	1+(20x2)
50	mẹgwa le ozi	10+(20x2)
51	ọka le mẹgwa le ozi	(1+10)+(20x2)
61	ọka le ọta	1+(20x3)
161	ọka le ọta le ọrụn	1+(20x3)+(20x5)
170	mẹgwa le ọta le ọrụn	10+(20x3)+(20x5)
171	ọka le mẹgwa le ọta le ọrụn	1+10+(20x3)+(20x5)
190	mẹgwa le ọrẹn le ọrụn	10+(20x4)+(20x5)

91	ọgụ anọ na ili na ofu	(20x4)+10+1
101	ọgụ ise na ofu	(20x5)+1
201	ọgụ ili na ofu	(20x10)+1
240	ọgụ ili na abua	20x(10+2)
360	ọgụ ili na asatọ	20x(10+8)
361	ọgụ ili na asatọ na ofu	(20x(10+8))+1
481	nnụ na ọgụ anọ na ofu	400+(20x4)+4
571	nnụ na ọgụ asatọ na ili na ofu	(400+((20x8)+10))+1
1271	nnụ atọ na ọgụ atọ na ili na ofu	(400x3)+(20x3)+10+1
3000	nnụ asa na ọgụ ili	(400x7)+(20x10)
3071	nnụ asa na ọgụ ili na atọ na ili na ofu	(400x7)+(20x(10+3)+(10+1)

191	ọka le mẹgwa le ọrẹn le ọrụn	1+10+(20x4)+(20x5)
201	ọka le ọrụn mezi	1+((20x5)x2)
251	ọka le mẹgwa le ozi le ọrụn mezi	1+10+(20x2)+(100x2)
270	mẹgwa le ọta le ọrụn mezi	10+(20x3)+(20x5)x2
371	ọka le mẹgwa le ọta le ọrụn mẹta	1+10+ (20x3)+(20x5)
472	mezi le mẹgwa le ọta le ọrụn mẹrẹn	2+10+(20x3)+(20x5)x4
574	mẹrẹn le mẹgwa le ọta le ọrụn mẹrụn	4+10+(20x3)+(20x5)x5
675	mẹrụn le mẹgwa le ọta le ọrụn mẹfa	5+10+(20x3)+(20x5)x6
777	meze le mẹgwa le ọta le ọrụn meze	7+10+(20x3)+(20x5)x7
878	mẹzọ le mẹgwa le ọta le ọrụn mẹzọ	8+10+(20x3)+(20x5)x8
879	mẹha le mẹgwa le ọta le ọrụn mẹha	8+10+(20x3)+(20x5)x8

Morphological processes

Though the processes of forming numerals are through mathematical processes like the ones that have been analysed above; however these processes have some morphological underpinnings. One of such morphological processes known as blending has been observed to occur in Olukumi numerals.

Blending

In most of the cases, numerals are derived by either juxtaposing a basic numeral to a base through the use of an overt connective (as in the case of addition) or juxtaposing a base and another basic numeral (as in most cases of multiplication). However, in Olukumi, it has been observed that there is another process where the beginning of a base (20) is joined to the end of a basic numeral to for a single word representing a number. This process is shown in the examples below.

Table VII

Numbers	**Olukumi**	**Blends**
40	Ozi	**ọ**gbọn + me**zi**
60	Ọta	**ọ**gbọn + mẹ**ta**
80	Ọrẹn	**ọ**gbọn + mẹ**rẹn**
100	Ọrụn	**ọ**gbọn + mẹ**rụn**

From the example above, one can observe that the first syllable of the base (20) is joined to the final syllable of the multiplier. These syllables that are blended together are highlighted in bold type in the data above. This process occurs in only the Olukumi language in the derivation of 40, 60, 80 and 100. Blending does not occur in the numeral system of Igbo.

Summary of findings and conclusion

Ukwunzu is a community in Delta state where communal bilingualism is practiced; every member of the community speaks Olukumi and Igbo. This rich linguistic diversity has been able to avail us the opportunity of investigating the numerals of both languages. From our study, we have been able to establish some areas of similarities and differences in the system of both numerals.

Some of these similarities include;

- The Igbo and the Olukumi language operate a vigesimal system.
- Counting in both languages does not exceed thousands.
- They both have basic and derived numerals.
- Numerals 1-10 in both languages are basic numerals.

- In deriving numerals from basic ones, they both employ the same mathematical processes (addition, subtraction and multiplication).
- Both make use of an overt conjunction in the process of addition.
- Multiplication in both languages is achieved by juxtaposing a basic number to the right of the base.

Findings also show that both languages have some differences. They include:

- Counting in Igbo extends to 4000 unlike in Olukumi where the numerals do not exceed 1000.
- In addition to the basic numerals, Igbo has 400 (nnu) as a basic numeral while Olukumi on the other hand has 30 (ogban) as a basic numeral.
- In addition to base 20, Igbo also have 400 as a base; Olukumi on the other hand also uses 100 as a base.
- The mathematical process of addition is applied to the right of the base in Igbo; in Olukumi, on the other hand, addition is to the left of the base.
- Only Olukumi employs the morphological process of blending; Igbo does not.

Recommendation

In this study, we have been able to look at some of the basic issues in the numeration system of both languages spoken by the Ukwunzu people. Traditionally, most African societies do not have higher numerals; as this study reveals, the Ukwunzu people can only count till 1000 in Olukumi and 4000 in Igbo and anything beyond that is referred to as *ijeli* (which literally means uncountable). However, in the light of modern day requirements, understanding the processes these languages utilize in forming derived numerals from basic ones gives us insight in constructing higher numerals to enable the language to cope with the modern day challenges. Take for instance, the knowledge of Igbo numerals have enabled linguists and language practitioners to reconstruct the standard Igbo language beyond what it was in the time past. Today, one can count in millions in standard Igbo. Also such reconstruction in Standard Igbo has resulted in the shift from its traditional vigesimal system to decimal system. Such increased development is equally ongoing in some other languages like Yoruba and Efik. A better understanding of the numeral system of a language is therefore necessary if the linguist is to

undertake a reconstruction of the languages numeral system to ensure it stays relevant in this modern day.

In the process of gathering our data also, it was observed that the numeral system of these two languages is endangered. This is because most people below the age of 45 can barely count beyond 100 and this kind of situation puts the language in a bad position. Thus, language owners are advised to utilize all aspects of their languages (most importantly in this case numerals) to ensure their sustainability from one generation to another.

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