



OLD FOLK'S MEASUREMENT: THE LOCAL KNOWLEDGE AND PRACTICES ON COUNTING AND MEASUREMENTS OF THE IKALINGA

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Abstract: *Old folk's measurement of IKalinga is the study of the relationship between their mathematics and their culture. It is associated with cultures without written expression, since objects come in all different sizes and shape, they can also be measured in lots of different ways. The study aimed to document indigenous measuring tools in Kalinga, and classify as to: linear measure, measure of mass, measure of volume, and determined and translate to English the Indigenous term use on the passage of time of the IKalinga; find out the local concepts applied on countable objects, and come up with vocabulary lingo in both Kalinga and English as used in the counting and measurement. The descriptive method of research, informal interviews, focus group discussions among key informants, and photo documentation were utilized. Findings show that indigenous measurement is still existing in most areas of Kalinga to quantify objects as well as to relate to their natural environment. To measure the lapse of time and fit certain occupational activities to certain periods during the year, the Kalingas utilize the moon to measure a one month period year.*

Keywords: *Old Folks Measurement, Local Knowledge, counting*

BACKGROUND OF THE STUDY

Local Knowledge is unique in every culture and society. It is embedded in community practices, institutions, relationships and rituals. Indigenous knowledge is considered a part of the traditional knowledge in the sense that it is rooted in a particular community and situated within broader cultural traditions. It is a set of experiences generated by people living in those communities, it is based on, and is deeply embedded in local experience, historic reality, and is therefore unique to that specific culture; it plays an important role in defining the identity of the community. It has developed over the centuries of experimentation on how to adapt to local conditions. It therefore represents all the skills, innovations of the people and embodies the collective wisdom and resourcefulness of the community.



Indigenous Knowledge on measurement on counting refers to the unique, traditional, local knowledge existing within a particular geographic area. The development of indigenous knowledge systems has been a matter of survival to the people who generated these systems. Such knowledge systems are cumulative, representing generations of experiences, careful observations and trial and error experiments (Grenier, 1998).

Moreover, Local Knowledge on measurement on counting and measurement is simple and a very practical way to meet the challenges of day-to-day living. This people have not forgotten the knowledge and wisdom of their forebears. They have sustained it until today even the traditional knowledge is sometimes dubbed as primitive, backward and old fashioned but practiced over generations of living in a particular environment. It encompasses all forms of knowledge-technologies, expertise skills, practices and beliefs-that enable the community to achieve stable livelihoods in their environment. A number of terms are used interchangeably to refer to the concept of indigenous knowledge (IK), including traditional knowledge, indigenous technical knowledge, and indigenous knowledge systems. (The United Nations Environment Programme-UNEP).

On the other hand, The Indigenous Peoples' Rights Act (IPRA) also defines indigenous people as a group of people or homogenous societies identified by self-ascription and ascription by others, who have continuously lived as organized communities on communally bounded and defined territory, and who have, under claims of ownership since time immemorial, occupied, possessed and utilized such territories, sharing common bonds of language, customs, traditions and other distinctive cultural traits, or who have, through resistance to political, social and cultural inroads of colonization, non-indigenous religions and cultures, became historically differentiated from the majority of the Filipinos. ICCs/ IPs shall likewise include people who are regarded as indigenous on account of their descent from the populations which inhabited the country, at the time of conquest or colonization, or at the time of inroads of non-indigenous religions and cultures, or the establishment of present state boundaries, who retain some or all of their own social, economic, cultural and political institutions, but who may have been displaced from their traditional domains or who may have resettled outside their ancestral domains (Republic Act 8371, section 3, Chapter 2).



The cordillerans, as one of the identifiable ethnic group in the Philippines can be described as indigenous people who have close attachment to ancestral territories and to the natural resources in the areas; they have self identification and recognition by others as members of a distinct cultural group; their indigenous knowledge are oftentimes different from the national language; and they are primarily subsistence-oriented production. Among the tribal groups in the Cordillera are the IKalinga whose ways of living are still alive today. They are known for wisdom of different Indigenous knowledge; one of its areas is the old measurement and counting which do not exist in isolation; this quantifies and qualifies its relation to its people, objects and culture. The people depend on the practicality in ways of living for survival for they believe that objects come in different sizes and can be measured and counted in different ways where the use of indigenous knowledge on counting and measurement are still prevailing in the locality which strengthen awareness of the mathematical concepts which are embedded in cultural activity of its people.

In most part of Kalinga, systems of measurement are defined locally; the different units are defined independently, compared to any other culture, the Kalinga culture is also dynamic. There have been values and traditions of Ikalinga that vanished as they were transmitted from one generation to another. The process of diffusion is the representation of the important role played by the people's own values as affected by many factors from within, and largely from outside interactions from migrants. Culture change and development are greatly influenced by migration to the urban areas or overseas due to employment of "Kailyans". Moreover, in the economic aspect, the lucrative market has encouraged the loss of Indigenous knowledge from the indigenous communities. However, the indigenous concept of collective wisdom on the usage of these indigenous ways of measurement is still prevalent up to this time.

The Ikalinga has very rich culture. However, the harvest in written form is minimal. Hence; it is imperative to harvest these grains, a great deal of which has already gone to obscurity if not on the stage of total eradication from the cultural package, notwithstanding massive adulteration of the original customs and traditions of the people because of changing times. This collection of local knowledge and practices on counting and measurements of the ikalingas will provide them opportunities to dwell into the mathematical genius of their forebears. The local knowledge and practices on counting and measurements were passed



only through mouths from one generation to the other yet its original version is clearly mirrored by the ventilation of the few surviving ancestors.

For this reason, the researcher, being a descendant of one of the early settlers of the place conducted this study to look into the old folks measurement and counting which contributed to the in- depth understanding and appreciation of the Ikalanga to their own culture. Culture is an organized body of conventional understandings manifest in art and artifacts which are persisting through tradition and characterizes a human group. It encompasses modes of thinking, feeling, and acting commonly found in a society and includes what man has acquired as a member of society.

CONCEPTUAL FRAMEWORK

If we wish to provide learning opportunities for students, we must first reflect on what it means for the student to “learn measurement” in their own culture and how the students goes about that task meaningfully (Reynolds and Wheatley, 1996, p.564). Reynolds and Wheatley explicitly described the importance of giving students’ opportunities to show and tell us how they learn measurement in their own language. In learning how the students internalize measurement concepts in their own local language, the literature on learning trajectories of measurement informs this study. Also, addressing the indigenous tools (the cultural capital) these students bring into their learning, the literature on multilingualism in mathematics classroom is employed.

Research has proven that the integration of culture and native language in mathematics classroom enriches students’ understanding of mathematical concepts (Nicol, 2005; Matang, 2006; Adler, 1998; Setati, 1998; 2002; 2005; Setati and Adler, 2001; Setati and Barwell, 2006). Therefore, instead of native culture and languages becoming stigmatized languages in the classroom they should be treated as cultural capital students’ bring and be acknowledged as their point of reference. A strong form of the proposition that language determines thought has been revived for the domain of numbers on the basis of studies of the kalinga culture on counting and measurement with languages that lack exact numerical values for measurement. It is argued that vocabulary of measurement is necessary for a person to possess the concepts of exactness. Without vocabulary, only primitive, approximate numerical values are possible. It is proposed that counting words modify two



innate core systems of knowledge with numerical content: parallel individuation of objects, which enables the representation of exact numerosity.

I remember what my grandfather told me when I was a child, a group of tribes, had an official pacer. When they wanted to know "exactly" how far a place was from their community, they always used the same guy to pace it off and count his steps. When that guy died, they'd tried to pick a new fellow whose pace was the same length. If they didn't need that much exactitude, they'd said "Oh, half a day's walk" or "two days by river, downstream." We'd measured heights the same way. We chop it so that it falls across the river, will it go all the way, or fall short of the other bank?" And would have to carefully estimate the tree's height in paces, the river's width in paces, and tell the tribe chief yea.

THEORETICAL FRAMEWORK

Lotman's theory states that "no language can exist unless it is steeped in the context of culture; and no culture can exist which does not have at its centre, the structure of natural language".

CULTURAL RESEARCH OBJECTIVES:

This study looked into the system of counting and measurement of the IKalinga, specifically, this study endeavoured to:

1. Identify existing traditional measuring tools of the Ikalinga and classify as to genres:
 - a) linear measure, and
 - b) measure of volume
2. Translate to English the indigenous term use on naming the passage of time in Kalinga;
3. Find out the local concepts applied on countable objects and come up with vocabulary terminologies in both Kalinga and English as used in the counting and measurement.

METHODOLOGY

The paper made use of ocular observation and interviews among eight major key informants on the local/indigenous knowledge of measurement and counting of the Kalinga. Documentation was conducted with the help of the elders, to get more data on how they utilized the different indigenous measuring tools and count their products according to category. All the data gathered were synthesized with the help of some literate old folks



who have enough knowledge about the indigenous ways of measurement and counting of the Ikalings.

RESULTS AND DISCUSSION

A. Local Knowledge and Practices on Counting and Measurements of the Ikalings as to genres

In using the local knowledge and practices on counting and measurements, the Ikalings deeply follow the character of integrity, community-ness, reliability, & fairness and trust directive otherwise it is *paniyaw(prohibition)* on the values instil in the community

To the Kalinga people, trust is the belief and confidence in the integrity, reliability and fairness of their kailians(people in the community) in all endeavours, an essential human value that quantifies and defines our interdependence in relationships with others thus people do believe that trust is the foundation of all relationships.

a) linear measure

For the Ikalings, the body ruled when it comes to linear measurement. The length of a foot, the width of a finger, and the distance are still prevalent measurements among the tribe until this time.

| Linear Measure/Distance | |
|---------------------------|-------------------|
| Local Measurement | Approximate Value |
| <i>Sin Tam'ucho</i> | 1 inch |
| <i>Sin changan</i> | 9 inches |
| <i>Sin Chakulap</i> | 4 inches |
| <i>Sin Cho'pa</i> | 6 feet |
| <i>Sin Chap'an</i> | 12 inches |
| <i>Sin ak'yang</i> | 3 feet |
| <i>Sin Kayang</i> | 6 feet |
| <i>Sin l'ma (elbow)</i> | 18-24 inches |
| <i>Sin ta'klay (yard)</i> | 36 inches |



Sin Tam'ucho (Inch) *Sin Chakulap (Hand)* *Sin changan (Handspan)* *Sintaklay(fathom)*



sin cho'pa(2 fathom)



Sin Chapan to (footspan)



sin akyang(half pace)



sin kayang(pace)

| Local Measurement | Estimated Value | Local Measurement | Estimated Value |
|--------------------------|-----------------|---------------------------------------|--|
| Volume Measure | | Volume Measure | |
| <i>Sin Gamut</i> | 0.1 kilo | <i>Chuyog"ba'ol"</i> (Ungngot) | 2 cups |
| <i>Sin akop</i> | 0.33 kilo | <i>Tugnu</i> (Bamboo Cups) | 2 cups |
| <i>Sin Supa</i> | 0.33 kilo | | |
| <i>Sin salup/ganta</i> | 1 kilo | <i>Sin chuyog</i> (Coconut Shell Mug) | 2 cups. |
| <i>Sin Ammutu</i> (Gusi) | 5 liters | <i>Aklu</i> (Coconut Shell Ladle) | 1 cup |
| <i>Sin Ful'nay</i> | 32 liters | <i>Sin Magalaw</i> (can) | 17 liters and 60 chupas of rice |
| <i>Sin Uggatit</i> | 1 liter | <i>Sin Langaya</i> | 50 chupas |
| <i>Amayan/fa'nga</i> | 2 liters. | <i>Sin Chamus</i> | 25 chupas |
| <i>Lalanggan</i> | 15 liters | <i>Sin A'lang</i> (rice granary) | 5-10 uyun depending on the social status of the owner. |
| <i>Tapayan/ Kuwong</i> | 15 liters | <i>Sin Tod'tod</i> | one drop of liquid |

b) Measure of Volume

The Kalinga also use the system of measurement based on volume. These are *cavan*, *ganta* (or *salop*), and *supa*. There are 10 *chupas* in a *ganta*, thirty-five *ganta* to make a *cavan*. Kalinga did not invent this system; it evolved from early Europe and the Middle East, which they in turn introduced it as a convenient system in the Philippines. It was popularly adopted for almost 400 years.



sin ga'mot



sin akuko



sin lab'nak



sin lab'nak



sin chamus



sin langaya



sin paok



sin chuyog



sin immuso



Sin tapayan



sin ful'nay



sin lalang'gan

The Kalinga also use the system of measurement based on volume. These are *cavan*, *ganta* (or *salop*), and *supa*. There are 10 *chupas* in a *ganta*, thirty-five *ganta* to make a *cavan*. Kalinga did not invent this system; it evolved from early Europe and the Middle East, which they in turn introduced it as a convenient system in the Philippines. It was popularly adopted for almost 400 years.

C. Local concepts on naming the lapse of time

The measurement of time to the Ikalunga is incredibly important because they determined the right time to plant and to harvest and they probably only had cold, fine, warm and hot; they were concerned a great deal with temperature.

To measure the lapse of time and fit certain occupational activities to certain periods during the year, the Kalingas utilize the moon to measure a one month period. From the day the first quarter in the western horizon to the day the last quarter completely disappears at dawn in the eastern sky, a month period is counted averaging 28 to 31 days duration. The evening appearance of the crescent in the western sky is called "Sa-al" which means coming into view. Making use of the moon to measure a one-month period, the Kalingas coincidentally count twelve (12) lunar months to a year. These lunar months are as follows:



| Month | Coincidental Phenomena and Incidents |
|----------------------|---|
| 1. `Eyang | Weather is very cool and people jump over the streams to avoid getting chilled. |
| 2. Lachaw | The Panafa, a kind of tree blooms |
| 3. Panafa | Continuous drizzling ends and the lachaw |
| 4. Achawoy | The Achawoy, a kind of tree blooms. |
| 5. Akar | The first ricecrop of the year blooms. |
| 6. It-iti/Kamaduyung | The first ricecrop of the year is harvested. |
| 7. Waro | Time of heavy rains with hailstones in the afternoon. |
| 8. Fisfis | Windy days with slight drizzling. |
| 9. Luya | These bow down constantly because of strong. |
| 10. Arachog | Second ricecrop of the year blooms. |
| 11. Iniling/Gabbok | Second ricecrop of the year is harvested. |
| 12. Opok | The folks are at home, frequently group in the fireplace called <i>chalpung</i> (hearth) because of the rainy and cool weather. |

Using the calendar, several attempts were made to determine the number of days in one lunar-month period. The date was usually marked when the first quarter appears until the first quarter the next new moon appears or is indicated in the calendar.

The kalinga tribes kept track the seasons by giving distinctive names to each recurring situation in a month. Their names were applied to the entire month in which each occurred. New settlers followed that custom and list the names of the months of the whole year.

For common understanding of the local concepts used in naming months of the year, the English translation is shown.

Eyang (January), Weather is very cool and people jump over the streams to avoid getting chilled., *Lachaw* (February), a kind of tree blooms, and last days of cold season is in this month, native tribes of the Kalinga most often called lachaw since harsh weather conditions in the area made hunting very difficult or it is in this period where the rain pour at once or sometimes it is very late, *Panafa* (March), Continuous drizzling ends and as the temperature begins to change and the ground begins to dry, earthworm casts appear, northern tribes of Kalinga knew this when the crows signalled the end of cold season To the settlers, it was considered to be the last full Moon of cold season. *Achawoy* (April), a kind of tree blooms or



set off to bear flower, the Pagoy which is one of the earliest widespread flowers of the tribe. Other names for this month's include the full sprouting grass, the egg moon, and full fish moon, because this was the time that the river upstream starts to spawn. *A'kar* (May), The first ricecrop of the year blooms. in most areas of Kalinga, flowers are abundant everywhere during this time. This signal the month when they rang the *linga* (traditional *fanga*), It-iti (June) The first ricecrop of the year is harvested , This name was universal to every Kalinga tribe because of the relative short season for harvesting comes each year during the month of June. *Waro*(July) , Time of heavy rains with hailstones in the afternoon, *kilat* (thunderstorms) are most frequent during this time. *Fisfisb*(August) The fishing tribes are given credit for naming of this month, since abundant, and large fish are readily caught using *bingwit* (*The traditional fishing equipment*) in the river and other bodies of water. *Ikalinga* knew this because the moon appears reddish. *Luya* (September) This month's name is attributed to native Kalinga because it marks when they feel the cold breeze of the weather. *Arachog* (October), Native Kalinga named this month for obvious reasons These bow down constantly because of strong The level of water in any bodies of water goes up. Second ricecrop of the year blooms *Iniling*(November). Second ricecrop of the year is harvested. and *Opok* (December), During this month the cold fastens its grip, and nights are at their longest and darkest period and is a doubly appropriate name because the night is indeed long, and because the moon is also above the horizon for a long time. This is also the time that the family members come together near the *chalpong*(*The Kalinga indigenous cooking area with three stones*) to at least warm through their trembling knees.

Significant Cosmological Terms

The Kalinga have their own cosmic terms the most significant of which are as follows:

a) Weather and Atmospheric terms

| Kalinga Term | English Equivalent |
|--------------|--------------------|
| 1. Lifu-o | Clouds |
| 2. Fid-Fid | Winds |
| 3. Fali | Typhoon |
| 4. Dullalo | Hailstone |
| 5. Lichaga | Aurora borealis |
| 6. Kilat | lightning |
| 7. Uchan | Rain |
| 8. Kichor | Thunder |
| 9. Afungal | Rainbow |
| 10. Funot | Fog |



- | | | |
|-----|---------|----------------------------------|
| 11. | Ligat | Dry day |
| 12. | Chagun | Dry season |
| 13. | Aguilid | Rainy days, continuous drizzling |
| 14. | Lunig | Earthquake |
| 15. | Chulum | Cloudy |

b) Times Lapse and Indications

| Kalinga Term | English Equivalent |
|---------------------|---------------------------|
| 1. Tawon | Year |
| 2. Fulan | Month |
| 3. Argaw | Day |
| 4. Padcha | Daytime |
| 5. Vumolingot | Nightbreak |
| 6. Tiprok/Lafi | Nighttime |
| 7. Seminar | Sunrise |
| 8. Mamatuk | Noon |
| 9. Er-ergaw/Machama | Afternoon |
| 10. Maschom | Sunset |
| 11. Fig-Figat | Morning |
| 12. Wisnit | Beginning of Day |
| 13. Pumadcha | Sunrise/Daybreak |
| 14. Chigas/Majamaan | Breaktime |
| 15. Sa-er | Beginning of lunar month |
| 16. Sikut | End of lunar month |
| 17. Adgarabyan | Yesterday |
| 18. As-fikat | Tomorrow |
| 19. Say-lafi | Last night |
| 20. Afigatana | The day after tomorrow |
| 21. Asin-garabyan | The day before yesterday |
| 22. Kanad | A while ago |
| 23. Sana | Now |
| 24. Nu-oni | Later |
| 25. Vinigat | Everyday |
| 26. Nilafi | Everynight |

Heavenly Bodies

To most of these cosmic terms the Kalinga give significant implications and from several of the same, forecast are made for future events to come. The lightning and thunder are unmistakable signs of coming heavy rains and strong winds. So making use of these signals the mountain folks hurry to keep things in, get home before being overtaken by heavy rains and trapped by small streams. From this cosmological concept the mountain folks make use of the lightning and thunder to best advantage as the spur of the moment demand.



Local concepts applied on countable/measurable objects

| Kalinga Number Word (<i>filang</i>) | English | Present Numeral |
|--|--|---------------------------|
| Osa | One | 1 |
| Chuwa | Two | 2 |
| Tuû | Three | 3 |
| Opat | Four | 4 |
| Lima | Five | 5 |
| Onom | Six | 6 |
| Pitu | Seven | 7 |
| Walu | Eight | 8 |
| Siyam | Nine | 9 |
| Simpuû | Ten | 10 |
| Simpuû ya + KNW (1-9) | Eleven-Nineteen | Exact Number from 11-19 |
| Nasawalan si simpulu | | Number ranges from 10 -19 |
| Chuwampuû | Twenty | 20 |
| KNW (2-9) + puû | Twenty-Ninety (by 10) | 20-90 |
| Singgasot | One Hundred | 100 |
| KNW (1-9) + gasot | Two Hundred-Nine Hundred(by hundred) | 200-900 |
| Sinlivo | One thousand | 1,000 |
| KNW (1-9) + livo | Two thousand -Nine thousand (by thousand) | 2000-9000 |
| Alivo-livo | More than One thousand | 1,000 and Above |

Local concepts applied on countable/measurable objects

The following local various units of measurements used by early Kalingas. Each measuring unit has a corresponding approximate equivalent. Since early Kalingas used mostly their body parts for measuring, I used my body parts as my basis for finding the standard unit equivalent. For example, in finding the length/distance (estimated equivalent), I used the ruler to measure parts of my body.

In Kalinga, palay harvesting was done by a hand-held tool (*la'om*). The stem of the panicle is cut one foot long. The leaves are removed, and the panicles are bundled with tie (*chanug*) made of *a'nus* bamboo, the girth of which allows both hands to meet (*fo'tok*). *Sin fotok(a)* is one bundle of palay, *Sin iting(b)* is equivalent to 6 bundles of palay, *Sin laom* which is also equal to 2 iting is twelve bundles of palay, 60 bundles of palay is also equal to *Sin chalan* or *10 iting*, *Sin uyun* which is sum up to *100 iting* is equal to 600 bundles of palay, The bundles are inverted like bouquet under the sun or they are hanged in an (*a'loy*) made of horizontal



and vertical bamboo which can handle more or less *sin –uyun* to dry before they are threshed and milled, or kept in the granary.

Moreover, *Sin fukol(c)*, means one the term is often times use to denote a unit bigger object which is also similar to *Sin fulas* but the term is applicable to a smaller countable object. *Sin-kimit* is the local term for two heads, specifically coin to counting coconut and others, *Pingi* is the term use to describe twin objects like banana, *Sin sapad* is coin to a bundle of objects, and 6-8 *sapad* or 6-8 bundles makes up a *fulig*



(a) *sin fo'tok*



(b) *sin iting*



(c) *sin fukol*



Sin kimit



pingi



sin sapad



(d) *sin fu'lig*



sin fu'kol



sin fu'las

Terms taken from the local knowledge and practices on counting and measurement of Ikalanga from the native term to English

| | |
|--------------------------------|--|
| <i>A'beng.</i> | Children |
| <i>Aklu.</i> | Coconut Shell Ladle |
| <i>Amayan/fa'nga.</i> | Pot made up of clay |
| <i>cha'pan.</i> | Feet |
| <i>Chakolan.</i> | Big |
| <i>Chanum.</i> | Water |
| <i>Chuyog"ba'ol"(Ungngot).</i> | It bowl made up of half coconut shell |
| <i>Fa'falas.</i> | A lady |
| <i>Ful'nay.</i> | <i>Ful'nay</i> is traditionally used for storing basi, vinegar and bagoong. <i>Ful'nay</i> is heavy because it is a closed, tightly packed jar which is kneaded and pounded over and over to make it air-tight. fine gravel, sand, and ashes are mixed into the clay. all these make the burnay heavy and very sturdy. |



| | |
|-----------------------------|--|
| <i>Lalangan.</i> | Pot made up of clay, bigger than <i>fanga</i> |
| <i>Mal'tafa.</i> | A vat that is being used during occasions like wedding, funeral, posipos, and others. It can be used also to cook 'fayas' or wine and cook squeezed sugarcane to come up with sugar. |
| <i>Pingi.</i> | A twin banana |
| <i>Sin A'lang.</i> | It is made up of a four-legged cubicle wood, farmers used this for storing their <i>pagoy</i> that they have harvested |
| <i>sin a'loy.</i> | A crisscross made up of bamboo use to dry the <i>pagoy</i> |
| <i>Sin ak'yang.</i> | One pace |
| <i>Sin akop.</i> | One handful |
| <i>sin akuchan.</i> | One |
| <i>Sin botok.</i> | One bundle of palay (joining your thumb finger and pointing finger then form a circle.) |
| <i>Sin cha'pan.</i> | One feet |
| <i>Sin Chakulap.</i> | One hand |
| <i>Sin chalan.</i> | 60 bundles of palay |
| <i>sin chamus.</i> | It is made up of <i>iwoy</i> (rattan). It is half smaller than <i>langaya</i> . They usually used for storing beans. |
| <i>Sin changan (Lick).</i> | <i>Sin Cha'ngan</i> is used by the Kalinga to measure the distance from the tip of the thumb to the tip of the pinky finger |
| <i>Sin Cho'pa (fathom).</i> | 2 yards or the distance between an adult's fully outstretched hands. |
| <i>sin cholan.</i> | One plate |
| <i>Sin fotok.</i> | One bundle of grains |
| <i>Sin Fu'kol.</i> | One piece |
| <i>Sin fulas.</i> | One piece, applied to smaller objects |
| <i>Sin Fulig.</i> | Consist of 4-6 bunches of banana |
| <i>Sin fulnay.</i> | One jar |
| <i>Sin Gamut.</i> | This is an indeterminate quantity of some dry measure, such as grain, that can be held in the cupped hands |
| <i>Sin l'ma.</i> | (One forearm), the distance from the elbow to the fingertips. |
| <i>sin immuso.</i> | It is a clay pot used as the traditional water container. . |
| <i>Sin iting.</i> | six bundles of grains |
| <i>Sin Kayang(Pace)</i> | The length of a double step |
| <i>Sin kimit.</i> | Two heads of coconut |
| <i>sin la'om.</i> | Twelve bundles of palay |
| <i>sin langaya.</i> | It is made up of <i>iwoy</i> (rattan). It serve as storing container while pounding before tranfering into a <i>maga'law(can)</i> |
| <i>Sin Magalaw(can).</i> | It is usually used for storing milled rice, dried coffee and it is also used for fetching water. |
| <i>sin pisngit.</i> | About half an inch |
| <i>Sin Pusot.</i> | One bundle |
| <i>Sin salup/ganta.</i> | Twelve Chupas of rice/ 3 kilos |



| | |
|-----------------------------|---|
| <i>sin sapad.</i> | One bunch of banana |
| <i>Sin Supa.</i> | One can of regular condensed milk |
| <i>Sin ta'klay (yard).</i> | The distance from tip of the nose to the end of the thumbnail |
| <i>Sin Tam'ucho (Inch).</i> | The basis of the measurement, it is the width of a man's thumb |
| <i>Sin tod'tod.</i> | One drop of liquid |
| <i>Sin Uggatit.</i> | is a clay pot used as the traditional food preparation container, and it half smaller than fa'nga |
| <i>Sinfula'n.</i> | One month |
| <i>Sin-uyun.</i> | One hundred bundles |
| <i>Tapayan/ Kuwong.</i> | Its height is 16 inches and its diameter is 15 inches with valve/ faucet and great texture |
| <i>Tugnu (Bamboo Cups).</i> | It is a cup made up of bamboo which used in drinking water. It can also be used to store sugarcane. |
| <i>Vakka.</i> | Coconut shell |

CONCLUSION

Based on the findings of the study, the following conclusions are derived:

1. The Kalinga consider using body parts measurement and the natural surroundings as non-standard tools for measurement
2. Time is usually measured by a vertical pillar or stick stuck into the ground and gave some indication of time by the length of the shadow it cast on the ground, and that name of the time, days of the week, and months of the year is based on the periods of the sun, moon, and other heavenly bodies.
3. The Kalinga generally classify countable/measurable objects as to size and shapes.

RECOMMENDATIONS

In the light of the salient findings and the conclusions, the following recommendations are offered:

1. The local knowledge and practices on counting and measurement of the Ikalunga should be preserved so that it would be a readymade reference material in the implementation of the Indigenous Peoples Education (IPED).
2. The worth of old folk's measurement or local knowledge and practices on counting and measurement of the Ikalunga would be realized by sharing not only through formal education but also in the community or to the family members as a form of recreation.



3. School grade teachers must know, that the best way to expand children's knowledge of measurement systems is to have them work first-hand on what they know

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