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Discovering Mathematical Concepts Among the Kankana-ey of Demang, Sagada, Mt. Province

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The siklat or tinukbob, the one-storey house whose standard measurement is 12 x 12 x 9 to 13 x 13 x 10 dangan.

Ethnomathematics is a useful way of conceptualizing the inter-connections between practical, everyday mathematical knowledge and abstract, theoretical mathematical knowledge (Frankenstein and Powell, 1993).

It is practised among identifiable cultural groups, such as national-tribal societies, labor groups, children of a certain age bracket, professional classes and so on (D'Ambrosio, 1985). It is how mathematical ideas are emphasized, how they are expressed and how their particular contexts vary from culture to culture (Ascher, 1991).

This research presents results of the survey on the spoken number language in its traditional and present forms. It also shows how such number language has been used in the practical concerns of the Kankana-ey and how this usage brought about the evolution of mathematical concepts among them.

The Kankana-ey Number Words and Their Equivalent. The number word construction is based on ten and has great similarity with the

equivalent Filipino words: *esa (isa)*, *duwa (dalawa)*, *tulo (tatlo)*, *apat (apat)*, *lima (lima)*, *enem (anim)*, *pito (pito)*, *wao (walo)*, *siyam (siyam)*, *simpuu (sampu)*.

Some Kankana-ey Mathematical Concepts and Forms. The following are sample farm items and their corresponding units of measurement. The size of a ricefield (*payew*) is measured in terms of *gimata*, *sinkaliba* (housefloor size), and *sinkabotkong* (one parcel). Harvested palay (*inani ay pagey*) is measured by *simbenge*, *sin-iting* (or 5 *simbenge*), *simbaa* (10 *simbenge*), or *dowanbaa* (20 *simbenge*).

Threshed palay (*nataltag*) is measured in terms of *boti* (bottle), *sako* or rice sack (*tolong ka boti et guddua*), and *labba* or woven basket (*esay boti et guddua*). Rice for cooking is measured using the cover of the *kamowan* (a woven container) where *sinkasukop* is good for 5-7 people and a *supa* or a milk can is good for 4-6 people.



Dangan or hand span

Units of Measurement. *Dangan* or hand span is a measurement from the tip of the *pag-ama* (thumb) to the tip of the *pag-iking* (little finger).

Deppa is the measurement from the tip of the middle finger of the left hand to the tip of the middle finger of the right hand when the two hands are stretched sideways. This measures from 5 feet to 5 feet, 6 inches.

Metro is a measurement from the shoulder blade (of one side) to the tip of the middle finger of the outstretched hand (of the other side).

Trading Activities. Commodities are bartered using measuring devices such as *banit* (a buri bag), *pilon* (a small drum) or a *supa* (chupa). *Manok* (chicken), *beteg* (pig) or *ubi* (camote) are bartered for these other commodities: *pagey* (palay), *asin* (salt), *gaman* (bolo), *galang* (metal cooking wares), *dingke* (sugar), *lupot* (clothing) or *uwes* (Ilocano blanket).

The Kankana-ey Time Reckoning. The start of the Kankana-ey day is signaled by the crowing of the rooster, the location of the sun and the quacking of the *Tala*, a bird in the area.



Deppa

The week is marked by 3-, 5- and 7-day rituals and by *obaya* (rest day/s). The Kankana-ey keep track of the month through the phases of the moon: *tekwa* (first quarter), *gawa* (half moon), *kudang* (full moon), *gawan de kepan* (last quarter) and *lemmeng* (new moon). The year is determined by the agricultural cycle.

The Kankana-ey Months. December is *Innana*, which signals the start of the year and thus, the time for planting rice. January is *Killalaw*, where villagers look after the newly-planted seedlings and replace those which are rotten. February is *Upok*, the month when there is not enough water. The term suggests the act of staying overnight to tap and share water from rivers. March is *Bakakew*, named after the bird which appears to signal the start of graining. April is *Kitkiti*, the growing of grains.

May is *Kiyang*, the reddening and ripening of grains. June is *Pannaba*, the time for the fattening of the grains and the start of harvest. July is *Bandawey*, which means harvest is finished. August is *Adugna*, named after the birds that come out during this month. September is *Pugpugew*, October, *Kiling* and November, *Liponed*, months when people prepare for the next planting season by tilling the land, sowing the seeds, performing thanksgiving (*begnas*), etc.

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