

The Pohnpei Counting System

A

Term Paper

submitted to:

Dr. Don Rubinstein

and

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by

Deeleeann Daniel

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Introduction

The people of Pohnpei (formerly known as Ponape) developed their own counting systems. This traditional knowledge included wisdom that Pohnpeians accumulated by observing their environment and structuring their island society.

Students struggling with mathematics may benefit from understanding and recognizing that mathematical patterns exist in the counting system. According to Zaslavsky (1996), children who have the opportunity to learn in a meaningful context can develop better critical thinking skills. This paper provides detailed descriptions of the Pohnpei Counting System. There are at least twenty-nine different counting systems in Pohnpei. The native speakers use different classifiers for different objects to assist them in differentiating objects, which gives them an advantage over speakers with other counting systems.

There are numerals in Pohnpeian from 1 to 10. Numeral classifiers are used in most Micronesian languages and the Pohnpeian language uses at least twenty-nine. This makes a very unique way of counting, which results in twenty-nine counting systems. Also there is one counting system that does not employ classifiers, thus actually there are thirty counting systems. However, there are only three ways of saying ten: *eisek*, *ehk* and *ngoal*. Rehg claimed that “many speakers of Pohnpeian language have consequently expressed concern that the rich system of numeral classifiers is in a state of decay and that many counting systems are in danger of being lost” (1981, p 137). Most of my interviewees support the idea of making these counting systems part of the school curriculum; however, only a few teachers are doing this, and they teach only 4 or 5 different counting systems to their students.

Interviewees also felt that today many students are less exposed to these different counting systems not only in the schools but at home as well.

“Today, most people around the world are taught mathematics based on the decimal number system and techniques developed by Western mathematicians.

However, the use of mathematics in everyday life varies according to each different culture and its needs” (www.prel.org, accessed 2/25/2010). The use of “culturally based” mathematics will provide an opportunity to preserve local practices and culture and at the same time connect everyday life activities with mathematics.

“When most people think of mathematics, they think of numbers. But mathematics is much more: It also includes skills such as recognizing patterns, storing information and constructing objects. These skills have evolved over time and have been adapted according to local needs and customs. Numbers form an important part of daily life and are used to count people in a village, animals in a herd, or days of the year, etc.” (www.prel.org, accessed 2/25/2010).

If a native Pohnpeian speaker is asked to count from ‘one’ through ‘ten’, he/she proceeds initially as in English: ‘one’ (*ehu*), ‘two’ (*riau*), ‘three’ (*siluh*), ‘four’ (*pahiou*), ‘five’ (*limau*), ‘six’ (*weneu*), ‘seven’ (*isuh*), ‘eight’ (*walu*), ‘nine’ (*duwau*), ‘ten’ (*eisek*). The mathematics patterns that exist in the general counting system will help any learner to use the Pohnpei counting system easily.

Methodology

In this paper, I will present my findings on the different ways of counting in Pohnpei based on interviews with knowledgeable Pohnpeians, and some written studies of the complex counting system of Pohnpei. Various classifiers will be

specifically discussed to better understand each different counting system and how it is being used.

To learn more about the different counting system, I focused on different interview groups: teachers, administrators, and local leaders. I asked the following questions to identify common knowledge and ideas about the Pohnpei counting system.

1. How many counting systems you are aware of?
2. The classifiers are categorized into three groups based on the three different ways of saying 'ten': *eisek*, *ehk* and *ngoaul*. Why do we have only three ways of naming 'ten' unlike 'one' through 'nine'?
3. Why do we have only one way of saying the higher numbers like 100, 1,000, 10,000, 100,000, 1,000,000, and so forth?
4. How come we have terms for numbers only up to one billion?
5. Do you feel that it necessary to implement these different counting systems in the schools?
6. Do you realize that there are mathematical patterns in the counting systems?

Knowing only a few classifiers in the counting system, I relied on knowledge that I gathered through interviews and the limited sources available through friends.

I started my search through the internet and consulting friends. At some point, I felt discouraged because the office that I felt would collect and store books and documents about my topic didn't have much. Then, I started making appointments for interviews, but due to other priorities that the interviewees had, some of my appointments were canceled.

I also found that some teachers are using the book titled “Pohnpei Studies: Mahsen Meing Kan En Pehi Sarawi Wet” which has only twenty-five different counting systems. Some of my interviewees disagreed with some of the classifiers that Rehg (1981) identifies and the explanations he gives of some classifiers.

I believe that with more study and research on the Pohnpei counting system, there will be more generalizations that could be identified to make it easier for people to understand and learn about the counting system.

Description

There are numerals in Pohnpeian from 1 to 10. Numeral classifiers are used in most Micronesian languages, and the Pohnpeian language uses at least twenty-nine. “Every concrete noun in Ponapean belongs to one or more classes. When we use a numeral with a noun, an appropriate numeral classifier must be used. The choice of the numeral system one uses is dependent upon what one is counting” (Rehg 1981, p. 125). This makes a very unique way of counting, which results in twenty-nine different counting systems. Also, there is one system that does not employ classifiers, so actually there are thirty counting systems. Within these systems, there are only three ways of saying ‘ten’: *eisek*, *ehk*, and *ngoul*.

“Different communities and different cultural groups have developed and used a range of ways of counting and representing numbers” (www.ethnomath.org). In fact, there is more than just a single way to count in Pohnpeian. Table 1 classifies the classifiers into three ways of saying ‘ten’: *eisek*, *ehk*, and *ngoul* and includes objects that use the classifiers.

Table 1. Classifiers and Objects to which they apply.

Numeral classifier/word ending	Objects using such classifier
Set of classifiers used with <i>eisek</i>	
1. <i>-u</i>	inanimate things, commonly used
2. <i>-pak</i>	occurrence
3. <i>-mwut</i>	objects in heap or pile
4. <i>-lep</i>	halves
5. <i>-pit</i>	strips or strands of hair
6. <i>-el</i>	restricted to leis worn on the head
7. <i>-sop</i>	cut more than a half
8. <i>-mwodol</i>	small round objects
9. <i>-tumw</i>	gusts of wind
10. <i>-dip</i>	slices smaller than half
11. <i>-dun</i>	food tied together
12. <i>-i</i>	bunch of things, many interviewees disagrees
13. <i>-sou</i>	trash or feces
Set of classifiers used with <i>ehk</i>	
1. <i>-men</i>	animal and human
2. <i>-pwoat</i>	long objects (trees)
3. <i>-pali</i>	slices
4. <i>-poar</i>	thin objects or pieces (board and strips of tuna)
5. <i>-te</i>	leaves, paper
6. <i>-par</i>	tin roof
7. <i>-ka</i>	sheaf or bundle (woods and sugar cane)
8. <i>-pa</i>	frond
9. <i>-ra</i>	branches of trees
10. <i>-pwuloi</i>	stanzas of a song
11. <i>-sel</i>	sennit
12. <i>-kap</i>	row or lines
13. <i>-pei</i>	coconut husks
Set of classifiers used with <i>ngoal</i>	
1. <i>-umw</i>	yams and bananas traditionally prepared in an <i>uhmw</i> 'stone oven'
2. <i>-pwong</i>	night (nipwong)
3. <i>-wel</i>	single root plants (bamboo, sugarcane)
4. <i>-kis</i>	small pieces or fragments of things

Table 2 Common prefixes and examples.

Commonly used prefixes	Examples
(One) <i>a-, e-, o-</i>	<i>ara, ehu, oumw</i>
(Two) <i>ria-, rie-, rio-</i>	<i>riara, riewel, rioumw</i>
(Three) <i>sili-, or sil-</i> if followed by a vowel	<i>silipak, siluh</i>
(Four) <i>pah-</i>	<i>pahkis</i>
(Five) <i>lim-, limo-, lime-, lima-</i>	<i>limpak, limoumw, limewel, limakis</i>
(Six) <i>wen-, wene-, weno-</i> if followed by 'u'	<i>wenpwuloi, wenepwong, wenoumw</i>
(Seven) <i>isi-, is-</i> if followed by 'u'	<i>isimen, isuh</i>
(Eight) <i>wel-, weli-, wali-, wal-</i>	<i>wellep, welisop, walimwut, waluh</i>
(Nine) <i>duwa-, duwe-, duwo-</i>	<i>duwauh. duwewel, duwoumw</i>

Each noun is constructed using the counting prefixes followed by the classifier. In the following table you can find all different ways of saying one to nine for each highlighted classifier.

-u	-pak	-mwut	-lep	-pit	-el
1. <i>ehu</i>	<i>apak</i>	<i>emwut</i>	<i>elep</i>	<i>epit</i>	<i>ehl</i>
2. <i>riau</i>	<i>riapak</i>	<i>riemwut</i>	<i>rielep</i>	<i>riepit</i>	<i>riehl</i>
3. <i>siluh</i>	<i>silipak</i>	<i>silimwut</i>	<i>sillep</i>	<i>silipit</i>	<i>siliel</i>
4. <i>pahieu</i>	<i>pahpak</i>	<i>pahmwut</i>	<i>pahlep</i>	<i>pahpit</i>	<i>pahiel</i>
5. <i>limau</i>	<i>limpak</i>	<i>limmwut</i>	<i>limelep</i>	<i>limpit</i>	<i>limiel</i>
6. <i>weneu</i>	<i>wenepak</i>	<i>wenemwut</i>	<i>wenlep</i>	<i>wenepit</i>	<i>weneiel</i>
7. <i>isuh</i>	<i>isipak</i>	<i>isimwut</i>	<i>isilep</i>	<i>isipit</i>	<i>isiel</i>
8. <i>waluh</i>	<i>welipak</i>	<i>walimwut</i>	<i>wellep</i>	<i>walipit</i>	<i>wellel</i>
9. <i>duwau</i>	<i>duwapak</i>	<i>duwamwut</i>	<i>duwelep</i>	<i>duwapit</i>	<i>duwel</i>

-sop	-sou	-mwodol	-tumw	-dip	-dun
1. <i>osop</i>	<i>esou</i>	<i>emwodol</i>	<i>otumw</i>	<i>edip</i>	<i>adun</i>
2. <i>riasop</i>	<i>riesou</i>	<i>riemwodol</i>	<i>riotumw</i>	<i>riadip</i>	<i>riadun</i>
3. <i>silisop</i>	<i>silisou</i>	<i>silimwodol</i>	<i>silitumw</i>	<i>silidip</i>	<i>silidun</i>
4. <i>pahsop</i>	<i>pahsou</i>	<i>pahmwodol</i>	<i>pahtumw</i>	<i>pahdip</i>	<i>pahdun</i>
5. <i>limisop</i>	<i>limisou</i>	<i>limwomwodol</i>	<i>limatumw</i>	<i>limadip</i>	<i>limadun</i>
6. <i>wenesop</i>	<i>wensou</i>	<i>wenemwodol</i>	<i>wenetumw</i>	<i>wenedip</i>	<i>wendun</i>
7. <i>isisop</i>	<i>isisou</i>	<i>isimwodol</i>	<i>isitumw</i>	<i>isidip</i>	<i>isidun</i>
8. <i>welisop</i>	<i>welisou</i>	<i>welimwodol</i>	<i>welitungw</i>	<i>welidip</i>	<i>welidun</i>
9. <i>duwasop</i>	<i>duwesou</i>	<i>duwemwodol</i>	<i>duwetumw</i>	<i>duwadip</i>	<i>duwadun</i>

-men	-pwoat	-pali	-poar	-te	-par
1. <i>emen</i>	<i>oapwoat</i>	<i>apali</i>	<i>oapoar</i>	<i>ete</i>	<i>apar</i>
2. <i>riemen</i>	<i>rioapwoat</i>	<i>riapali</i>	<i>rioapoar</i>	<i>riete</i>	<i>riapar</i>
3. <i>silimen</i>	<i>silipwoat</i>	<i>silipali</i>	<i>silipoar</i>	<i>silite</i>	<i>silipar</i>
4. <i>pahmen</i>	<i>pahpwoat</i>	<i>pahpali</i>	<i>pahpoar</i>	<i>pahte</i>	<i>pahpar</i>
5. <i>limmen</i>	<i>limpwoat</i>	<i>limpali</i>	<i>limpoar</i>	<i>limete</i>	<i>limpar</i>
6. <i>wenemen</i>	<i>wenepwoat</i>	<i>wenepali</i>	<i>wenepoar</i>	<i>wenete</i>	<i>wenepar</i>
7. <i>isimen</i>	<i>isipwoat</i>	<i>isipali</i>	<i>isipoar</i>	<i>isite</i>	<i>isipar</i>
8. <i>welimen</i>	<i>welipwoat</i>	<i>welipali</i>	<i>welipoar</i>	<i>welite</i>	<i>welipar</i>
9. <i>duwemen</i>	<i>duwoapwoat</i>	<i>duwepali</i>	<i>duwoapoar</i>	<i>duwete</i>	<i>duwapar</i>

-kap	-ka	-pa	-ra	-pwuloi	-sel
1. <i>akap</i>	<i>akap</i>	<i>apa</i>	<i>ara</i>	<i>opwuloi</i>	<i>esel</i>
2. <i>riakap</i>	<i>riaka</i>	<i>riapa</i>	<i>riara</i>	<i>riopwuloi</i>	<i>riesel</i>
3. <i>silikap</i>	<i>silika</i>	<i>silipa</i>	<i>silira</i>	<i>silipwuloi</i>	<i>silisel</i>
4. <i>pahkap</i>	<i>pahka</i>	<i>pahpa</i>	<i>pahra</i>	<i>pahpwuloi</i>	<i>pahsel</i>
5. <i>limakap</i>	<i>limaka</i>	<i>limapa</i>	<i>limara</i>	<i>limpwuloi</i>	<i>limasel</i>
6. <i>wenakap</i>	<i>weneka</i>	<i>wenepa</i>	<i>wenera</i>	<i>wenpwuloi</i>	<i>wenesel</i>
7. <i>idiksp</i>	<i>isika</i>	<i>isipa</i>	<i>isira</i>	<i>isipwuloi</i>	<i>isisel</i>
8. <i>welikap</i>	<i>welika</i>	<i>welipa</i>	<i>welira</i>	<i>weliwuloi</i>	<i>welisel</i>
9. <i>duwakap</i>	<i>duwaka</i>	<i>duwapa</i>	<i>duwara</i>	<i>duwopwuloi</i>	<i>duwesel</i>

-umw	-pwong	-wel	-kis
1. <i>oumw</i>	<i>opwong</i>	<i>ewel</i>	<i>ekis</i>
2. <i>rioumw</i>	<i>rioapwong</i>	<i>riewel</i>	<i>riakis</i>
3. <i>siluhmw</i>	<i>silipwong</i>	<i>siliwel</i>	<i>silikis</i>
4. <i>pahmw</i>	<i>pahpwong</i>	<i>pahwel</i>	<i>pahkis</i>
5. <i>limoumw</i>	<i>limpwong</i>	<i>limewel</i>	<i>limakis</i>
6. <i>wenoumw</i>	<i>wenepwong</i>	<i>wenewel</i>	<i>wenekis</i>
7. <i>isuhmw</i>	<i>isipwong</i>	<i>isiwel</i>	<i>isikis</i>
8. <i>weluhmw</i>	<i>welipwong</i>	<i>welewel</i>	<i>welikis</i>
9. <i>duwoumw</i>	<i>duwoapwong</i>	<i>duwewel</i>	<i>duwakis</i>

There are many nouns that occur with more than just a single counting system.

A few examples that occur with more than one counting system are as follows:

Banana

1. Two bananas *uht riau*
2. Two banana trees *uht rioapwoat*
3. Two bunches of bananas *uht rioumw*

Breadfruit

- | | |
|------------------------------------------|---------------------|
| 1. One breadfruit | <i>mahi ehu</i> |
| 2. One breadfruit leaf | <i>mahi ete</i> |
| 3. One breadfruit tree | <i>mahi oapwoat</i> |
| 4. One bunch of breadfruit tied together | <i>mahi adun</i> |

The older generation of Pohnpeians also remembers a set of names for ‘one’ to ‘nine’ but nowadays this system is no longer commonly used. This counting system does not have classifiers like the ones indicated above and is considered to be the oldest counting system in the Pohnpeian language.

1. *ehd* ‘one’
2. *are* ‘two’
3. *esil* ‘three’
4. *epeng* ‘four’
5. *alem* ‘five’
6. *oun* ‘six’
7. *eis* ‘seven’
8. *oawoal* ‘eight’
9. *adu* ‘nine’

The first five have survived because they combined with the Pohnpeian prefix *ni-* (at) to form: *Niehd* (Monday), *Niare* (Tuesday), *Niesil* (Wednesday), *Niepeng* (Thursday), and *Nialem* (Friday).

Higher Numbers

Nowadays few younger Pohnpeians use or know the Pohnpeian terms for numbers higher than ‘thousand’. In fact, many are likely to use English number words for both lower and higher numbers, though they are fluent in both languages. The Pohnpeian names for higher numbers are:

<i>kid</i>	‘one thousand’
<i>nen</i>	‘ten thousand’
<i>lopw</i>	‘hundred thousand’
<i>rar</i>	‘million’

<i>dep</i>	‘ten million’
<i>sapw</i>	‘hundred million’
<i>lik</i>	‘billion’

The root words or prefixes for ‘two’ to ‘nine’ are combined with the one-syllable words to create their multiples. For example, ‘two thousand’ is *rie-kid*, ‘thirty thousand’ is *sili-nen*. The existence of different one-syllable words for each denomination of ten from ‘thousand’ to ‘billion’ is very intriguing. Unlike the classifiers, these one-syllable words do not have any other meaning. Rehg (1981, p. 140) notes that according to the German linguist Girschner, the names for higher numbers were introduced by missionaries.

These words for higher numbers are treated as morphemes and used after each counter-prefix, ‘one’ to ‘nine’, for the higher numbers. Following are detailed names used for most of the higher numbers.

For counting systems employing *eisek*, the morpheme representing ‘ten’ here is *isek*, which then combines with the lower number stems or prefixes; *e-*, *rie-*, *sili-*, *pah-*, *lime-*, *wene-*, *isi-*, *weli-*, and *duwe-* to create the multiple of ten numbers: ‘ten’ *eisek*, ‘twenty’ *rieisek*, ‘thirty’ *silisek*, ‘forty’ *pahisek*, ‘fifty’ *limeisek*, ‘sixty’ *weneisek*, ‘seventy’ *isisek*, ‘eighty’ *welisek*, and ‘ninety’ *duweisek*.

Using the three 10 different ways of saying ‘ten’:

	<u><i>eisek</i></u>	<u><i>ngoul</i></u>	<u><i>ehk/akan</i></u>
10	<i>eisek</i>	<i>ngoul</i>	<i>ehk</i>
20	<i>rieisek</i>	<i>riengoul</i>	<i>riehk</i>
30	<i>silihsek</i>	<i>silingoul</i>	<i>siliakan</i>
40	<i>pahisek</i>	<i>pahngoul</i>	<i>pehk</i>
50	<i>limeisek</i>	<i>limengoul</i>	<i>limehk</i>
60	<i>weneisek</i>	<i>wenengoul</i>	<i>wenehk</i>
70	<i>isihsekl</i>	<i>isingoul</i>	<i>isiakan</i>
80	<i>welihsek</i>	<i>welingoul</i>	<i>weliakan</i>
90	<i>duweisek</i>	<i>duwengoul</i>	<i>duwehk</i>

The morpheme representing ‘hundred’ is *-pwiki*

100 *epwiki*
200 *riepwiki*
300 *silipwiki*
400 *pahpwiki*
500 *limepwiki*
600 *wenepwiki*
700 *isipwiki*
800 *welipwiki*
900 *duwepwiki*

The morpheme for ‘thousand’ is *-kid*

1000 *kid*
2000 *riekid*
3000 *silikid*
4000 *pahkid*
5000 *limekid*
6000 *wenekid*
7000 *isikid*
8000 *welikid*
9000 *duwekid*

Similar morphemes are used for ‘ten thousand’, ‘hundred thousand’ and so forth. “Obviously the higher numbers, particularly those higher than ‘thousand’ are not commonly used. One important observation about higher numerals is that they do not combine with numeral classifiers. Therefore *riepwiki*, meaning ‘two-hundred’, may be used to mean two-hundred of anything” (Rehg 1981, p.140). This is unlike the lower numbers, where the use of the classifiers helps to identify what object is being counted.

I also learned from my interviewees a special counting system for coconuts that is counted as a decimal smaller when it reaches one hundred, one thousand and so forth.

1 coconut *mangas ehu*
10 coconuts *mangas eisek*

100 coconuts *mangas ngoal* which is also mean ten
1,000 coconuts *mangas epwuki*
10,000 coconuts *mangas kid*

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Personal Interviews

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