LEARNING AS ONE NATION

Expanded Project

Stat & Prob_17

S H S L E A R N I N G A C T I V I T Y

Name: _____ **Score/Mark:** _____

Grade and Section: _____ **Date:** _____

Strand: ☐ STEM ☐ ABM ☐ HUMSS ☐ ICT (*TVL Track*)

Subject: ***Statistics & Probability***

Type of Activity: ☐ Concept Notes ☐ Skills: Exercise/Drill ☐ Illustration ☐ Performance Task ☐ Essay/Report ☐ Others: _____

Activity Title: Sampling Distribution of the Sample Mean

Learning Target: To identify and construct a sampling distribution of a sample mean.

References: *(Author, Title, Pages)*
1) Belecina, R.R. et al. "Statistics and Probability", 1st Ed. pp. 101-135;
2) L.A. Sajulga, CVIF Learning Activities

Sampling distribution is the probability distribution of a statistic.

We learned from the previous activity that a '*sample statistic*' or '*statistic*' has the purpose of estimating the population parameter.

Suppose you had a challenging core subject last semester and you want to know the average grade obtained by the Grade 11 students. Using simple random sampling, you selected 5 random samples each with a sample size equal to three. The obtained data are shown below:

	Sample	Sample mean $= \frac{x_1+x_2+..+x_n}{n}$
1	99, 97, 94	96.67
2	98, 98, 100	98.67
3	97, 94, 90	93.67
4	97, 95, 89	93.67
5	98, 99, 99	98.67

Each value for the sample mean varies as it depends on the sample being drawn. Thus, it is also a *random variable*. It follows that it also has a probability distribution.

The sample means can be denoted by the random variable $\bar{X}$, so we have:

$$\bar{X} = \{93.67,\ 96.67,\ 98.67\}\ ;$$

and the corresponding probability for each average grade is:

$P(\bar{X} = 93.67) = \frac{n(E)}{n(\Omega)} = \frac{2}{5}$	$P(\bar{X} = 96.67) = \frac{n(E)}{n(\Omega)} = \frac{1}{5}$	$P(\bar{X} = 98.67) = \frac{n(E)}{n(\Omega)} = \frac{2}{5}$

Therefore, the probability distribution of $\bar{X}$ can be written as:

$\bar{X}$	93.67	96.67	98.67
$P(\bar{X})$	$\frac{2}{5}$	$\frac{1}{5}$	$\frac{2}{5}$

The probability distribution of the sample mean (such as the table shown above) is called the "*sampling distribution of the sample mean*".

Exercise:

A certain store sells 5 different brands of pen with the corresponding prices of 20, 15, 12, 35, and 42 (in Php). Suppose you asked your classmate to buy four of any of these brands of pen. You want to know the possible average price to be paid for the pens bought. Construct the sampling distribution of the sample means. (Hint: List all the possible samples of size 4.)