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Beach Forest Communities of San Agustin, Romblon with Notes on Coastal Threats

Jeric B. Gonzalez, Xyrra Jeremiah C. Mazo, and Shiela Me G. Mangao

ABSTRACT

The coastal plains of the Philippines were among the first sites opened for human settlement. However, the sprouting of communities has displaced beach forests and mangrove swamps. The growing intensity and frequency of weather disturbances brought by changing global climate highlight beach forests' critical role as bio-shields for vulnerable coastal communities. Unfortunately, beach forests continue to disappear due mainly to conversion into human settlements and wanton harvesting for fuel wood and medicinal plant parts. Currently, no study has been conducted on the beach forest communities in San Agustin, Romblon; thus, this study was conceptualized. A survey was conducted in all barangays of San Agustin, and species identification was made. A total of 38 species of beach forest plants belonging to 21 families were identified. The municipality of San Agustin has a species richness of 3.99, Shannon diversity index of 2.53, Simpson dominance index of 8.73, and Evenness index of 0.70. Cabolutan had the highest species richness among the barangays, while Binonga-an had the highest diversity and dominance index. The relatively high abundance of *Cocos nucifera* denotes that these areas were subjected to anthropogenic activities. Erosion, garbage, seawall, road widening, and infrastructure developments for beach resorts and summer houses were the five major coastal threats recorded in the beach forest areas around San Agustin, Romblon. These data can serve as a reference for different conservation activities to protect and enhance the current status of the beach forest of San Agustin, Romblon.

Keywords: *coastal threats, distribution of beach forest, diversity of beach forest, mapping, species composition*

INTRODUCTION

The coastal forest plays a significant role in the social and economic development of both present and future generations, as coastal resources support critical economic and subsistence activities [Food and Agricultural Organization (FAO), 1998]. Coastal forest ecosystems provide many unpriced services (Cochard, 2017). Coastal forests form essential links with other terrestrial and marine coastal ecosystems. Such forest communities include mangroves, beach forests, and peat swamps.

A beach forest is a plant community growing along sandy shores up to a high tidal zone. These are critical ecological zones in many coastal regions. Plant species in these zones are adapted for growing in harsh environmental conditions, experiencing wide variations in temperature, salinity, and humidity which influence the composition of plant species (Cochard et al., 2008; Kongapai et al., 2016). They are also resilient to wind, rain, waves, and salt sprays from the ocean (Tanaka et al., 2007; Cochard et al., 2008; Kongapai et al., 2016).

Beach forests are essential in sustaining coastal ecosystems and local communities (Kongapai et al., 2016). For centuries, beach forests have provided shelter from strong typhoon winds. The beach forest and trees, to some extent, contribute significantly to preventing coastal erosion brought by fast tidal currents, wind, and wave activity (Prasetya, 2006). It reduces the impact forces, flow depths, and velocities, limiting the extent of flooding (Forbes & Broodhead, 2007). It also protects against damages caused by salt spray to human settlements or cultivation (Goltenboth et al., 2006; De Zoysa, 2008). Beach forests filter floodwaters of suspended soil particles before reaching the sea, thus protecting the coral reefs from coastal water sedimentation. (Victor et al., 2006). Adjacent sandy beaches are also important nesting sites for sea turtles (Kongapai et al., 2016). Thus, the increasing intensity

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and frequency of weather disturbances brought by changing global climate highlight beach forests' critical role as bio-shields for vulnerable coastal communities and biodiversity.

Despite the significant roles of coastal forests, vegetation in these areas was the first to disappear, followed by mangroves and other forest types. Most Philippine beach forests have been lost to human development projects such as converting into human settlements and wanton harvesting for fuel wood and medicinal plant parts (Liao, 2014). Due to their early loss, beach forest is not well studied as other flora and, therefore, not familiar to the average Filipino (Primavera & Sadaba, 2014). Thus, studies assessing the beach forest communities of the country must be done to generate knowledge of what remains of these forests and formulate appropriate actions to protect them.

At present, no study has been conducted about the beach forest communities in the municipality of San Agustin, Romblon. Such information is needed to understand the ecology of beach forests and spatial changes over the long term. To address this knowledge gap, this study was conceptualized. This study is vital in determining the status of the beach forest of San Agustin, Romblon. This serves as baseline information for policymakers' decision-making in environmental awareness and resource management. Increased awareness of the total benefits of coastal forests is vital for its conservation and sustainable management aiming to increase and improve vegetation richness and diversity of disturbed beach forests, allowing them to thrive once again. Further, the study's results may also serve as a reference in initiating activities to build community awareness in protecting the beach forests, stressing its importance to the local communities. It may also serve as a reference and precedence for replicating other researchers of the same interest.

This study aimed to assess the beach forest of San Agustin, Romblon taking notes on coastal threats. Specifically, the study determined the species composition, distribution, and richness in the beach forest of San Agustin. Through this study, a map of the beach forest of San Agustin was generated, and threats to coastal areas of San Agustin were also identified.

METHODOLOGY

Locale of the Study

The sampling was conducted in the whole coastal area of San Agustin Romblon (Figure 1). It was conducted in the beach forest area of the coastal barangays, namely Cawayan, Long Beach, Sugod, Carmen, Cabolutan, Cagbo-aya, Dubduban, Doña Juana, Binonga-an, Lusong, Hinugusan, Buli, Camantaya, and Bachawan. A request letter was sent

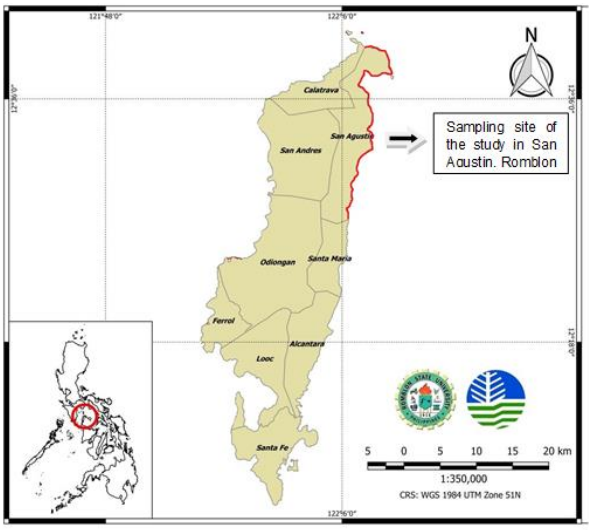

Figure 1. Location of sampling site (indicated by red line) in San Agustin, Romblon.

and approved by the Barangay Captain of each barangay before the start of the sampling. The sampling was conducted from December 2018 - February 2019.

Research Design

A descriptive-quantitative research design was used in this study to determine the species composition, distribution, species richness, diversity, dominance, and evenness of beach forest plants. Direct observation and descriptive analysis were done to identify the threats on coastal areas and generate a map of the beach forest of San Agustin, Romblon.

Sampling Procedure

The survey method of English et al. (1997) was used to determine beach forest plants' distribution, richness, diversity, dominance, and evenness in San Agustin. A 100-meter transect was laid out five meters above the highest high tide in the beach forest area of each barangay. The transect was laid out parallel to the shore. All beach forest trees five meters below and five meters above the transect line were documented, counted, and recorded. Each transect was further replicated thrice in each barangay and had a 30 meters distance for short beach forest and at least 30 meters distance for long beach forest area. A total of 42 transects were established in the beach forest area of San Agustin.

Plant Identification and Beach Forest Mapping

A transect walk survey was used to inventory beach forest plants and map the beach forest areas in San Agustin. All plants such as trees, shrubs, ferns, palms, grass, and vines found in the beach forest were documented and identified using the work of Primavera

and Montilijao (2017). Further verifications were done by sending documented pictures of beach forest plants to experts. The beach forest plants were marked, and the forest area was recorded by taking coordinates points using a handheld GPS Garmin metrics device. The coordinates were then plotted on Google Earth. Mapping of the beach forest of San Agustin was done using QGIS 3.22.

Coastal Threats Identification

The identification of coastal threats was made by a transect walk survey. All observed threats including erosion, an unwanted structure such as illegal settlements and concrete seawalls, root exposure, and other anthropogenic activities that caused coastal threats was recorded and captured.

Data Analysis

The descriptive statistics such as counts, percentages, and mean were computed using Microsoft Excel. The diversity, dominance, and evenness indexes were computed using the formula below. Data were analyzed using SPSS version 16.

For the Shannon Diversity Index, the following formula was used:

$$H = \sum_{i=1}^{S} -(Pi * In\ Pi)$$

Where:

H = the Shannon Diversity Index
Pi = fraction of the entire population made up of species i
S = numbers of species encountered
∑ = sum from species 1 to species S

Note: The power to which the base e (e=2.718281828) must be raised to obtain a number is called the number's natural logarithm (ln).

For Simpsons Dominance Index, the following formula was used:

$$D = \sum_{i=1}^{S}(Pi^2)$$

Where:

D = Value of Simpsons diversity index
Pi = proportion of individuals in the ith species
S = # of species

For Evenness Index, the following formula was used:

$$e = H / \ln S$$

Where:

H = Shannon Diversity index
S = Total number of species in the sample

RESULTS AND DISCUSSION

Species Composition of Beach Forest Plant in San Agustin, Romblon

A total of 38 species of beach forest plants belonging to 21 families were identified in San Agustin, Romblon, Philippines (Table 1). Only one species was identified under each Amary: Two species were identified under families Arecaceae, Lamiaceae, Lecythidaceae, Malvaceae, and Rubiaceae. Three species were identified under each of the families Apocynaceae and Sterculiaceae. The family with the highest identified species is Fabaceae, with eight species. Meanwhile, there were two unidentified species of beach forest plant.

Distribution of Beach Forest Plants in San Agustin, Romblon

The distribution of beach forest plants in San Agustin, Romblon varied in every barangay (Table 2; Plate 1). A total of seven species were noted common in all barangays and these includes, *Terminalia catappa*, *Albizia procera*, *Morinda citrifolia*, *Ipomoea-pes caprae*, *Cocos nucifera*, *Millettia pinnata*, and *Vitex trifolia.* Cocos nucifera has the highest total number of 2,687 individuals among the seven common species.

Meanwhile, some beach forest plants showed restricted distribution, with some plants only found in specific barangays. This pattern indicates a restriction in the spatial distribution of beach forest trees of San Agustin, Romblon. The type of substrate present influenced the species composition in each area. It was observed that beach forest plants that showed restricted distribution were found in either the sand beach or rock beach substrate. Some beach forest plants were restricted to only two barangays, including *Caesalpinia bonduc*, *Cordia subcordata*, *Ficus microcarpa*, and *Heritiera littoralis*, which were only found in areas with a sandy substrate. On the other hand *Erythrina variegate* and Species 1 (unidentified) were found in areas with sandy and rocky substrates. Moreover, some plant species showed a very restricted distribution and are only found in the sandy substrate of a single barangay. These include *Alstonia macrophylla*, *Commersonia bartramia*, *Crinum asiaticum*, *Cydas edentate* and *Entada parviflora* in barangay Cagbo-aya, *Barringtonia acutangula*, *Cerbera manghas*, *Dolichandrone spathaceae*, and *Pterocarpus indicus* in barangay Cabolutan, and *bili* and *Guettarda speciosa* in barangay Sugod.

Species Richness, Diversity, Dominance, and Evenness of Beach Forest Communities in San Agustin Romblon

The municipality of San Agustin was found to have a species richness value of 3.99 with 38 recorded species of beach forest plant, diversity index of 2.53, the dominance index of 8.73, and an evenness index of 0.70. Among the barangays of San Agustin, barangay Cabolutan was found to have the highest species richness value of 3.79, with 27 recorded species of beach forest plant.

Table 1. Checklist of Species Composition of Beach Forest Trees in San Agustin, Romblon

Family Name	Scientific Name	Local Name
Amaryllidaceae	*Crinum asiaticum* Linnaeus, 1753	Bakong
Apocynaceae	*Alstonia macrophylla* Wall. ex G.Don, 1837	Itang-itang
	A. scholaris (L.) R.Br. 1810	Dita
	Cerbera manghas Linnaeus, 1753	Buta-buta
Arecaceae	*Cocos nucifera* Linnaeus, 1753	Niyog
	Nypa fruticans Wurmb, 1779	Nipa
Bignoniaceae	*Dolichandrone spathacea* (L.fil.) K. Schum., 1889	Tiwi
Boraginaceae	*Cordia subcordata* Lam., 1792	Agut-ut
Capparidaceae	*Capparis micracantha* DC.,1824	Halubagat
Combretaceae	*Terminalia catappa* Linnaeus, 1767	Talisay
Convolvulaceae	*Ipomoea pes-caprae* (L.) R.Br., 1818	Palang-palang
Cycadaceae	*Cycas edentata* de Laub., 1998	Pitogo
Euphorbiaceae	*Macaranga tanarius* (L.) Müll.Arg., 1866	Binunga
Fabaceae	*Albizia procera* (Roxb.) Benth., 1844	San Pedro
	Caesalpinia bonduc Linnaeus, 1753	Dalugdug
	Entada parvifolia Merr., 1908	Bayakaw
	Erythrina variegata Linnaeus, 1754	Dapdap
	Gliricidia sepium (Jacq.) Kunth, 1842	Madre cacao
	Millettia pinnata Linnaeus, 1763	Bani
	Pterocarpus indicus Willd., 1802	Narra
	Vachellia aroma (Gillies ex Hook. & Arn.) Seigler & Ebinger, 2006	Aroma
Goodeniaceae	*Scaevola taccada* (Gaertn.) Roxb., 1814	Panabolong
Guttiferae	*Callophyllum inophyllum* Sieber ex C. Presl., 1828	Dangkalan
Lamiaceae	*Premna serratifolia* Linnaeus, 1771	Agdaw
	Vitex trifolia Linnaeus, 1753	Lagunding dagat
Lecythidaceae	*Barringtonia asiatica* (L.) Kurz, 1875	Bitoon
	B. acutangula (L.) Gaertn., 1791	Putat
Malvaceae	*Taliparitiliaceum* (L.) Fryxell, 2001	Malabago
	Thespesia populnea (L.) Sol. ex Corrêa, 1807	Banago
Moraceae	*Ficus microcarpa* L.fil., 1781	Lunok
Pandanaceae	*Pandanus tectorius* Parkinson ex Du Roi, 1774	Pandan
Rubiaceae	*Guettarda speciosa* Linnaeus, 1753	Lambon
	Morinda citrifolia Linnaeus, 1753	Noni
Sapotaceae	*Planchonella obovata* (R.Br.) Pierre, 1890	Banasi
Sterculiaceae	*Commersonia bartramia* (L.) Merr., 1917	Mayamaga
	Sterculia ceramic R.Br., 1844	Banilad
	Heritiera littoralis Dryand. ex Aiton, 1789	Dungon late
		Bili
		Species 1 (Unidentified)

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Table 2. Checklist of the distribution of beach forest plants in San Agustin, Romblon

Scientific Name	Barangay													
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**
Albizia procera	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Alstonia macrophylla						x								
Alstonia scholaris						x	x	x	x					
Barringtonia acutangula					x									
Barringtonia asiatica	x	x	x	x	x	x	x	x	x	x	x	x		x
Bili			x											
Caesalpinia bonduc			x		x									
Callophyllum inophyllum		x	x	x	x	x	x	x	x	x	x	x		x
Capparis micracantha		x		x	x				x					
Cerbera manghas					x									
Cocos nucifera	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Commersonia bartramia						x								
Cordia subcordata				x		x								
Crinum asiaticum						x								
Cydas edentate						x								
Dolichandrone spathacea					x									
Entada parviflora						x								
Erythrina variegate	x					x								
Ficus microcarpa			x					x						
Glericidia sepium		x	x	x	x	x	x	x	x			x		x
Guettarda speciosa			x											
Heritiera littoralis					x		x							
Ipomoea-pes-caprae	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Macaranga tanarius		x	x	x	x	x	x	x	x		x	x	x	x
Millettia pinnata	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Morinda citrifolia	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Nypa fruticans			x	x	x		x	x	x					
Pandanus tectorius	x	x	x	x	x	x	x	x	x	x	x	x		
Planchonella obovata	x	x	x	x	x	x	x	x	x			x	x	
Premna serratifolia		x	x	x	x	x	x	x	x		x	x		
Pterocarpus indicus					x									
Scaevola taccada	x		x	x	x	x		x	x	x	x			x
Species 1 (Unidentified)			x							x				
Sterculia ceramica		x	x	x	x		x	x			x			
Taliparíti tiliaceum				x	x	x				x	x			x
Terminalia catappa	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Thespesia populnea		x		x	x	x				x	x		x	
Vachellia aroma		x	x	x	x	x	x	x	x					
Vitex trifolia	x	x	x	x	x	x	x	x	x	x	x	x	x	x
TOTAL	**13**	**18**	**23**	**22**	**27**	**26**	**19**	**20**	**19**	**14**	**16**	**14**	**10**	**13**

Note: (**A**) Cawayan, (**B**) Long Beach, (**C**) Sugod, (**D**) Carmen, (**E**) Cabolutan, (**F**) Cagbo-aya, (**G**) Dubduban, (**H**) Doña Juana, (**I**) Binonga-an, (**J**) Lusong, (**K**) Hinugusan, (**L**) Buli, (**M**) Camantaya, and (**N**) Bachawan.

FN: AMARYLLIDACEAE
SN*: Crinum asiaticum*
LN: Bakong

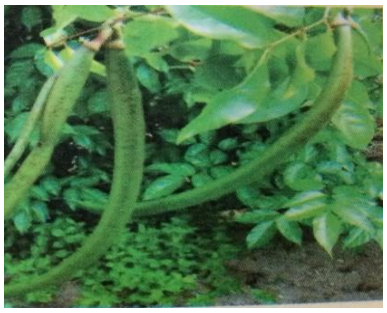
FN: ARECACEAE
SN*: Cocos nucifera*
LN: Niyog

FN: ARECACEAE
SN: *Nypa fruticans*
LN: Nipa

FN: APOCYNACEAE
SN: *Alstonia macrophylla*
LN: Itang-itang

FN: APOCYNACEAE
SN: *A. scholaris*
LN: Dita

FN: APOCYNACEAE
SN*: Cerbera manghas*
LN*:* Buta-buta



FN: BIGNONIACEAE
SN: *Dolichandrone spathaceae*
LN: Tiwi

SN: **BORAGINACEAE**
SN: *Cordia subcordata*
LN: Agut-ut

FN: CAPPARIDACEAE
SN: *Capparis micracantha*
LN: Halubagat

Plate 1. The beach forest plants of San Agustin, Romblon, Philippines

FN: COMBRETACEAE
SN: *Terminalia catappa*
LN: Talisay

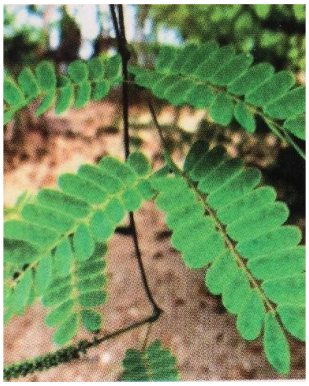
FN: CONVOLVULACEAE
SN: Ipomoea-pes caprae
LN: Palang-palang

FN: CYCADACEAE
SN: *Cydas edentate*
LN: Pitogo

FN: EUPHORBIACEAE
SN: *Macaranga tanarius*
LN: Binunga

FN: FABACEAE
SN: *Erythrina variegate*
LN: Dapdap

FN: FABACEAE
SN: *Caesalpinia bonduc*
LN: Dalugdug

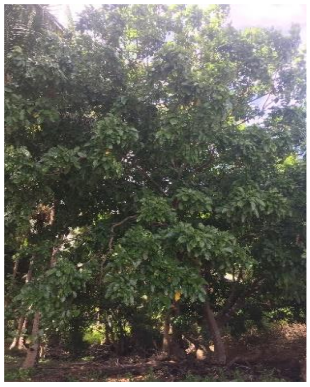


FN: FABACEAE
SN: *Entada parviflora*
LN: Bayakaw

FN: FABACEAE
SN: *Albizia procera*
LN: San Pedro

FN: FABACEAE
SN: *Glericidia sepium*
LN: Madre cacao

Plate 1. The beach forest plants of San Agustin, Romblon, Philippines (cont.).



FN: FABACEAE
SN: *Millettia pinnata*
LN: Bani

FN: FABACEAE
SN: *Pterocarpus indicus*
LN: Narra

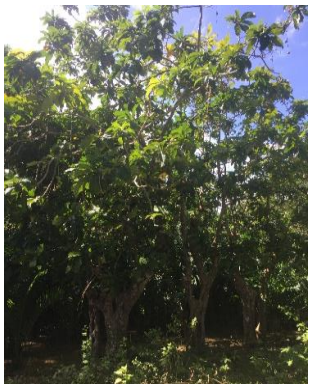
FN: FABACEAE
SN: *Vachellia aroma*
LN: Aroma

FN: GOODENIACEAE
SN: *Scaevola taccada*
LN: Panabolong

FN: GUTTIFEREAE
SN: *Callophyllum inophyllum*
LN: Dangkalan

FN: **LAMIACEAE**
SN: *Vitex trifolia*
LN: Lagunding dagat

FN: LECYTHIDACEAE
SN: *Barringtonia asatica*
LN: Bitoon



FN: LECYTHIDACEAE
SN: *B. acutangula*
LN: Putat

FN: MALVACEAE
SN: *Taliparíti tiliaceum*
LN: Malabago

Plate 1. The beach forest plants of San Agustin, Romblon, Philippines (cont.).

FN: MALVACEAE
SN: *Thespesia populnea*
LN: Banago

FN: MORACEAE
SN*: Ficus microcarpa*
LN: Lunok

FN: PANDANACEAE
SN*: Pandanus tectorius*
LN: Pandan

FN: RUBIACEAE
SN: *Guettarda speciose*
LN: Lambon

FN: LAMIACEAE
SN: *Morinda citrifolia*
LN: Noni

FN: LAMIACEAE
SN: *Premna serratifolia*
LN: Agdaw

FN: SAPOTACEAE
SN: *Planchonella obovata*
LN: Banasi

FN: STERCULIACEAE
SN: *Commersonia bartramia*
LN: Mayamaga

FN: STERCULIACEAE
SN*: Sterculia ceramica*
LN: Banilad

FN: STERCULIACEAE
SN: *Heritiera littoralis*
LN: Dungon late

Species 1 (Unidentified)

LN: Bili

Plate 1. The beach forest plants of San Agustin, Romblon, Philippines (end.).

It was then followed by Cagbo-aya with 3.50 (26 species), Sugod with 3.02 (23 species), Dubduban with 2.88 (19 species), Carmen with 2.81 (22 species), Binonga-an with 2.68 (19 species), Long Beach with 2.64 (18 species), Dona Juana with 2.60 (20 species), Hinugusan with 2.42 (16 species), Cawayan with 2.38 (13 species), Buli with 2.25 (14 species), Lusong with 2.22 (14 species), Bachawan with 2.04 (13 species) and lastly, Camantaya with 1.80 (10 species) (Figure 2).

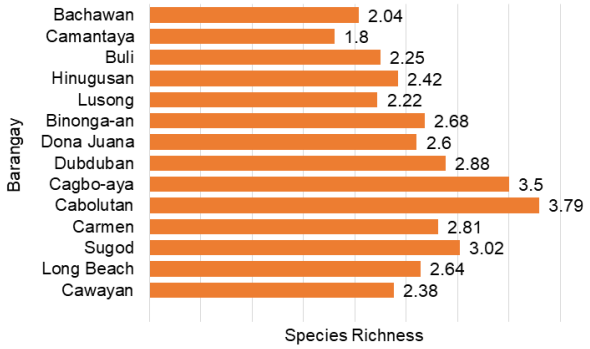


Figure 2. Total species richness of beach forest of San Agustin, Romblon.

Regarding diversity, the beach forest of barangay Binonga-an housed the most diverse species of plants with an index of 2.47. It was then followed by Cagbo-aya with 2.45, Cabolutan and Dona Juana with 2.42, Sugod with 2.31, Carmen with 2.21, Dubduban with 2.19, Cawayan with 2.15, Buli with 2.13, Long Beach with 2.08, Bachawan with 1.93, Camantaya with 1.92, Lusong with 1.84, and Hinugusan with 1.74, respectively (Figure 3).

Meanwhile, in terms of dominance, the beach forest of barangay Binonga-an has the most dominant plant species, with an index value of 9.15. It was then followed by Cagbo-aya with 8.72, Dona Juana with 8.48, Cabolutan with 8.13, Sugod with 6.84, Carmen with 6.73, Dubduban with 6.40, Cawayan with 6.30, Buli with 5.93, Longbeach with 5.63, Camantaya with 5.51, followed by Bachawan with 5.30, Lusong with 4.03, and Hinugusan with 3.46, respectively (Figure 4).

Moreover, barangay Binonga-an and Cawayan were found to have the highest evenness index of 0.84. It was then followed by Camantaya with 0.83, Buli and Dona Juana with 0.81, Cagbo-aya and Bachawan with 0.75, Dubduban with 0.74, Sugod with 0.74, Cabolutan with 0.73, Carmen and Longbeach with 0.72, Lusong with 0.70, and Hinugusan with 0.63 (Figure 5).

Furthermore, after subjecting to statistical analysis, results showed no significant difference in species richness, diversity index, dominance index, and evenness index among the beach forests of all the barangay in the municipality of San Agustin, Romblon.

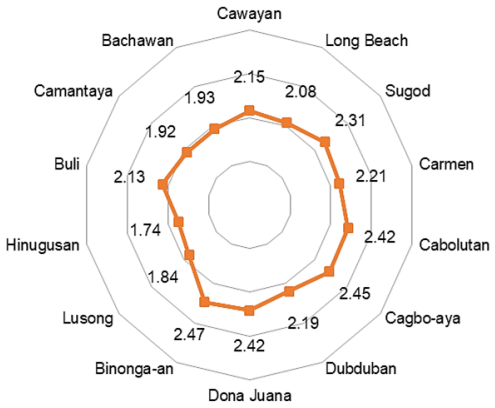


Figure 3. Shannon diversity index of beach forest of San Agustin, Romblon.

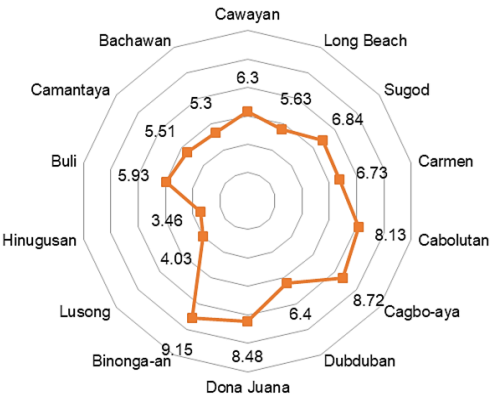


Figure 4. Simpson dominance index of beach forest of San Agustin, Romblon.

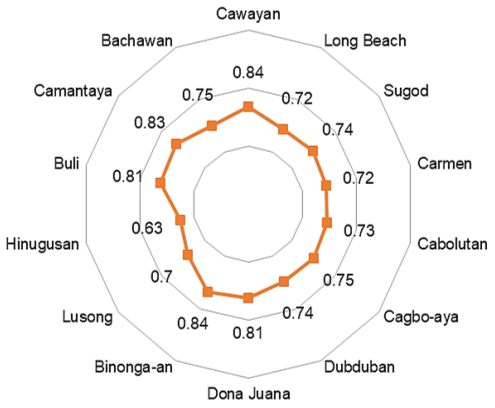


Figure 5. Evenness index of beach forest of San Agustin, Romblon.

This indicates that the beach forest around the municipality of San Agustin has an even distribution of beach forest plants.

Results showed that the beach forest of San Agustin holds about 38 species out of 96 species of beach forest plants in the country. The number of beach forest plants in San Agustin, Romblon was relatively higher than in other beach forests in the Philippines and other countries (Table 4). For instance, only 16 species were found on Dinagat Island (Lillo et al., 2019), 21 species were found on Sicogon Island (Pedregosa et al., 2006), and 24 species were found in Pang Nga, Thailand (Kongapai et al., 2016). On the other hand, the results of the present study were lower compared to the study of Sabulao et al. (2020) in Guiuan Eastern Samar with 39 species, a study by Garcia et al. (2017) in Surigao, the Philippines, with 55 species, study of Nini and Tatil (2017) in Surigao del Norte with 57 species and the study of Neamsuvan et al. (2012) in Songkhla province, Thailand with 69 species.

Some beach forest plant species recorded from the study have high economic value, such as *Pterocarpus indicus* and *Callophyllum inophyllum* for their timber, *Cocos nucifera* for its fruit, and *Ipomoea-pes caprae* and *C. inophyllum* for their medicinal uses (Neamsuvan et al., 2012). Some species also serve as food for the coastal area animals and play key roles in the ecosystem.

Among the 21 families present, Fabaceae has the highest recorded species of beach forest plants. This family is known to fix nitrogen and is relatively common in beach forests (Goltenboth et al., 2006; Lillo et al., 2019). However, in the present study, four species under this family were only found in a few barangays. *P. indicus*, a species of beach forests tree which provides valuable timber was only found in the sandy beach of only one barangay. Another beach forest tree that provides timber widely distributed in the municipality is *C. inophyllum.*

Moreover, seven beach forest plant species were found common in all barangays. These include *Terminalia catappa, Albizia procera, Morinda citrifolia, Ipomoea-pes caprae, C. nucifera, Millettia pinnata, Vitex trifolia.* These species were also noted to be the dominant beach forest plant in the study of Lillo et al. (2019). Among these *C. nucifera* was found dominant. The relatively high abundance of *C. nucifera* denotes that these areas were subjected to anthropogenic activities that have altered the species composition since palms are not natural vegetation in these ecosystems (Goltenboth et al., 2006). It was reported that the agriculture sector of the municipality has initiated the plantation of these trees for agricultural purposes.

Based on the Shannon diversity index, the beach forest of San Agustin, Romblon, has a diversity index value of 2.53. This result indicates that the municipality has higher species diversity when compared to Dinagat Island with a 1.45 index (Lillo et al., 2019) and the beach forest trail of Puerto Princesa Subterranean River National Park, Palawan with a 1.85 index (Alcantara et al., 2014), but lower when compared to Brgy. Sta Cruz, Surigao del Norte with 3.27 index (Nini and Tatil, 2017). Moreover, San Agustin, Romblon's Simpson dominance index and Evenness index were 8.73 and 0.70, respectively. These high index values indicate a uniform distribution of various species of beach forest plant in the whole municipality and are are interpreted as about 70 % of the species in the sampling sites are like each other. This value is higher than the recorded evenness index in Brgy. Sta Cruz, Surigao del Norte with 0.66 (Nini and Tatil, 2017), but lower than the recorded evenness index in Dinagat Island of 0.956 (Lillo et al., 2019)

Among the barangays of the municipality, the beach forest with relatively high species composition was found in Cabolutan. In contrast, the highest diversity, dominance, and even distribution of the different plant species were found in barangay Binonga-an. Other barangays with high indexes also include barangay Cagboaya, Doña Juana and Cawayan. This result can be attributed to the situation and structure of the coastal communities in these barangays. It was observed that the communities' houses were not close to the seacoast, giving an area for the beach forests plant to flourish. Another factor can be due to the topographical features of each barangay. Due to the steeper topography of some barangay, the community was forced to build their houses near the shore, occupying the areas for possible beach forests. Furthermore, the low indexes obtained from the beach forests of barangay Hinugusan and barangay Lusong must have been affected by the shorter coastal zones in these barangays.

Map of the Beach Forest of San Agustin, Romblon

The coastal area of the San Agustin, Romblon was characterized by a long range of beach forests where diverse species of beach forest plants can be found (Figure 6). The northern part of the municipality, specifically in the coastal areas of barangay Cawayan and barangay Long Beach, was characterized by karst forest, rock, and boulders. Mangroves and beaches also characterized the coastal area. Meanwhile, piles of garbage and coastal erosion were also observed in some areas and in the artificial infrastructure of seawalls and bridges.

Coastal Threats in the Beach Forest Communities of San Agustin, Romblon

Five major coastal threats were recorded along the beach forest areas of San Agustin, Romblon (Table

3; Plate 2). The most common threat in all the barangay was the garbage that was possibly dumped or washed by waves to the beach forest areas. Locals also built seawalls as barriers against strong waves or typhoons. Meanwhile, the beach forest area of some barangay was also replaced by beach houses and resorts for tourism purposes. Coastal erosion, which caused escarpment and exposure of roots of beach forest trees, was also observed. Lastly, the cutting of beach trees in the beach forest was observed in two barangays.

Table 3. Checklist of coastal threats in beach forest communities of San Agustin, Romblon.

Barangay	Erosion	Seawall	Garbage	Infrastructure	Cutting of beach trees
Cawayan					
Longbeach			x	x	
Sugod	x		x		
Carmen		x	x	x	x
Cabolutan	x		x	x	
Cagbo-aya	x		x	x	
Dubduban			x		
Dona Juana	x	x	x		x
Binonga-an		x	x		
Lusong			x		
Hinugusan		x	x	x	
Buli		x	x	x	
Camantaya		x	x	x	
Bachawan		x	x	x	

Plate 2. Captured threats in beach forest of San Agustin, Romblon which includes houses and seawall (a), exposed roots of trees (b), port (c), washed out garbage (d), beach resort (e), and cut trees (f).

Table 4. Comparison of beach forest in different parts of the world.

Location	No. of species	Author
San Agustin, Romblon	38	This study 2019
Surigao, Philippines	55	Garcia et al., 2017
Dinagat Island, Philippines	16	Lillio et al., 2019
Surigao del Norte, Philippines	57	Nini and Tatil, 2017
Guiuan Eastern Samar, Philippines	39	Sabulao et al., 2020
Philippines	96	Primavera and Montilijao, 2017
Sicogon Island, Antique, Philippines	21	Pedregosa et al., 2006
Pang Nga, Thailand	24	Kongapai et al., 2016
Songkhla province, Thailand	69	Neamsuvan et al., 2012

Beach forests are plant communities growing along sandy shores and up to the high tidal zone. The vegetation is found on dunes, sometimes on sand, gravel, or rock, and are composed of dense grasses, shrubs, and herbs, grove, or forest with a closed canopy (Neamsuvan et al., 2012). Plants present in this area can tolerate salt spray (halophytes), strong wind, and drought (Rueangphanich, 2005). The beach forest and trees play a significant role in protecting the shoreline from the erosion caused by wave action, wind, and fast tidal currents (Prasetya, 2006).

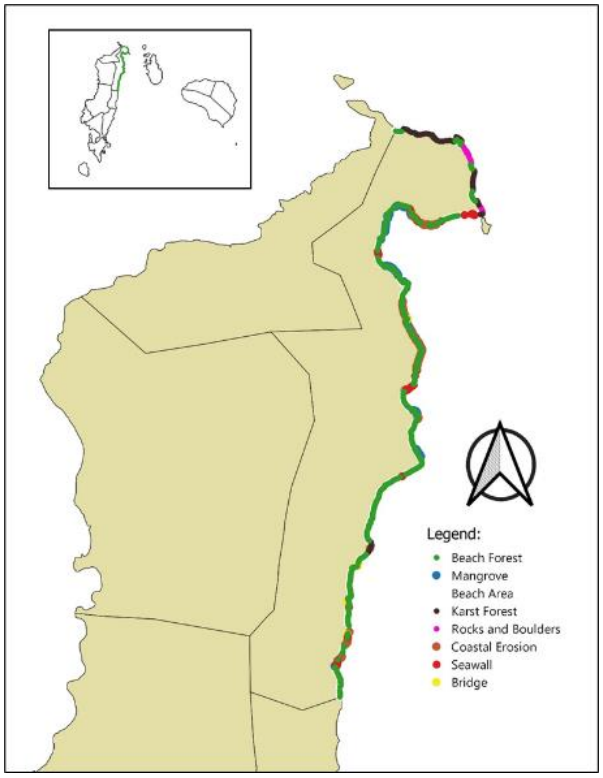


Figure 6. Beach Forest Mapping of San Agustin, Romblon

However, these coastal ecosystems were threatened by different natural changes like sea-level rise, high-intensity storms and anthropogenic activity such as excessive resource exploitation and coastal development (Barbier et al., 2011; Frosini et al., 2012). These areas also serve as hotspots of plastic accumulation (Ceccarini et al., 2018; Rangel-Buitrago et al., 2018). These plastics were washed to shore by floods from the coastal communities or brought into the beaches by the strong action of waves and winds from the sea. Tons of household garbage, industrial wastes, and sewage are produced every year. Mismanagement of these often results in major environmental problems. Plastic bags are one of the most problematic garbage that threatens the ecosystem. During rainfall events, the additives from these plastic bags leach out into dunes and absorbed by the seeds and roots of plants (Menicagli et al., 2019). Accordingly, plastic pollution creates several adverse impacts combined with ecological and socio-economic effects (Thushari & Senevirathna, 2020). Significant ecological effects that threaten biodiversity and trophic relationships include entanglement, toxicological effects from ingesting plastics, suffocation, starvation, dispersal and rafting of organisms, provision of new habitats, and introduction of invasive species (Thushari & Senevirathna, 2020).

Moreover, the increasing coastal population has dramatically disturbed the forests, converting these areas to residential zones where houses and beach resorts were built along with seawalls protecting them from strong waves and high tides. Although these structures support economic and social activities that can contribute to positive or negative effects on the coastal environments (Sevilla et al., 2018), coastal development, such as residential houses and beach resorts, not only replaced the beach forests and the ecosystem services it provides but may also produce pollutants which affect near-by ecosystems such as coral reefs (Bozec et al., 2008).

Furthermore, beach forest trees were cut in the coastal areas. Trees were cut and harvested for charcoal production and house construction, similar to what had happened to other beach forest areas in the Philippines (Buitre et al., 2019). These human activities significantly contribute to the loss of coastal ecosystems such as beach forests. These anthropogenic activities might have also resulted in further natural threats such as coastal erosion.

Nowadays, more extensive beach forest areas only occur in more remote parts of the country. The beach forests in more populated areas have declined drastically, and the destruction went almost unnoticed by the community. As the population of the province increases and pressures are put along the coastal areas where the community settles near the shore due to fishing, their primary source of income, activities for the conservation and protection of the beach forests must come to action.

CONCLUSION

Beach forests play an essential role as a component of coastal ecosystems that links with other terrestrial and marine coastal ecosystems. However, only a few studies were conducted on the beach forests in the country. In the municipality of San Agustin, a total of 38 species of beach forest plants belonging to 21 families were identified and recorded. Seven (7) species were noted common in all barangays, such as *Terminalia catappa, Albizia procera, Morinda citrifolia, Ipomoea-pes caprae, Cocos nucifera, Millettia pinnata,* and *Vitex trifolia.* The relatively high abundance of *C. nucifera* among these species was due to the plantation activity of the agriculture sector of the local government unit. The spatial situation and structure of coastal communities in barangay Cabolutan and Binonga-an affected the beach forest plants population. Moreover, the mapping revealed a long range of beach forests along with the coastal areas of San Agustin, which are now being threatened by different factors that anthropogenic activities cause. Due to the lack of data, the researchers could not assess how much has been lost in the beach forest of the municipality. However, these data serve as a reference for different conservation activities to protect and enhance the status of the beach forest of San Agustin, Romblon.

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AUTHORS' CONTRIBUTION

Mr. Gonzalez and Ms. Mangao participated on the conceptualization and data collection. Mr. Gonzalez and Ms. Mazo carried out the data processing and data interpretation. All authors helped in the manuscript write-up. All authors read and approved the final manuscript.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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Organizational Culture and Leadership Praxis: Basis for a Proposed Leadership Framework

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ABSTRACT

Organizational culture is broadly considered to be one of the most important factors of organization variables, which also affects the behavior of employees. Cultural diversity in an organization has a significant influence on work behavior, managerial practices, organizational effectiveness, and efficiency. To evaluate the organizational culture and leadership practice, the researchers invited 24 principals, 246 teachers, and 26 stakeholders from the selected elementary schools in San Agustin, Calatrava, and Sta. Maria in the province of Romblon. The collected data were subjected to cool and warm analyses yielding a set of themes and sub-themes that characterized the desired organizational culture and leadership practices. The findings suggest that the organizational culture of the elementary school principals and teachers was vision-, mission-, goal- and objective-oriented. They are motivators who continuously support their members in facing challenges and work demands. In addition, it was also determined that they were good at problem-solving. Finally, this study generated a proposed leadership framework that could potentially help improve the organizational culture and leadership praxis, particularly in the formulation of an instrument or criteria for choosing new school leaders.

Keywords: *organizational culture, leadership praxis, principals, teachers, stakeholders*

INTRODUCTION

Organizational culture is broadly considered to be one of the most important factors of organization variables. Every organization has its own unique culture that distinguishes them from the others. It also affects employees' behavior at work. The challenge of today's managers is managing a culturally diverse workforce that has various work behavior, managerial practices, organizational effectiveness, and efficiency (Schein, 2010). Leadership learning and development are increasingly seen as important constituents in preparing potential head teachers and principals to assume senior roles. Understanding the nature of culture, its diversity, and how far it may be open to influence would seem to be important within such development, yet deciding what leaders need to know and be able to do in this field is very challenging (Schein, 2010).

Global demands in the teaching and learning environment are resulting in increasingly diverse societies, and principals are encountering more complex and challenging school communities. According to Section 6.1, Rule VI of the Implementing Rules and Regulations of Republic Act No. 9155 (Official Gazette, 2001), a school head is a person responsible for the administrative and instructional supervision of the school or cluster of schools. As such, a school head is expected to possess educational, people, and strategic leadership dimensions. Effective principals are continuously searching for new strategies and means of communicating with their external and internal stakeholders. Therefore, one determining factor of a principal's ability to effectively communicate is through establishing a connection with the intended audience (Schein, 2010). Principals need to understand that it will take more than verbal rhetoric to effectively communicate the goals and priorities of the school. As leaders, principals' non-verbal communications are equally important in determining the effectiveness of their leadership by positively or negatively influencing the school culture. Thus, principals need to constantly be aware of their actions. There is an abundance of available research that provides models and specific strategies and actions to guide and support principals in the establishment of a culture that supports positive outcomes for students and their schools. Effective principals must have extensive knowledge based on the area of school improvement and the skills to effectively implement the initiatives (Schein, 2010).

Based on various models of effective instructional leadership, a good leadership practice

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includes establishing a shared vision, communicating the vision, creating a culture, and empowering others. Each demands a different set of knowledge and skills, most of which today's leaders have not had the opportunity to learn (Reagle, 2006). Concerning this, the lack of appropriate professional development is one of the reasons why principals are ill-prepared for the job, and no matter how effective the communication skills are, there will always be uncertainty in the goals established (Schein, 2010). To improve the effectiveness, principals need to develop strategies to successfully communicate their vision. The ability to create a vision and communicate its reality is what separates managers from leaders (Bennis, 2000). However, principals must not overlook the degree to which the goals and purpose of the school remain unclear to some of its members. Effective principals can build trust and credibility, ensuring their behaviors and actions are consistent and aligned with the communicated vision and goals (Kouzes & Posner, 2017). In this sense, effective leaders are those that act as transformational leaders who empower, motivate, teach, and learn from the staff (Hersey et al., 2001; Fullan, 2001; and Kouzes & Posner, 2017). A remarkable leader is always expected to engage employees in their work strongly, so the employee would feel motivated, emotionally attached, committed to the future, and understand the future vision buy contribution of courageous leaders (Kantabutra & Avery, 2011).

This phenomenological study aims to contribute to the educational leadership literature in several ways: (a) define and create some needed modifications as substantial policy change on modern technology programs acquiring and retaining well-trained managers, leaders, and teachers in Nation's Classrooms that will redound to quality management, education, and turnouts; b) come up with improved leadership and managerial policies across educational institutions; (c) contribute to improving the leadership practices on how school constituents are carried on through the leadership competencies; (d) guide the leaders to have an excellent performance in doing their functions and achieving the major thrusts, as to research, instruction, extension, production, and development; and (e) producing competent learners, prepared for effective participation in a global society.

This study was anchored on two theories by Schein (2010) on organizational culture and leadership theory, respectively. Organizations need to deal with the external environment where group formation and culture formation are two sides of the same coin and the result of leadership activities and shared experiences. The objectives are to build shared assumptions about the mission, strategy, goals, means, evaluation, and corrective measures if goals are not met. It should also address internal integration, which includes a common language, criteria for inclusion/exclusion, distribution of power, authority and status, norms of trust and intimacy, allocation of rewards and punishments, and explaining the unexplainable. Similarly, the Path-Goal leadership theory focuses on the subordinates' characteristics (needs, confidence, abilities) and the nature of the workplace (type and nature of tasks and relationships between colleagues) (Schein, 2007).

This study intended to build up a growing body of research on organizational culture and leadership praxis, particularly in the leadership practices of elementary school principals in the district of Sta. Maria, San Agustin, and Calatrava in the province of Romblon, respectively. At a practical level, the researchers looked further at the valuable resource that could potentially assist aspiring school heads and principals, as academic administrators, to become more capable of leading and managing people, as well as the resources available, so this study was conducted.

METHODOLOGY

Design

This study utilized a mixed-methods design. The quantitative and qualitative data were examined to answer the research questions of the study. The lived experiences of the select group of leaders were described and clarified. An in-depth interview was conducted and used as a data-gathering technique to capture the essence of the subject's praxis.

Study Site

Table 1. Frequency Distribution of Respondents of the Study.

Elementary School Districts	Number of Principals	Number of Teachers	Number of Stakeholders
1.Sta. Maria	5	60	10
2.San Agustin	13	138	10
3. Calatrava	6	48	6
Total	24	246	26

The respondents of this study were 24 school principals and 246 teachers (Table 1). The sampling technique employed was probability sampling, particularly purposive sampling for both the principal and teacher-respondents, because the sample was a proportion of the population, and such sample was selected from the population employing some systematic way in which every element of the population has a chance of being included in the sample.

Validation of the Instrument

The contents of the questionnaire were verified by School Principals and Administrators to check the appropriateness of the content and format and to be able to provide an intelligent judgment or experts' opinion on its adequacy. Pilot testing was conducted to determine the consistency and dependability of the questions. Two elementary school principals and 12 teachers from Calagonsao Elementary School and Tugdan Elementary School were the respondents to the pilot testing of the instrument to determine its reliability.

Collection of Data

The questionnaires were retrieved from the principals and teachers and then sorted and encoded in the computer for analysis thru SPSS. In addition, responses of stakeholders like LGU officials, SK, and PTA officers were consolidated for the formulation of a selection framework for choosing principals.

Ethical Considerations

Given that extremely sensitive and confidential information is likely to surface in a study of this type (Cranston et al., 2010), a meeting was held with the participants before the conduct of the interview to inform them of the nature and purpose of the researchers, the plans for using the results from the interview, and the protocol to be observed to protect the privacy of the participants and the institutions they represent (Creswell & Creswell, 2009). On the actual day of the interview, the participants were requested to read and sign a letter of consent to participate in the study and for the interview to be recorded. Participants were assured that their participation in the research was strictly voluntary and that they would have the freedom to withdraw their consent at any time. To enhance respondents' openness to share their experiences more freely and vividly (Viernes & de Guzman, 2005), it was further reiterated that participants may – at their discretion – choose not to answer questions posed by the researchers that they deemed to be unpleasant, or request for the recorder to be turned off at any time during the session. These norms were observed by the researchers in several cases when recording sessions had to be disturbed upon the request of participants before issuing a certain statement that they wished not to be recorded.

Mode of Analysis

Each recorded interview was transcribed by the researchers. Efforts at immersing oneself in the data have been found useful in data analysis to provide the researchers with a sense of the data as a whole and intuit emergent insights for their work (Patton, 2009). To ensure the accuracy of the transcription, spot-checking procedures were used (Joinson et al., 2012). The extended text was subjected to phenomenological reduction following the steps proposed in Colaizzi's method (Wojnar & Swanson, 2007). The field text was organized using within and across case analysis as a data reduction technique (Ayres et al., 2003). Cool analysis was then conducted by extracting significant statements from respondents' verbalizations. Next, significant statements were subjected to warm analysis by scrutinizing text for similarities and differences from which categories are derived (Ryan & Bernard, 2003). Data categories then undergo further analyses yielding themes and sub-themes that eidetically capture the central phenomenon, which served as the core of this study.

The study was conducted from an *emic*, or insider, perspective considering the researcher's work experience and academic background. In gaining a professional role in the participants, the researchers acquired access to the world of chair-participants who willingly opened about their experience of the phenomenon in question. However, the researchers recognize the potential bias that one's professional expertise could bear in the way one views, understands and interprets the outcomes of research. The perspective that the researchers adopted in this study is therefore key to reducing the effect of investigator bias. Appreciating and recognizing the uniqueness of the perspective that only chair-participants could give on the phenomenon under study served as an overall guiding principle for the researchers in the conduct of this study. Finally, to ensure openness to alternative interpretations of data, and hence increase the validity and trustworthiness of findings, investigator triangulation was observed using respondent or member validation strategies (Rothbauer, 2008).

RESULTS AND DISCUSSION

Considering the age of the respondents (Figure 1A), most of them have already been in service for 30 years or more (38%), though a significant number are still new in the service (31%). The respondents are dominated by males (Figure 1B) and most are already married (Figure 1C). While some have finished their graduate studies up to the doctoral level (21%), the majority of the respondents are Bachelor's degree holders (62%) who have already taken up a few educational units for their Master's degrees (Figure 1D). This is a good indicator that teachers are motivated to pursue graduate education for career development. In addition, most of them have attended several trainings on organizational culture and leadership practice indicating that the school principals are taking updated and articulated training for an improved organizational culture and leadership praxis.

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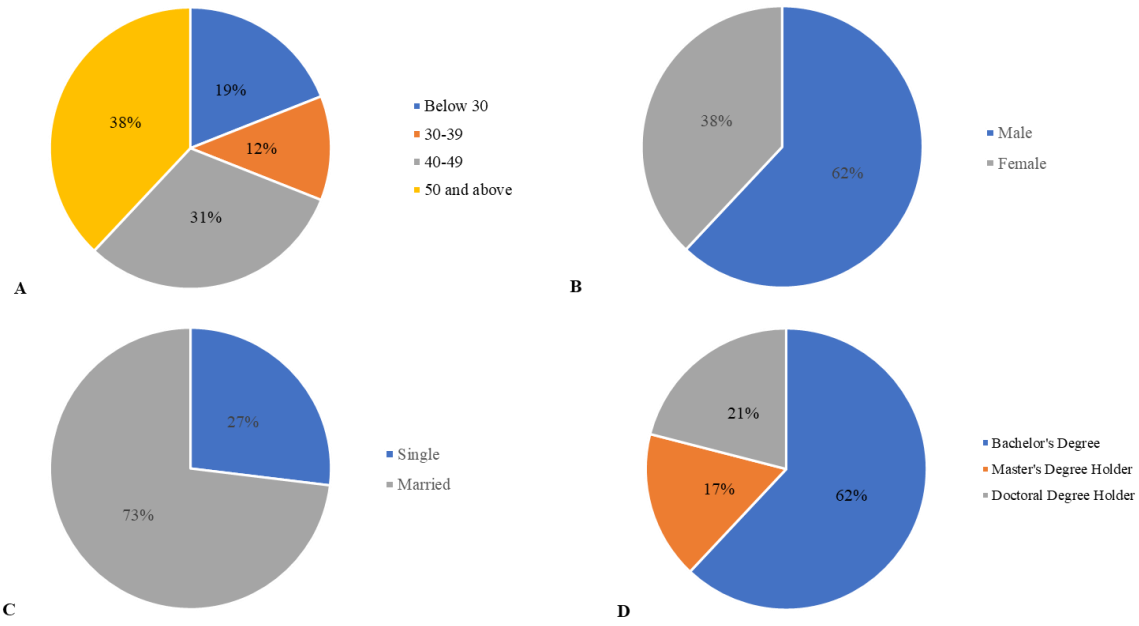

Figure 1. Demographic profile of the respondents showing the population percentage based on (A) Age, (B) Sex, (C) Marital Status, and (D) Educational Qualifications.

Table 2. Level of Organizational Culture of the Elementary School Principals and Teachers in Terms of Achieving Goals.

ACHIEVING GOALS	Principals		Teachers		Overall		LEVEL
	M	DI	M	DI	M	DI	DI
1. Structures clear and well-defined policies in the organization.	4.67	SA	4.56	SA	4.62	SA	VH
2. Uses communication as an effective way of getting relevant feedback and critical information for corrective action.	4.83	SA	4.55	SA	4.69	SA	VH
3. Believes in a set of shared values about how people should work together to reach mutual objectives.	4.83	SA	4.62	SA	4.73	SA	VH
4. Plans the tasks, and distributes assignments and supervises the work on the organization.	4.83	SA	4.58	SA	4.71	SA	VH
5. Concerns for people, to help one another to develop greater skills and thereby advance in the organization.	4.88	SA	4.69	SA	4.79	SA	VH
Grand Weighted Mean	**4.81**	**SA**	**4.60**	**SA**	**4.71**	**SA**	**VH**

Mean (M)	**Descriptive Interpretation (DI)**	**Level (DI)**
4.51 – 5.00	Strongly Agree (SA)	Very High (VH)
3.51 – 4.50	Agree (A)	High (H)
2.51 – 3.50	Fairly Agree (FA)	Fairly High (FH)
1.51 – 2.50	Disagree (DA)	Low (L)
1.00 – 1.50	Strongly Disagree (SDA)	Very Low (VL)

As reflected in Table 2, the principals (M = 4.81) and teachers (M = 4.60) have positive perceptions towards achieving goals in the organization. According to Durukan (2006), individual goals are more likely to be converted into the shared goal in schools where there is participation and a strong culture. This is because there is a collective consciousness in strong organizational cultures. Thus, the coherence of an individually developed vision within an organizational culture is more important than who created this individual vision. The most important role of the school leader is to make the shared vision compatible with the school culture. Shared vision and coherence in culture make the vision more achievable and thus the school leaders and their employees can pass from vision to action.

Table 3. Level of Organizational Culture of the Elementary School Principals and Teachers in Terms of Coordinating Teamwork.

Coordinating Teamwork	**Principals**		**Teachers**		**Overall**		
	M	**DI**	**M**	**DI**	**M**	**DI**	**DI**
1. Shows a very friendly atmosphere and people spend enough time in formal relations.	4.88	SA	4.64	SA	4.76	SA	VH
2. Treats subordinates' mistakes as an experience (by the boss) from which lessons are learned to prevent failure and improve performance in the future.	4.79	SA	4.52	SA	4.66	SA	VH
3. Initiates innovation or change which may result in highly oriented individuals.	4.67	SA	4.47	A	4.57	SA	VH
4. Demonstrates the cordial relationship between the union and the management.	4.75	SA	4.54	SA	4.65	SA	VH
5. Safeguards its employees in risky situations.	4.83	SA	4.56	SA	4.70	SA	VH
Grand Weighted Mean	4.78	SA	4.55	SA	4.67	SA	VH

Mean (M)	**Descriptive Interpretation (DI)**	**Level (DI)**
4.51 – 5.00	Strongly Agree (SA)	Very High (VH)
3.51 – 4.50	Agree (A)	High (H)
2.51 – 3.50	Fairly Agree (FA)	Fairly High (FH)
1.51 – 2.50	Disagree (DA)	Low (L)
1.00 – 1.50	Strongly Disagree (SDA)	Very Low (VL)

Table 4. Level of Organizational Culture of the Elementary School Principals and Teachers in Terms of Building a Strong Culture.

Building a Strong Culture	**Principals**		**Teachers**		**Overall**		
	M	**DI**	**M**	**DI**	**M**	**DI**	**DI**
1. Encourages everyone in the organization to be innovative in solving problems.	4.71	SA	4.56	SA	4.64	SA	VH
2. Considers an individual's expertise and competencies in dealing with issues.	4.79	SA	4.48	A	4.64	SA	VH
3. Prevails higher human orientation among supervisors.	4.92	SA	4.51	SA	4.62	SA	VH
4. Assures updated and appropriate services for quality turnouts.	4.71	SA	4.51	SA	4.61	SA	VH
5. Gives everyone the freedom to initiate preventive action on most matters to improve self-esteem and group performance.	4.87	SA	4.53	SA	4.70	SA	VH
Grand Weighted Mean	4.80	SA	4.52	SA	4.66	SA	VH

Mean (M)	**Descriptive Interpretation (DI)**	**Level (DI)**
4.51 – 5.00	Strongly Agree (SA)	Very High (VH)
3.51 – 4.50	Agree (A)	High (H)
2.51 – 3.50	Fairly Agree (FA)	Fairly High (FH)
1.51 – 2.50	Disagree (DA)	Low (L)
1.00 – 1.50	Strongly Disagree (SDA)	Very Low (VL)

Table 5. Leadership Praxis of the Elementary School Principals as Visionary.

Visionary	Principals		DI
	M	DI	
1. Demonstrates willingness to take risks.	4.37	STP	H
2. Possesses thorough in-depth knowledge of the organization and people.	4.37	STP	H
3. Demonstrates personal accountability for the decisions and actions made.	4.54	EP	VH
4. Makes certain that change initiatives support the organization's vision, mission, and goals.	4.67	EP	VH
5. Draws people in and builds collaboration alliances of people working toward a common goal.	4.62	EP	VH
6. Adopts to ever-changing conditions.	4.54	EP	VH
7. Shows consistent persuasiveness.	4.62	EP	VH
8. Makes long-term focused, resisting quick fix opportunities or short-term solutions.	4.37	STP	H
9. Shows confidence in the ability to lead people.	4.58	EP	VH
10. Demonstrates enthusiasm and willingness to share the organization's purpose and vision to ensure faculty and staff support.	4.58	EP	VH
Grand Weighted Mean	4.53	EP	VH

Mean (M)	Descriptive Interpretation (DI)	Level (DI)
4.51 – 5.00	Excellently Practiced (EP)	Very High VH)
3.51 – 4.50	Strongly Practiced (STP)	High (H)
2.51 – 3.50	Moderately Practiced (MP)	Fairly High (FH)
1.51 – 2.50	Sometimes Practiced (SP)	Low (L)
1.00 – 1.50	Not Practiced at all (NP)	Very Low (VL)

Table 6. Leadership Praxis of the Elementary School Principals as Inspirer.

Inspirer	Principals		
	M	DI	DI
1. Helps people to see "What's in it for them about impending change.	4.58	EP	VH
2. Shows unwavering enthusiasm in achieving desirable outcomes.	4.54	EP	VH
3. Works with others to arrive at viable solutions.	4.71	EP	VH
4. Allows faculty to participate in the development of the organization's vision.	4.67	EP	VH
5. Incorporates new ways and changes into the daily routine.	4.46	STP	H
6. Displays consistently desirable qualities in leading the faculty.	4.46	STP	H
7. Works collaboratively with the faculty to accomplish the organization's goals and objectives.	4.62	EP	VH
Grand Weighted Mean	4.58	EP	VH

Mean (M)	Descriptive Interpretation (DI)	Level (DI)
4.51 – 5.00	Excellently Practiced (EP)	Very High (VH)
3.51 – 4.50	Strongly Practiced (STP)	High (H)
2.51 – 3.50	Moderately Practiced (MP)	Fairly High (FH)
1.51 – 2.50	Sometimes Practiced (SP)	Low (L)
1.00 – 1.50	Not Practiced at all (NP)	Very Low (VL)

The principals strongly manifest positive perceptions (M = 4.78), the same with the perceptions of teacher respondents (M = 4.55), which are strongly agreeing in terms of coordinating teamwork (Table 3). This means that all respondents have akin perceptions (M = 4.67). As mentioned by Yoeli and Bercovich (2010), school culture can be used by school administrators as a tool to influence and direct other people or to establish coordination among employees. Beyond being representatives of school bureaucracy, administrators should be cultural and moral guides who pioneer the creation and development of fundamental values in school.

As presented in Table 4, principals have positive discernment toward building a strong culture in the organization (M = 4.80), like the teachers' perceptions (M = 4.52). This means that principals and teacher-respondents have common perceptions regarding building a strong culture in the organization (M = 4.66). Şişman (2002) revealed that the formation of a common culture first depends on the presence and association of a group of people interacting with each other. In educational organizations, where humans are at the

center, every school has a culture built in the process of its formation (Marzano et al., 2005). The main task of the principal in creating a positive atmosphere is to contribute to the creation of strong school culture. As a result, the school's formal and informal dimensions integrate. Administrators, teachers, and students take pride in the schools they belong to. This common sentiment provides cohesion and convergence among administrators, teachers, students, and parents (Özdemir, 2006).

Table 5 shows that school principals excellently practiced the desirable leadership praxis (*M* = 4.53). Sannwald (2000) said that leaders have a vision of what is realistically possible and manage that vision in a practical, achievable manner. They also know how to sell that vision to others. As a result, there is a strong element of salesmanship and perhaps evangelization in the qualities of leadership.

As seen in Table 6, principals served as inspirers to their school constituents (*M* = 4.58). According to Dirks and Ferrin (2002) respected leaders besides having outstanding character and personality as the best role model for their followers, also give importance to trust as well. To Godsell and Scarbrough (2006) along with instilling respectful relationships among his associates, leaders who aim to accomplish the leadership capacity entrusted to them should also be able to spark confidence and trustworthiness among them. It takes time to form trust and it may be built incrementally. O'Brien (2011) cited that open communication, integrity, mutual respect and support, justice and equality, competence, and cooperation are essential ingredients of trust. It is very unlikely for associates to accept leaders whom they perceive as untruthful, and it is very likely when associates feel that their rights are not being abused that they put trust in their leaders. Carrier and Levasseur (2015) cited that leader behaviors enable followers to transform themselves and to be inspired to perform beyond expectations while transcending self-interest for the good of the organization.

Table 7 describes how school principals served as supporters, assisting, or helping their subordinates in achieving the organization's VMGO (*M* = 4.56). According to Dasanayake and Mahakalanda (2008) maximizing employees' values is considered a rational asset that required culture to support their logical participation both for individual and organizational learning, new knowledge formation, and readiness to share with others.

Table 7. Leadership Praxis of the Elementary School Principals as Supporter.

Supporter	Principals		
	M	DI	DI
1. Identifies and eliminates barriers to change within the organizations.	4.25	STP	H
2. Allows faculties to make mistakes and learn from them.	4.08	STP	H
3. Demonstrates willingness to modify plans when necessary.	4.67	EP	VH
4. Opens to new ideas and fresh perspectives.	4.75	EP	VH
5. Encourages people to share their opinions, concerns, and suggestions for improvement.	4.75	EP	VH
6. Understands the intricacies of the organization its players and capabilities, and used this knowledge to secure needed resources.	4.67	EP	VH
7. Creates free of fear work environment.	4.58	EP	VH
8. Builds trust by providing people the freedom to develop their creativity and innovative solutions.	4.71	EP	VH
9. Devotes full attention to others and actively addressing the needs	4.54	EP	VH
10. Advocates commitment to enhance skills and be actively engaged in self-development activities.	4.58	EP	VH
Grand Weighted Mean	4.56	EP	VH

Mean (M)	**Descriptive Interpretation (DI)**	**Level (DI)**
4.51 – 5.00	Excellently Practiced (EP)	Very High (VH)
3.51 – 4.50	Strongly Practiced (STP)	High (H)
2.51 – 3.50	Moderately Practiced (MP)	Fairly High (FH)
1.51 – 2.50	Sometimes Practiced (SP)	Low (L)
1.00 – 1.50	Not Practiced at all (NP)	Very Low (VL)

Table 8. Leadership Praxis of the Elementary School Principals as Solver.

Problem Solver	**Principals**		
	M	**DI**	**DI**
1. Employs multiple data gathering techniques, such as observation, survey, interviews and focus groups	4.29	STP	H
2. Gathers data, draws conclusions, propose, and assesses alternatives, and recommend viable solutions	4.33	STP	H
3. Generates broad alternatives and engage in thorough analysis of viability.	4.46	STP	H
4. Thinks "outside the box" and encourage others to do the same.	4.42	STP	H
5. Demonstrates resourcefulness to meet the new trends, problems, and opportunities.	4.46	STP	H
6. Involves with people, spending significant time with each other to assess the skills needs and ways that he /she may be of help.	4.50	STP	H
7. Works collaboratively with people to evaluate the status of change efforts and modify as needed.	4.58	EP	VH
Grand Weighted Mean	4.43	STP	H

Mean (M)	**Descriptive Interpretation (DI)**	**Level (DI)**
4.51 – 5.00	Excellently Practiced (EP)	Very High (VH)
3.51 – 4.50	Strongly Practiced (STP)	High (H)
2.51 – 3.50	Moderately Practiced (MP)	Fairly High (FH)
1.51 – 2.50	Sometimes Practiced (SP)	Low (L)
1.00 – 1.50	Not Practiced at all (NP)	Very Low (VL)

Table 9. Leadership Praxis of the Elementary School Principals as Change Manager.

Change Manager	Principals		
	M	DI	DI
1. Helps people work effectively and efficiently by minimizing organizational interferences.	4.42	STP	H
2. Understands the immense complexities of change, including planning, implementation, and humane reactions.	4.42	STP	H
3. Provides a communication climate that is non-threatening, comfortable, and conducive to sharing.	4.58	EP	VH
4. Communicates openly with people to meet their needs and help them work through change.	4.75	EP	VH
5. Utilizes a variety of methods to communicate, and deliver the needs of the clients.	4.54	EP	VH
6. Understands the importance of goal settings and its relationships to motivate people.	4.54	EP	VH
7. Works with people and collaboratively set realistic, challenging, yet attainable goals and expectations.	4.58	EP	VH
8. Understands that conflict can be constructive rather than destructive.	4.67	EP	VH
9. Provides advancements and promotion opportunities for people who embrace change.	4.62	EP	VH
10. Links people adaption of change to appreciate recognition and awards.	4.75	EP	VH
Grand Weighted Mean	4.59	EP	VH

Mean (M)	**Descriptive Interpretation (DI)**	**Level (DI)**
4.51 – 5.00	Excellently Practiced (EP)	Very High (VH)
3.51 – 4.50	Strongly Practiced (STP)	High (H)
2.51 – 3.50	Moderately Practiced (MP)	Fairly High (FH)
1.51 – 2.50	Sometimes Practiced (SP)	Low (L)
1.00 – 1.50	Not Practiced at all (NP)	Very Low (VL)

Principals are good at problem-solving and decision-making (*M* = 4.43) (Table 8). According to Heffernan and Flood (2000), organizational performance does not only mean defining the problem but also the solution to the problem. Organizational performance is the organization's capability to accomplish its goals effectively and efficiently using resources. Similarly, achieving organizational goals and objectives is known as organizational performance (Daft, 2000; Richardo, 2001).

School principals communicate openly with people to meet their needs and help them work through change and link people's adaptation to change to appreciate recognition and awards (*M* = 4.59). It shows that principals are change enthusiasts. According to Acar (2012), a leader can also manage and manipulate the culture to some degree. The opposite idea says that leaders have the potential to create the organizational culture and undoubtedly, they also have an impact on shaping it. Leaders define and maintain the values, goals, mission, and vision of the organization and thus they form organizational culture.

The mean achieving goals of the principals was 4.81 (*SD* = .292), while teacher-respondents has a mean of 4.60 (*SD* = .464). This indicates that it is important to teachers and their school heads to achieve the pre-determinded goals in their respective schools, $t(267) = 2.156$, $p = 0.05$). In the coordinating teamwork, principals had a mean of 4.78 (*SD* = 4.368) while, teacher-respondents had a mean of 4.55 (*SD* = .463). Teamwork is essentially important in any organization. As reflected in the results, both teachers and the principals strongly believe in the importance of camaraderie in running a particular organization, $t(267) = 2.432$, $p = 0.05$). Thus, bilding a strong culture is critical. The results showed that the principal-respondents had a mean of 4.80 (*SD* = .221), whereas the teacher-participants had a mean of 4.52 (*SD* = .467). It indicates that the perceptions of principals and teachers on the level of organizational culture is not significant, $t(267) = 2.935$, $p = 0.05$).

Qualitative Analysis

From the cool and warm analyses of respondents' verbalizations, the proposed framework for an Improved Organizational Culture and Leadership Praxis of School Principals (Figure 2) emerged. Interestingly, the framework describes a variety of practices encountered by school principals in organizational culture and leadership. Principals are expected to do their duties and responsibilities efficiently and effectively, to make the organization more responsive to change and be able to come up with a holistic teaching-learning process for quality turnouts. Hallinger (2003) cited that effective leader responds to the changing needs of their context. Nowadays, school principals must know what to prioritize, what direction they must take to achieve the organization's vision, mission, goals, and objectives, and have a conception of what the ideal looked like.

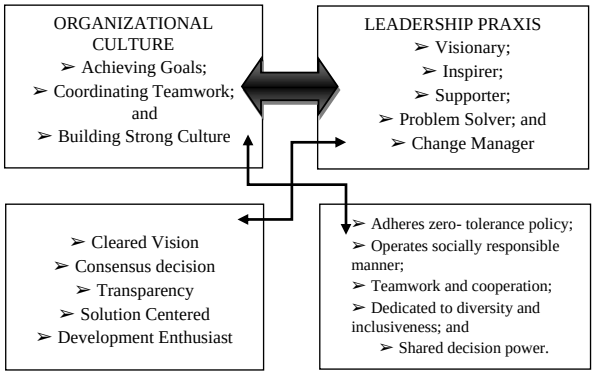

Figure 2. The paradigm shows the given indicators as identified themes from the qualitative part of the study.

The leadership framework is composed of organizational culture which is: 1) Achieving goals; 2) Coordinating teamwork, and 3) Building strong culture (Table 10). The principals are expected to set goals and coordinate with all the members in the organization to achieve smoothly the projected outcomes and be able to build a strong working environment. Principals shall adhere zero-tolerance policy so that the organization will be socially inclined and responsible in managing the tasks. There should be a good relationship among members to embrace diversity and work effectively. The principals shall give the individual the power to contribute to problem-solving and decision-making.

Under leadership praxis are: 1) Visionary; 2) Inspirer; 3) Supporter; 4) Problem solver; and Change manager. Leadership is a certain responsibility that brings an incredible change to the organization. Principals are expected to be a person of vision having a visible direction in achieving the VMGO of the institution. They should serve as an inspiration to their people by allowing everyone to share their potential ideas to address the issues and concerns in the educational system. As change agents, they shall practice transparency to motivate enthusiastically the people, to embrace the reality of growth and development. Principals should purposely comprehend the demands in the global and local settings for them to be able to apply exactly the desirable praxis and be having a holistic culture within the organization.

Table 10. The Features of the Leadership Framework

Area	Description
I. Organizational Culture	The diverse culture, values, and beliefs among members of the organization are expressed and experienced by all.
1. Achieving Goals	focuses on achieving the set goals of the organization.
2. Coordinating Teamwork	collaborates individual efforts and coordinates well with the concerned persons to bring a huge impact in achieving the organization's VMGO.
3. Building Strong Culture	understands everyone's culture, values, and beliefs among members of the organization and builds a strong culture that gives assurance of sustainability and functional organization.
4. Adheres zero- tolerance Policy	gives support or maintains loyalty to management conditions.
5. Operates socially responsible manner	performs functions that are accepted by the members of the organization.
6. Teamwork and cooperation	works collaboratively to achieve a common goal.
7. Dedicated to diversity and inclusiveness	willfully embraces diversities of peoples' values and beliefs in an organization.
8. Shared decision power	accepts ideas and suggestions of members in solving problems and decision-making.
II. Leadership Praxis	The theories, principles, desirable practices, and experiences are applied to make people in the organization happy, enjoy, and satisfied while performing their duties and responsibilities excellently.
1. Visionary	gives clear direction in fulfilling the purpose or aims of the organization. Letting his/her self and everyone moves together and share ideas for a better future.
2. Inspirer	influences potentially his subordinates to become energized and be able to have a sense of direction and purpose for an exciting result.
3. Supporter	motivates all the members of the organization to fulfill the goals and objectives and keeps the way of communication, being open-minded, accepting modifications, reproaches, and ideas as much as possible to be together as one in attaining the vision of the organization.
4. Problem Solver	thinks and focuses on how to eradicate problems and tries to look for a better solution and also settles some issues and concerns well in a constructive manner.
5. Change Manager	manages diverse changes, directs people to embrace and apply the acquired trends for an improved management system.
6. Cleared Vision	clearly shows understanding and awareness about the organization's VMGO.
7. Consensus Decision	makes a general agreement about something from the ideas or opinions shared by all the people in an organization with careful legal or official judgment.
8. Transparency	practices honesty and avoid hidden agendas within the organization.
9. Solution Centered	focuses on solving a problem and making a wise decision rather than complaining.
10. Development Enthusiast	enjoys and offers many opportunities for the development of new and interesting ideas.

CONCLUSION

This study has vibrantly described the organizational culture and leadership praxis of the principals, teachers, and stakeholders within the covered districts of San Agustin, Calatrava, and Sta. Maria in the province of Romblon. Gathered information showed the very high level of organizational culture of elementary school principals and teachers as to achieving goals, coordinating teamwork, and building a strong culture, respectively. The level of leadership praxis of the elementary school principals: visionary, inspirer, supporter, and change manager, is described as strongly practiced which means respondents are good at problem-solving and decision-making.

The findings of this study can be expected to increase the level of awareness of the academic bureaucrats and understanding of the processes on how to make culture in the organization healthy, vibrant, and productive. The formulated proposed leadership framework could be utilized by the Department of Education (DepEd) as one of their new standards, and potential guide in determining the full capabilities and qualifications in selecting/choosing new leaders in the educational system.

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AUTHORS' CONTRIBUTION

All authors have equal contributions in the completion of this research and preparation of the manuscript.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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Speaking and Writing Anxiety and Efficacy Beliefs of ESL Students in Spoken and Written Discourse

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ABSTRACT

Students pay importance to their self-efficacy beliefs as an indicator of their language performance. Yet, if students experience trouble in learning and mastering the target language, anxiety is provoked. This study intends to prove and measure the relatedness of speaking and writing achievement to speaking and writing self-efficacy as well as speaking and writing anxiety among selected senior high students in ESL classrooms. It follows a survey-correlational design and adapts the Foreign Language Classroom Anxiety Scale (FLCAS) and Second Language Writing Anxiety Test (SLWAT) as the data gathering tools. Results of descriptive statistics such as mean, standard deviation, and Factorial MANOVA show that considering the grades, low speaking anxiety is equivalent to low writing anxiety, and high speaking anxiety leads to no significant difference in the writing anxiety of the students. General findings indicate that the speaking and writing anxiety levels of the respondents affect their communicative performance. The study recommends to language teachers the need to re-visit the way they promote the use of the English language as confidence boosters and efficacy builders. This is to inspire students to be more communicatively competent and confident in their strategies to become better language learners.

Keywords*: academic achievement, communicative performance, efficacy beliefs, language anxiety, second language learning*

INTRODUCTION

In the Philippines, students in language classes are evaluated in spoken and written modes. Exercises and other school activities capitalize on these two important skills. The reading skill is evaluated either by having the students group together and discuss (spoken discourse) what they think of the topic or by having the students write a paragraph or two to reflect on the material. The listening skill is evaluated either in spoken or written discourse as well. In this case, the unseen concepts of self-efficacy belief and anxiety are to be further studied, and although studies on this relationship have been done several times, having students from the provinces as participants of the study might alter the results. Readers might assume the participants can be unable to perform the productive skills well, and their anxiety and efficacy beliefs may well impede their performance, so this study takes a closer look into this matter.

As most scholars have noted, the student's level of English proficiency is a factor that marks their academic achievement; thus, second language learning becomes a complex and relatively challenging undertaking for them. It is always a recurring complaint among many teachers that most students are reticent from using the English language and even reluctant in expressing their thoughts because of the fear of committing errors and becoming ridiculed by their classmates. For example, if the students are being required by the teacher to present and say something in front of the class, to respond verbally to questions raised by the teacher, or to enact dramatizations or role-plays (Alibec & Sirbu, 2017). This is the reason why Gardner and MacIntyre (1993) assert that language subjects are indeed anxiety-provoking.

As a result, language anxiety develops as students continue to have trouble learning and mastering the target language. Horwitz et al. (1986) assert that experiencing anxiety when communicating in English can be devastating and can affect the way learners adapt to the target language. According to Cheng (2004), second language classroom anxiety could be triggered by a low level of self-confidence such as failure, fear of evaluation, or negative affectivity. Another predictor of high anxiety levels is having negative self-perceptions

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toward language competency. These self-perceived factors affect the potential of many students which led them to underrate their performance in using the language.

The Affective Filter Hypothesis proposed by Krashen (1982) emphasizes that anxiety can feasibly impede the language acquisition and learning process. Relative to this, the deficit model justifies this kind of learners' performance. This model asserts that one's performance can be unsuccessful due to a skill that is inadequately developed (Musch & Bröder, 1999; MacIntyre, 1995; Sparks & Ganschow, 1991). In the study of Sparks, et al. (2000), it is argued that cognitive and linguistic infirmity of students results in reduced performance that causes high anxiety.

Furthermore, MacIntyre (1999) and Zhang (2001) justify that students are expected to experience a higher level of anxiety during productive skills development such as speaking and writing. Findings showed that among these two skills, speaking is the higher source of anxiety in language classrooms and was found to be the ultimate anxiety-provoking skill (Koch & Terrell, 1991). Whereas, other researchers who explored second language learning discovered that writing causes a high level of apprehension that negatively affects learners in a variety of ways (Cheng et al., 1999; Daud et al., 2005). Thus, these two skills, if not learned proficiently, may lead to a hampered second language learning, which can be a hindrance not only for students but also for teachers. It can now be deduced from these claims that anxiety in various communication skills can be traumatic and can be a hindrance to students' goals in attaining their educational dreams.

Aside from language anxiety that affects language performance, studies likewise found that learners also pay importance to their self-efficacy beliefs rather than what they are capable of in learning the target language. Bandura (1977) first introduced 'self-efficacy' in his Social Cognitive Theory and refers to this term as a concept in psychology relating to an individual's own ability to begin and complete a task (Eggen & Kauchak, 2007). One study concerning this matter is the one pursued by Cheng (2001) that explored the connection between the learners' second language anxiety and self-efficacy belief. It was discovered that highly anxious learners with low self-efficacy believed in the idea that efficacious language learners are exceptional. It may be that the highly anxious students undervalued their competencies, and they supposed that they must be skilled to be effective as language learners.

This study, therefore, is an attempt to corroborate and measure the relationship between speaking achievement (Oral Communication in Context grades) and the writing achievement (Reading and Writing Skills grades) termed 'communicative performance', to the Speaking and Writing self-efficacy and Speaking and Writing anxiety. Treated separately, this paper juxtaposes the findings with previous literature. Moreover, with various studies relating these variables together, the interaction may lead to the pre-diagnostics of senior high school students' language readiness to enter college.

Hence, this study determined the differences in speaking and writing performance between levels of speaking and writing anxieties as well as efficacy beliefs of selected senior high school students. To establish this, the researchers attempted to determine the difference in communicative performance between levels of speaking and writing anxiety and identify the effect of anxiety and efficacy on communicative performance.

METHODOLOGY

The design of this study is purely quantitative and employed the survey-correlational data collection method. The participants in this study were selected through convenience sampling that obtained a total sample size of 283 senior high school students who are enrolled in a private school in Cavite and a public school in Batangas. Parents' consent was first secured before the conduct of the study since most of the respondents are below 18 years of age. Permits from the School Registrars and subject teachers were likewise secured to gain access to the grades of the students in Oral Communication in Context and Reading and Writing Skills subjects.

The grades from the Registrar's Office of the two schools served as the primary data and these grades represented the speaking and writing achievement respectively, then termed 'communicative performance.' As for the participants' level of efficacy beliefs and anxiety, the standardized questionnaire adapted from the Foreign Language Classroom Anxiety Scale (FLCAS) and the Second Language Writing Anxiety Test (Howitz et al., 1986) were used.

The data for anxiety, self-efficacy, and communicative performance or the grades themselves underwent descriptive statistics – mean, and standard deviation. With the use of SPSS, factorial MANOVA was then performed.

RESULTS AND DISCUSSION

As factorial MANOVA derives the significance of group differences to be able to create a linear combination of the dependent variables with each other and maximize the mean group differences, it uses multiple continuous data for the dependent variables and multiple discrete data for the independent variables.

Table 1. Descriptive.

	N Statistic	Minimum Statistic	Maximum Statistic	Mean Statistic	Std Deviation Statistic
GRADE_SPK	283	48.00	99.00	83.7350	8.19772
GRADE_WRI	283	25.00	97.00	83.9170	10.35236
SpeEff_Mean	283	1.50	3.75	2.5830	.34664
Wri_Eff_Mean	283	1.63	3.94	2.7858	.34368
Sp_Anx_Mean	283	1.40	3.80	2.6774	.42466
WR_ANX_Mean	283	1.73	3.64	2.5748	.31036

Table 2. Results of the Tests of Normality for the Variables.

		Shapiro-Wilk Statistic	**df**	***p*-value**
Speaking Performance	Speaking Anxiety			
	HIGH	.985	145	.130
	LOW	.961	129	.001
Writing Performance	Speaking Anxiety			
	HIGH	.909	145	.000
	LOW	.872	129	.000
Speaking Performance	Writing Anxiety			
	HIGH	.972	131	.009
	LOW	.978	143	.023
Writing Performance	Writing Anxiety			
	HIGH	.884	131	.000
	LOW	.901	143	,000
Speaking Performance	Speaking Efficacy			
	HIGH	.985	120	201
	LOW	.962	154	.000
Writing Performance	Speaking Efficacy			
	HIGH	.871	120	.000
	LOW	.970	154	.002
Speaking Performance	Writing Efficacy			
	HIGH	.981	123	.082
	LOW	.960	151	.000
Writing Performance	Writing Efficacy			
	HIGH	.876	123	.000
	LOW	.971	151	.003

From the Self-Efficacy Theory of Bandura (1977), the variables were then assigned and quantified. The dependent variables are the grades themselves.

For the independent variables, self-efficacy beliefs and anxiety that were measured using a 4-point scale (as in the FLCAS) were coded as high and low values (as per the derived means from the 4 to 1 answers), to become discrete data.

The mean speaking grade is 83.74 while the writing grade is 83.92. For the efficacy beliefs, the mean for speaking efficacy is 2.58, writing efficacy at 2.79. For anxiety, the speaking anxiety mean is 2.68, and writing anxiety is at 2.57 (Table 1). With the lower and upper boundaries of the quantitative equivalents of the variables identified, being within the acceptable range (the grades not exceeding 100.00, and efficacy and anxiety within the 1-4 range, the sample is said to be representative of the population.

When the Box's Test of Equity of Covariance Matrices was staged, the *p*-value of .000 was identified to be able to determine the interaction between and among the variables for both the combination of the grades and anxiety, and grades and self-efficacy belief. This means that there is a significant difference between the assigned variables.

It was the intention of the study to determine the differences on speaking and writing performance between levels of speaking and writing anxieties as well as efficacy beliefs of Senior High School students.

To check for outliers in the data, a multiple regression analysis was performed with all the dependent variables for the MANOVA as independent variables of the multiple linear regression. Outliers were identified based on a critical Chi-square (10.8276) at a significance level of .001 with degrees of freedom of 2. Any ID number with a Mahalanobis distance value greater than the critical Chi-square value of 10.8276 was removed. There were only 9 cases or respondents removed based on the analysis.

The multivariate normality was performed by testing for the normality of each dependent variable for all combinations of groups of the two independent variables (anxiety and efficacy for both writing and speaking). The Shapiro-Wilk test of normality was used for this purpose.

As seen in Table 2, the Shapiro Wilk's test of normality for the speaking performance and writing performance considering the speaking anxiety levels shows that only the speaking performance data for high speaking anxiety level is approximately normal ($p > 0.05$) and the rest are not ($p < 0.05$). It further shows that all the data distributions for each writing anxiety level are not approximately normal ($p < 0.05$). The findings suggest that speaking anxiety is a concern for the respondents. Although speaking is considered the main language skill that students should improve, this does not mean it is simple to master. Therefore, students need to be encouraged to master this skill. According to Black (2019), speaking remains the most difficult skill to master for the majority of English learners, and they are still incompetent at communicating orally in English. This finding supports the results of the current study.

In another research, it was concluded that many students have found themselves in situations where they have had to speak and 'felt the fear' (Byram, 2019). If the fear comes from a natural shyness, children and adults alike need time to 'warm up' and get comfortable before they can speak. Social situations can stress students and even professionals, and they worry about what they might, or might not, say. Worse still is the more formal events, such as class presentations, where the students are put in the spotlight (Huerta, et.al. 2017). What could have been more difficult is about speaking in a different language; in this context, it is the English language. As Stephen Krashen described in his hypothesis, a student experiencing a challenge has a High Affective Filter (Richards, 2018). Using this hypothesis, one felt anxious about his or her inability to participate in conversations and worried about making mistakes. It seemed that this was down to an anxious state of mind. Only speaking performance data for the high speaking efficacy level/group and the speaking performance data for the high writing efficacy group are approximately normal ($p > 0.05$).

Although the results show that the data distribution of the dependent variables for most of the speaking and writing anxiety–efficiency levels are not approximately normal, the MANOVA is not very sensitive to violations of multivariate normality provided that there aren't any outliers. Also, since the samples for each anxiety and efficacy level are sufficiently large, the multivariate normality assumption holds.

A Pearson product-moment correlation coefficient was computed to assess the relationship between writing performance and speaking performance. There was a correlation between the two variables, r = 0.552, n = 274, $p = 0.000$.

Table 3. Descriptive Statistics on Communicative Performance and Levels of Anxiety.

		Mean	SD	N
	Speaking Anxiety			
Speaking Performance	HIGH	82.35	8.46	135
	LOW	84.99	7.76	148
	Writing Anxiety			
Speaking Performance	HIGH	82.86	11.25	135
	LOW	84.87	9.39	148

Descriptive statistics were also used to provide baseline information for the data. Table 3 shows the mean scores and standard deviation of the variables in the study. It reveals that most students who receive higher grades in speaking and writing performance have low anxiety levels.

For the purpose of determining whether there is a difference in speaking and writing performance between levels of speaking and writing anxiety, a test for significant differences between the said levels was performed. Results of MANOVA show that there is a significant difference between levels of speaking and writing anxiety, Wilks $\lambda=0.97$, $F(2, 278) = 3.06$, $p = 0.048$. Multivariate effects of speaking and writing anxiety are presented in Table 4.

Table 4. Multivariate Effects of Levels of Speaking and Writing Anxiety.

Effect		Value	F	Sig
Speaking Anxiety	Pillai's Trace	.022	3.066[b]	.048
Writing Anxiety	Wilks' Lambda	.978	3.066[b]	.048
	Hotelling's Trace	.022	3.066[b]	.048
	Roy's Largest Root	.022	3.066[b]	.048

Table 5. Multivariate Effects of Levels of Speaking and Writing Efficacy.

Effect		Value	F	Sig
Speaking Anxiety	Pillai's Trace	.015	2.133[b]	.120
Writing Anxiety	Wilks' Lambda	.985	2.133[b]	.120
	Hotelling's Trace	.015	2.133[b]	.120
	Roy's Largest Root	.015	2.133[b]	.120

Table 6. Multivariate Effects of Anxiety and Efficacy on Communicative Performance.

Effect		Value	F	Sig
Speaking Anxiety	Pillai's Trace	.015	2.012[b]	.136
Writing Anxiety	Wilks' Lambda	.985	2.012[b]	.136
Speaking Efficacy	Hotelling's Trace	.015	2.012[b]	.136
Writing Efficacy	Roy's Largest Root	.99	2.012[b]	.136

The study also sought to determine the difference in speaking and writing performance between levels of speaking and writing efficacy. Results of MANOVA show that there is no difference in speaking and writing performance between levels of speaking and writing efficacy, Wilks $\lambda = 0.98$, $F(2, 278) = 2.13$, $p = 0.120$. Multivariate effects of speaking and writing efficacy are presented in Table 5.

The last question that this study aimed to answer is whether there is an interaction effect between anxiety and efficacy on speaking and writing performance. After another test on difference, results of the MANOVA show that there is no interaction effect of anxiety and efficacy on speaking and writing performance. This is seen in Wilks $\lambda = 0.98$, $F(2, 266) = 2.012$, $p = 0.136$. Multivariate effects of anxiety and efficacy on speaking and writing performance are presented in Table 6.

CONCLUSION

The findings of the study highlight the strong possibility that the speaking and writing anxiety levels of the respondents affect their communicative performance. This is consistent with available literature pointing out that an anxious student may not perform well in language tasks. Only the first part of the hypothesis has been proven true in this research. That part refers to high anxiety levels which impact the grades of students.

Efficacy on the said tasks may not be that evident as seen in the findings. This can be explained by considering other variables such as the age and personality of the respondents. Most of the respondents are still young adults and are studying in rural areas of the Philippines (meaning outside the capital, Manila). Their profile could have an impact also on the way they perceive themselves as confident users of the language. This could be a cultural trait of the respondents that distinguishes them from others. It can be harnessed to enable them to achieve their dreams in life without harming others. Culture and communication are inseparable because culture and communication go along, and communication is not possible without a language. Peck (2018) cited in Khan (2020) contended that foreign language instruction can never be easy without the study of culture. Since culture is an inseparable part of language learning a language is essentially a social phenomenon. It has been defended that the target students cannot be proficient in the target language unless they know about cultural perspectives. Peterson and Coltrane (2003) and Byram et.al. (2013) revealed the adult learners' perceptions of the incorporation of their L1 in foreign language classrooms. Moreover, Byram (2019) has talked about the close relationship between language and culture.

Furthermore, the lack of other sources of information to verify the findings of this study hamper the generalizability of the results. Yet, it has presented a glimpse of what is going on inside the mind of today's high school students, specifically the first batch of senior high school graduates from a public school.

Finally, language teachers and other persons of influence can draw important insights from this study such as the role of anxiety and how it will be harnessed to develop more assured individuals. They need to re-visit the way they promote the use of the target language as confidence boosters and therefore efficacy builders. They may eventually inspire students to be more communicatively competent and confident in their strategies to be better language learners. They have to keep in mind Bandura's theory on self-efficacy and the means it can be explored to minimize anxiety, in the language classroom for instance.

AUTHORS' CONTRIBUTION

The authors' contributions to this study were fair and impartial. From the conceptualization, data collection, and data treatment, the five authors convened together in coming up with comprehensive discussions of the findings. As to the writing process of this paper, Jacinto, Pinay-an, and Sy took charge of the data gathering and the literature review, while Anudin and Dalisay facilitated the statistical analysis of the data, including the discussion of the results and conclusion.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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Effect of Contextual Inquiry Approach on Interest Towards Science and Achievement in Earth Science among Grade 10 Students

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ABSTRACT

This study determined the effect of the contextual inquiry approach (CIA) on interest in science and achievement in Earth Science among grade 10 students at Ferrol National High School. In CIA, students are doing inquiry-based learning using situations and materials that are within their context and locality. The pretest–posttest control group quasi-experimental design was employed in the study, which involved two matched classes of 30 students each, both implementing the 7Es inquiry model: elicit, explore, engage, explain, elaborate, evaluate, and extend. The experimental class used the CIA in conducting the activities and providing examples about the concept while the control group used pictures in delivering 10 learning competencies in Earth Science topics. The instruments used were the 40-item researcher-made achievement test in Earth Science and 12-item Science Inventory Test modified from the Program for International Student Assessment. Results showed that the CIA helped improve students' achievement in Earth science ($\eta_p^2 = .11$). In classes implementing the 7Es inquiry model, CIA is comparable to the conventional teaching approach (CTA) in improving students' interest in science. However, interest in science and achievement in Earth Science are not related to each other. This advances the argument that the attitude-achievement paradox is possibly existent among Filipino learners.

Keywords: *contextualization, 7Es, achievement in Earth Science, interest, contextual inquiry*

INTRODUCTION

As teaching approaches continue to flourish from time to time, it is imperative that innovations should keep up with this pacing, otherwise, the educational system cannot ensure quality learning due to obsolescence. This principle serves as the very reason why there has to be an appropriate approach for every gap that exists in the process of teaching and learning.

The goal of science teaching in the K12 Science curriculum is to develop scientific and technological literacy among students. Three of the domains are scientific knowledge, scientific skills, and scientific attitude. More notably, the science education curriculum aims to develop students to become effective communicators, critical and creative problem solvers, responsible stewards of nature, innovative thinkers, and informed decision-makers. These kinds of students can be achieved if they can demonstrate science inquiry skills, understand and apply scientific knowledge and develop and demonstrate scientific attitudes and values. Fortunately, the 7Es model in science teaching has been found to develop these skills and eventually bring about a positive effect on teaching and learning (Gok, 2014).

The Philippines undeniably faces a daunting challenge to prove itself in the international educational landscape because it ranked as the second-lowest in science and mathematics (obtaining 353 in the former and 357 in the latter) among 79 countries (CNN Philippines, 2019), and exhibited a consistently abysmal performance having ranked only 34th out of 38 countries in high school Math, and 43rd out of the 46 participating countries in Grade 8 Science in the Trends in International Mathematics and Science Study (TIMMS) in 2015 for high school.

Considering the claim of experts from the University of the Philippines National Institute for Science and Mathematics Education Development (UP NISMED), the discipline-based curriculum encouraged mostly rote learning instead of inquiry and high levels of thinking. Most research revealed that some of the students here in the country failed to meet the mastery

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of the basic skills needed to learn science and its specific fields.

Aside from the performance being at stake if teaching approaches are compromised, interest in the subject cannot be downplayed in any learning endeavors. It must be dealt with well by the teachers. As evidenced in the study by Anderhag et al. (2016), sustaining the interest of students in science becomes an everyday challenge for teachers. It was also found that primary students lost interest in science during their secondary school contrary to their primary days. Similarly, Dawson (2000) and Osborne et al. (2003) posited that as the children grow, their interests in science tend to decline.

With this in perspective, the teaching approach will always be the greatest factor to account for which justifies the current investigation. This study was conducted to determine the effect of the contextual inquiry approach (CIA) on interest in science and achievement in Earth Science among grade 10 students at Ferrol National High School, Ferrol, Romblon during the school year 2019-2020.

METHODOLOGY

Research Design

The pre-test - post-test control group quasi-experimental design was employed because two intact classes were used and randomly assigning students to either group was not possible. As discussed in the work of Ross et al. (2005), this design is the best option for school-based research where classes are formed at the start of the year, and it is neither practical nor feasible to assign the students randomly to treatments (Table 1). Students in both groups took the pre-test in Achievement Test in Earth Science (ATES) (O1). Post-test in ATES (O2) was administered to both groups immediately after the implementation of the intervention. The dependent variable in the study is the students' post-test scores in ATES. The covariate is their pretest score. The adjusted posttest scores are used in comparing the two groups. Both groups also answered the ISI (O3). Selected students from both groups were likewise interviewed about their experience in learning the lessons (O4).

Table 1. The Research Design.

Group	Pretest	Treatment	Posttest
1	O_1	CIA	O_2, O_3, O_4
2	O_1	CTA	O_2, O_3, O_4

where:
1- Experimental Group
2- Control Group
O_1- Pretest- Achievement Test in Earth Science (ATES)
O_2 – Posttest- Achievement Test in Earth Science (ATES)
O_3 – Posttest in Interest Inventory (ISI)
CIA- Contextual Inquiry Approach
CTA- Conventional Teaching Approach
O4 – Random interview

Achievement Test in Earth Science

The ATES is a 40-item multiple-choice type teacher-made test developed based on the Table of Specifications (Table 2). The topics covered in the test were parallel to the K12 grade ten learning modules. The test items were validated by five experts in the field: one Ph.D. in Educational Management and teaching science subjects in college, two science professors in college, one Master Teacher in Science, and two high school teachers. The experts' suggestions were considered in the revision of the test items.

To establish the reliability of the ATES, it was pilot tested among grade 11 students at Ferrol National High School (FNHS). This study considered 30 grade 11 senior high school students since the test intends to measure achievement on Earth Science topics covered in grade 10. Hence, grade 11 students were the most appropriate test takers of the test as shown in the work of Lantano (2009). Rasch analysis was used in determining the item reliability of ATES resulting in α=0.88. This means that the instrument is acceptable.

Interest in Science Inventory

The ISI is a researcher-made test that contains item indicators measuring student interest in science (OECD, 2007). The draft of ISI was initially composed of 30 items. However, when it was administered to another section of grade 10 students not included in the study, the items were reduced to 12 only with a Cronbach's alpha value of 0.80. This established the acceptability and reliability of the developed ISI.

Data Collection

A letter of permission was sent to the Principal of FNHS. Then, the validated instruments were pilot tested: ATES to 43 grade 11 students and ISI to another section of grade 10 with 30 students in the same school who were not included in the study. The experimental and control groups were identified as explained in the previous section. A letter of consent was sent to the parents of the students informing them that their children were participating in the study. The confidentiality of data was emphasized.

The Contextual Inquiry Approach Intervention

Contextual inquiry is a learning approach that uses local information and materials in the teaching and learning process. This includes names, situations, or settings that are needed to give context to the lesson, activities, or tests. In this study, 7Es as a model for inquiry approach was implemented in both the control and experimental groups. In the experimental group, however, some phases of 7Es are localized and

contextualized. Localized learning refers to the process of relating the learning content to local information and materials in the learner' community. In localized learning, the learning content includes local information and local materials used in teaching. During instruction, the teacher uses examples, names, situations, and settings to give context to test questions or problem-solving exercises within the locality or immediate community.

Table 2. Table of Specifications of the Achievement Test in Earth Science.

Learning Competencies	**Teaching Hours**	**%**	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating	**No. of Items**
1. Describe the distribution of active volcanoes, earthquake epicenters, and major mountain belts. **(S10ES-Ia-j-36.1)**	9	60%	6 (1-6)	6 (7-12)	5 (13-17)	3 (18-20)	2 (21-22)	2 (23-24)	24
2. Describe the different types of plate boundaries. **(S10ES-Ia-j-36.2)**	5	33%	4 (25-28)	3 (29-31)	2 (32-33)	2 (34-35)	1 (36)	1 (37)	13
3. Explain the different processes that occur along the plate boundaries. **(S10ES-Ia-j-36.3)**	1	7%	1 (38)	1 (39)		1 (40)			3
	15 hrs.	**100%**	**11**	**10**	**7**	**6**	**3**	**3**	**40**

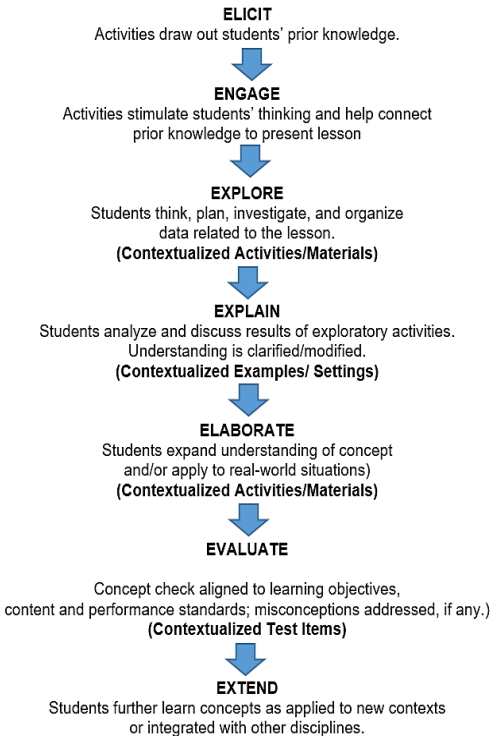

Figure 1. The Contextual Inquiry Approach

For instance, during the exploration phase, students used locally available materials. A laboratory sheet with procedures of what to do was distributed to each one of them. They answered the questions after doing the activity. In the explanation stage, local information or examples were also given to the students. In this way, their interest could be stimulated because of relatable and localized examples which could potentially result in better understanding and retention of science concepts. The 7Es inquiry model was similarly employed in the CTA group but the materials and information were not localized. Instead, pictures were used and presented to the students. The complete contextualization's embedded within the 7Es inquiry model as used in the study are found in Appendix F.

Figure 1 models how the Contextual Inquiry Approach can be done in science classes. On the other hand, the control group used the 7E learning model where they were exposed to concepts with activities that are not localized and contextualized.

Data Processing and Analysis

Descriptive statistics such as the mean (*M*) and standard deviation (*SD*) were used to present the preliminary information of ATES and ISI scores as well as the characteristics of respondents in terms of age and their grade in science. The science grade of grade 10

CIA and CTA classes, the mean pretest scores in ATES, and the mean post-test score in ISI were compared using the *t*-test for independent samples. One-way analysis of covariance (ANCOVA) was used in testing the significant difference between CIA and CTA groups in terms of their post-test mean score in ATES using their pretest scores as covariates (Fraenkel et.al.,2012; Gall et al.,1996; Wiersma, 1995; Best & Kahn, 1993; Sprinthhall et. al.,1991). The ANCOVA also allows the determination of the effect of the intervention on the posttest that is not predictable by the pretest. In defining the effect of the intervention, the effect size was used. In ANCOVA, the effect size was interpreted as: 0.10 = small, 0.25 = medium, 0.40 large (Cohen et. al., 2001). For *t*-test, the effect size was interpreted as: 0.01 = small effect, 0.06 =moderate effect, and 0.14 = large effect (Cohen, 1998). In determining the relationship between interest in science and students' achievement in Earth Science, Pearson product-moment (r) correlation was used.

RESULTS AND DISCUSSION

Comparison of Earth Science's Achievement

Table 3 shows the pretest and post-test mean scores of students in the Achievement Test in Earth Science from both CIA and CTA. It appears that students from the CTA class (M = 11.93, SD = 2.99) have lower pretest mean scores than those from the CIA class (M = 12.37, SD = 4.76) with a mean difference of 0.44. However, a t-test for two independent samples established that this difference was not significant, $t(60) = 1.16$, $p = .252$, hence their comparability. As to the posttest scores in ATES, CIA class (M = 21.03, SD = 6.28) obtained a higher mean score than the CTA class (M = 17.57, SD = 5.13) with a difference of 3.46.

Table 3. Descriptive Analysis of Pretest and Post-Test Mean Score in Achievement Test in Earth Science

Group		N	Mean	SD
Pretest	CIA	30	12. 37	4.76
	CTA	30	11.93	2.99
Posttest	CIA	30	21.03	6.28
	CTA	30	17.57	5.13

A one-way between-groups analysis of covariance (Table 4) was conducted to compare the effectiveness of the two teaching approaches on the dependent variable, the posttest mean score on the Achievement Test in Earth Science. Students' scores on the ATES pretest were used as a covariate in this analysis. After adjusting for pretest ATES scores, there was a significant difference between CIA (M = 21.03, SD = 6.28) and CTA (M = 17.57, SD = 5.12) on posttest scores in the Achievement Test in Earth Science, $F(1,57) = 6.85$, $p = .011$, $\eta_p^2 = .11$, a small Cohen's effect size (Cohens et al., 2001). Therefore, using the pretest mean score in Earth Science Achievement Test recorded as a covariate, the class exposed to the contextual inquiry approach have a significantly higher post-test mean score than the class taught using the conventional teaching approach.

The findings supported the claim of Satriani and colleagues (2012) that contextual learning can motivate learners to take charge of their learning and to relate knowledge and its application to the various contexts of their lives. Likewise, it will also make learning more meaningful when students do practical activities.

Comparison of Interest in Science

Table 5 shows the result of an independent samples t-test conducted to compare the post-test mean scores in ISI for CIA and CTA classes. There was no significant difference in scores between CIA (M = 47.13, SD = 4.32) and CTA (M = 48.93, SD = 5.04), $t(58) = 1.49$, $p = .14$, $\eta^2 = 0.037$. Thus, the class exposed to CIA does not have a significantly higher mean score in ISI than the class taught using the conventional teaching approach.

The result of this study affirmed the claims of Suryawati and Osman (2017) that the CTL approach is not significantly different from the conventional approach in terms of attitude towards science. The findings indicated that the students were able to work as a team but being responsible is still at a low level. This scenario might be due to a low level of cognitive maturity and self-confidence among the students. Lack of responsibility skills was detected through qualitative observation, where students were less concerned about the instrument's condition as well as the overall cleanliness after every lab activity.

In addition, the results of this study do not support the claims that context-based approaches result in improvement in attitudes towards science (Benneth et al., 2007; Febriani et al., 2017). This can be possibly explained by using the 7Es as an inquiry model in both groups which was claimed to have the greatest effect on the learning interest of the students (Samba et al., 2016; Senol & Oskay, 2017; Gibson & Chase, 2002) positively. This might have overshadowed the effect of the CIA on students' interest in science as supported by the narratives of the students.

Relationship between Interest in Science and Earth Science Achievement

Table 6 illustrates the overall relationship between the Interest and post-test mean score in the Achievement Test in Earth Science using the Pearson product-moment correlation coefficient. Overall, the result indicates no correlation between the two variables, $r(58) = -.10$, $n = 60$, $p = .94$. Likewise, no

significant correlations between ISIT and ATES scores were observed within CIA, r(58) = -.06, n = 30, p = .76, and CTA, r(58) = 0.04, n = 30, p = .82) classes. Therefore, there is no significant relationship between the students' scores in ISI.

This result is contrary to the conventional knowledge wherein the interest in the subject, an effective trait that is attitudinal is expected to have a strong bearing on one's academic performance (Amrai & Parhon, 2011; Koller et al., 2001). However, based on the Attitude-Achievement Paradox, learners can achieve highly in science without necessarily holding a positive attitude towards it (Osborne et al., 2003). Such paradox is prevalent among black Americans and other races and is affected by factors such as ethnic background and social class, race, sample selection, and sample size (Ma & Kishor, 1997; Mickelson, 1990). Interestingly, this result mirrors the state of Filipino learners in general who holds a positive attitude toward science (Talisayon et.al., 2006) but have disappointing performance in science-related international surveys such as TIMSS and PISA during the last few decades (Imam et al., 2014). In the context of the Romblomanon learners, similar findings have also been reported in the quasi-experiment of Fetalvero (2017) among college students.

Table 4. ANCOVA Test Between-Subjects Effects in Achievement Test in Earth Science.

Source	Type III Sum of Squares	df	M^2	F	Sig.	η_p^2
Corrected Model	902.553[a]	2	451.277	21.761	0.000	.433
Intercept	408.148	1	408.148	19.681	0.000	.257
Pretest	722.286	1	722.286	34.830	0.000	.379
Group	142.049	1	142.049	6.850	0.011	.107
Error	1182.047	57	20.738			
Total	24434.000	60				
Corrected Total	2084.600	59				

[a] R^2 = 0.433 (Adjusted R^2 = 0.413)

Table 5. *t*-Test Analysis for independent samples on students' post-test mean Interest toward Science Inventory Test score between CIA and CTA groups.

Group	Sample Size	Mean	SD	Mean Difference	df	t	Sig.
CTA	30	48.93	5.03	1.80	58	1.49	.143
CIA	30	47.13	4.32				

Table 6. Correlation between Interest and Achievement Test in Earth Science (ATES).

	Independent Variable	Dependent Variable Post-ATES
Overall		
Interest	Pearson Correlation	-.01
	Sig. (2-tailed)	0.94[ns]
	N	60
CIA Class		
Interest	Pearson Correlation	.06
	Sig. (2-tailed)	.76[ns]
	N	30
CTA Class		
Interest	Pearson Correlation	.04
	Sig. (2-tailed)	.82[ns]
	N	30

CONCLUSION

Based on the findings, the researcher concluded that the contextual inquiry approach can help improve students' achievement in Earth science. Moreover, in classes implementing the 7Es inquiry model, the contextual inquiry approach is comparable to the conventional teaching approach in improving students' interest in science. Lastly, interest in science and achievement in Earth Science are not related to each other. This advances the argument that the attitude-achievement paradox is existent among Filipino learners.

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CONFLICT OF INTEREST

The author declares no conflict of interest.

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Effect of Carousel Strategy on the Academic Achievement in Earth and Space Science of Grade Six Pupils

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ABSTRACT

Science as a subject requires an accurate teaching approach to learn the science content and processes better. This study determined the effect of the carousel strategy approach on the academic achievement in earth and space science of grade six pupils. The pretest-posttest control group quasi-experimental design was employed in this study with two intact classes. One of these groups was the experimental group, wherein carousel strategy (CS) was employed; the other was the control group, wherein the conventional teaching approach (CTA) was used. Pretest and post-test achievement tests and the daily lesson log (DLL) in earth and space science were used as research instruments. The data were analyzed using descriptive and parametric statistics, including the independent samples *t*-test and paired samples *t*-test. The results indicated a significant difference between the pretest and post-test of the CS and CTA. The results also showed higher academic achievement of students in the CS group over the CTA group. This study concluded that the carousel strategy is an effective intervention and learning in Earth and Space Science.

Keywords: *academic achievement, carousel strategy, cooperative learning strategy, quasi-experimental design, and earth and space science*

INTRODUCTION

Science education in the Philippines aims to develop scientific, technologically, and environmentally literate Filipino learners. The Department of Education (DepEd) envisioned the science curriculum as learner-centered and inquiry-based, emphasizing the use of evidence in constructing explanations. The ideas and skills in the matter, living things, and their environment, force, motion, energy, Earth, and space were presented in spiral progression so that the school-age children could have a deeper and profound comprehension of key concepts and their applicability to real-world scenarios. Even though the planners of the science curriculum have crafted it intelligently and teachers were trained on the approaches they will employ in facilitating their lessons, elementary pupils still fell behind the expected outcome.

The Philippines' fifteen-year-old pupils scored lower in reading, mathematics, and Science than children in most countries and economies participating in the 2018 International Student Assessment (PISA) Program. The country's average scores in reading, mathematics, and science were 340, 357, and 354, respectively. Out of the 79 countries, the Philippines settled at the bottom in reading while second to the last in Mathematics and Science. This means that the Philippines ranked poorly in the 2018 PISA, and over 80% of pupils in the country did not achieve a minimum level of reading competence, making it one of the countries with the highest proportion of low performers among PISA participants [Organisation for Economic Cooperation and Development (OECD), 2018].

Furthermore, according to the Bureau of Education Assessment of DepEd [(DepED-BEA), 2016], the National Achievement Test (NAT) in Science for Grade Six verified that some learning abilities were below the level of achievement. Based on the data, the mean percentage score (MPS) of the Division of Romblon in Science was 37.05% (S.Y. 2015-2016) and 29.76% (S.Y. 2016-2017). Concurrently, the MPS of the whole MIMAROPA region in Science during the S.Y. 2017-2018 was 30.94%. These data only showed that the MPS for three consecutive years was far behind the 75.00% national standard, describing a poor Science achievement level.

Unfortunately, there were also elementary grade pupils who were not motivated to participate in the lesson because they were not interested and bored and displayed behavioral problems during the teachers' course of instruction in Science. There were also times that during the giving of the teacher's formative assessment, pupils could not achieve the needed learning competencies of the day. Moreover, some

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pupils still have fairly satisfactory grades in Science, indicating that even frequent remedial classes and peer mentorship were not adequate to address the low-performance level in a given learning skill that did not fulfill expectations.

To address the issue, many strategies have been studied to improve the achievement of elementary students. According to Peniero and Toshihiko (2020), many instructional materials are used in teaching Science in the Philippines, such as textbooks, laboratory activities, activity sheets, and visual aids, where textbooks are commonly used references. These resources bring together and support instruction (Janovsky, 2019). Teachers work hard to provide quality and interesting methods but are still hooked on traditional approaches due to a lack of facilities. However, the teacher-centered approach, which usually uses blackboards and chalkboards, is still prevalent. Also, the additional functions of teachers hinder them from reviewing students' achievements (Peniero & Toshihiko, 2020).

The aforementioned facts become the basis of this research on the need for appropriate learning strategies to improve the academic achievement of grade six pupils. One solution to these problems is employing the carousel strategy (CS) as one of the newest trends in the K12 curriculum. This cooperative learning strategy is a communicative and interactive opportunity for pupils to get up and move around a room, similar to a carousel, and stop intermittingly in each station to comment, discuss, and give ideas about the activities posted in each station inside the room.

The researcher intended to employ CS since it can improve pupils' thinking, social skills, camaraderie, communication skills, and knowledge. The implementation of CS can improve the students' higher-order thinking skills and the students' learning outcomes. There are numerous studies regarding the positive outcome of using CS. Owen and Thomas (2019) averred that pupils were very engaged in completing the activities at each workstation. The pupils demonstrated a high level of autonomy and responsibility for running the activity in each station. In general, Owen and Thomas (2019) found out in their study that pupils' levels of motivation and achievement when participating in the carousel activity were high.

At present, researchers have disputes regarding using CS as a pedagogical intervention in teaching and learning in a primary school. According to Lin (2013), student engagement in cooperative learning experiences like CS is also a barrier to teacher implementation. Teachers need to be aware that adopting the aforesaid strategy does not guarantee deep student engagement and cooperative learning instruction requires deep planning and consideration of student learning style. Therefore, this study wants to determine if CS affects the academic achievement in Earth and Space Science of grade six pupils at Santa Fe Central Elementary School, Poblacion, Santa Fe, Romblon.

METHODOLOGY

Research Design

The researcher used the pretest-posttest control group quasi-experimental design because two intact classes were used while participants were not assigned randomly. Besides, Weirsma (2006) stated that quasi-experimental is the design suggested to be appropriate in intervention studies done in a school setting. Furthermore, the aforesaid design is more practical in real life when dealing with groups like students who are already in classes.

The CS represents the experimental group, while CTA represents the control group. The AA1 represents the pretest achievement test in Earth and Space Science, while the post-test represents AA2 for the experimental and control groups. The CS intervention is represented as X, while CTA is represented as O (Table 1).

Table 1. The Research Design showing the Quasi-Experimental Design

Group	Pretest	Intervention	Post-Test
Carousel Strategy (CS)	AA1	X	AA2
Conventional Teaching Approach (CTA)	AA1	O	AA2

Where:
AA1 pretest for achievement test
X the experimental group for teaching the intervention (CS)
O the control group for teaching the CTA
AA2 post-test for achievement test

To reconcile the research gap, quantitative research design was used. The grade six pupils in experimental and control groups were given a pretest and a post-test to investigate whether there would be significant differences and increases between the CS and CTA groups. After the pretest was administered, the pupils under the CS group were given the CS intervention to facilitate the lessons in Earth and Space Science. In contrast, the control group was taught using CTA. Same teacher taught both groups in two consecutive periods for four weeks.

Research Locale and Time of the Study

This study was conducted in Santa Fe Central Elementary School, Barangay Poblacion, Santa Fe, Romblon. The preparation and construction of academic assessment multiple test items, daily lesson logs (DLL),

and the permit requests were done from October 2019 to December 2019, while the actual experiment was conducted from January 2020 to February 2020.

Population and Sample of the Study

The study included 60 grade six pupils who were allowed by their parents to participate. Thirty (30) from section Camellia and another 30 from section Carnation participated in the study. They belong to the Basic Education Curriculum with heterogeneous class grouping. The distribution of the population by section is shown in Table 2.

Table 2. Population and Participants of the Study

Sections	Population	Grouping
Camellia	30	Experimental (CS)
Carnation	30	Control (CTA)
Total	60	

Research Instruments

Achievement Test. A researcher-made test consisting of 50 items was administered to CS and CTA groups to determine the pupils' academic achievement before and after the study. A table of specifications was prepared following the revised Bloom's taxonomy of learning domains. The achievement test was developed covering the lessons in Earth and Space Science, particularly in the following learning competencies: describe the changes on the Earth's surface as a result of earthquakes and volcanic eruptions(S6ES-IVa-1), enumerate what to do before, during, and after an earthquake and volcanic eruption (S6ES-IVb-2), Describe the different seasons in the Philippines (S6ES-IVc-3), discuss appropriate activities for specific seasons in the Philippines (S6ES-IVd-4), demonstrate rotation and revolution of the Earth using a globe to explain day and night and sequence of seasons (S6ES-IVe-f-5) and compare the planets of the solar system (S6ES-IVg-h-6). Items in the academic assessment were distributed as follows: Remembering (17), Understanding (18), Applying (2), Analyzing (8), Evaluating (2), and Creating (3). The achievement test was a multiple-choice type in which each correct answer received one point. The same achievement test was used for pre and post-test.

Daily Lesson Log Incorporating the Carousel Strategy. Daily lesson log (DLL) is a format used by teachers to record portions of their lessons and activities. All teachers with at least a year of teaching experience who handle subjects with aaccessible learning materials or teaching guides must fill out daily lesson logs (DDL) every week (DepEd, 2016). The DepEd supports the role of K12 teachers as facilitators of learning; therefore, using DLL allows teachers to reflect on what learners need to learn, how to learn, and how best to facilitate the teaching, learning, and assessment process. The DLL covers a day or weeks' worth of teaching and contains the objectives, content, learning resources, procedures, remarks, and reflection.

Carousel Strategy. The CS, in the context of the experiment, featured a cooperative learning strategy wherein pupils worked in small groups. The teacher started the lesson by eliciting, reviewing previous lessons, and presenting the new lesson. Then, engaged the curiosity and interest through asking questions, presenting pictures or illustrations, and conducting guessing games.

Moreover, the teacher employed the CS in the exploring part of the lessons, wherein pupils were given opportunities to work together and build concepts through their first-hand experience. Pupils were grouped into four. Each group was assigned to each station where simulation, puzzles, describing activity, and answering questions were performed. The group members discussed each task and wrote their ideas using a colored marker or post-its. Then, the group moved from one station to another as they heard the music timer. In addition, each group received a chart paper with ideas of the four groups. The group members collaboratively summarized the thoughts and ideas written and posted by the other group. The summarized ideas were posted in their respective station before moving to the next station to see and read the output of other groups. This part of the lesson lasted for 16 minutes. The teacher then further explained the lessons by processing the outputs made by each group to help the pupils build the lesson's concept and knowledge. This was done by asking questions and adding information to elaborate the lessons and apply their learnings. The teacher also did the extended part of the lesson wherein pupils applied what they had learned. Finally, a short formative evaluation was given to check pupils' mastery of the lesson. This is a five-item multiple-choice or enumeration test at every lesson's end. Results were checked and recorded but not graded to assess if the students had mastered the competencies of the day.

In CTA, the usual way of teaching-learning was followed wherein the lessons in Earth and Space were taught. Students in this group received the same instruction as in the CS following the context of DLL, incorporating the 7E's: elicit, engage, explore, explain, elaborate, extend, and evaluate. During the exploring part, the students were grouped into four, each given the same task. Members of the group worked independently and lasted for 16 minutes.

Validation and Reliability of the Research Instruments

The content of the research instrument was validated with the assistance of master teachers working at the elementary school with ten years in the service.

They were consulted to determine whether the points were clear and grammatical mistakes were present in the instrument. The suggestions were incorporated into the revised form in consultation with the researcher's adviser. The instrument was pilot tested among grade seven pupils of Santa Fe National High School during the S.Y. 2019-2020. The data from the pilot test were used to calculate the instrument's internal consistency, which was used to see if all the items in the questionnaire measured the same thing. Cronbach's alpha was used to measure the reliability of the research instrument. According to the data analysis, the test was valid, and its test characteristics are within the permitted range values for index discrimination of 0.43 and index of difficulty of 0.60. Furthermore, the achievement test's reliability score is 0.80, indicating that the instrument is excellent and reliable.

Data Collection Procedure

The study procedure involved three phases: the pre-activity phase, the experimental phase, and the post-activity phase. The pre-activity phase consisted of a given pretest on Earth and Space Science to assess the pupils' academic performance before the conduct of the study. The experimental phase is characterized by using CS in the CS group, scheduled from 7:00 to 7:50 in the morning. The traditional teaching method, including lectures and discussion, was scheduled during 7:50 to 8:40 in the morning and was used in the CTA group. The post-activity phase was conducted by administering post-tests on both CS and CTA groups. The results of the pretest and post-test of the two classes were analyzed. Table 3 shows the specific dates and activities of data collection.

Table 3. Schedule of Data Collection Activities

Date	Data Collection Activities	
	CS	CTA
A. Pre Activity Phase		
October 28-30, 2019	Preparation of Daily Lesson Log for CS and CTA Group	
November 10, 2019	Sending Letter of Permissions to Conduct Study	
November 11, 2019	Crafting of Achievement Test with TOS	
January 6, 2020	Validating the Achievement Test with TOS	
January 8, 2020	Pilot Testing of Achievement Test	
January 16, 2020	Orientation to Pupils on the conduct of study	
January 17, 2020	Conducting Achievement Test (Pretest)	
B. Experimental Phase	7:00 AM-7:50AM	7:50AM-8:40AM
January 20-24, 2020	Lesson 1 to Lesson 5	Lesson 1 to Lesson 5
January 28-31, 2020	Lesson 6 to Lesson 10	Lesson 6 to Lesson 10
February 3-7, 2020	Lesson 11 to Lesson 15	Lesson 11 to Lesson 15
February 10-14, 2020	Lesson 16 to Lesson 20	Lesson 16 to Lesson 20
C. Post Activity Phase		
February 17, 2020	Conducting Achievement Test (Posttest)	
February 19- April 2020	Data Processing and Analysis	

Data Analysis

In this study, the researcher used a quantitative data analysis technique using the Statistical Package for Social Sciences (SPSS) program. The mean and standard deviation were used to determine the level of academic achievement in Earth and Space Science of grade six pupils in both CS and CTA groups using the results of the pretest and post-test. On the other hand, the paired sample *t*-test was used to determine the significant difference in the pretest and post-test, and the post-test mean gain achievement of the pupils of Earth and Space Science under the CS and CTA. Lastly, paired sample *t*-test was used to compare both groups' significant increase in pretest and post-test achievement.

RESULTS AND DISCUSSION

Table 4 shows the descriptive statistics of pupils' academic achievement, measured by the number of correct responses on the 50-item achievement test developed by the researcher. The table presented the increase in post-test mean scores of pupils in the CS group (M = 14.70) compared to those in the CTA group (M = *2.13*). The result denoted a more proficient

performance shown by the CS pupils in their academic achievement compared to the CTA group. Across groups, a slight difference of 0.80 on their pretest mean scores were found. After the intervention, the CS group obtained higher post-test score (M = 30.70, SD = 5.09) than the CTA group (M = 17.33; SD = 4.03). Both groups showed an increase from pretest to post-test. However, the CS group consistently scored higher and has improved their mastery level than the group taught with CTA, which has low improvement.

Table 4. Academic Achievement of Grade Six Pupils Exposed to Carousel Strategy (CS) and Conventional Teaching Approach (CTA).

Group	Mean	SD	Mean Percentage Score	Description
CTA Group				
Pretest	15.20	4.00	30.40	Low
Posttest	17.33	4.03	34.66	Low
CS Group				
Pretest	16.00	4.50	32.00	Low
Posttest	30.70	5.09	61.40	Average

An examination of the findings in Table 5 reveals that the results of the independent sample *t*-test for the pretest academic achievement of the CS and CTA group did not show a significant difference ($F(58) = .520$, p = 0.47). This means that both groups have the same level of achievement prior to the experiment.

Table 6 illustrates the results of the independent sample *t*-test of the post-tests in CS and CTA groups which revealed a statistically significant difference, $F(55) = 2.870$, $p < .01$. It means that there is a significant difference between the post-test academic achievement of grade six pupils exposed to CS and CTA in facilitating Earth and Space Science lessons. The result also shows that the pupils under the CS group produced a more significant overall improvement in post-test academic achievement in Earth and Space Science. The study of Doymus (2008) discussed that pupils taught using the carousel strategy have more significant achievements in Earth and Space Science than those taught through the traditional teaching approach. The result of this study is also consistent with the findings of Sahin (2010), which show that cooperative learning leads to improved academic performance.

Comparing the participants' pretest and post-test academic achievement, Table 7 shows a significant difference between the pretest and post-academic achievement of the pupils in the CS group ($t(49) = 11.91$, $p = 0.00$). Based on the results obtained, it could be argued that CS significantly increased pupils' academic achievement in the CS group. This could be due to the teacher's ability to design a series of measurable activities in carousel strategy. This study is supported by Owen and Thomas (2019) who affirmed that the carousel strategy illustrated a pupil-centered approach since they put pupils at the heart of their learning and give them locus of control. So, the learners' attention and interest captured such presentation, thus, improved pupils' performance. Also, Avisteva (2017) found out that because pupils have the opportunity to contemplate and revise their responses before presenting them, the carousel activity engages them. This statement further agrees with what Joni (2015) concluded: through the implementation of the carousel activity, pupils academic achievement achieved a fairly positive impact. Agreeing with this, Yusmanto et al. (2017) revealed that the carousel strategy can improve students' learning outcomes.

Table 8 reveals a significant difference between the pretest and post-test academic achievement scores of pupils in the CTA group ($t(29) = 2.33$, $p = 0.03$). This denotes a significant increase between the pretest and post-test achievement of grade six pupils exposed to CTA in Earth and Space Science.

Table 9 shows the result of the independent sample *t*-test applied to compare the post-test mean gain of pupils in the CS and CTA groups. The table discloses a statistically significant difference ($t(58) = 8.18$ p = 0.00). This indicates that grade six's mean gain achievement exposed to CS and CTA in Earth and Space Science are significantly different. It also indicates that the CS group's mean academic achievement is higher than the CTA group. Owen and Thomas (2019) support this finding and found that CS has positively impacted pupils' learning outcomes. Consequently, Avisteva (2017) found out in his study that pupils become more active during the CS since pupils work in groups to improve their critical thinking skills about previous learning and generally improve their achievement. Thurston et al. (2010) also found that the quasi-experimental investigations he analyzed found any statistically significant detrimental effects on pupils' academic achievement. Below are some of the pupils' reflections about carousel strategy:

> "*Ang ganda ng* Carousel Strategy *na ginamit ni* Ma'am *sa kanyang pagtuturo dahil napaisip ako sa mga gawain sa bawat istasyon. Madali akong natuto sa ganitong pamamaraan ng pagtuturo*".
> (The teaching approach used by Ma'am was absolutely great because it helped me think of the varied activities in each station. I learned a lot every time Carousel Strategy was used.).

> "*Ang pamamaraan sa pagtuturo na ginamit ng aming guro ay hindi* boring. *Ako ay nagaganyak*

na makisali sa talakayan sa klase. Mas marami kaming ginawa kaysa sa kanya."
(The teaching approach employed by my teacher was not boring. It motivated me to participate in the class discussion. We have done a lot than the teacher did.)

"*Mas lalong nahasa ang aking pag-iiisip, pakikibahagi at ang pakikipagtalakayan sa aking kaklase dahil sa pinakitang makabagong paraan ng pagtuturo, ang* Carouse Strategy."
(The way I think, share and discuss with my classmates were sharpened and enhanced because of Carousel Strategy.)

"*Naibahagi ko ng malaya ang aking ideya tungkol sa paksa gamit ang mga makukulay na papel at panulat. Masaya kong naibahagi ang aking nalalaman sa mga miyembro ng pangkat.* Excited *akong pumasok at matuto dahil sa* Carousel Strategy *na ginagamit ng aming guro*."
(I have shared freely my thoughts using the colored marker and post its. I am happy sharing all the things I've learned with my classmates. I am also excited to go to school and learn because of the carousel strategy that was used by the teacher.)

"*Dati-rati ako ay nahihiyang tumayo at makisalamuha sa talakayan sa klase. Noong ginamit ng aking guro ang* Carousel Strategy *sa kaniyang pagtuturo, ako ay tuwang tuwa dahil nagkaroon ako ng pagkakataong mag-isip at maibahagi ang aking opinyon*."
(I am shy to stand and participate in the class discussion. I am very much a glee with glow every time the teacher employed the carousel strategy in our class.).

Table 5. Result of Independent Sample *t*-test on the Difference between the Pretest on Academic Achievement of the Pupils in Earth and Space Science for both groups.

Group		Levene's Test for Equality of Variances		*t*-test for Equality of Means			Interpretation	Decision
		F	Sig.	T	df	Sig. (2-tailed)		
Pre-test of CTA Group and CS Group	Equal variances assumed	.520	.474	-.728	58	.470	Not Significant	Accept Ho

Table 6. Result of Independent Sample *t*-test on the Difference of the Post-test Academic Achievement of Pupils in Earth and Space Science for Both Groups.

Group		Levene's Test for Equality of Variances		t-test for Equality of Means			Interpretation	Decision
		F	Sig.	T	df	Sig. (2-tailed)		
Post-test of CTA Group and CS Group	Equal variances not assumed	2.870	.096	-11.283	55.109	.000	Significant	Reject Ho

Table 7. Results of the Paired *t*-Test to Compare the Pretest and Post-test Academic Achievement of Pupils in Earth and Space Science of Carousel Strategy Group.

Category	N	Mean	MD	t	df	Sig. (2-tailed)	Interpretation	Decision
Post-test of Control Group Using Carousel Strategy	30	30.70	14.700	11.91	29	.000	Very Significant	Reject Ho
Pre-test of Control Group Using Carousel Strategy	30	16.00						

Table 8. Results of the Paired Sample *t*- Test to Compare the Pretest and Post-test Academic Achievement of Pupils in Earth and Space Science of Conventional Teaching Approach (CTA) Group.

Category	N	Mean	MD	T	df	Sig. (2-tailed)	Interpretation	Decision
Post-test of Control Group Using Conventional Teaching Approach	30	17.33	2.13	2.333	29	0.027	Significant	Reject Ho
Pre-test of Control Group Using Conventional Teaching Approach	30	15.20						

Table 9. Results of Independent Sample *t*-Test on the Post-test Mean Gain of Academic Achievement of Pupils in Earth and Space Science for Both Groups.

Group		N	Mean Gain	Levene's Test for Equality of Variances		t-test for Equality of Means			Interpretation	Decision
				F	Sig.	t	df	*P*		
Mean Gain Post	CS	30	14.23	0.886	0.350	8.183	58	.000	Very Significant	Reject Ho
	CTA	30	1.87							

CONCLUSION

Using a quasi-experimental research design, this study examined the effect of the carousel strategy on the academic achievement of grade six pupils in Earth and Space Science. Because of the collaboration that occurs during learning activities such as receiving help from classmates, influencing peers, modeling, observing, and interacting with others, which are typical features of social and cultural theories of learning, the carousel strategy has been found to be effective in teaching earth and space science topics. This strategy has the potential to provide an engaging and interactive way of facilitating science lessons. It can also make science lessons more meaningful and enjoyable, as well as motivate and engage students throughout the lesson. It is suggested that this strategy be investigated and documented in other disciplines.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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Streamlining Service Delivery of Final Duties and Taxes in a Private Banking Corporation

Ellaine Joy G. Eusebio

ABSTRACT

This paper discusses the actions taken regarding the slow delivery of final duties and taxes in a private banking corporation. The objectives were to eliminate customer complaints and close all the pending transactions to gain customer satisfaction and increase the percentage of clients and transactions served. After observations, a series of interviews, data collection and documentation, and collaboration efforts with the team members involved, the issue was constructed. Various tools were used in planning, constructing, implementing, and evaluating the streamlined process improvement. Process mapping and lean thinking methodology were applied to know which activity should be eliminated. A workflow instruction was formulated, which improved the cycle time. Time and motion analyses were crafted during the implementation to verify each transaction. Pending transactions, follow-ups, and complaints were compared before and after implementation to confirm if the streamlined process improved the service delivery. It was observed that some of the team members were hesitant to change at first, but by using convincing words and data during the team meeting, all members were convinced that streamlining service delivery is a need. After a month of implementation, the record showed that the streamlined process eliminated complaints, reduced follow-up concerns through telephone calls from clients, and decreased pending transactions by 50%. Through this, the relevance of data to support a particular idea is further realized. Furthermore, it was also observed that the streamlined process improvement saved the company time, energy, and even costs. It ensures the fast delivery of products or services, resulting in customer satisfaction.

Keywords: *service delivery, streamline, speed, process improvement, action research*

INTRODUCTION

Time or speed is one of the most critical competitive priorities today. Companies in all industries compete to deliver high-quality products as quickly as possible. Today's customers do not want to wait, and companies that can meet their need for fast service are becoming leaders in their industry (Reid & Sanders, 2010).

According to Hatzakis and colleagues (2014), service design must be as rigorous as product design because the customer experiences the service firsthand, much like a product, and comes away with impressions regarding the quality of service. However, Cirpin and Sarica (2014) noted that since service quality does not involve concrete elements, it is an ambiguous and complex concept regarding its comprehension, application, and inspection. Service is a set of non-tangible activities sold for a specific price to benefit and/or satisfy human needs, which can be wasted easily and cannot be standardized.

Meanwhile, Swar (2012) shows that systemization elements of service delivery are the best predictor of customers' expected service delivery. Thus, the banks should focus more on this dimension of service delivery. Systemization Elements of Service Delivery include: 1) adequate and necessary facilities are available for good customer care; 2) exhibits enhancement of technological capability to serve customers more effectively; 3) highly simplified service delivery process; and 4) customers feel safe, secure, satisfied, and delighted. Parasuraman et al. (1985) identified ten key determinants influencing perceived service quality: reliability, responsiveness, competence, access, courtesy, communication, credibility, security, understanding/knowing the customer, and tangibility. In a later study, the authors reduced the ten factors to five known as RATER: reliability, assurance, tangibles, empathy, and responsiveness (Tanwar, 2013).

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In the Philippines, most banks have various services that assist their clients in their financial obligations. In a particular private bank corporation, the bank serves as an intermediary for payments of final duties and taxes to the Bureau of Customs (BOC). Since it deals with logistics requiring speed, it should be more concerned about how it can transmit the payments to BOC as fast as it can. When time is a competitive priority, the job of the Operations Unit is to critically analyze the system and combine or eliminate processes to save time (Reid & Sanders, 2010). However, aside from system monitoring and releasing payments to the BOC, the account officer in charge is also responsible for accepting calls and answering clients' queries. An alarming increase in follow-ups and pending transactions in the final duties and taxes settlement section was noticed at the end of every banking day, resulting in more client complaints. Arguably, these complaints are acceptable, given that clients have to pay the demurrage fee as a penalty for late payment transfer to BOC. Demurrage charge is applied for shipments wherein customers have exceeded the standard free time or the agreed free days for all containers to remain at the terminal. Figure 1 presents the existing process for handling telephone calls and inquiries of clients.

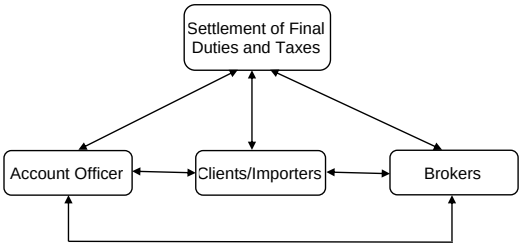

Figure 1. Existing process on telephone calls/inquiry of clients.

Adding to the problem is the absence of proper filing system where special instructions of clients are located. Some of these special instructions include the details to which bank account will the transaction be credited, how will the payment be processed, and the specific person to contact in case of problems. Details such as these are essential in every transaction, that is why it is important not to miss any of these (Table 1).

Urgency is needed, especially with the payments of taxes to government agencies. Final duties and taxes, if not collected on time have consequences: 1) an hour or a day delay resulted in a loss of our client's money; penalties like storage fees are too costly. 2) not paying duties and taxes hinders the release of goods at the port, affecting the production or deliverables to customers.

The above situations can affect the bank by losing potential revenue. Aside from that, clients can quickly exit and seek the competitors' services if the bank cannot satisfy or exceed their expectations. They might have lost their clients if the issue was not properly handled or resolved. It was also an opportunity loss. Positive informal communication (word-of-mouth) is very significant in gaining prospective customers. These unsatisfied clients can bad mouth the bank to other importers.

In summary, the main issue is the slow delivery of service in settlements of final duties and taxes. The objective is to eliminate complaints and close the pending transactions. The goals are to gain customer satisfaction since they will not be penalized and increase the percentage of clients and transactions served.

METHODOLOGY

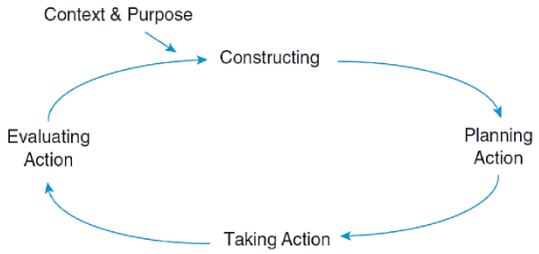

Figure 2. Action research cycle. (Coghlan & Brannick, 2010).

Action research is used to address the issue of the company. An action research cycle (Figure 2) comprises a pre-step, context, and purpose, and four basic steps: constructing, planning action, acting, and evaluating action (Coghlan & Brannick, 2010).

Data collection began with an observation. Data was gathered from company reports to confirm the observation. The researcher validated her observations with the other members of the team. She also conducted informal interviews with several clients and account managers, researched related papers and books on service delivery improvement, and obtained data.

In addition to observations, interviews, and pertinent documents, the researcher kept a journal, which assisted her in documenting her reflections. She kept a journal using Schein's observation, reaction, judgment, and intervention (ORJI) approach. It concerns what happens in mind and how it influences covert behavior. One observes (O), reacts emotionally to what he or she has witnessed (R), analyzes, processes, and makes judgments based on the observations and feelings (J), and intervenes to effect change (I) (Coghlan & Brannick, 2010).

Table 1. Summary of Issues regarding Slow Delivery of Service in Final Duties and Taxes Settlements.

Manifestations	Consequences	Proposed Interventions
Clients make a follow- up. Massive phone calls were received	**Minor:** Disappoints and irritates the clients **Major:** Clients can shift to other banks	
Clients complain as their transactions were not done on the day, they were required to pay	**Minor:** Duties and taxes were not collected on the given time allowed clients to pay Lodgments expire and pass the given days allowed clients to pay **Major:** Clients pay corresponding penalties i.e. storage fees and demurrage because of the delay	Review the process flow and eliminate unnecessary tasks Manage Client Information/ special instructions
There were bulk of unclosed/pending for approval transactions at the end of the day	**Minor:** Stressful to the employee handling the responsibility **Major:** Loss of potential revenue to the bank	

Streamlined Process Improvement (SPI)

SPI is a systematic way of using inter-functional teams to analyze and improve the way the organization operates by improving the effectiveness, efficiency, and adaptability of the organization's process. It is sometimes called *process redesign* (Harington, 2012). This methodology focuses on setting new, higher performance levels rather than process variation. The improvement approach used by the streamlined process improvement (SPI) methodology is a five-phase process improvement approach called PASIC (Planning, Analyzing, Streamlining, Implementing, and Continuous Improvement). (Figure 3).

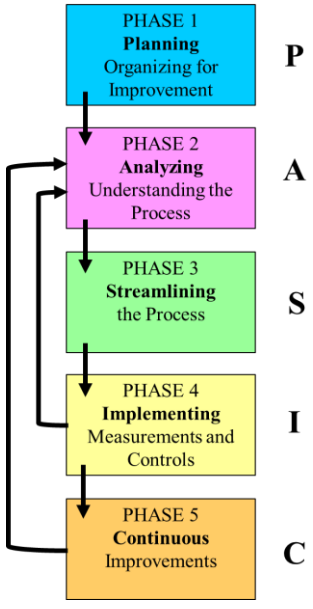

Figure 3. The Five Phases of the SPI Methodology (Harrington, 2012).

A streamlined approach (Phase III) was taken to improve the process effectiveness and resolve the slow delivery of final duties and taxes service. It focuses on eliminating the seven types of waste, in which case, processing wastes is one. These are operations, activities, and tasks that do not add actual value, which include: inspection operations, duplicate activities, unused outputs, unnecessary storing of information, redundant records and files, and rework operations.

RESULTS AND DISCUSSION

The data collection process is summarized in Table 2. Intervention is a series of sequentially planned actions or events designed to assist an organization in increasing its effectiveness. Interventions purposefully disrupt the status quo; they aim to shift an organization or subgroup to a different and more effective state (Cummings & Worley, 2009).

November 3-14, 2014. During the unit monthly meeting, the Assistant Manager (AM) discussed the matter with one of the accounts with the LC opening division. The settlement unit sent the wrong amount to BOC.

Carmen (not her real name) had overseen duties and taxes for over two (2) decades. She formerly had one assistant. However, she was left alone in settlements because most in the section were rotated and trained for a different responsibility every six months. For the most part, it looked manageable because the role of her assistant had previously been distributed to other section members.

During the meeting, the AM requested that the researcher handle the final duties and taxes. She would oversee sending emails and calling clients and account officers. On the other hand, Carmen would handle

payment, debiting clients, and crediting them to the Bureau of Customs. It will commence on November 10, 2014.

When the insider action researcher began handling settlements, she learned how complex the job was. Clients sent her a variety of complaints and follow-ups. She became the focal person for queries and transaction updates after becoming the person in charge of monitoring and settling duties and taxes. She believed she was unfit for the role during her first two weeks. Though she knew, she was still in her adjustment stage. However, after two weeks, she realized that when she had already adjusted to work, the situation lessened, but there were still complaints and follow- up (Figure 4).

As presented, the number of follow-ups from the clients consisted of similar clients, account officers, and brokers who called within a week. Some clients were ready to wait, while others wanted their transactions completed as soon as feasible. There were also several missed special instructions. The area of final duties and taxes settlement interacted with many clients with specific instructions. Some customers had auto-debit arrangements. Some preferred to be reached personally. Some preferred account numbers from which payments were debited. They overlooked several special instructions because they were scattered over multiple files. The number of missed transactions or complaints represented the complaints about payments supposedly sent to BOC and those who paid demurrage and storage fees.

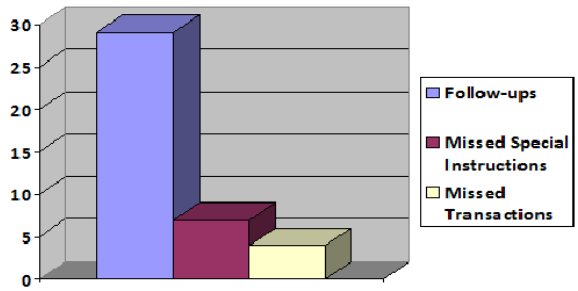

Figure 4. Frequency Report on follow-ups and complaints of clients.

Table 2. Data generation and intervention.

Date	Activities	Data Collected
2nd – last week of November 2014	Observation	Non-stop follow-up from clients Complaints on the non-passed transactions
1st week of December 2014	Telephone Interviews with clients, brokers, and account officers Process Mapping Generating and analyzing data from reports	Expected time of delivery Process flow Bulk of pending transactions
2nd week of December 2014	Collaboration with LC Opening Section Joint Diagnosis of the problem	Confirmation of my observations Generated the issue of slow delivery of service Projected process flow
3rd week of December 2014	Joint action Planning with AVP, AM, ISDP Trainee and the other FD assistant	Gained approval on the suggested process improvements Suggestions on how to communicate more effectively the lodgments to clients
January 2015 onwards	Implementation of the suggested process improvement to enhance service delivery Time and motion analysis	Streamlined process Workflow instruction Standard Time
1st to 2nd week of February 2015	Evaluation: Observation Analyzing data	No more complaints Less phone calls Less pending transactions Suggestion on Lead Time

Table 3. Process Flow Analysis in final duties and taxes settlements

Accounted Person	Process
Main Processor	1. For Balut: Receives summary of advance copy of incoming transaction 2. Monitors lodgments on the system 3. Email branches/calls clients about the lodgments 4. For Balut: Checks first if lodgments are on the summary of advance copy through PAS5 reference number; check if there is change in amount, then call and dictate. 5. Receives confirmation to debit 6. Checks if details in the confirmation to debit/DCA/authority to debit is correct 7. Checks and writes the special account number if any 8. Prints and endorses documents for processing of payments
Branches' employees	1. Receives information of lodgments 2. Confirms to client if okay to debit 3. Optional: waits for instruction to debit 4. Emails final duties and taxes if okay to debit
For Balut Branch:	1. Checks if lodgments appeared match the amount and reference number in the advance copy 2. Dictates to client the reference numbers and amount (change in amount or the same amount) that appeared on the system 3. Waits for confirmation to debit/authority to debit 4. Emails final duties and taxes settlements the amount and reference number that is okay to debit
Payment processor	1. Debits client's savings or checking account/apply checks or DCA 2. Credits BOC account
Approver	1. Checks if the information in the documents are consistent to one another 2. Releases payment entries and payments to BOC

December 1, 2014. Telephone interviews were also used to obtain information from clients, account officers, and brokers. Most clients wanted their transactions completed on the same day because their containers could only stay at the port for a certain period. Some wanted to pay as soon as possible.

Branch assistants were also interviewed. Balut Branch was one of them. Balut, Tondo is located near Manila's port area and has the most clients among all Private Bank branches in the Philippines. They account for 35% of all settlement unit transactions. The branch daily faxes a summary of expected transactions for advance checking. Some transactions, however, do not display on the system on the same day. Some appeared a week later since some cargos had not yet arrived. Every day, the settlement section had to monitor these transactions and the lodgments on the BOC system. It was time-consuming since they still had to confirm these expected transactions once they appeared on the system before processing and transferring them to BOC. As a result, it is a non-value added (NVA) activity in the process. NVA are non-value-added activities that do not contribute to achieving external customer needs and might be discontinued without compromising the product, service function, or business (Harrington, 2012). The process flow is shown below (Table 3).

Finally, an analysis of the data on hand was conducted. The weekly pending transactions averaged roughly 50 items (Figure 4). Payments awaiting confirmation must be monitored the following day every day. This means more work for the next day. These lodgments were not transmitted because some do not have funds; others have not yet arrived at the port or have not maximized their free time. However, much was because the settlement unit missed some orders and did not notify clients.

Planning

The data collection was completed in time for the December 8, 2014, meeting. The observations were conveyed to the team. All the members of the team agreed with her observations. The majority also experienced the same complaints from the clients. When the researcher showed the customer reports, such as the number of complaints and missed special instructions and transactions, it bothered the AVP.

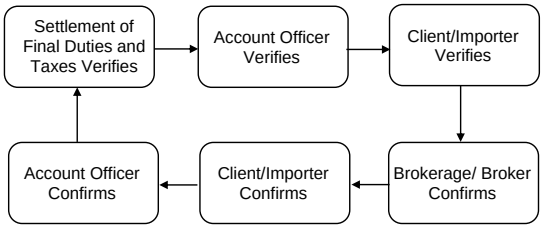

Figure 5. Projected scenario on telephone calls/inquiry of clients.

Based on the researcher's observation, clients follow up and file complaints because there was a problem with service delivery. They concluded the discussion on a note, with everyone agreeing that the slow delivery of service is an issue that must be addressed. They also created a projected scenario, as seen in Figure 5.

The number represents the order or flow of information. Lodgments that occur in the system must be coordinated with the appropriate account officers. These Account Officers will then check with clients whether these lodgments can be transmitted. The clients will check with their brokers to see if the amount is the same as expected. As indicated, information flows clearly from the researcher's unit to the account officers and back to the unit.

Since the team is committed to quality and efficiency, it adheres to the Private Bank's tight protocols and procedures. Everyone should make every effort to ensure that all instructions are documented, especially in final duty and tax settlements involving large sums of money. Written instructions (email), debit-credit advice from branch officers, or client authorization letters must be secured. Before leaving the AVP's office, the latter urged the action researcher to consider improving service delivery in her area.

December 15, 2014. The researcher met with the AVP, AM, ISDP Trainee, and Carmen to discuss her proposed action plans. The researcher used the process flow chart to determine the duplication of tasks in settlements and one of the central branches, the Balut Branch. The AVP, AM, and ISDP agreed that checking and validating the material lengthened the procedure. Carmen was first hesitant to eliminate the NVA, but after encouraging words and reports, she accepted. Following the discussion, the AVP stated that she would discuss the matter with the branch manager.

The study also showed that special instructions such as auto-debit arrangement, contact numbers, contact person, and specific account numbers were dispersed over multiple files. Inadequate customer knowledge can also have an impact on process and procedure. As a result, they agreed to integrate all of these materials. Because Carmen knows most of the clients, the AVP assigned her to assist in consolidating all special instructions and disseminating the file around the group. Understanding the position of a specific service on each continuum and the position of competitors is thus a necessary step toward identifying potential sources of competitive advantage (Swar, 2012). Concerning the pending transactions, they also decided that the transactions awaiting confirmation should be confirmed with the account officers via email and phone call at the end of the day.

The action plans were scheduled to be completed on the first working day of January 2015. Because there were only a few working days left before the end of the year, they had work twice as hard to complete the workflow process.

Implementation

The researcher began compiling all the clients' special instructions on the same day. They completed the workflow instruction in two days with the help of Carmen.

The following day, the AVP relayed her conversation with the Balut Branch Manager. She explained to the latter the job of the settlement division, which is to monitor and release payments on the BOC system and secure authority to debit.

Concerning the follow-up call to account officers and clients, she advised them that the settlement section would only process entries until 3:30 p.m., accommodate payment instructions until 4:00 p.m., and perform follow-up calls within the 30-minute gap.

January 5, 2015. The researcher found that several of the queries/calls received were about the status of transactions, and the unit could not guarantee a definite turnaround time. As a result, she created a time and motion analysis. She observed and interviewed each person involved in the process on his or her lead-time. The time and motion analysis would also test the effectiveness of the streamlined process of final duties and taxes service delivery (Table 4).

The processing time is the fastest time the section can complete each activity, while the cycle time considers tasks other than final duty and tax settlements. The time and motion study revealed that each transaction, excluding customer confirmation, can be completed in 1 hour and 10 minutes.

Evaluation

January 12, 2015. The researcher noticed the improved final duties and taxes processing. They shortened the processing time and improved communication with all parties involved. The information flowed smoothly. They also eliminated

complaints, consequently reducing customer anxieties and inquiries. The number of phone calls received was already manageable. It was down to 5 to 10 calls from about 30 received. The researcher could now concentrate on her primary responsibility of monitoring and releasing payments.

She also found that after two weeks of calling account officers and clients for updates on the status of their transactions, they became more diligent about providing them with an update. She provided updates to the AVP regularly and reported her observations.

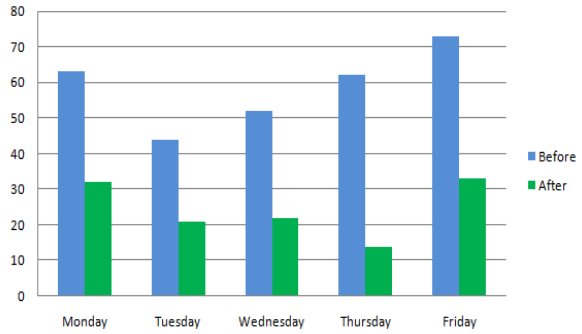

Figure 7. Evaluation on pending transactions.

February 9, 2015. The researcher examined the number of pending confirmations before and during the implementation phase. She then presented the information to the AVP. She was happy that it had dropped by half in just one month (Figure 7). Pending before implementation is represented by blue, whereas pending during evaluation is represented by green. As indicated, pending transactions fell nearly 60% after the adjustment was implemented.

The following day, the AVP called a team meeting to provide an update on the streamlined process of final duties and taxes. She talked about the shortened process and the intention to improve service delivery in final duties and taxes continually. The AVP stated they would continue to streamline their procedure because it saves time, energy, and cost. She pushed them to be more active rather than passive once more.

She also reminded them of one of the bank's core values, initiative or resourcefulness, and encouraged them to initiate improvements. She admitted that she was aware that most of their methods were mature and might not be appropriate today. Especially now that the bank is expanding, employees must deal with a rising number of consumers. Finally, the AVP underlined the importance of streamlining operations to serve clients better.

Table 4. Time and Motion Analysis.

Activity	Process Time (Minutes)	Cycle Time (Minutes)
When the lodgment appears in the Bureau of Custom's (BOC) system, the account officers or the client will be directly informed about the amount and the reference number.	5	5
When the approval or confirmation in the form of email, Debit Credit Advice (DCA) or authorization letter is received, the details will be checked and verified vis-a vis the lodgment. If all details are okay, the payment instruction in the BOC system will be printed and forwarded to personnel 2.	5	10
Personnel 2 will debit the account of client or apply check payment or DCA and credit the Bureau of Customs System. Then she will forward it to the releasing officer, the AVP or the ISDP trainee.	10	30
The Approver will check the details of the transaction, approve the debiting and crediting of the accounts then release the payment in the Bureau of Custom's System	5	10

CONCLUSION

This insider action research is not only helpful to people in the unit in satisfying final duties and taxes clients. This is also beneficial to any operations managers experiencing the same situation.

Fast service delivery or quality is essential, especially in a service-based business. Beryl and Brodeur (2007) posit that service quality is a critical success factor influencing an organization's competitiveness. A bank can differentiate itself from competitors by providing high-quality service. As a result, banks must constantly improve their services. There is no guarantee that what is excellent service today will also be applicable for tomorrow (as cited by Onditi, Oginda, Ochieng & Oso, 2012). Moreover, Johnston et al. (2013) noted that the success of service

operations managers is not simply about performing an excellent technical task, such as educating a student, delivering a project on time, or providing a holiday. Sound operations management should lead to better (or more appropriate) services and experiences for the customer, the staff, and the organization – 'triple bottom line.

By using the lean thinking methodology, the researcher proved some of its main benefits: reduced process times and lead times; reduced processing costs per item/customer through increased productivity; increased customer satisfaction; better communication with all the parties in the chain; reduced customer anxiety; and reduced costs resulting from lower levels of complaints or inquiries (Johnston et al., 2013). Hence, if banks and other financial service providers wish to execute their commitments to their clients effectively and efficiently, they should adopt this methodology.

Banks should also constantly examine their processes or procedures to ensure they are still effective today. No matter how good the managers are or how hard the employees try, all the stakeholders will lose if the critical business processes are outmoded and ineffective (Harrington, 2012). Unfortunately, too many managers feel that either they or their employees are the problem when, in truth, it is the processes that are the problem. If anyone is at fault, it is management because the managers have not recognized the need to improve the organization's business processes and have not assigned the required resources to improve them.

The SPI method helped the unit meet customer delivery schedules, improved service quality, and reduced pending transactions. Since SPI had been successfully implemented in big companies such as Corning, Boeing, IBM, LTV, Nutrasweet, Florida Power & Light, and Compaq, and now in the private bank, it has improved the service delivery of final duties and taxes in the subject area, any company, even the smaller ones can use this method in enhancing their process. SPI improves effectiveness, efficiency, customer satisfaction, morale, and adaptability. It also reduces costs, cycle time, variation, interdepartmental conflict, and bureaucracy (Harington, 2012).

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CONFLICTS OF INTEREST

The author declares no conflict of interest.

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CHAMPIONING A LEGACY OF FREE HIGHER EDUCATION. Philippine Commission on Higher Education Chairperson, Dr. J. Prospero E. De Vera III, brought inspiration and hope to the Romblomanon youths during his visit in the province on July 18-20, 2022, championing universal access to tertiary education, grass roots governance and his *PadyaKalikasan*'s environmental causes.

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