



# Tangkoyob

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## Research Journal

Research & Development Center  
University of the Cordilleras  
Baguio City



## About the Cover

*Tangkoyob* is an Ibaloi word for a carabao, cow, or goat horn in the Cordilleras used as a signalling device in the olden times to call people's attention on special occasions such as fiestas, weddings, and wakes and during emergencies such as fire or other natural disasters and calamities. In the Holy Bible, horns are symbols of power, authority, fame, and fierceness, as they are the chief means of attack and defense of the animals endowed with them.

In this journal, *Tangkoyob* means an incessant call for new knowledge and cutting-edge research information. This is the University's medium of generating and disseminating the power of knowledge; and imbibing and inculcating the development of critical and creative minds of the researchers. The University regards the creation of knowledge as one of its fundamental missions. The academic community works at myriads of research and collaborate with colleagues across disciplines and around the world and eventually address the society's biggest challenges.



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University of the Cordilleras

# Tangkoyob Research Journal

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(Special Issue)



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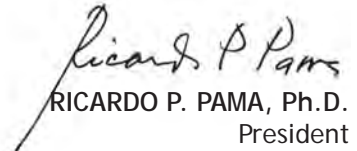
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Message

I am very pleased to introduce the new look of the University Research Journal called "Tangkoyob." I know that this journal is keen on strengthening further its professional content, to focus deeply on key issues and innovations in the evolving world of research, and deliver cutting-edge insights and articles that will be of value to the academe and the community.

Disseminating research findings is the ultimate goal of any research project since the value of research is meaningless if nobody has heard about it or even used it as a reference. I believe researchers generally want to achieve the largest readership for their work. As such, publication in a research journal is one key to the success of a research output.

This prestigious institution recognizes this need, and as a result, this research journal aims to relay research findings from researchers not only from the University of the Cordilleras, but from other research institutions as well. I hope that this issue of the UC Research Journal, and its succeeding volumes, will not only be enlightening and informative but will continue spreading quality research output in the Cordilleras and beyond.

  
RICARDO P. PAMA, Ph.D.  
President





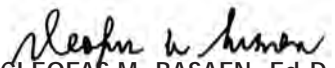
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Message

The University of the Cordilleras research publication is truly remarkable in both its breadth and depth. It reflects the proficiency, originality, and ingenuity of the researchers who set the cutting-edge research agenda, and who have a long tradition of engaging with their colleagues and students to work across disciplines.

Having the new look and face of the University of the Cordilleras Research Journal called, "Tangkoyob," novel initiatives continue to break down academic boundaries and bring together collaborative teams of experts to address major societal issues, such as those related to environmental sustainability, language, human health, economics, GIS, philosophy, and business. This also underscores some examples of innovative basic and applied research that are explored by academic scholars.

This entire research enterprise should and must create the culture in which researchers are taught multidisciplinary research as a rational, evidence-based approach in improving the quality of research inquiry pieces. We are proud of our researchers who gave their best in submitting quality research outputs for publication, a truly amazing world-changing discoveries and research advances. The success of our researchers and their importance in melding education with research is a source of pride for all of us.

  
CLEOFAS M. BASAEN, Ed.D.

Vice-President for Academic Affairs



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## Foreword

**Researchers need to publish.** It is said that a scholarly done research is not certainly complete until you have written and published it, making it available and useful to the intended readers.

Academic researches develop when the results are regularly communicated and thoroughly examined with the rest of the academic community and other research institutions to be confirmed or repudiated. Likewise, they need to be shared with the rest of society or the community because research should benefit us all.

Conversely, useful research is often locked in institutions, published as in-house reports only, or even placed on shelves in the offices. Other interesting results lie in libraries as thesis and monographs, out of the reach of many prospective researchers and scholars in the university. This information takes much longer to be accessed by readers, unless regularly considered in a circulated or published journal.

The University of the Cordilleras Research Journal called *Tangkoyob*, revives the existing university research journal that had stopped for more than two years. This issue provides a new look and freshness of multidisciplinary cutting-edge researches, articles, and reviews that explore the distinctiveness of the Cordillera region and its people. This edition is improved with a new front cover design that is contemporary and follows the world standards regarding this type of publication. Its improved outlook comes with a new emerging journal set out to ride the wave of change in the relationship among research and other emerging topics using the Geographic Information System (GIS) tool in research.

*Tangkoyob* was founded with the notion of being active and liberal, welcoming good quality research outputs to foster the interaction and propagation of favorably stimulating outcomes among academic scholars, researchers, and the community.

So far, we have received a very good response from various colleges and we are indeed grateful to our colleagues who submitted manuscripts and/or collaborated as expert referees in the review committee. This revival issue of the journal includes researches of multidisciplinary topics in the fields of science, language, health, economics, philosophy, and GIS. In its effort to



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provide distinctive research outputs, the R&DC and the Center of Geographic Information Science of the University are closely collaborating in producing applied researches using GIS applications and eventually create a platform that will advance the University's threshold in the world of research and technology in the region. In fact, the University has already strengthened all aspects of its research infrastructure.

*Tangkoyob* is on the verge of being a dependable entryway to the world of publications and to make its researches, reviews, and articles readily available to the Academe and readers in the community.

In light of this forward-looking orientation of the Journal, *Tangkoyob* will demonstrate that it remains focused on new trailblazing researches including theoretical and empirical articles in varied disciplines.

Cezario Joel C. Espejo  
Director  
Research & Development Center





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# Suppression of Growth of Some Medically Important Bacterial Pathogens (*Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Salmonella typhimurium*) with Plant Extracts of Selected Indigenous Semi-Temperature Medicinal Plants in the Philippines

(This research was a collaboration among different universities in the Cordillera Administrative Region under the Commission on Higher Education Zonal Research Grant. It was also presented orally during the Ratchaphruek 2011 International Symposium on Medicinal and Aromatic Plants on December 15-18, 2011 at Chiang Mai, Thailand)

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## Abstract

The suppression of growth of bacterial pathogens (*Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Salmonella typhimurium*) employing the standard Modified Kirby-Bauer Disc Diffusion Assay was evaluated. In addition, the different plant extracts were also subjected to phytochemical screening to determine the presence of natural products (secondary metabolites), i.e., alkaloids, steroids, anthraquinones, flavonoids, saponins, tannins and polyphenols, and cyanogenic glycosides which may be responsible for the antibacterial property of the plants. Extracts from the following plants were utilized: *Persea americana* (avocado),



*Chrysophyllum cainito* (caimito), *Anona muricata* (guyabano), *Artocarpus heterophyllus* (langka), *Carica papaya* (papaya), and *Sandoricum koetjape* (santol). For the phytochemical screening, the presence of alkaloids, steroids, anthraquinones, flavonoids, saponins, tannins, and polyphenols in the leaf extracts were proven. In the test for antimicrobial activity, bacterial species treated with the plants extracts and the different antibacterial agents showed significant differences in terms of the zones of inhibition, while no change in the zones of inhibition of the microorganisms treated with methanol. The highest antimicrobial potential was observed in *P. americana* extract with the highest activity against *S. aureus*. However, *C. cainito* and *A. heterophyllus* extracts did not present any antimicrobial activity against *S. typhimurium*. The results of the present study suggest synergistic antibacterial activity between the antibiotics and plant extracts against the pathogenic bacteria. The results obtained with *E. coli*, *P. aeruginosa*, and *S. typhimurium* were particularly interesting since they were inhibited by most of the plant extracts.

**Keywords:** medicinal plants, phytochemicals, antimicrobial, ethnobotany

## Introduction

The Cordillera Administrative Region (CAR) in the Northern Philippines encompasses most of the central mountains of Luzon. The region has high species diversity and high endemicity of both floral and faunal species. It is also known to house a varied species of medicinal plants. These plants have been used traditionally to treat several types of ailments by the indigenous people from different ethnic groups.

Indigenous people have to optimize the use of these medicinal plants due to the increasing prices of medicines which the local community cannot afford. Furthermore, the indigenous people strongly believe that these medicinal plants are safer to use than the other forms of medicines.

According to the World Health Organization (WHO), as cited by Akinyemi *et al.* (2005), medicinal plants constitute an effective source of both traditional and modern medicines. Herbal medicine has been shown to have genuine utility and about 80% of rural population depends on it as primary health care. Over the years, WHO advocated that countries should interact with traditional medicine with a view to identifying and exploiting aspects that provide safe and effective remedies for ailments of both microbial and non-microbial origins.



The use of medicinal plants predates the introduction of antibiotics and other modern drugs in the Philippines and in almost all countries of the world. Herbal medicine has been widely used and formed an integral part of primary health care in almost all parts of the Philippine islands. Traditional medical practitioners in the country use a variety of herbal preparations to treat different kinds of microbial diseases (Segismundo *et al.*, 2008). The antibacterial study of various plants has identified various extracts with activity against several pathogenic bacteria, which might explain their ethnomedical uses for the treatment of various infectious diseases. Furthermore, many extracts from Philippine medicinal plants can possibly be used as antibacterial agents (Penecilla & Magno, 2011).

Bacteria have been the cause of some of the most deadly diseases and have taken a large toll of humanity. Infections such as septicaemia and bacteremia are caused by *Staphylococcus aureus*, which is also often associated with various skin infections. The *Escherichia coli* is known to be the causative agent of urinary tract infection. The *Pseudomonas aeruginosa* is the most common cause of infections of burn injuries and of the external ear, and is the most frequent colonizer of medical devices, and in rare circumstances, it also causes community-acquired as well as ventilator-associated pneumonias. The *Salmonella typhimurium* causes gastroenteritis in humans, among others. Therefore, the growth inhibition of pathogens by the different plant extracts is significant in addressing public health issues due to bacterial infections caused by these clinical pathogens.

In the Philippines, very remarkable ethnobotanical documents have been written and published. These studies include those of Fox (1952), Yen and Gutierrez (1974), and Yen and Nance (1976) that focused on well-known minority groups. Specific studies on various medicinal plants in the Philippines include those of Quisumbing (1978), De Padua (1983), Ladion (1985), and Santos *et al.* (1985).

Co *et al.* (1989) documented different medicinal plants in the region. Despite some of these herbal plants have been documented to cure a certain ailment, most of the substance or substances that make it a potent medicine have not been identified. Furthermore, herbal remedies may also pose danger to users because some claimed medicinal plants may also contain phytochemicals that are hazardous to human health. Scientific validity must be done to eliminate danger to the lives of many who depend mostly on herbal remedies as a form of affordable therapy. A comprehensive and in-depth study of herbal plants as well as its chemical constituents should address the real need of local communities who, for generations depend on herbal plants as remedies for ailments.



On the other hand, infections caused by some common bacterial pathogens are also widespread in the region. Therefore, there is a continuous and urgent need to discover new and effective antimicrobial agents. Plants are known to be sources of limitless substances that can be synthesized. Most of these substances are usually molecules for plant defense against predation by certain microorganisms (Mallikharjuna *et al.*, 2007).

Many antimicrobial and phytochemical analyses on different plants were conducted by different authors. Asusheyi *et al.* (2010) conducted a study on the phytochemical and antimicrobial screening of *Schwenkia americana* Linn that demonstrates the presence of phytochemicals of various pharmacological importance. Parekh and Chanda (2007) tested 12 species of plants for their antibacterial properties using phytochemical analysis. Penecilla and Magno (2011) had shown that many plants used in traditional medicine in the Philippines have very potent antibacterial activity but bioactive components of the plant may vary. The characterization of the active components of these plants may lead to full utilization by the local folks.

In this study, locally identified medicinal plants were analyzed for their phytochemical composition and their antibacterial property against common clinical pathogens was also evaluated. This baseline information will provide the basis for developing potential drugs from these plants.

Table 1. Ethnobotanical information of some semi-temperate medicinal plants species selected for antimicrobial activity

Plant Species	Family Name	Common	Part Used	Therapeutic Use
<i>Persea americana</i>	<i>Lauraceae</i>	Avocado	Bark, fruit, leaves, and seeds	Promotes menstruation hastens the suppuration of wounds, relieves tooth-aches, anti-diarrheal and used to treat dysentery.
<i>Chrysophyllum cainito</i>	<i>Sapotaceae</i>	Caimito	Seeds, leaves, bark, fruit	Emmenagogue, pectoral, antihelmintic, anti-periodic, antidiarrheal.
<i>Anona muricata</i>	<i>Anonaceae</i>	Guyabano	Leaves, flowers, fruit sudorific.	Antiscorbutic and astringent, antipasmodic,
<i>Artocarpus heterophyllus</i>	<i>Moraceae</i>	Langka	Leaves	Antiasthmatic, laxative, aphrodisiac, astringent, carminative and tonic, sedative.
<i>Carica papaya</i>	<i>Caricaceae</i>	Papaya	Leaves, fruit and latex of trunk	Antirheumatic, emmenagogue, antihelmintic



## Methodology

### Collection and identification of plant materials

Healthy plant samples were collected from the mountain areas of Barangay Sablan, Benguet Province, Cordillera Administrative Region, Philippines between May and September 2011. The plant parts were identified using standard taxonomic keys at the University of the Philippines Baguio Herbarium, Baguio City, Philippines.

Prior to the conduct of the ethnobotanical survey, consultation with the local community was conducted for the prior informed consent in compliance with Republic Act 9147 or otherwise known as the Wildlife Resource Conservation Act. Information regarding ethnobotanical knowledge among the local community in Sablan were gathered through extensive survey, focused group discussions, and semi-structured interviews (Martin, 1995; Cotton, 1996).

### Preparation of plant extracts

The leaves were air-dried and crushed into small pieces using Mortar and Pestle and pulverized using an electric osterizer. Twenty grams of each of the pulverized plant materials were mixed with 100ml of methanol solvent. The preparation of extracts was done as previously described by Guevara (2005). The plant extracts were prepared and stored in a vial for further experimental procedures.

The plant roots were washed thoroughly with tap water and dried at room temperature for 20 days. The 40g of the powdered air-dried root sample was percolated in 100ml each of water, hexane, ethyl acetate methanol, and chloroform for seven days. The extract was filtered using a Whatman No. 1 filter paper. The organic solvent filtrates were concentrated in a water bath below 50°C.

### Test Organisms

The test microorganisms, gram (+) *S. aureus* and gram (-) *S. typhimurium*, *P. aeruginosa*, and *E. coli* were obtained from the Natural Sciences Research Institute, University of the Philippines Diliman, Quezon City, Philippines.

### Qualitative analysis for phytochemical components

Collected plant samples that were identified to have medicinal properties were subjected to phytochemical screening. Five hundred milligrams of the dried methanolic extract was reconstituted in 10ml of methanol subjected to preliminary phytochemical testing for the presence of different chemical



compounds using standard methods.

All plant parts were extracted on the day of collection. The screening procedures were adapted from Guevara (2005). An extraction of each plant was prepared by macerating a known weight of the fresh plant material in an electric blender. Each extract was suction-filtered and the process repeated until all soluble compounds had been extracted, as judged by loss of color of the filtrate. Extract from each plant part was evaporated to dryness in vacuo at about 45°C and further dried to a constant weight at the same temperature in a hot-air oven. A portion of the residue was used to test for plant constituents.

The test for alkaloids was carried out by subjecting 20g plant material in 5ml 2M HCl, heated, filtered and 2 to 3 drops of both Dragendorff and Mayer's reagents were added. In the test for steroids, Keller-Killiani (plant extract was added to acetic anhydride plus H<sub>2</sub>SO<sub>4</sub>) and the Libermann-Burchard tests were employed by adding 3ml of FeCl<sub>3</sub> and 10ml dichloromethane to portions of defatted plant material, respectively. The presence of anthraquinones was also tested employing both the Borntrager and Modified Borntrager's tests (5g of extract was added to 10ml benzene, filtered and ammonia solution added). The presence of flavonoids was determined employing Bate-Smith and Metcalf method and Wilstatter "cyanidin" test (1% aluminium chloride solution in methanol concentrated HCl, magnesium turnings, and potassium hydroxide solution).

The extract was subjected to Froth test for the identification of saponin and Liebermann-Burchard test for unsaturated sterols. The tests for tannins and polyphenols were carried out by subjecting the plant extracts in Gelatin test and Ferric chloride test. Cyanogenic glycosides were identified by subjecting 2g extract in 10ml sterile water with few drops of chloroform, and were filtered. Sodium picrate paper (modified) was added to the filtrate and heated to boiling.

### Preparation of culture medium and inoculum

The test organisms were inoculated overnight into Mueller Hinton media and incubated for 18-24 hours at 35°C. Cultures stored on slants were subculture onto fresh slants every three months.

### Disc preparation

The 6mm diameter discs were prepared from Whatmann #1 filter paper. The discs were sterilized by autoclave at 15psi pressure. After sterilization, the discs were dried in an oven at 50°C. Various solvents and control discs were prepared afterwards.





Selected Indigenous Semi-Temperature  
Medicinal Plants in the Philippines



*A. heretophyllus* (Langka)



*P. cainito* (Caimito)



*A. muricata*  
(Guyabano)



*P. americana* (Avocado)



*C. papaya* (Papaya)



*S. koetjape* (Santol)



### Determination of antimicrobial sensitivity test of the plant extracts against selected bacterial pathogens

The antibacterial activity of the leaf extracts was determined using the standard Modified Kirby-Bauer disc diffusion assay by Guevarra (2005). The medium employed was diagnostic sensitivity agar (Lab. M.). Mueller Hinton agar was inoculated with the given microorganisms by spreading the bacterial inocula on the media. Sterile discs (6mm diameter) were filled with 10µg plant extracts. Controls discs were also filled with 10µg each of standard antibiotic solutions. The Kanamycin, Streptomycin, Vancomycin, and Chloramphenicol were run as parallel positive controls in the same plate. The plates were incubated at 37°C for 24 hours and the antibacterial activity was assessed by measuring the diameter of the zone of inhibition of microbial growth in the plates in millimeters.

### Results and Discussions

Tables 2a and 2b present the results of the phytochemical screening of the methanolic extracts of the six medicinal plants. In the preliminary test (for primary metabolites), proteins, carbohydrates, glycosides, and tannins were detected in all plant extracts. Proteins were not present in *C. cainito* and *A. heterophyllum*. All the plant extracts were found to have alkaloids except for *P. americana*. Steroids were also detected in all plant samples. It was only in *P. americana*, *A. muricata*, and *S. koetjape* extracts that anthraquinones were observed. Flavonoids were present in *P. americana*, *A. muricata*, *C. papaya*, and *S. koetjape* extracts which were absent in *C. cainito* and *A. heterophyllum*. Saponins were also detected in all plant extracts. Notably, tannins were present in *P. Americana*, *C. cainito*, and *A. muricata*, but were absent in *A. heterophyllum*, *C. papaya*, and *S. koetjape*. Cyanogenic glycosides were not detected in all plant extracts tested.

Table 2a. Preliminary phytochemical screening of metabolites of plant extracts

Primary Metabolites		Inference					
Primary Metabolites	Biochemical Test	<i>P. americana</i> (Avocado)	<i>C. cainito</i> (Caimito)	<i>A. muricata</i> Guyabano	<i>A. heterophyllum</i>	<i>C. papaya</i> (Papaya)	<i>S. koetjape</i> (Santol)
Proteins	Millon's	+	-	+++	-	++	++
Carbohydrates	Fehling's	+++	+	+++	+	+++	++
Glycosides	Lead Acetate	++	+	+++	+	++	+++
Tannins	FeCl <sub>3</sub>	++	+	++	++	+++	++

+ presence of the phytochemical; - absence of phytochemical; +++ abundant; ++ average; + minimal



Table 2b. Phytochemical screening of secondary metabolites of plant extracts

Primary Metabolites		Inference					
Primary Metabolites	Biochemical Test	<i>P. americana</i> (Avocado)	<i>C. cainito</i> (Caimito)	<i>A. muricata</i> (Guyabano)	<i>A. heterophyllus</i>	<i>C. papaya</i> (Papaya)	<i>S. koetjape</i> (Santol)
Alkaloids	Dragendorff	-	+	+	+	-	-
	Mayer	-	+	+	+	++	+
Steroids	Keller Killiani	+	+	+	+	+	+
	Libermann-Buchard	+	+	-	-	-	+
	Borntrager	-	-	+	-	+	-
Anthraquinones	Modified Borntrager	+	-	+	-	-	+
Flavonoids	Bate-Smith Metcalf	+	-	+	-	+	+
	Wilstater cyanidin	+	-	+	-	+	+
Saponins	Froth	+	-	+	-	+	-
	Libermann-Burchard	+	+	+	+	+	+
Tannins & Polyphenols	Gelatin	+++	++	++	-	-	-
	FeCl <sub>3</sub>	+	+	+	+	+	-
Cyanogenic glycosides	Guignard	-	-	-	-	-	+

+ presence of the phytochemical; - absence of phytochemical; +++ abundant; ++ average; + minimal

The antibacterial activity of the six indigenous plant extracts were assessed using the Modified Kirby-Bauer disc diffusion assay by measuring the diameter of inhibition zones with different plant extracts as shown in Table 3. The methanolic extracts of the different plant samples exhibited varying degree of antimicrobial activities against the test organisms. The result of the study reveals that all plant extracts were active against the *E. coli*, *S. aureus*, *P. aeruginosa*, and *S. typhimurium* and their effects significantly differ from most of the antimicrobial agents used as positive control. The results show that all the six plant extracts possessed antibacterial activity against most of the tested gram positive and gram negative pathogenic bacteria. Methanolic extract of *P. americana* was observed to inhibit *S. aureus*, which was higher than the zone of inhibition caused by most of the standard drugs used.



The present study reveals that the different indigenous medicinal plants used in this study possess potent antibacterial activity, and suggests that the extracts contain the bioactive constituents responsible for eliminating the pathogens. These agents are alkaloids, steroids, anthraquinones, flavonoids, saponins, tannins, and polyphenols. It is thought that the active chemical compounds present in the different medicinal plant extract should certainly find place in treatment of various bacterial infections. Furthermore, the results of this study give credence to the use of these medicinal plants by the indigenous people. It is of high probability that these plant extracts can be developed into antimicrobial drugs if specific compounds can be isolated and purified, or at least standardized using High Performance Liquid Chromatography (HPLC) as to its contents and origin (Penecilla & Magno, 2011).

Table 3. Antibacterial activity of different plant extracts on human pathogens bacteria

Plant Extract	Zone of Inhibition (mm) <sup>a</sup>			
	<i>E. coli</i>	<i>S. aureus</i>	<i>P. aeruginosa</i>	<i>S. typhimurium</i>
<i>Persea americana</i>	8.33±0.58	16.00±2.65	8.33±0.58	9.00±1.00
<i>Chrysophyllum cainito</i>	8.00±1.00	10.33±0.58	7.33±0.58	7.00±0.00
<i>Anona muricata</i>	9.33±0.58	8.33±0.58	9.33±0.58	8.00±0.00
<i>Artocarpus heterophyllus</i>	8.33±0.00	8.67±0.58	8.67±0.58	9.33±0.00
<i>Carica papaya</i>	8.33±0.58	8.67±1.15	8.67±0.96	9.33±1.53
<i>Sandoricum koetjape</i>	8.00±0.00	12.33±0.00	8.33±0.58	10.33±0.58
Kanamycin <sup>b</sup>	18.00±0.00	15.00±0.00	18.00±0.00	16.00±0.00
Streptomycin <sup>b</sup>	15.67±2.52	14.33±1.15	15.00±0.00	18.33±1.53
Vancomycin <sup>b</sup>	9.67±0.58	9.00±2.00	8.00±1.00	8.00±0.00
Chloramphenicol <sup>b</sup>	17.67±1.53	24.33±5.13	15.00±2.65	22.67±1.53
Methanol <sup>c</sup>	7.00±0.00	7.00±0.00	7.00±0.00	7.00±0.00

<sup>a</sup> values are mean inhibition zones (mm) including the 7mm± SD of replicates

<sup>b</sup> standard antibiotic disc (10ug/disc) used as a positive reference standard

<sup>c</sup> negative control

### Conclusions and Recommendations

In this study, although there are variations in the chemical constituents, the six medicinal plants tested are potential antimicrobial agents. Characterization and isolation of the active chemical components possessed by these traditional plants for further study may lead to the development of a potential drug that may treat various kinds of infections and for utilization by the local community. The results of this study may also be of commercial interest to research institutes and pharmaceutical industries in the development of new drugs.



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# The 2007 Global Financial Crisis: Its Contagion Effect on the Malaysian Stock Market

*(A revised paper under the title "The Contagion Effect of the 2007 Global Financial Crisis on the Malaysian Stock Market" was presented in IICIES 2012, Universitas Ciputra, Surabaya, Indonesia on June 26-28, 2012)*

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## Abstract

This paper is an investigation of the impact of the 2007/2008 global financial crisis and foreign exchange (forex) rate on the stock market of Malaysia, in two sub periods, namely: the pre crisis (January 2002 to June 2007) and during crisis (July 2007 to December 2010). The findings revealed that the stock market returns in the US and Malaysia were depressed during the period of crisis as depicted by the strongly significant correlation coefficients during the indicated periods. In addition, multiple regression analysis provided evidence that contagion effects existed in the Malaysian stock market during the US financial crisis; however, the forex rate was not significantly related to the stock market of Malaysia during the said financial crisis. It implies that when the US stock market collapsed, so did the Malaysian stock market.

**Keywords:** financial crisis, contagion, stock market, foreign exchange

## Introduction

The 2007 global financial crisis which originated in the US began in real estate mortgages. The credit crisis arose due to the careless darting in granting facilities and exaggerated estimated value of the mortgaged real estate providing borrowers with guaranteed loans. As a consequence, this led to the inability of many borrowers to repay their debts (Al-Zeer, Al-Khateeb, & Areiqat, 2010). The crisis has not only affected the financial markets and the economy of the US, but it has also spread over the other financial markets worldwide. For example, from July 25, 2007 to December 31, 2008, the



global financial crisis has severely affected the US stock market as indicated by a decline in the S&P500 index by 40.50 percent. Other stock markets in the advanced and emerging economies have also been affected such as the FTSE100 index of UK stock market which plunged by 31.30 percent, the Nikkei225 index of Japan which also fell by 50.39 percent, the KLSE index of Malaysia which decreased by 36.45 percent, and Jakarta composite index (JCI) of Indonesia which also declined by 43.39 percent in the corresponding period (Bloomberg Database, 2008).

The stock market activity is one of the principal activities in the corporate world among the chain of activities; hence, the stocks got affected due to the financial crisis. The stock market indices are one of the principal indicators of the economic activities. The movement of stock market indices presents the future economic outlook. A falling stock index reflects the dampening of the investment climate while a rising stock index indicates more confidence and soundness in the economy. The latter attracts more investment demand for stocks and it also raises investment on stock prices and generates profits. When crisis affects the real estate activities, it affects the stock market, as profit expectation on financial investments would decrease. If financial investment is affected, its impact would be felt on the real investment, as real investment would not increase. Once the real estate sector activity lessens, that would affect the entire economy. Thus, the expectation of the investors mainly works affecting both the financial and real investment in the economy.

The integration of global equity markets has been a well-studied topic since the stock market crash of October 1987. Though most of the studies have initially been conducted in the developed markets like the US, European countries, and Japan, recently, after the Asian crises in particular, literature has started focusing on emerging Asian markets. Along this line, this study focused on the effect of the 2007 US financial crisis on the stock market, particularly that of Malaysia. It is important to note that this study is an offshoot of Laing's (2010) study that recommended further studies on the effect of the 2008 world financial crisis on forex rate and eventually to the stock market.

This study is limited to the contagion effect of the US financial crisis to the stock market of Malaysia, taking into consideration the forex rate as a factor of contagion. This, then, aims, specifically, to examine whether contagion effects exist on the Malaysian stock market, during the 2007 US financial crisis; and measure the impact of forex on the Malaysian stock market during the crisis.



## Co-integration

A large body of literature exists on the equity market integration. Since the seminal work of Grubel (1968), which explained the benefits of international portfolio diversification, the relationship among national stock markets has been analyzed in a series of studies such as Granger and Morgenstern (1970) and Lessard (1974, 1976), among others. Following the influential works of Johansen (1988) and Johansen and Juselius (1990), numerous studies beginning with Taylor and Tonks (1989), Kasa (1992), and, subsequently, Masih and Masih (1997, 2002), Chowdhry (1994), and Chowdhry *et al.* (2007), among several others, have used the co-integration hypothesis to assess the international integration of financial markets. When analyzing the linkages among international stock markets, it is interesting to determine if there are any common forces driving the long-run movement of the data series or if each individual stock index is driven solely by its own fundamentals. This relationship can be captured by co-integration analysis.



When markets are said to share a single common stochastic trend, it indicates that these markets are perfectly correlated over long horizons, and gains to international diversification will diminish or disappear over the long term. Bekaert and Harvey (1995) point out that a market is completely integrated with the world if its assets have the same expected return with the assets of markets having an identical risk level listed in major global markets. In an integrated world, the cross section reward to risk is not important, as it is common to all integrated markets. However, the reward to risk is different from a segmented market due to different risk exposures for each country. In other words, the law of one price can definitely work as the behavior of stock market integration. The nature and extent of financial market integration is thus prominent for investors as it influences international asset allocation potentials and portfolio diversification decisions.

Accordingly, Malik and Ewing (2009) argue that the increasing integration of major financial markets has generated a good deal of interest in understanding the volatility spillover effects from one market to another. Two lines of thinking have developed as to why these spillovers exist. First, volatility spillovers may result from cross-market hedging and changes in common information, which may simultaneously alter expectations across markets. A second reason given to explain the mean and volatility spillover effect is that of financial contagion, specifically, a shock to one country's



financial market. Recently, Engle (2002) has developed a dynamic conditional correlation (DCC) Generalized Auto Regressive Conditional Heteroskedasticity (GARCH) model capable of allowing for conditional asymmetries in both volatilities and correlations. Meanwhile, Kasa (1992) was the first to apply multivariate co-integration method to five well-established financial markets in order to examine the existence of a single common stochastic trend as a driver of the co-integrated system. Using Johansen's test (Johansen & Juselius, 1990) for co-integration, he found a single common trend driving stock markets of the US, Japan, England, Germany, and Canada, particularly when using quarterly data. And correspondingly, in case of co-integration between equity indices, it is possible that gains from diversification occur in the short term but not in the long term.

Furthermore, Phylaktis and Ravazzolo (2002) applied this similar methodology and examined the potential interrelationships among the trending behavior of the stock price indices in a group of Pacific-Basin countries such as Japan and the US, from 1980 to 1998. The paper shows that international investors have opportunities for portfolio diversification by investing in most of the pacific basin countries since short-run benefits exist due to substantial transitory fluctuations. Moreover, the estimated common trends showed that although the US markets were found to play a role of smaller magnitude, Japan was found to play a more significant role. On the other hand, neither of the countries had any unique influence in the Pacific Rim stock markets. In a related study, Beine and Candelon (2005) conducted a sample study of 25 developing countries to examine the impact of trade and financial liberalization on the degree of co-movements of the stock markets. They found a positive impact of trade agreements and liberalization on the market linkage between the stock markets. In short, this would imply that trade agreements between countries in a specific regional area contribute, to some extent, to the integration of the economies.

There are varied views on the after effect of the Asian financial crisis on the integration of the Asian markets. Ghosh, Saidi and Johnson (1999) considered whether nine Asia-Pacific markets are separately co-integrated with either the US or Japan stock market. Their results suggest that while some markets are co-integrated with the US, some are co-integrated with Japan, and others are not co-integrated with either. However, they consider daily data covering only a nine-month period in 1997. Moreover, Sheng & Tu (2000) discovered that the co-integration relation among 12 pacific nations, including Taiwan and the US, did not exist in the stock markets until the occurrence of the 1997 Asian financial crisis. The variance decomposition further showed that none of the nations, during the financial crisis, had



the exogenous characteristic, which verified the existence of the contagion effect. At the same time, causality tests pointed out that the US indices were the leading factors affecting the stock performance of other nations.

Asian stock markets may (or may not) be more integrated with each other and with the world for various reasons, including extensive stock market liberalization, increased economic integration within the region and with the world, technological advances in communication, and stock market crashes. Stock market crashes such as the one in 1987 have been widely argued to strengthen major international as well as Asian stock market linkages. This study contributes to the literature by comprehensively examining the Asian stock market integration using a twelve countries vector autoregressive (VAR) model with different currencies and different sample periods surrounding the Asian financial crisis.

Yang and Lim (2002) in an empirical study of nine East Asian stock markets for the period, January 1990 to October 2000, found some evidence of short-term linkages. Their results indicate that there was a significant difference between sub-periods pre-and during/post-Asian crisis, with an overall improvement of correlation coefficients for each pair from the pre-crisis to the post crisis period, except for Malaysia and Taiwan. Unlike results from short-run tests, there is no long run co-movement among East Asian stock markets, as the absence of co-integration in the post-crisis period rules out the existence of a long-term stability trending relationship among East Asian stock markets.

With regard to studies in Malaysian context, they predominantly depend on the bivariate and multivariate co-integration analysis. The study by Abd Majid and Kassim (2009) uses standard time series methods of co-integration and VAR model to capture the mechanism by which S&P500 daily returns impact the mean KLCI, JCI returns. Morales and O`Callaghan (2009) compared returns on the S&P500 with those in nine countries stock market returns, namely: Indonesia, Malaysia, Thailand, South Korea, India, China, Hong Kong, Singapore, and Taiwan, and found no evidence of contagion effect, but found the existence of the interdependencies with Asian markets. Tambi (2005) has examined the financial integration between financial emerging markets (India, Singapore, and Malaysia) and developed countries (US, UK, and Canada). He found that the developed stock markets are segmented and proved that some of the emerging markets have some integration with the developed markets to a limited extent. By using Granger causality relationship and the pairwise, multiple and fractional co-integration, Raghavan, Dark & Maharaj (2010) found that the Malaysian stock market is integrated with the matured markets of the World. Nath and Verma (2003) tested no evidence



in favor of co-integration among the Nifty, STI, and Taixex indices. The study by Raj and Dhal (2008) uses correlation and the vector error correction and co-integration model (VECM) to gauge the integration of Asia`s main stock markets with global markets such as the United States, the United Kingdom and Japan. They examined the co-integration for the period 1993-2008 as well as for the sub-periods 1993-2002 and 2003-2008 with different weekly and daily data sets.

Empirical evidence supports the international integration of Malaysia`s stock market in terms of US dollars but not in the local currency; a finding attributable to the investment decisions of foreign investors. Correlations of daily stock price indices and returns suggest a strengthening of the integration of Malaysia`s stock market with global and regional markets in the more recent period since 2003. There is evidence of the differential impact of regional and global stock markets on the Malaysian market in the long run as well as the short run. The absolute size of coefficients in the long-run co-integration relation suggests that the Malaysian market`s dependence on global markets, such as the US and the UK, is substantially higher than in regional markets like Singapore and Hong Kong.



Innovation accounting in the VECM for the more recent period shows that international market developments at regional and global levels together could account for the mass of the total variation in the Malaysian stock market.

## Contagion

There is now a reasonably large body of empirical work testing for the existence of contagion during financial crises. According to Forbes and Rigobon (2002), contagion should be interpreted as a change in the transmission mechanisms that takes place during a turmoil period. The authors identify financial contagion with ‘a significant increase in cross-market linkages after a shock to one country (or group of countries)’ and defend that such definition presents a number of operational advantages, namely: its utility for financial investors engaged in strategies of international diversification, or for monetary authorities aiming at justifying bailing out interventions in markets affected by foreign crises, but displaying sound fundamentals.

Dungey *et al.* (2002) included the possibility of contagion across the Latin American, Asian, and Russian credit markets. Their major findings show





that the world factor explains most of the volatility experienced by various emerging credit markets, being largely due to the fact that the emerging countries studied were open economies. Given the strong influence of global factors, their results show that the global factors contribute most to total volatility experienced by emerging credit markets.

Chiang *et al.* (2007) also applied a DCC model to nine Asian stock markets from 1990 to 2003, confirming a contagion effect. In Egert and Kocenda (2007) the bivariate version of the DCC GARCH model shed light on the strong correlation between the German and French markets from June 2003 to January 2006. By contrast, very little systematic positive correlation can be detected between the French index (which was used as a benchmark for Western European stock markets) and the three Central and Eastern Europe (CEE) stock markets. Ahmad, Umer, Mammona and Shahza (2010) studied the effect of global financial crisis on the Pakistan commercial banking sector. Furthermore, through multiple linear regression analysis, the study showed that profit is significantly influenced by net investment, net advances, and operating fixed assets. Borrowing from a financial institution, deposits and other accounts, and number of employees also influenced profits but on an insignificant level.

Others employed the correlation coefficient between stock returns to test for the impact of the US stock crash in 1987 on the stock markets in England, Japan, and several other countries (King & Wadhvani, 1990; Lee & Kim, 1993). Empirical findings showed that the correlation coefficients between several markets significantly increased during the crash. Thus, these findings supported the contagion hypothesis that states, "if the correlation coefficient increases significantly, the contagion effect exists."

The application of ARCH and GARCH models in contagion analysis has also been reported. Hamao, Masulis, and Ng (1990) employed the conditional variance estimated under the GARCH model to test for correlations between market volatilities during the 1987 US stock market crisis. It was found that the spread out effects from New York to London and Tokyo, and from London to Tokyo were observed among the stock markets in these three countries.

King and Wadhvani (1990) found evidence of an increase in stock returns' correlation in the 1987 crash. Calvo and Reinhart (1996) reported correlation shifts during the Mexican crisis. Baig and Goldfajn (1999) found significant increases in correlation for several East Asian markets and currencies during the East Asian crisis, supporting the contagion phenomenon.

Wang and Thi (2006) used DCC-Bivariate GARCH model to examine the impact of the Asian financial crisis on Chinese Economic Area (CEA). It was noted that sample period spans from February 21, 1992 to November 15,



2000. The findings showed that the conditional correlation coefficients of stock returns were positive, and co-movement existed among the Thailand and CEA markets. The Asian financial crisis significantly shocked the stock markets in the region. For all the markets, the variances were higher in the post-crisis period than in the pre-crisis period. The conditional correlation coefficient revealed that in the post-crisis period, it increased at a significant level, providing the evidence of the contagion effect.

Azeez and Yetunde (2011) estimated the causes and implications of the global financial crisis on the performance of Nigerian banks with a view to determine the extent of this impact, and determining various options that could cushion the impact as well as to avoid future reoccurrence. By using multiple regression analysis (MRA), the study illustrated that the global financial crisis has a negative influence on the performance of Nigerian banks in defiance of high liquidity possessed by these banks immediately after the consolidation exercise of 2005. Mathur, Gleason, Dibooglu, and Singh (2002) used MRA to observe the contagion effect of the 1994 Mexican crisis on the Chilean stocks. The study found that the spillover contagion effects were very efficiently transmitted from the Mexican market to the Chilean market then to the Chilean American Depository (ADR). Also, it showed that the most significant impact on the pricing of Chilean ADR was the raw Chilean index.

Looking at the survey of literature, few studies were carried out on the contagion effect of the financial crises in Malaysian context. This study, therefore, examines this issue and finds whether there exists a contagion effect of the crisis on the Malaysian stock market.

### Foreign exchange (Forex) rate

The forex also functions as a tool that influences stock returns through its effect on both the individual stock level and the market level. On the individual firm level, the sensitivity of the firm's discounted stream of profits to forex is dependent on the characteristics of the firm's liability and asset positions. At the market level, the exchange rate is determined through the use of a market equilibrium pricing relationship (Bodnar & Gentry, 1993). Mainly, according to Velde (2008) and Forbes and Rigobon (2002), forex is one of the main channels or meeting points and/or an interdependence instrument between two countries' stock markets. Khalid and Rajaguru (2006) studied and traced the alleged origin, and the subsequent path of the currency contagion using data from a sample of selected Asian countries. In an attempt to study currency contagion effects, nine empirical estimations were used with high frequency data (daily observation) on exchange rates from 1994 to 2002. The researcher split the sample into four periods (full,



pre-crisis, crisis, and post crisis periods). To further test the constructs, a multivariate GARCH model was used and the Granger causality test was applied to identify the interlinkages among exchange rate markets in selected Asian countries. The evidence suggests that currency links increased during and after the crisis. However, they found weak support for contagion in the pre-crisis period.

Kolari, Moorman, and Sorescu (2008) examined the relation between the cross-section of the US stock returns and forex rates from 1973 to 2002. The study found that stocks most sensitive to forex risk in absolute value have lower returns than other stock markets. Applying the VAR to test for causal relationship and to analyze the shock response, Nagayasu (2001) discovered the contagion effect of Thailand's currency crisis that affected the industrial indices in the Philippines' stock market via foreign exchange rate.

Lee *et al.* (2007) examined whether the South-East Asian Tsunami of 2004, as an external and unpredictable shock, influenced the stability of the correlation structure in international stock and forex markets. In here, Heteroskedasticity biases based on correlation coefficients were used to test for the contagion effects across 22 economies. The results indicated that no international stock market suffered contagion due to any crisis situation; however five economies (India, Philippines, Hong Kong, Mexico, and Argentina) and three (India, Philippines, and Hong Kong) international forex markets displayed contagion from one to three months after the South-East Asian Tsunami of 2004, respectively. An important result is that, contagion effects are more obvious in developing financial markets than those of the developed ones. The study of Chun (2005) showed that during the Asian financial crisis, the Thai baht exchange rate led to contagious effects on Asian American Depository Receipts (ADRs) and country fund returns, with contagion also been observed with regard to the volatility of ADRs and country funds in Asia.

## Methodology

### Empirical Model

The data obtained in this study were analyzed using ordinary least square (OLS) methods. According to Gujarati (2003), OLS is Best Linear Unbiased Estimator (BLUE); and in order to be characterized as Best Linear Unbiased Estimator (BLUE) of  $\beta$ 's, the following conditions must be present:

1. It is linear, that is, a linear function of a random variable, such as the dependent variable Y in the regression model;



2. It is unbiased, that is, its average or expected value,  $E(\beta_i)$ , is equal to the true value,  $\beta_i$ ; and
3. It has a minimum variance in the class of all such linear unbiased estimators; an unbiased estimator with the least variance is known as an efficient estimator.

The OLS is a method for estimating the unknown parameter in a linear regression model. This method minimizes the sum of squared vertical distances between the observed responses in data set, and the responses predicted by the linear approximation.



Since,

$$\tilde{\beta}_i = \frac{\sum X_i Y_i}{\sum X_i^2}$$

An alternative for computing  $\sum \hat{u}_i^2$

$$\sum \hat{u}_i^2 = \sum y_i^2 - \frac{\sum x_i y_i}{\sum x_i^2}$$

In passing, the positive square root of

$$\hat{\sigma}^2 = \sqrt{\frac{\sum \hat{u}_i^2}{n - 2}}$$



The OLS formula is

$$\begin{aligned}\hat{\beta}_1 &= \frac{n \sum X_i Y_i - \sum X_i \bar{Y}_i}{n \sum X_i^2 - (\sum X_i)^2} \\ &= \frac{\sum (X_i - \bar{X})(Y_i - \bar{Y})}{\sum (X_i - \bar{X})^2} \\ &= \frac{\sum x_i y_i}{\sum x_i^2} \\ \hat{\beta}_1 &= \frac{\sum X_i Y_i}{\sum X_i^2} \\ &= \frac{\sum X_i Y_i}{\sum X_i^2 - n \bar{X}^2} \\ &= \frac{\sum X_i Y_i}{\sum X_i^2 - n \bar{X}^2} \\ \hat{\beta}_1 &= \frac{\sum X_i^2 \sum Y_i - \sum X_i \sum X_i Y_i}{n \sum X_i^2 - (\sum X_i)^2} \\ &= \bar{Y} - \hat{\beta}_2 \bar{X}\end{aligned}$$

Model (linear)

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \varepsilon$$

Where

- $y$  = Stock market of Malaysia KLCI (MY)
- $x_1$  = United States stock Market S&P500 (US)
- $x_2$  = Foreign exchange rate (Forex)
- $\varepsilon$  = error term

This study explored two models to examine the relationship among the US stock market returns, forex rate, and stock Malaysia market returns.

First, on the pre-crisis period, the global financial crisis from January 2002 to June 2007, the model tested is:



Model 1:

$$\begin{aligned}MY_t &= \alpha + B_1 U.S._t + B_2 FOREX + \varepsilon \\MY &= \text{Stock market of Malaysia KLCI} \\US &= \text{United States stock Market S\&P500} \\FOREX &= \text{Foregin exchange rate} \\ \varepsilon &= \text{error term}\end{aligned}$$

Second, on the crisis period from July 2007 to December 2010, the model tested is:

$$\text{Model 2: } MY_t = \alpha + B_1 U.S._t + B_2 FOREX + \varepsilon$$

### Collection of Data

*Sample population.* Stock price indices of the US and Malaysia were used to compute the stock returns and find the correlation between the two series. The MY and US are taken as representatives of Malaysian and US stock markets, respectively. Independent variables include US index and forex rate; the factors are defined in Ringgit Malaysian (MYR) value of a unit foreign currency.

*Sampling.* Inasmuch as MY (KLCI) represents hundred main leading Malaysian stocks indices while US (S&P500) represents five hundred main leading US stocks indices, the purposive sampling was employed.

The sample period is from January 2002 to December 2010 as the pre-crisis period began from January 2002 to June 2007, while the period of crisis began in July 2007 and ended in December 2010. Although some claim that the crisis ended in January 2010, the data collected were until December 2010 to determine and confirm if the crisis was still felt by this time. Monthly data was collected from Data Stream.

### Data analysis

In order to examine the impact of the 2007 US financial crisis on Malaysian stock market, this study, after running all the necessary prerequisite tests, used multiple regression technique to investigate and analyze the contagion effects of the US stock market and forex on the Malaysian stock market in two sub periods, namely: pre crisis (January 1, 2002 to June 30, 2007) and during crisis (July 1, 2007 to December 31, 2010). This method was used in similar studies (Mathur *et al.*, 2002; Ahmad *et al.*, 2010; Azeez & Yetunde, 2011; Ruben, 2011).



Stock returns in the Kuala Lumpur stock exchange (KLSE) and US Stock market composite (S&P500) were used as representatives of Malaysian and US markets, respectively, to measure the degree of co-movement. In order to recognize the contagion effect, a test whether the mean of correlation coefficients within the crisis period differs from that in the pre-crisis stable period was conducted.

#### *Regression test for three-factor model*

Regression model is used to empirically examine the impact of the US stock market composite (S&P500), and forex on Malaysian stock market (KLSE):

$$MY_t = \alpha + \beta_1 U.S.t + \beta_2 FOREX + \varepsilon$$

Where:

- MY* = Kuala Lumpur Stock Exchange Composite
- U.S.* = U.S. Stock market composite; S&P500
- FOREX* = Foreign exchange

The multiple regression coefficients  $\beta_1$  and  $\beta_2$  measure the net relationship between dependent variable, MY and each of the independent variables (US and forex). The positive sign (+) indicates that the independent variable favorably affects the dependent variable and a negative sign (-) indicates adverse effect.

## Results and Discussion

Table 1 provides the summary of mean, standard deviation, maximum and minimum for all of the variables over the pre- and during-crisis of the 2007 global financial crisis. The table shows that the means of the stock market returns (pre-crisis) were 0.011875 for MY, 0.003070 for US, 3.745171 for forex; during-crisis, the means of the variables were; 0.003666 for MY, -0.004116 for US, and 3.370007 for forex, respectively. It is interesting to note that in the period before the crisis, the averages of monthly stock returns for MY and US are higher than the average returns during the crisis period which indicates that the stock market returns slowed down during the global financial crisis that originated from the US. The average of forex shows that the mean in the pre-crisis period 3.745171 is higher than during the crisis period, i.e., 3.370007. Obviously, as a consequence of the crisis, the Malaysian Ringgit became stronger against the US dollar.





Table 1. Descriptive analysis for the dependent and independent variables

		MY	US	FOREX
Pre-crisis	Mean	0.011875	0.003070	3.745171
	Max	0.109934	0.149463	3.800000
	Min	- 0.074918	- 0.121532	3.398000
	Std. Dev.	0.041801	0.043476	0.102975
	Observations	66	66	66
During Crisis	Mean	0.003666	- 0.004116	3.370007
	Max	0.112661	0.168901	3.725500
	Min	- 0.103567	0.067724	0.161721
	Observations	42	42	42

Notes: Pre-crisis period starts from 1, January 2002 to 30 June 2007; during crisis period spans from July 2007 to 31 December 2010. MY and US refer to the stock Markets of Malaysia and the USA, respectively. FOREX represent Foreign Exchange rate.

As shown in Table 2, Spearman's rho order correlation in the pre-crisis period, shows that US has positive correlation with MY at 0.05 level, while forex was not strongly correlated with MY Malaysia stock market since the rho' coefficient estimates were less than 0.05.

Table 2. Correlation between MY, US, and forex (pre-crisis)

		MY	US	FOREX
Spearman's rho	MY Contagion Coefficient	1.000	.273*	-.139
	Sig. (2-tailed)	-	.026	.266
	N	66	66	66
US	Correlation Coefficient	.273*	1.000	.002
	Sig. (2-tailed)	.026	-	.989
	N	66	66	66
FOR	Correlation Coefficient	-.139	.002	1.000
	Sig. (2-tailed)	.266	.989	-
	N	66	66	66

\* Correlation is significant at the 0.05 level (2-tailed)

Table 3. Correlation between MY, US, and forex (during-crisis)

		MY	US	forex
MY	Pearson Correlation	1	.578**	.020
	Sig. (2-tailed)		.000	.900
	N	42	42	42
US	Pearson Correlation	.578**	1	-.030
	Sig. (2-tailed)	.000		.850
	N	42	42	42
FOREX	Pearson Correlation	.020	-.030	1
	Sig. (2-tailed)	.900	.850	
	N	42	42	42

\* Correlation is significant at the 0.01 level (2-tailed). Normality test for during crisis period shows that all the variables are normally distributed.



Table 3 shows that the US has the highest positive percentage of 57.8 coefficient correlations during the crisis. The forex has a weak correlation with MY which is less than 0.05. From this result, we can find that MY might be strongly impacted by the US, because the correlation is high.

Based on figures generated in Table 4, the regression of model 1 (pre-crisis) is significant at 1%, the value of  $R^2$  is 0.151 or 15.1% for the pre-crisis period, with adjusted  $R^2$  of 0.124 or 12.4% which indicates co-movement that the changes in the independent variables explain 12.4% change in the dependent variable (MY).

Table 4. Model 1 Summary of analysis

R	.389 <sup>a</sup>
R <sup>2</sup>	.151
Adjusted R <sup>2</sup>	.124
Std. Error of the Estimate	.3912
F	5.615
Sig	.006 <sup>a</sup>

<sup>a</sup> Predictors: (constant), US, Forex; <sup>b</sup> Dependent Variable: MY

According to the results in Table 5, all the variables have significant impact on the Malaysian stock market (MY). The US is significant on MY at .05 alpha level. Forex is likewise significant at .05 alpha level. Based on the table, forex was one of the channels of the impact in the pre-crisis period as the US dollar, the platform for all currencies, was volatile.

Table 5. Model 1 Regression result (pre-crisis)

Model 1	Unstandardized Coefficient B	Std. Error	Standardized Coefficient (Beta)	t	Sig.
(Constant)	.382	.177		2.165	.034**
US	.291	.112	.303	2.607	.011**
FOREX	-.099	.047	-.244	-2.103	.039**

*a* Dependent variable is MY; \*\* is significant at the 0.05 level, the confidence level is 95%

It can be seen in Table 6 that the regression of Model 2 (during crisis) is strongly significant as indicated by p-value (.000). The  $R^2$  is .336 and the adjusted  $R^2$  is .302. This shows that all of the independent variables are collectively related to the MY dependent variables. Two collective variables have been explained in this analysis; these variables are the US stock market composite and forex. The remaining changes were identified by other factors not captured in the model.



Table 6. Model 2 Summary analysis (during-crisis)

R	.579 <sup>a</sup>
R <sup>2</sup>	.336
Adjusted R Square	.302
Std. Error of the Estimate	.04445
F	9.855
Sig	.000 <sup>a</sup>

*a Predictors: (constant), US, Forex*

According to the results shown in Table 7, there is one significant variable which is US (0.000). This describes that the contagion effect exists between the stock market of the US and Malaysia stock market during the 2007 US financial crisis.

Table 7. Model 2 Regression result (during-crisis)

Model 1	Unstandardized Coefficient B	Std. Error	Standardized Coefficient (Beta)	t	Sig.
(Constant)	-.036	.1145		-.248	.806
US	.455	.103	.579	4.437	.000**
FOREX	.012	.043	.037	.286	.776

*a Dependent variable is MY; \*\* is significant at the 0.01 level, the confidence level is 99%*

On the other hand, forex is not significant at .05 alpha level. This might be due to the difference in time period, type of data, econometric models, and economic policies of countries.

### Conclusions and Recommendations

This paper examined whether there was any contagion from the US economy to Malaysia during the US sub-prime financial crisis. Moreover, the study examined the impact of forex rate on the stock market of Malaysia. It used correlation coefficients and regression linear model, in two sub periods, namely: the pre crisis (January 2002 to June 2007) and during crisis (July, 2007 to December 2010).

Based on these objectives, the empirical findings showed that the returns of the stock markets were depressed during the global financial crisis. The correlation coefficients of stock returns are positive, and therefore, contagion exists between the US and Malaysia markets. The correlation coefficient mean in



the crisis period increased at a strong significant level, providing evidence of the contagion effect. The empirical results also showed that the foreign exchange rate is significant in the pre-crisis period but not during-crisis; hence, may not affect KLCI at all.

A number of studies have been conducted on the contagion effects of the economic crisis which showed mixed empirical evidence. However, the result changes from one economy to another. The reasons for these differences can be explained by varied or different time periods, econometric models, and economic policies of countries. This result is in line with the other studies of similar nature (Wang *et al.*, 2006; Kenourgios *et al.*, 2007). As Kenourgios *et al.* (2007) put forth - the equity correlations increase when bad news hit stock markets and policy responses to a crisis are unlikely to prevent the spread among countries since cross-market correlations dynamics are driven by behavioral reasons.

Subbarao (2008) indicates that, in the advanced countries, the contagion spread from the financial to the real sector. This requires to be discovered more as an extension of this study. For instance, there is a need to study the other channels of contagion effect that might affect the financial market in Malaysia.

Since the study was limited to the contagion effects of US S&P500 index and foreign exchange to the economy of Malaysia as indicated by KLCI, it is recommended that further studies need to be conducted to determine the contagion effects of the financial crisis based on other factors like market behavioral and psychological factors.

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# Zarathustra's Postmodernistic Education for Man: A Neitschean Perspective

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## Abstract

The paper is an attempt at providing a concept of man in a postmodern world primarily as attaining self-supremacy through a postmodernistic concept of education. It is the aim of the paper to show that the role of education is significant in the realization of man's supremacy. In understanding man's supremacy, the paper is presented with the assistance of the prose poem of Nietzsche, *Thus Spake Zarathustra*. The paper poses three components of education. First, the educational system has a role in breeding the Übermensch, a man who constantly surpasses his present state. Second, the teachers teach self-valuation and reflection since it is their primary objective in teaching. Last, the learners' purpose is not focused primarily on the end goal of money making. It is through proper education that man is able to realize his full capacity as a component of society. The realization of one's capacity is far more relevant to one's validation of the "self" than to be of the mindset that man's purpose is to work for the benefit of others or for financial stability.

**Keywords:** self-supremacy, nihilism, eternal recurrence, will to power, Übermensch

## Introduction

### Man in time

Since ancient times, man has defined himself in the context of virtue and justice. Protagoras said, "man is the measure of all things" (Palmer, 1994, p.40). This is virtue for him. Thrasymachus claims that "might makes right" (Palmer, 1994, p.42). This is justice for him. During the period of Christianity, man identified himself with the Christian God. His concern according to Fieser *et al.* (2002) was more focused on "the existence of God, the origin of evil, and the freedom of the will (p.178)." In this era, man was inclined towards being with God, solving the problem of evil and maintaining free will. The modern



concept of man on the one hand focused on humanity's capacity to know.

One of the classifications was the rationalists and the empiricists. The rationalists believed that "an important group of foundational concepts was known intuitively through reason." The empiricists argued that "knowledge was based on both sense experience and internal mental experiences, such as emotions and self-reflection" (Fieser *et al.*, 2002, p.404).

At present, contemporary existentialists emphasize the importance of an individual's free choice and his authenticity. DeVilbiss (1998) states that "an existentialist lives only for himself, yet he cannot ignore the fact that when he chooses for himself, he cannot transcend his individuality." By nature, man cannot escape from his choices, so this brings out his individuality. It is his realm of dwelling; even in death, the self is identified based on his choices. Trower (1979), from his chapter on Existentialism adds that the experience of living is being given by man's choices alone. He can transform good into evil and evil into good. Such decisions made by him, guided by his will, appeal to his basic needs. The existential individual focuses on his choices, which constitutes his freedom as an individual. Based on his choices, he can become who he wants to be. He is the only one who can identify the meaning of his own identity.

The different reactions regarding man's perspective in understanding himself, created the postmodern concept of man. The postmodern man is not only bound by the choices that he makes but also seeks the truth about himself. He sees life from his own perspective and gets out from universal boundaries in his quest for truth.

One work which discusses the postmodern man is Nietzsche's "Thus Spake Zarathustra." This prose poem written in the late modern era opens the window for the realization of man's potentiality. The analysis of the character of Zarathustra at least becomes a starting point for man's awareness to go beyond the standards of tradition. This reveals a philosophical depiction of man's supremacy which is the ability to surpass his limitations and achieve his full potentiality.

### Post-modernity - Is it real?

Postmodernism "marks the end of a single, universal worldview...It likewise entails a rejection of the emphasis on rational discovery through the scientific method, which provided the intellectual foundation for the modern attempt to construct a better world" (Grenz, 1996, p.12). Postmodernism is abandoning the Enlightenment that constitutes the modern belief in expected development. In the same study, he thinks that beliefs are ultimately a matter of social context, and hence concludes, "What is right



for us might not be right for you," and "what is wrong in our context might in your context be acceptable or even preferable" (p.15). This means that the idea of a single real world, that is to say a unified world, is impossible and is not attainable. Instead, truths should be based on their applicability within the group especially for the self. In addition, Smith (2007) states that, for Nietzsche, "There are...only interpretations...it is our drives that interpret the world." According to Erickson (1990), "Nietzsche tells us that human beings must believe they know why they exist, if they are to trust life and in any way flourish"(p.175).

But, how did postmodernity come about? According to Grenz (1996, p.15), "it likely first appeared sometime in the 1930s. Although the term was coined in the 1930s, postmodernism as a cultural phenomenon did not gain momentum until three or four decades later" (p.16). According to Habermas as cited by Docherty (1993, p.52), "Nietzsche brought the modern time-consciousness to bear...against objectivism." He continues, "Nietzsche does not negate the modern time-consciousness, but heightens it...which is most subjective forms of expression" (p.54). In addition, Since Nietzsche's goal was to heighten modern consciousness he had to "reach beyond the origins of western history... in order to rediscover the traces of the Dionysian" (p.58).

The emergence of different views in postmodernity opened several meanings in rediscovering man. Postmodern construction is the rule of the stronger, in the sense of having the wisdom of ruling. It is the imposition of his will that can serve as an example to his followers. It is man that learns and his ability to create oneself freely. Lyotard (1984) states that "work without rules in order to formulate the rules of what could have been done" (p.81). This is not to bring out a certain reality but to create a reference to grasp what cannot be given by the promises of modernity, and that, a better understanding of the self.

## Education

With proper education, man can have a meaningful life. He will know his purpose and learn not to cause harm. A virtuous man has the capacity to become wise. Man's education helps in defining himself primarily without relating to another. He is defined in one's own point of view only and not with the notions of the others. However, education is misunderstood because most think that it is a means to acquire money. This concept cannot be scrapped entirely because of the problems of economics, thus the youth goes out of their path just to compensate for their economic needs. Educational institutions and teachers alike focus so much on the learners' economic needs that instead of teaching and promoting value centered education



geared towards their chosen profession, they are instead preparing learners in economic slavery, that is, a false consciousness in their lives.

Man's consciousness is protruding to the negative when he thinks as a materialistic being. Quoting from Nietzsche in the work of Kaufman (1974), he states "the desire for one's education free from politics, nationality, and newspapers" (p.418). The problem with an economic based education is that it is misled by its teaching of what is true. In effect, it is ruining the whole of education and its society. In order to understand education, man should deviate from the limited teachings of the educational institution in order to achieve his full capacity.

Education should focus on the learners, not on the lessons to be learned. It is focusing on class participation or on what they can contribute to the lesson. It is letting the lessons be part of the learners so that they may incorporate all that is being learned to their full capacity. The paper proposes through education a postmodern system that all teachers and students are aware of their capacity to surpass themselves. Through the teachers, learners will learn self-valuation and reflection. Self-valuation for Nietzsche is a call for reevaluation of values "that is a complete rethinking of the whole traditional values" (Palmquist, 2003). Particularly, self-valuation focuses on the revaluations of the values that an economic centered education is promoting. In order to master what his desires are, it is necessary for one to deviate from the traditions and customs that are imposed, and the hindrances to the quest of supremacy. Man becomes great because he can act within his free will. He acquires sense of the will to power in order to exceed the present state of being a common man. Learners focus on their creativity and emancipate from their economic value. It is a focus on valuing family, friends, life, health, and goals in life of the learners in their quest for supremacy. They will then have no boundaries in the application of creativity, fixating on a central goal, and aiming for it then surpassing it.

### Scope and Limitation

The paper primarily focused on the analysis of the text *Thus Spake Zarathustra* in depicting a postmodernistic education for the development of man. Zarathustra as the focus of analysis brings into the open the meaning of man in its supremacy through education. This paper aims to support the ideas presented in *Thus Spake Zarathustra* and other works of Nietzsche to give more emphasis and reinforce the ideas presented in his prose poem. It also emphasized on three themes specifically on the postmodern education system in fostering creativity in the institution and its constituents,



the teacher teaching the *Übermensch* through self-reflection and value formation, and the learners redirecting their motive for going to school and expressing their full creativity in their chosen field of expertise.

### Theoretical Framework

The study used the following theories in analysing the poem *Thus Spake Zarathustra*.

**Postmodernism theory.** This theory is described as “a set of critical, strategic and rhetorical practices employing concepts such as difference, repetition and hyper-reality to destabilize other concepts such as presence, identity, and historical progress” (Aylesworth, 2005).

**Expressive Theory.** This theory focuses on the author as one who establishes the criteria to be judged expressing his perceptions and emotions of man. Holman and Harmon (1992) states that expressive “theory holds the object of art to be the expression of the artist’s emotions, impressions, or beliefs; an essential doctrine of romantic critics.”

**Perspectivism.** This theory developed by Nietzsche, states that all perceptions and ideations (mental power to form ideas), takes place from a particular perspective in terms of inner drives as elucidated by the will to power. Cavalier (*n.d.*) claims that claims that, will, in the philosophy of Nietzsche, poses a problem that is “...tied up with the problem of life.” Thus, this will is the affirmation of the self as the answer to the problem of will to power which is the fundamental instinct or drive, even more fundamental than the act of self-preservation, the desire to exert one’s will.

“The will to power appears to be self-consuming, as may be the notion of invoking the analogy between seeing and knowing which of Nietzsche’s Perspectivism explicitly does, in order to set aside the dominating visual of traditional epistemology” (Magnus & Higgins, 1996, p.7). In Nietzschean Perspectivism, they also claim that “Most often this is interpreted as a kind of epistemological relativism. The doctrine that there is no intersubjectively valid way to determine which interpretation of a phenomenon is better than another” (p.139).

Perspectivism states that truth is true until a new interpretation is stated, though it might not be a better interpretation or the real truth since the interpretations can never become complete in themselves. Based on Kaufman’s hierarchy (as a summary), Nietzsche’s concept of supremacy implies three things: “will to others,” “will to nature,” and “will to self.”

The “will to others” is a kind of desire in order to preserve oneself. This suggests that one has to transcend the present state of the masses. Another



concept associated with man's supremacy is "will to nature." Man exerts himself to manipulate his creative will in order to utilize nature for his own purpose. Last is the "will to self." This will is used in relation to will to power in the sense that the self can have self-preservation. There is a need to exert one's will over the self, the transcendental self.

### Methodology

The paper is descriptive in nature which utilized a content analysis of the prose poem of Wilhelm Friedrich Nietzsche's *Thus Spake Zarathustra*. It presents an in depth analysis of the prose poem in order to depict man's supremacy. The analysis focuses on the character of Zarathustra whose will embodies the blueprint of the postmodern man.

To draw out the depiction of the postmodernistic education for man in Zarathustra, moral-philosophical and historical-biographical approaches were used in the paper.

A Moral-Philosophical Approach is utilized in the analysis since this approach was based on the ethical standpoint regarding values in the image of Zarathustra. It brought out all moral implications and how *Thus Spake Zarathustra* affected readers, whether subtly or directly. It also highlights that the message of a work--and not just the decorous vehicle for that message--is important (Burris, 1999).

On the other hand, Historical-Biographical approach was employed to have knowledge about the "events in his lifetime" (Guerin, p.26). This presents an idea why he wrote the text. Another is that the work could have been created as it was molded by the events in his lifetime.

### Analysis

#### Man in Post-modern Age

##### Zarathustra's eyes-Übermensch: Postmodern Man

If one traces the concept of man, it would come apparent that man even in his early development has already been defining himself different from other living things to the extent that man thinks of himself as supreme to other living things. However, the aim is to seek the motivation of a man to become higher over other men and over the self.

Nietzsche on the other hand, transcends man's concept of supremacy and named it the Übermensch. Nietzsche depicted this concept as something that is constantly surpassing man's present state. The Übermensch does not



identify with the herd or the many. He is governed by his own will. The Übermensch, most of all, is misunderstood by the people because he stirs up possibilities that may cause conflict in the present standards of the people and in the community.

The Übermensch does not speak of universality, instead he focuses on his own will and his perspectives. He is the big picture that only few understand, and have the capacity to become at par or even surpass his present state. He thinks differently because he does not want to be tainted like the many.

Nietzsche's concept of man is unique because it does not speak of conformity with the laws of society. It is not solely existential because he transcends both these ideas and precepts of man. He identifies as having the potential to become an Übermensch. Not everyone is an Übermensch as many of us are living in the conventions. The Übermensch is highly depicted in the character of Zarathustra because "Zarathustra asketh as the first and only one: how man is to be surpassed?" (Nietzsche, 1997, p.277). His will is to be supreme and to maintain that supremacy.

Zarathustra teaches the Übermensch not only to live with it but to share it. However, only few can comprehend him. His concern is not of the greater being, but he concerns himself with humanity and what is earthly. "The Übermensch is the meaning of the earth" (Nietzsche, 1997, p6). He aims at defining man in the earth instead of defining the self in the platonic sense. The Übermensch is an instance in human capacity. He is an outbreak, a realization of one's timid, boring, and lifeless existence. "He is the lightning, he is that frenzy" (Nietzsche, 1997, p.7).

When Zarathustra explained the Übermensch to the people, no one would believe him. He had no ally because he was different. He gave ideas that were very horrid to ordinary human understanding. His dilemma was on how to make them understanding his teachings. This was one of the problems of Nietzsche, either they did not understand him or misappropriated his thinking. He still pursues in convincing them to listen to him. That is the identity of the Übermensch; he depicts a person who does not easily give up on humanity because it is most important. As Zarathustra claimed "I love mankind" (Nietzsche, 1997, p.7). His only wish was that the people would accept his gifts.

Zarathustra loves man because he understands them. He wants them to surpass the very idea of human capacity. In the 5th prologue, he also discussed what he calls the last man. This kind of man is the opposite concept of the self that Nietzsche perceives as a person who inquires about his world but he himself has no hope, letting everything pass by. He deceives humanity. "A little poison now and then: that maketh pleasant dreams.





And much poison at last for a pleasant death" (Nietzsche, 1997, p.11). The last man destroys one's humanity slowly that no one can really perceive it. "Their wisdom speaketh thus: 'A fool, he who remaineth alive; but so far are we fools! And that is the foolishness in life!'" (Nietzsche, 1997, p.41). They have no hope, nothing to look forward to. They see meaning only after their bodies would cease to exist. They see life only as suffering. He is the anti- superman. It is a concept of man that does not want to have any kind of change, who is comfortable being with the crowd and having someone to agree with, to laugh with, etc. These are men who perceive togetherness as the solution of knowing the self.

Zarathustra does not just want to have somebody to agree with him. He wants to give life to man's dead existence. Zarathustra claims, "I want to teach men the sense of their existence, which is the Übermensch, the lightning out of the dark cloud" (Nietzsche, 1997, p14). But this is still far from actuality. Man is still disposed to trust in their own dwelling. Zarathustra's ways are still beyond human understanding. "Gloomy is the night, gloomy are the ways of Zarathustra" (Nietzsche). Many are still against Zarathustra and many are still against the ways of the Übermensch.

### People express their contempt on Zarathustra

Others tremble and get blinded that they cannot perceive what is in the open. Zarathustra trusts only the truth that even in darkness he walks with confidence to find that little light of truth that would awaken a life of slumber. "Zarathustra again went on for two hours, trusting to the path and the light of the stars: for he was an experienced night-walker, and liked to look into the face of all that slept" (Nietzsche, 1997, p.16).

### A Path to the Übermensch

Zarathustra said, "...I need living companions, who will follow me because they want to follow themselves" (Nietzsche, 1997, p.17). People who are not conventional, that is what Zarathustra wants as companions. "To allure many from the herd--for that purpose have I come. The people and the herd must be angry with me: a robber shall Zarathustra be called by the herdsmen" (Nietzsche, 1997, p.17). Zarathustra wants companions who will go beyond such orthodox ways. "Behold the good and just! Whom do they hate most? Him who breaketh up their tables of values, the breaker, the lawbreaker:-- he, however, is the creator" (Nietzsche, 1997, p.17). He seeks companions who deviate from the herd.

"Companions, the creator seeketh, and such as know how to whet their sickles. The Destroyers, will they be called, and despisers of good and evil.



But they are the reapers and rejoicers... With the creators, the reapers, and the rejoicers will I associate: the rainbow will I show them, and all the stairs to the Übermensch... To the lone-dwellers will I sing my song, and to the twain-dwellers; and unto him who hath still ears for the unheard, will I make the heart heavy with my happiness" (Nietzsche, 1997, p.17-18).

Zarathustra poses three different types of individuals - the camel, lion, and the child. At the same time he also used these metaphors as the becoming of the Übermensch by which he is known. The camel carries the burden of the world and follower to the command of that which dominates his world. He carries the heaviest loads to which he finds respect for himself. The lion, a proud being and commands all that is around him but most of all commands that which he considers as the slave. He is governed by rules and standards that are presets of his surroundings. He walks proud, maintaining his posture that no one would try to overpower him. "All values have already been created, and all created values-do I represent. Verily, there shall be no 'I will' any more" (Nietzsche, 1997, p.22). The child, a contradiction to both, he is neither a slave nor a follower of standards and traditions. He is a master of his self. "But tell me, my brethren, what the child can do, which even the lion could not do?" (Nietzsche, 1997, p.22). The child is untainted free from any prejudice and from any pollution created by human existence. "Innocence is the child, and forgetfulness, a new beginning, a game, a self-rolling wheel, a first movement, a holy Yea" (Nietzsche, 1997, p.22). As he creates his own life, the child is capable of discovering new things. He has his own will and spirit free in creating his own world.

These are the stages that are to be surpassed in order to be an Übermensch. He is a child that can potentially do his will towards the others and towards the self. As the Übermensch, he uses his creative power to go beyond the orthodox way of life. He thinks differently and does not emphasize on the demands of the economy and the principles of the herd. He questions values and thus reevaluates it. Further, he listens to the aches of man aiming to emancipate them from exploitation thereby opening the possibility and beauty of postmodernity.

### **Amor-Fati: Overcoming recurrence**

The most difficult task for an individual is to surpass the demands of society and especially, to surpass the self. The only way to achieve this is for one to be deviant from human standards. He must journey towards a path that no one would take. "And whatever may still overtake me as fate and experience-a wandering will be therein, and a mountain-climbing; in the end one experienceth only oneself" (Nietzsche, 1997, p.149). One must mount higher than the heavens until one stands over them.



However, one central thought of Nietzsche in becoming the Übermensch is the problem of eternal recurrence. Aside from being misled by one's capacity, eternal recurrence is the idea that everything repeats itself endlessly and ceaselessly. "All truth is crooked; time itself is a circle" (Nietzsche, 1997, p.154). This signifies that at some point in the past a form of an Übermensch existed and that soon, another Übermensch will exist due to continued recurrence. Hence, the idea of the Übermensch is not something that ends up in nothing.

Zarathustra at a moment found a solution to the problem of recurrence during his encounter with a young shepherd being strangled by a serpent. He tried to help the shepherd to escape but he could not do anything because it had already crawled into his throat. So he cried out loud:

"Bite! Bite!... Its head off! Bite!'-so cried it out of me; my horror, my hatred, my loathing, my pity, all my good and my bad cried with one voice out of me... The shepherd however bit as my cry had admonished him; he bit with a strong bite! Far away did he spit the head of the serpent, and sprang up-' (Nietzsche, 1997, p.155-156).

At this point there is a sense of liberation on his part and of the young Shepherd. He was no longer a mere man nor a shepherd but "a transfigured being, a light-surrounded being" (Nietzsche, 1997, p.156). He has surpassed human capacity and cheated death because he wants to live. He laughed for even with the heaviest burden, he was able to overcome the moment. "Courage, however, is the best slayer, courage which attacketh; it slayeth even death itself; for it saith: "was that life? Well! Once more!" (Nietzsche, 1997, p.153). It is about surmounting one's suffering and still continuing to journey one's life. It is to face one's life.

Another form of liberation from being mere human is to live not in the twisted truth that is embedded in the minds of society, but in the truth which condemns people who are living and believing in these truths. It is through one's journey that one can perceive such a lifestyle. A person who sees errors and condemns them but who himself has no ideals, is a disease that keeps the system down to its knees. They spread words, anecdotes, lines, and even gossips that others do not understand that resulted in being deceived. The Übermensch however, is free from the fools of the state. He is liberated from the contempt of human folly, that which they call life. However, this is not still the solution to his problem. "Everything breaketh, everything is integrated anew; eternally buildeth itself the same house of existence" (Nietzsche, 1997, p.211).

The Übermensch, in order to escape eternal recurrence, has to be eternal. Continuously living in the present not looking forward to what may come or



turning back to what has become. It is to surpass man, as Zarathustra would ask the first and only question: "How is man to be surpassed?" (Nietzsche, 1997, p.277). To surpass man is to transcend eternal recurrence because man is imprisoned or trapped in this recurring state. It is then, maintaining that state of eternity by not looking at the future or at the past, but living in the constant present in order not to move in circles and return to what is and what will be. "Never yet have I found the woman by whom I should like to have children, unless it be this woman whom I love: for I love thee, O Eternity!...For I love thee, O Eternity!" (Nietzsche, 1997, p.222). It is that state of eternity that one "is." One cannot love another being unless he first loves life (i.e., *Amor-Fati*). It is to constantly surpass the self and to love life that one becomes an *Übermensch*.

### The Capacity to create

"More uprightly and purely speaketh the healthy body, perfect and square-built; and it speaketh of the meaning of the earth" (Nietzsche, 1997, p.29). Zarathustra's aim is to make the body accessible to one's purpose that is self-creation. It is "bending the world to its own will" (Palmer, 1994, p.258). "The body is a big sagacity, a plurality with one sense, a war and a peace, a flock and a shepherd" (Nietzsche, 1997, p.30).

"The Self saith unto the ego: 'Feel pain!' And thereupon it suffereth, and thinketh how it may put an end thereto-and for that very purpose it is meant to think.

The Self saith unto the ego: 'Feel pleasure!' Thereupon it rejoiceth, and thinketh how it may oftentimes rejoice-and for that very purpose it is meant to think" (Nietzsche, 1997, p.30-31).

The self is a thinking being and it is through the body that he can express and understand the knowledge that he creates for himself. He wills himself to create because he wants to live. "I tell you, your very Self wanteth to die, and turneth away from life" (Nietzsche, 1997, p.31). The common man does not want to express himself nor does man will himself to create. In the end, he functions only to his demise unable to create beyond himself. On the other hand, the *Übermensch* is always going beyond his capacity.

### On Individualism

"Wherever I found a living thing, there found I Will to Power; and even in the will of the servant found the will to be master" (Nietzsche, 1997, p.112). It is the human will to surpass his said capacity towards his perspective in life. It provides a better life "That to the stronger the weaker shall serve-thereto persuadeth he his will who would be master over a still weaker



one..." (Nietzsche, 1997, p.112. Will to power is for everyone who desires power. It does not choose anyone. The self chooses to have one. "And this secret spake Life herself unto me: 'Behold,' said she, 'I am that which must ever surpass itself'" (Nietzsche, 1997, p.112). The power of his will that one would possess is something that could not be broken down. Zarathustra claims that in order to become an Übermensch, life should be the means of man's creation. "Rather would I succumb than disown this one thing; and verily, where there is succumbing and leaf-falling, lo, there doth Life sacrifice itself—for power!" (Nietzsche, 1997, p.112-113). Power is worth sacrificing because it is his identity which represents his existence. This is the truth that is brought about in his life. "Will to existence': that will--doth not exist!...Only where there is life, is there also will: not, however, Will to Life, but-so teach I thee-Will to Power!" (Nietzsche, 1997, p.113). Man's existence will be meaningful because of the truth that he speaks, the truth that he walks, and most of all the truth that he lives. He seeks to improve his existence that is the will towards his supremacy.

### Dawn of reflection

It is important to meditate and understand one's individuality and to contemplate about one's life. It is very important for an Übermensch to contemplate because he might be misled by what he knows. He might have second thoughts of his capability to become more than what he is. Zarathustra claimed in his meditation, "I lack the lion's voice for all commanding," (Nietzsche, 1997, p.145) a part of him knows that he has the capacity and the will to rule and surpass the standards given out to him and his own standards. He needs to reflect on himself so as to realize his limitations which are basically the beginning in moving away from the herd or the traditions. In his contemplation there spoke to him "Thou forgottest the path before, now dost thou also forget how to walk!... Thou art one who hast unlearned to obey; now shalt thou command!" (Nietzsche, 1997, p.145). It is the time when one's capacity is shaken and that needs self-reassurance. Nietzsche (1997) says, "So must thou go again into solitude: for thou shalt yet become mellow" (p.146) said the voiceless voice to him. It is through this meditation that one can reassure the self to be in the right path. It is meditation that gives a self-insight of what one is and what one can become. "Then was there again spoken unto me as a whispering: 'It is the stillest words which bring the storm. Thoughts that come with doves' footsteps guide the world'" (Nietzsche, 1997, p.145).



## Postmodern Education

### Education system

It is through teaching that what is left unsaid is brought to the forefront. In other words, in every idea there are concealed ideas that are taken for granted, hence, the role of education is to unconceal this hidden truth. The postmodern condition "teaches us that there is a multiplicity of viewpoints on what to be considered good" (Ramaekers, 2001). It is a dialogue between teaching and learning to lie. It is a never-ending task of self-overcoming. Education could be available to anyone interested in learning and developing their will to knowledge" (Smith, 2001). According to Smith (2001) the degree of freedom individuals can achieve is determined by the will to knowledge, not by mere will to vocational preparation. Education should create meaning in the lives of individuals. It is a process through which human beings in social settings create meaning in their lives and make sense of things. Nietzsche proposes that learning should be a process of "self-overcoming the decadent values of the mass culture" (Smith, 2001). The concern is to create the Übermensch by knowing how to create meaning and surpassing learning in the preparatory notion of landing a job.

But why lying? Only when one understands the meaning of lying can one really create meaning. In an article in education theory, Johnston argues that "Nietzsche's self-imposed task is not to reconstruct culture, but is to point the way to the possibility of a new individual, a self-overcoming individual, one able to create and live within his or her own valuations" (Ramaekers, 2001).

Lying implies creating beyond what is already given in a culture. Zarathustra stated to "the despisers of the body will I speak my word. Wish them neither to learn afresh, nor teach anew, but only to bid farewell to their own bodies, - and thus be numb" (Nietzsche, 1997, p.30). The despisers of the body for Zarathustra are individuals who cannot go beyond their constructed meanings of things in a particular culture. Indeed, they are the ones who cannot lie. Lying in Nietzschean context is given a transcended meaning from what is commonly defined and accepted by culture. It is commonly understood as lying because it defies the given meaning in the society. Education is liberating the learner from the entrapment of the common culture. Nietzsche's education "does not provide artificial limbs, false noses or eyeglasses...Education is rather liberation, a rooting out of all weeds, and rubbish and vermin from around the buds of plants..." (Stoy, 2008). To further exemplify Nietzsche's education, Smith (2001) states that the degree of freedom individuals can achieve is determined by the will to



knowledge, not by a mere will to vocational preparation. Precisely, the point of education is for acquiring knowledge to create new meaning in one's life and not just to have a job. One might as well have a skilled work if the money is only what one wants. Man's meaning is creating his self and creating his personal truth. To learn to lie then is to value the meaning of one's life.

Commonly, being educated is just laying the facts of the 'what is' idea. However, learning should interpret the truth of what is being taught in order to create meaning. "Education then is not a mere dissemination of knowledge from teachers to students" (Smith, 2001). Instead, "the individual must create not only the self, but also the means by which this ideal self is produced... Nietzsche is concerned with fostering the *Übermensch*" (Smith, 2001). Education is concerned with those who want to understand rather than those who seek a job. In relation to this, he further states that Nietzsche calls for philosophers, but the academy fosters careerists. Nietzsche reminds us that while everyone may be schooled, not everyone is educated. Nietzsche's most valuable education legacy is his warning that society cannot foster educated individuals through coercive mass schooling.

The character of Zarathustra speaks of education as always being transcendental. It does not end with what is being given and socially accepted knowledge. In his last words in 'Reading and Writing' he said, "I learned to walk; since then I let myself run. I learned to fly; since then I do not need pushing in order to move from a spot" (Nietzsche, 1997, p.37). When Zarathustra learned new knowledge he made sure that he did not stay that way, instead he went beyond what he has learned. He goes further as he becomes the *Übermensch* to quest for being enlightened.

Zarathustra seeks individuals to qualify as learners. In the course of his journey, he finds a handful learners who want to be an *Übermensch*. He states that learning in the common way becomes old, it becomes one's archaic comfort. He says, "my friends, might become weary of the old words which ye have learned from fools and liars:...That ye might become weary of saying 'that an action is good because it is unselfish'" (Nietzsche, 1997, p.93). Zarathustra preaches to his friends his concerns that education should not allow a learner to be comforted with facts and human acts such as being good and unselfish. Instead, education always transcends beyond what is absolute. Zarathustra states, "we also know too little, and are bad learners..." (Nietzsche, 1997, p.125). The *Übermensch* accepts these facts but is not satisfied with just knowing that this is his stature. He surpasses his stature, and that is what he wants for those who desire to be an *Übermensch*.

Nietzsche is trying to open the eyes of those who seek the *Übermensch*. But it is only through their will that man will learn. "For willing is creating:





so do I teach. And only for creating shall ye learn!" (Nietzsche, 1997, p. 200). Those who have the capacity to will can create meaning and eventually can learn obtainable truths. It is not only a matter of having knowledge based on the existing truths, instead, it is owning those truths and willing to create a higher truth to overcome knowledge and himself. "Education as merely teaching to lie then points to evoking the disposition of self-overcoming - whereby evoking means arousing as well as provoking" (Ramaekers, 2001). "I teach you the Übermensch. Man is something to be surpassed" (Nietzsche, 1997, p.6). Learning is not just a mere fact of accepting norms and standards, instead, it is creating new standards of reality. Ramaekers (2001) claims that "Nietzsche's analysis of his time leads him to conclude that human beings are living in the mentality of the herd." This means that human beings are satisfied with what they have rather than creating new socially-accepted realities. "The ostrich runneth faster than the fastest horse, but it also trusteth its head heavily into the heavy earth: thus is it with the man who cannot yet fly" (Nietzsche, 1997, p.187). A man who cannot let go of his herd mentality will not be able to transcend. He has no will to become an Übermensch.

Education teaches men to become Übermensch to surpass the herd. It teaches man to get out of the cave and transcends the knowledge that is being given to him. It is "not the mere dissemination of knowledge from teachers to students" (Smith, 2001). It understands that there is no one controlling the puppets of learning but only the self. It is teaching "men the sense of their existence, which is the Übermensch, the lightning out of the dark cloud-man" (Nietzsche, 1997, p.14). It is owning the hidden light of truth that education is more than facts laid down for one's consumption. Zarathustra says that "All the secrets of your heart shall be brought to light; and when ye lie in the sun, grubbed up and broken, then will also your falsehood be separated from your truth" (Nietzsche, 1997, p.91). An educated man transcends such things and falsehoods in order to reach the truth. Ramaekers (2001) put it simply "the true individual never shall be, but always shall be." It is not being in an "eternal hourglass... turned upside down again and again" (Nietzsche, 1974, p.273). Instead, It should always be a process of overcoming. An educational system that breeds individuals who constantly surpass their current state of being will definitely have a never ending cyclical process of learning and discovery. "Ten times a day must thou overcome thyself" (Nietzsche, 1997, p.24).

However, educators should take his time with those who are not yet open to such ideas because the learner will at one point understand that he will overcome himself. "Gentle is Zarathustra to the sickly. Verily, he is not



indignant at their modes of consolation and ingratitude. May they become convalescents and overcomers, and create higher bodies for themselves!" (Nietzsche, 1997, p.29). The sickly here is seen as the learner who is still weak to get out of his comfort. Smith (2001) states, "those lacking sufficient natural ability and/or will to knowledge consign themselves to herd mentality and conformity." Those who have no will to be cured and/or accept his weakness will never become the *Übermensch*. In the same note, "Johnston quotes Nietzsche: Educators are needed who have themselves been educated superior, noble spirits, proved at every moment, proved by words and silence representing culture which has grown sweet."

Proper education is needed to create such a person as *Übermensch*. He first must "satisfy the individual's will to knowledge in the most rigorous way possible" (Smith, 2001). However, most societies are concerned with generating income that is obviously defining their own accepted culture, which is not the only concern if one wants to become an *Übermensch*. Stoy (2008) states that there are "three tasks for which educators are required: one must learn to see, one must learn to think, one must learn to speak and write: in all three is a noble culture." The *Übermensch* teaching approach is concerned with the acceptance of culture and the knowledge of truth. Apparently, taking note on Stoy's (2008) statement, "The state is never concerned with the truth, but only with the truth which is useful to it, or to be or precise, with anything which is useful to it whether it is truth, half-truth, or error." Truth in this context is twisted because truth was defined vaguely and ambiguously.

"A light hath dawned upon me: I need companions—living ones; not dead companions and corpses, which I carry with me where I will...Companions, the creator seeketh...not herds or believers either. Fellow-creators the creator seeketh—those who grave new values on new tables. Companions, the creator seeketh, and fellow-reapers: for everything is ripe for the harvest with him...Companions, the creator seeketh, and such as know how to whet their sickles. Destroyers, will they be called, and despisers of good and evil. But they are the reapers and rejoicers" (Nietzsche, 1997, p.17).

### The Preacher of the *Übermensch* (teacher of method)

"All ye to whom rough labour is dear, and the rapid, new, and strange—ye put up with yourselves badly; your diligence is flight, and the will to self-forgetfulness" (Nietzsche, 1997, p.42). The teacher, who teaches self-forgetfulness to learners will detach themselves from their task, work, and the world. "Take what I have! Take what I am! So much less doth life bind me!" (Nietzsche, 1997, p.42). The learner in this effect is selfless unable to



connect with others. His life is in darkness lame and without purpose. He will have learned to work not for himself. What if teachers teach learners to always remember themselves? Teaching them the value of the self, their value? What then should be the role of the teacher?

The postmodern teacher is a preacher to learners in becoming an *Übermensch*. The teacher's goal is to make every learner an *Übermensch* that is, one who surpasses his own present state. The learner must understand why? "Teachers must let learners engage in critical self-reflection, new modes of action, and initiate the process of self-transformation" (Jackson, 2007). The teacher then teaches the learner how to think beyond the limits of his present state.

Reviewing the tale of Zarathustra, it can be observed that his method of challenging the traditions and their way of life is premature to the lifestyle of the people. In effect, he becomes ineffective in connecting to them. "Zarathustra is left with a realization that only the self-overcoming, self-valuing individual can reach the higher state" (Jackson, 2007). Only when educators and the educational institutions open their doors to a new methodology of teaching will the learners be able to realize that they have to overcome their present state, that there is something more. If the learners see that educators are going beyond their limits, then the learners will strive to surpass their present selves and upon finishing school they may attain a higher state. In doing so, the teacher can freely preach the *Übermensch*. The learner then becomes a man who does not only think of the lessons being taught instead its relationship to his life (a self-valuing learner).

As a teacher, one understands that every individual learner learns for their own personal reasons. They are learning to surpass whatever their state of being is, and that each and every one of them has their own perspective on life. It is the task of the teacher to hone this perspective to make every learner become *Übermensch* in whatever they will be doing in the future.

### Learners' mindset

Man learns to have work or start a business when they finish schooling. He basically wants to have money or achieve his needs and wants in life. Nietzsche generally influenced the economic world indirectly during his time. His contribution to the good of economics is illuminated through the voice of Zarathustra. It is overcoming man's role in the economic world.

The paper emphasizes the importance of the innovation of morality that is, to replace it with a new morality in effect overcoming man's present being, as Nietzsche (1966) puts it, "to revalue and invert 'eternal values'; in forerunners, in men of the future...to take new paths" (p.117). "It was



necessary for Nietzsche to destroy the old one: the new morality must quite literary stand on the ruins of the old" (Reinert & Reinert, 2006, p.3). The learner should overcome the state of economic optimism.

Economic optimism is the state of preservation of what is already at hand to the extent of protecting it at all cost. The learner must understand that man in this state assigns meaning to his exploitation and that man constantly loses his value. Such preservation and protection to what is already existing is a common value of the common man. What Zarathustra calls the 'last man' is resistant to change. Zarathustra preludes it as the worst of all human specimens, the 'most despicable man,' the embodiment of decline" (Reinert & Reinert, 2006, p.11). This is a path leading to nihilism, that is, "no justification for values" (Honderich, 2005, p.681) as it is a "will to nothingness" (Koppensteiner, 2009, p.5), and "Even in your folly and despising ye each serve your Self, ye despisers of the body. I tell you, your very Self wanteth to die, and turneth away from life" (Nietzsche, 1997, p.31). The economic life of the last man leads towards its own demise. The Last man's ultimate goal is towards his death that is to end his nihilistic cycle. He toils passionately towards his end.

The only way to surpass this cycle of nihilistic life is the will to power, the "force that governs this process, and which thus determines the future of humanity" (Reinert & Reinert, 2006, p.11). The authors also noted that Man's will to power is "the driving force behind all processes of change, progress and evolution, both the individual, in the species, and in the society" (p.12). This is his will to create. The following shows a contrast between the will of the last man as preserver and the Übermensch as the creator:

*Behold the good and just! Whom do they hate most? Him who breaketh up their tables of values, the breaker, the lawbreaker--he, however, is the creator.*

*Behold the believers of all beliefs! Whom do they hate most? Him who breaketh up their tables of values, the breaker, the law-breaker--he, however, is the creator...*

*Companions, the creator seeketh, and such as know how to whet their sickles. Destroyers, will they be called, and despisers of good and evil. But they are the reapers and rejoicers...*

*With the creators, the reapers, and the rejoicers will I associate: the rainbow will I show them, and all the stairs to the Übermensch (Nietzsche, 1997, p.112).*

Since man is dependent on his work, he has the will to preserve his state; making it his own supremacy that is to say owning his nihilism finding and creating meaning to that end. This is the supremacy of the last man. On the other hand, the will to power of the Übermensch dwells in his creativity. He



is a child of becoming, i.e., of becoming of what he is not yet. This creativity gives us an opportunity to discover will to power within us and only through this that we become what we ought to become or to achieve our fullest potential which is Übermensch.

The learner learns that it is only when he becomes creative that he can surpass the nihilistic life. He should understand that man constantly overcomes himself. Zarathustra said, "And this secret spake Life herself unto me. 'Behold,' said he, 'I am that which must ever surpass itself'" (Nietzsche, 1997, p.112).

He either preserves what is already in existence that is his world or creates a new world. The learners think that man's goal is for the greater heights, choosing to grow beyond human limitations. Zarathustra sings, "That all that is baddest is the best POWER, and the hardest stone for the highest creator; and that man must become better and badder" (Nietzsche, 1997, p.212).

The learner who quests for supremacy has to rise above himself, with others, and nature. In an economic world, man must "bend reality to one's own will" (Palmer, 1994, p.258). He must go into battle for supremacy. "Man is something that is to be surpassed" (Nietzsche, 1997, p.6). For Nietzsche, existence is a continuous process of human becoming. It must be a movement from being human to human becoming. Most people avoid conflicts but the beauty of conflicts is that it tells us something about what lacks in our lives. As his popular dictum says, "what doesn't kill me makes me stronger" (Nietzsche, 1997). This dictum implies that through conflict, it pulls us away from rest (contentment) and pulls us closer in becoming an Übermensch. Self-supremacy is constant and always exceeds itself and others (enemies). *Your enemy shall ye seek; your war shall ye wage, and for the sake of your thoughts! And if your thoughts succumb, your uprightness shall still shout triumph thereby!* (Nietzsche, 1997, p.43). "Attacking is proof of good will" (Reinert & Reinert, 2006, P14). The attack is needed to wake up a man from a "dogmatic slumber" (Palmer, 1994, p.191). The will of man must always be growing to its supremacy. Reinert and Reinert (2006) presented what Nietzsche had to say for today's economists, "Henceforth, my dear philosophers, let us be on guard against the old and dangerous myth that postulates 'a pure, will-less, painless and timeless knowing subjects.' Let us take care not to get caught in the tentacles of such contradictory concepts as 'pure reason,' 'absolute spirituality,' and 'knowledge in itself;' these always demand that we should think of an eye that is absolutely unthinkable, an eye which cannot be allowed to be turned in any particular direction, and in which the active and interpreting forces - through which seeing becomes seeing something - are supposed to be lacking; these always demand of



the eye a contradiction and a nonsense. The only seeing which exists is a seeing in perspective, a seeing with perception; and the more feeling we allow to get involved about an issue, the more eyed - different - eyes - that we mobilize to observe one thing, the more complete will our concept of this thing, our objectivity, be. Would not eliminating the will...be the same as to castrate the intellect?"

Nietzsche does not want stagnation of the human capacity as if life has reached its ultimate goal. Instead man should be in constant creation. What seems to be stagnant must be forced to reaction. It is a sense of chaos that is an imposition of difference in that capacity. There should be inequality in order for one to strive and to surpass. Reinert and Reinert (2006) stated Nietzsche's encouraging message: "Every concept originates through our equating what is unequal. No leaf ever wholly equals another, and the concept 'leaf' is formed through an arbitrary abstraction from the individual differences, through forgetting the distinctions; and now it gives rise to the idea that in nature there might be something besides the leaves which would be 'leaf' - some kind of original form after which all leaves have been woven, marked, copied, coloured, curled and painted, but by unskilled hands, so that no copy turned out to be correct, reliable and faithful image of the original form...What then, is truth? A mobile army of metaphors, metonyms, and anthropomorphism - in short, a sum of human relations, which have been enhanced, transposed and embellished poetically and rhetorically, and which after long use seem firm, canonical, and obligatory to people; truths are illusions about which one has forgotten that this is what they are; metaphors which are worn out and without serious power; coins which have lost their picture and how matter only as metal, no longer as coins."

The learner's creativeness should only be that which is constant in order for him to progress. He would then be able to see the difference of traits to own it to his benefit.

### Conclusions and Recommendations

Educational institutions in postmodernity open the possibility of creativity in learning. Postmodern educational systems foster the idea of surpassing financial security. Teachers in a postmodern educational institution teach self-reflection and self-valuation and incorporate this in the curriculum. Teachers are recommended to focus in shaping the learners through creative and critical thinking approaches.

The postmodern learners understand their individuality of having the ability to express the full extent of their capacity, ergo, the Übermensch.



They learn to constantly overcome their present state and constantly value their humanity. The learners overcome the state of economic optimism. They surpass exploitation, and constantly affirm their value.

The paper proposes further studies on the possibility of a postmodernistic educational system. Though Nietzsche (and even in the voice of Zarathustra) claimed that not everybody can achieve a state of *Übermensch*, educational institutions still have to struggle in achieving this goal. Also, teachers are recommended to modify their teaching methodologies focusing on self-reflection and value-formation.

On the other hand, learners are recommended to value their inner selves and the profession that they want to pursue, not only focusing on their economic gains they will reap in the future. Learners will not be contented with just knowing the information given but the values that can be interpreted from every lesson applying it to their everyday lives.

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# Kakayahang Panggramatika sa Filipino ng mga Mag-aaral sa University of the Cordilleras

*(Presented during the National Language Summit on April 29-30, 2011 at the University of the Philippines-Baguio, Baguio City)*

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## ABSTRAK

Pokus ng pangkasalukuyang kurikulum ng Filipino ang paglinang ng kakayahang komunikatibo ng bawat mag-aaral. Upang matamo ang kakayahang komunikatibo ng mga mag-aaral, isa ang kakayahang panggramatika sa mga aspektong dapat malinang sa kanila. Mahalaga kung gayon ang pagsipat sa kakayahang panggramatika ng mga mag-aaral upang umagapay sa naturang layunin ng kurikulum sa Filipino.

Sa pagtuturo sa mga mag-aaral ng mga tuntunin ng wika tungo sa malinaw at maayos na pagsusulat at pagsasalita, nararapat na gumawa ang guro ng pagtataya sa kanilang kakayahang panggramatika upang matukoy niya ang mga kahinaan ng mga mag-aaral sa gramatika at mabigyan ito ng diin at lunas sa kanyang pagtuturo. Kailangan din ang mga pagsasanay sa gramatika upang ganap na matutuhan ng mga mag-aaral ang mga tuntunin ng wikang pinag-aaralan.

Nilayon ng pananaliksik na isinagawa sa University of the Cordilleras, Taong-Aralang 2009-2010 na tukuyin ang antas ng kakayahang panggramatika sa Filipino ng mga mag-aaral; ilarawan ang pagkakaiba ng kakayahang panggramatika ng mga mag-aaral sa mga bahagi ng panalita; at kilalanin ang pagkakaiba ng antas ng kakayahang panggramatika ng mga mag-aaral ayon sa kolehiyo at unang wika.

Natuklasang hindi pa ganap na nalilintang ang kakayahang panggramatika ng mga mag-aaral; magkakaiba ang antas ng kanilang kakayahang panggramatika sa mga bahagi ng panalita; at may kaugnayan ang kolehiyong kinabibilangan ng mga mag-aaral sa kanilang kakayahang panggramatika ngunit walang kaugnayan dito ang kanilang unang wika.

**Keywords:** kakayahang panggramatika, kakayahang komunikatibo, pagtataya, salitang pangnilalaman, salitang pangkayarian

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## Panimula

Ang wika ayon kay Gleason, sa pagbanggit nina Garcia *et al.* (2008), ay masistemang balangkas ng mga sinasalitang tunog na inaayos at pinipili sa paraang arbitraryo upang magamit sa komunikasyon ng mga taong kabilang sa isang kultura. Sa depinisyon, isang katangian ng anumang wika ang pagkakaroon ng sistema: sistema ng mga tunog at mga kahulugan. Kapag ang sistema ng wika ay malalabag, magreresulta ito sa mali o malabong pahayag na labis na nakakaapekto sa daloy ng komunikasyon.

Ang bawat wika ay may mga tuntuning sinusunod na tinatawag na balarila o gramatika. Ang isang mag-aaral kung gayon ay dapat na marunong sa mga tuntuning ito upang magamit niya nang tama ang wika sa pagpapahayag, pasalita man o pasulat. Samakatuwid, kailangan ang paglinang sa kakayahang panggramatika ng mag-aaral dahil mahalaga ito sa pagkakaroon ng kakayahang komunikatibo ng mag-aaral.

Sinuportahan ito ni Lachica (1999) sa pagsasabing mahalaga ang ginagampanan ng gramatika sa pagpapahayag. Hindi sapat ang tamang pagpili ng mga salita lamang sa pagpapahayag bagkus kailangan ding nasusunod ang wastong kaayusan ng mga salita. Kanyang binanggit na napakahalagang magsama ang tamang pagpili ng mga salita na siyang sakop ng retorika at ang tamang kaayusan ng mga salita na siya namang sakop ng gramatika. Samakatuwid, kailangang masanay ang mga mag-aaral sa tamang pagpili at tamang pagsasaayos tungo sa masining nilang pagpapahayag.

Ang paglinang ng kakayahang panggramatika at kakayahang komunikatibo ng mga mag-aaral ay nakasaad sa Binagong Kurikulum ng Pangkalahatang Edukasyon. Ang mga asignaturang Filipino sa kolehiyo ay dapat lumilintang sa pagkakaroon ng mga mag-aaral ng mga kasanayan sa wika. Ang Filipino 1 (Komunikasyon sa Akademikong Filipino) ay nakatuon sa paglinang sa kakayahan ng mga mag-aaral na gamitin ang wikang Filipino sa akademikong diskurso; ang Filipino 2 (Pagbasa at Pagsulat tungo sa Pananaliksik) ay nakatuon pa rin sa pagtatamo ng higit na mataas na antas ng kakayahang komunikatibo upang magamit sa lalong masaklaw na aspekto ng pananaliksik; at ang Filipino 3 (Masining na Pagpapahayag) ay nakatuon sa paggamit ng kakayahan sa wika sa masining na pagpapahayag.

Kung pagbabatayan ang mga pokus ng tatlong nabanggit na kurso, binibigyang-pansin sa mga ito ang paglinang sa kakayahang panggramatika ng mga mag-aaral tungo sa pagkakaroon nila ng kakayahang komunikatibo. Hindi masasabing may kakayahang pangkomunikatibo ang mga mag-aaral kung kulang ang kanilang kakayahang panggramatika dahil isang pangangailangan ito sa pagkakaroon ng kakayahang komunikatibo.



Pinatunayan ito ni Lachica (1999) na isa ang kasanayang panggramatika sa mga kailangan sa mabisang pagpapahayag, pasalita man o pasulat. Kasama nito ang kakayahang estratehikal, kakayahang sosyolinggwistika, at kakayahang magpapahayag.

Sa paglinang ng kakayahang komunikatibo at panggramatika ng mga mag-aaral, dapat na gumawa ang guro ng pagtataya upang matiyak na nalilining sa mga mag-aaral ang mga kasanayang dapat malinang sa kanila. Sinabi ni Madsen (1983) na magkatuwang ang pagtuturo at pagtataya sa proseso ng pagtuturo at pagkatuto. Layunin ng pagtataya na tuklasin kung gaano ang pagkatuto ng mga mag-aaral sa anumang kasanayan o aralin pagkatapos ng ginawang pagtuturo. Magagamit naman ng guro ang mga resulta ng pagtataya bilang batayan sa pagsasagawa ng mga pagbabago sa kanyang pagtuturo at sa sarili. Bukod dito, malalaman ng guro ang mga kahinaang dapat lapatan ng lunas gayundin ang mga kalakasang dapat pang paunlarin sa mga mag-aaral. Idinagdag pa na nakatutulong ang pagtataya sa pagkatuto at pagiging bihasa ng mga mag-aaral sa pangalawang wika sa pamamagitan ng paglikha ng positibong pananaw sa kanila.

Ang mga nabanggit ang nag-udyok sa mga mananaliksik upang pag-aralan ang kakayahang panggramatika sa Filipino ng mga mag-aaral sa University of the Cordilleras. Nilayon ng mga mananaliksik na tukuyin ang antas ng kakayahang panggramatika sa Filipino ng mga mag-aaral; makilala ang pagkakaiba ng kakayahang panggramatika sa mga bahagi ng panalita; at, panghuli, maihambing ang kakayahang panggramatika ng mga mag-aaral ayon sa kanilang unang wika at kolehiyong kinabibilangan.

Sa pamamagitan ng pag-aaral na ito, mabibigyan ang mga mananaliksik at mga guro ng Filipino ng mga kaalaman tungkol sa kasanayang panggramatika ng mga mag-aaral lalo na ang mga dapat bigyang-diin sa pagtuturo. Magagabayan ang mga guro sa kung ano-ano ang mga magiging layunin sa pagtuturo ng wika, mga angkop na gawaing lalong lilinang sa kakayahang panggramatika at komunikatibo ng mga mag-aaral pati na ang mga angkop na kagamitan sa pagtuturo upang mapataas ang kasanayang pangwika ng mga mag-aaral.

Makatutulong din ang pag-aaral sa mga mag-aaral dahil mababatid nila ang mga kahinaan na dapat pa nilang pagsikapang pag-aralan gayundin ang mga kalakasan na dapat nilang pag-ibayuhin.

### Pamaraan ng Pag-aaral

Ang pag-aaral na ito ay isang palarawang pag-aaral. Sa pamamagitan ng mga iskor ng mga respondente sa pagsusulit sa gramatika, inilarawan ang



kakayahang panggramatika nila sa Filipino. Inilarawan din ang pagkakaiba ng kakayahang panggramatika sa iba't ibang bahagi ng panalita at pagkakaiba ng kakayahang panggramatika ayon sa kolehiyong kinabibilangan at unang wika.

Naging respondente ang mga mag-aaral na nasa unang taon ng University of the Cordilleras na kumuha ng mga asignaturang Filipino at nakapagpatala sa Ikatlong termino, Taong Aralang 2009-2010. Kasama rito ang mga mag-aaral na mula sa College of Accountancy (COA), College of Arts and Sciences (CAS), College of Business Administration (CBA), College of Criminal Justice Education (CCJE), College of Engineering and Architecture (CEA), College of Information Technology and Computing Science (CITCS), College of Teacher Education (CTE), at College of Hotel and Restaurant Management and Tourism (CHRMT). Hindi kasama ang College of Nursing dahil hindi ito kabilang sa programang traymestre at maaga silang nagbabakasyon kaya maaaring magkaroon ng suliranin sa pangangalap ng datos mula sa kanilang kolehiyo.

Ginamit na sampling teknik ang *purposive* at *random sampling*. Pinili ang dalawang *block section* mula sa bawat kolehiyo at mula rito ay bumunot ng tig-30 respondente na isinama sa pag-aaral. Napagkasunduan ang bilang na 30 dahil bagamat 40 estudyante ang karaniwang laki ng bawat klase, baka may mga hihinto sa kalagitnaan ng termino kung kailan naibigay ang pagsusulit sa mga mag-aaral. May kabuuang 240 mag-aaral ang naging respondente sa pananaliksik na ito.

Ginamit na instrumento ang pagsusulit sa gramatika na nakapokus sa mga bahagi ng panalita. Naging batayan ang pagpapangkat ni Santiago (1986) sa mga bahagi ng panalita, ang mga salitang pangnilalaman at mga salitang pangkayarian. Kabilang sa mga pangnilalaman ang mga pangngalan, panghalip, pandiwa, pang-uri, at pang-abay. Sa kabilang dako, kabilang sa mga pangkayarian ang mga panandang pantukoy, pangawil, at pang-ukol gayundin ang mga pang-ugnay na pangatnig at pang-angkop.

Nakatuon lamang sa morpolohiya, sintaktika, at semantika ng Filipino ang pag-aaral. Hindi kasama ang kakayahan ng mga mag-aaral sa ponolohiya ng Filipino dahil ang pag-aaral ay hindi sa aspektong pagsasalita ng mga mag-aaral.

Ang mga mananaliksik ay gumawa muna ng talaan ng ispisipikasyon bago ang pagbuo ng pagsusulit upang matukoy ang mga aspekto ng bawat bahagi ng panalita na dapat pagtuunan ng pansin gayundin ang bilang ng aytem at bahagdang inilaan para sa bawat bahagi ng panalita. Bumuo sila ng kabuuang bilang na 130 tanong tungkol sa gramatika. Lahat ng aytem ay kabilang sa pagsusulit na pagpipili-pili o *multiple choice*.

Bago ang pagbibigay ng pagsusulit sa mga respondente, idinaan muna ito sa pagsusuri ng mga aytem (*item analysis*) upang matiyak na balido ang mga aytem. Gamit ang *test-retest*, tiniyak ding mapanghahawakan ang



pagsusulit bago ang aktwal na pagpapasagot sa mga respondente. Lumabas na napakataas ang *reliability* nito sa iskor na 0.887.

Ang mga mananaliksik mismo ang nagbigay ng pagsusulit sa tulong ng iba pang guro ng Filipino pagkatapos na humingi ng pahintulot sa dekana ng Kolehiyo ng Edukasyong Pangguro. Naglaan ng isang oras at dalawampung minuto para sa pagsagot ng mga mag-aaral sa 130 na aytem.

Sa pagtukoy sa antas ng kakayahang panggramatika ng mga mag-aaral, ginamit ang pagkuha ng *mean* at pagraranggo upang matukoy ang kakayahan nila sa mga aspekto ng bawat bahagi ng panalita. Ginamit ang 5-point scale na may deskripsyong napakababa, mababa, katamtaman, mataas, at napakataas. Ginamit naman ang *F-test* at *Post-Hoc Analysis* upang makita kung may makabuluhang pagkakaiba ang kakayahang panggramatika ng mga mag-aaral sa mga salitang pangnilalaman habang *T-test* ang ginamit upang makita kung may makabuluhang pagkakaiba ang antas ng kakayahan sa mga salitang pangkayarian. Ang *F-test* naman ang ginamit upang makita kung may kaugnayan ang mga salik na kolehiyo at unang wika sa kakayahang panggramatika ng mga mag-aaral. Sinukat ang antas ng kabuluhang pagkakaiba sa .05 *level of significance*.

## Resulta at Pagtalakay

Mababasa sa bahaging ito ang presentasyon, analisis, at interpretasyon ng mga datos upang masagot ang mga suliranin ng pag-aaral; kabilang dito ang antas ng kakayahang panggramatika ng mga mag-aaral ng Filipino sa University of the Cordilleras; ang pagkakaiba ng kakayahang panggramatika ng mga mag-aaral sa mga bahagi ng panalita; at panghuli, ang pagkakaiba ng antas ng kasanayang panggramatika ng mga mag-aaral ayon sa kolehiyo at unang wika.

### Antas ng Kakayahang Panggramatika sa Filipino ng mga Mag-aaral

Pinangkat ang mga bahagi ng panalita sa dalawa ayon sa pagpapangkat ni Santiago (1985). Una ang mga salitang pangnilalaman at pangalawa ang mga salitang pangkayarian. Ang mga salitang pangnilalaman ayon kay Santiago ay tumutukoy sa mga nominal (pangngalan at panghalip), mga pandiwa at mga panuring (pang-uri at pang-abay). Ang mga ito ang nagtataglay ng pangunahing ideya ng pahayag kaya tinatawag na pangnilalaman. Kabilang naman sa mga salitang pangkayarian ang mga pang-ugnay (pangatnig at pang-angkop) at mga pananda (pangawil, pantukoy, at pang-ukol).



## Kakayahan ng mga Mag-aaral sa mga Salitang Pangnilalaman

Makikita sa Talahanayan 1 ang kakayahan ng mga mag-aaral sa mga salitang pangnilalaman. Makikita rito na pinakamataas ang over-all mean ng mga mag-aaral sa panghalip (3.76) na sinusundan ng pang-uri (3.29), pangngalan (2.89), pandiwa (2.76), at pang-abay (2.41) ayon sa pagkakasunod-sunod.

Talahanayan 1. Kakayahan ng mga mag-aaral sa mga salitang pangnilalaman

Mga Kategoriya	Over-all Mean	Interpretasyon	Ranggo
Kakayahan sa panghalip	3.76	Mataas	1
Kakayahan sa pang-uri	3.29	Mataas	2
Kakayahan sa pangngalan	2.89	Katamtaman	3
Kakayahan sa pandiwa	2.76	Katamtaman	4
Kakayahan sa pang-abay	2.41	Katamtaman	5

Ipinahihiwatig ng resulta na mas mataas ang kakayahan ng mga mag-aaral sa gamit ng mga panghalip at pang-uri na may antas na mataas kumpara sa pangngalan, pandiwa, at pang-abay na pawang nagkamit lamang ng antas na katamtaman.

Napakahalaga ang ginagampanan ng mga panghalip sa pagpapahayag dahil madalas itong gamitin bilang pamalit sa mga pangngalan. Ang madalas na paggamit nito sa pahayag ang isang nakikitang dahilan kaya mataas ang kakayahan ng mga mag-aaral dito. Bukod pa sa nabanggit, isa ang panghalip sa mga nabibigyan ng pokus sa pagtuturo ng wika simula pa sa elementarya.

Ang resulta ng pag-aaral ay sumasalungat sa natuklasan ni Lartec (2002) sa kanyang pag-aaral na nanguna ang panghalip sa mga kamalian ng mga mag-aaral at nangangahulugang walang gaanong kahusayan ang mga ito sa mga panghalip.

Salungat rin ang resulta sa pag-aaral ni Tibagacay (2001). Kanyang natuklasan na pumangalawa sa ranggo ng mga kamalian sa sintaktika ang mga kamalian sa panghalip na nangangahulugang hindi mataas ang kakayahan ng mga mag-aaral sa paggamit ng mga panghalip sa pagpapahayag.

Kung pagbabatayan ang *over-all mean* na 3.29, ang mga mag-aaral ay nagtamo rin ng mataas na iskor sa pang-uri. Nagpapahiwatig lamang ang resulta na may kasanayan ang mga mag-aaral sa pang-uri. Madalas gamitin ang pang-uri sa pagpapahayag lalo na pagsasalaysay at paglalarawan kaya't lalong nasasanay ang mga mag-aaral sa paggamit ng mga pang-uri. Kapag nasasanay ang mga mag-aaral sa paggamit nito, nadaragdagan ang kanilang kaalaman dito upang masuri rin ang pagkagamit nito sa pasulat na anyo.

May kaugnayan ito sa pahayag nina Canale at Swain (1980) na kailangang magtaglay ang mga mag-aaral ng kaalaman sa kayarian ng salita at





pangungusap upang maipahayag ang kahulugan nito. Dapat nilang maunawaan kung paano nabubuo ang pangungusap sa pamamagitan ng pagsasama-sama ng mga salita.

Ayon kay Maglaya (2003), sa pagtuturo ng wika gaya ng Filipino mula elementarya hanggang sa kolehiyo, pangunahing layunin nito ang paglinang sa kakayahan ng mga mag-aaral na magamit ang wika sa lalong maayos, masining, malikhain, makabuluhan, mabisa, at masaklaw na paraan, pasulat man o pasalita.

Ang kabuuhanang resulta sa kakayahan ng mga mag-aaral sa pang-uri ay sumang-ayon sa natuklasan ni Epistola (2003) na nagsasabing kakaunti ang kamalian ng mga mag-aaral sa pang-uri. Nangangahulugang may taglay na kaalaman din ang kaniyang mga naging respondente sa tamang paggamit ng pang-uri.

Lumabas din sa pag-aaral ni Tibagacay (2001) na panghuli sa ranggo ng mga kamalian ang mga kamalian ng mga mag-aaral sa pang-uri.

Kapansin-pansin naman ang katamtamang iskor ng mga mag-aaral sa pangngalan. Masasabing may kahusayan bagamat hindi mataas ang kakayahan ng mga mag-aaral dito. Ang resulta ay sumasang-ayon sa natuklasan ni Lartec (2004) na ang mga gurong mag-aaral ay hindi gaanong nagkakamali sa paggamit ng pangngalan sa kanilang pagpapahayag na nangangahulugang may katamtaman silang kasanayan sa paggamit nito.

Salungat naman ito sa resulta ng mga pag-aaral nina Taguba (1987), Tibagacay (2001), Hufana at Minong (1983) at Lartec (2002); kung saan, natuklasang may kahinaan sa pangngalan ang mga mag-aaral dahil kabilang ito sa mga nanguna sa ranggo ng mga kamalian nila sa pagpapahayag.

Katamtaman din ang kakayahan ng mga mag-aaral sa pandiwa at pang-abay na nasa pang-apat at panlimang ranggo. Indikasyon ito na medyo nahirapan ang mga mag-aaral sa pag-unawa ng mga tuntunin sa gamit ng mga pandiwa at pang-abay kaya kailangan pa nila ng karagdang pagsasanay. Nahirapan ang mga respondente sa mga aytem hinggil sa pandiwa dahil sadyang mahirap na paksa ito para sa mga mag-aaral lalo na ang tungkol sa pokus at kaganapan ng pandiwa.

Ang resulta ay sumasang-ayon sa pag-aaral nina Hufana (1982), Hufana at Minong (1983), Taguba (1987), at Lartec (2002). Sa naunang tatlong pag-aaral, nanguna ang mga kamalian sa pandiwa sa mga kamaliang leksikal habang pumangalawa naman sa pag-aaral ni Lartec. Bagamat Ingles ang tuon ng naunang tatlong pag-aaral, ipinapakita pa rin na nahihirapan ang mga mag-aaral sa bahaging ito ng panalita.

Ang naging resulta ng pagsusulit sa pang-abay ay sinasang-ayon naman ng natuklasan ni Tibagacay (2001) kung saan ay nanguna ang mga kamalian sa



pang-abay ng mga kadete sa Philippine Military Academy. Ibig sabihin na may kahinaan sila sa paggamit ng mga pang-abay sa pagpapahayag.

Salungat naman ang resulta sa natuklasan ni Epistola (2000) sa kanyang pagsusuri ng mga kamalian sa pagsulat ng mga mag-aaral din ng Baguio Colleges Foundation. Lumabas sa pag-aaral na pinakamababa ang bilang ng mga kamalian sa pang-abay sa ilalim ng mga kamaliang leksikal. Nangangahulugang may kahusayan ang kanyang mga respondente sa paggamit ng mga pang-abay sa pagsulat.

### **Kakayahan ng mga Mag-aaral sa mga Salitang Pangkayarian**

Makikita sa Talahanayan 2 ang antas ng kakayahan ng mga mag-aaral sa mga salitang pangkayarian na kinabibilangan ng mga pang-ugnay (pangatnig at pang-angkop) at mga pananda (pantukoy, pang-ukol, at pangawil). Gaya ng ipinakilala ng talahanayan, mas mataas ang kakayahan ng mga mag-aaral sa mga pang-ugnay kaysa sa mga pananda.

**Talahanayan 2. Antas ng kakayahan ng mga mag-aaral sa mga salitang**

Mga Kategoriya	Over-all Mean	Interpretasyon	Ranggo
Kakayahan sa pang-ugnay	2.80	Katamtaman	1
Kakayahan sa pananda	2.48	Katamtaman	2

Kung pagbabatayan ang naging resulta, masasabing hindi pa gaanong nalinang ang kakayahan ng mga mag-aaral sa paggamit ng mga pang-ugnay dahil sa antas nitong katamtaman. Bahagyang nahihirapan pa sila sa gamit ng mga ito.

Tumutugma ang resultang ito sa natuklasan ni Lartec (2004) na pumapangalawa sa karaniwang kamalian ng mga gurong mag-aaral sa isinulat nilang talaarawan ang mga koordinasyon o salitang nag-uugnay ng salita, parirala at sugnay. May kinalaman ito sa paggamit ng mga pang-ugnay dahil ayon kay Santiago (1985), ang mga pang-ugnay ay nagpapakita ng relasyon ng isang salita o parirala sa iba pang salita o parirala sa loob ng pangungusap.

Natuklasan naman ni Taguba (1987) sa kanyang pag-aaral na ang mga mag-aaral ay nagkakamali sa paggamit ng mga pangatnig sa kanilang pagsulat. Ganito rin ang resulta ng pag-aaral ni Epistola (2000) na kung saan ang mga mag-aaral ay may pagkakamali sa paggamit ng mga pang-ukol at pang-angkop.

Ipinapakita ng mga nabanggit na pag-aaral at ng pag-aaral na ito na ang mga mag-aaral ay nangangailangan pa ng karagdagang pagsasanay sa tamang paggamit ng mga pang-ugnay.

Nahihirapan din ang mga mag-aaral sa gamit ng mga pananda na



kinabibilangan ng mga pantukoy, pang-ukol, at pangawil. Umaayon ang resulta ng pananaliksik na ito sa resulta ng pagaaral ni Lartec (2004). Nanguna sa ranggo ng mga kamalian sa gramatika sa pagsulat ng talaarawan ang kamalian sa marker at karamihan dito ang paggamit sa panandang “ay.”

Ang mga natuklasan ay nagpapatunay na kulang ang kakayahang ng mga mag-aaral sa gamit ng mga pananda o marker kaya dapat pang bigyang-diin ang mga ito ng mga guro sa kanilang pagtuturo.

Sa kabuuan, kung titingnan ang kakayahan ng mga mag-aaral sa mga bahagi ng panalita, lumalabas na mataas ang kakayahan ng mga mag-aaral sa mga panghalip at pang-uri habang katamtaman naman sa pangngalan, pandiwa, pang-abay, pang-ugnay, at pananda. Hindi pa lubusang nalinang ang kakayahang panggramatika ng mga mag-aaral na nagpapahiwatig na dapat pang bigyang diin ang gramatika sa pagtuturo ng wika. Kailangan pa nila ang mga pagsasanay upang maging bihasa sila sa mga tuntunin ng wikang Filipino sa pasalita at pasulat na pagpapahayag.

### **Pagkakaiba ng Kakayahang Panggramatika sa Iba't Ibang Bahagi ng Panalita**

Isang layunin ng pag-aaral na ito ang pagtukoy kung may makabuluhang pagkakaiba ang kakayahang panggramatika ng mga mag-aaral sa iba't ibang bahagi ng panalita. Makikita sa bahaging ito ang pagkakaiba ng kakayahang panggramatika sa mga salitang pangnilalaman at sa mga salitang pangkayarian.

### **Pagkakaiba ng Kakayahang Panggramatika sa mga Salitang Pangnilalaman**

Matutunghayan sa Talahanayan 3 ang pagkakaiba ng antas ng kakayahan ng mga mag-aaral sa mga salitang pangnilalaman. Mapapansing mataas ang antas ng kakayahan ng mga mag-aaral sa pangngalan at panghalip na may *mean score* na 3.76 at 3.29 samantalang katamtaman sa pangngalan (2.89), pandiwa (2.78), at pang-abay (2.41). Ito ay nagpapakita na mas madali para sa mga mag-aaral na unawain ang mga tuntunin at tamang paggamit ng mga panghalip at pang-uri kumpara sa iba pang salitang pangnilalaman.

Batay sa lumabas na resulta sa *Post-Hoc Analysis*, may *significant* na pagkakaiba ang antas ng kakayahan ng mga mag-aaral sa pangngalan at panghalip dahil sa natuos na *mean difference* na 0.87 at *p-value* na .000 na mas mababa sa .05 *level of significance*. Nangangahulugan lamang na higit na nauunawaan ng mga mag-aaral ang panghalip dahil sa mas mataas na *mean* na 3.76 kumpara sa *mean* na 2.89 ng pangngalan. Ito ay dahil sa mas madaling makilala ang mga panghalip sa pangungusap kaysa sa pangngalan na maaring maimali sa iba pang uri ng salitang pangnilalaman.



Sa pagsusuring estadistika, mapapansin ding may significant na pagkakaiba ang antas ng kakayahan sa pagitan ng pangngalan at pang-uri dahil sa natuos na *mean difference* na 0.40 at *significant level* na .000. Ipinapakita rito na mas mataas ang antas ng kakayahan ng mga mag-aaral sa pang-uri dahil sa natamong *mean* na 3.29 kaysa sa *mean* na 2.89 ng pangngalan.

Talahanayan 3. Pagkakaiba ng kakayahang panggramatika ng mga mag-aaral sa mga salitang pangnilalaman

Antas ng Kakayahan	Pangngalan		Panghalip		Pandiwa		Pang-uri		Pang-abay	
	f	%	f	%	f	%	f	%	f	%
Very high (4.00-5.00)	9	3.75	111	46.25	4	1.67	53	22.08	11	4.58
High (3.00-3.99)	112	46.67	113	47.08	112	46.67	119	49.58	54	22.50
Average (2.00-2.99)	108	45.00	9	3.75	99	41.25	56	23.33	120	50.00
Low (1.00-1.99)	10	4.17	7	2.92	25	10.42	9	3.75	48	20.00
Very low (0.00-0.99)	1	0.42	0	0.00	0	0.00	3	1.25	7	2.92
Total	240	100	240	100	240	100	240	100	240	100
Mean	2.89-A		3.76-H		2.78-A		3.29-H		2.41-A	

F= 126.737 - Significant; sig.=.000

POST-HOC ANALYSIS (LSD)

Comparisons	Mean Difference	Sig.	Remarks
Pangngalan vs. Panghalip	0.87	.000	Significant
Pangngalan vs. Pang-uri	0.40	.000	Significant
Pangngalan vs. Pang-abay	0.48	.000	Significant
Panghalip vs. Pandiwa	0.98	.000	Significant
Panghalip vs. Pang-abay	0.65	.000	Significant
Pandiwa vs. Pang-uri	0.51	.000	Significant
Pandiwa vs. Pang-abay	0.36	.000	Significant
Pang-uri vs. Pang-abay	0.88	.000	Significant

May makabuluhan pa ring pagkakaiba ang antas ng kakayahan sa pagitan ng pangngalan at pang-abay dahil sa natuos na *mean difference* na 0.48 at *significant level* na .000. Ipinapakita lamang dito na bahagyang nadadalian ang mga mag-aaral sa pangngalan kaysa sa pang-abay dahil sa natamong *mean scores* na 2.89 at 2.41.

Lahat ng iba pang salitang pangnilalaman ay may *significant* na pagkakaiba sa .000 *level of significance* dahil sa mga lumabas na *mean differences* gaya ng sumusunod: panghalip at pandiwa (0.98), panghalip at pang-abay (0.65), pandiwa at pang-uri (0.51), pandiwa at pang-abay (0.36), at panghuli ang pang-uri, at pang-abay na may *mean difference* na 0.88.

Kung pagbabatayan ang resulta ng estadistika, ang *F-value* na 126.737 na mas mataas sa *significant level* na .000 ay nagpapakita na may makabuluhang pagkakaiba ang antas ng kakayahan ng mga mag-aaral sa mga salitang pangnilalaman. Samakatuwid, tinatanggap ang haypotesis na may significant



na pagkakaiba ang antas ng kakayahan ng mga mag-aaral sa iba't ibang bahagi ng panalita.

Magkakaiba ang mga tuntuning sinusunod sa iba't ibang bahagi ng panalita kaya magkakaiba rin ang antas ng kakayahan ng mga mag-aaral sa pag-intindi at paggamit ng mga ito. Bilang karagdagan, ang antas ng eksposyur sa paggamit at pag-aaral ng mga bahagi ng panalita ay magkakaiba rin kaya ito ang isang nakikitang dahilan kaya makabuluhan ang pagkakaiba ng kakayahan ng mga mag-aaral sa mga salitang pangnilalaman.

Ang resulta ay may kaugnayan sa teorya ng mga istrukturalista na dapat nakatuon ang pagtuturo ng wika sa katumpakan ng anyo ng wika at kahusayan sa mga tuntunin. Naniniwala sila na ang kaalaman ng mga mag-aaral sa katumpakan ng gramatika at mga tuntunin nito ay mahalagang salik sa pagpapahayag.

### Pagkakaiba ng Kakayahang Panggramatika sa mga Salitang Pangkayarian

Ipinakikita sa Talahanayan 4 ang pagkakaiba ng kakayahang panggramatika ng mga mag-aaral sa mga salitang pangkayarian. Makikita sa talahanayan na bahagya lamang na nagkakaiba ang iskor ng mga mag-aaral sa pang-ugnay at pananda dahil sa *mean scores* na 2.80 at 2.47.

Batay sa lumabas na estadistikang resulta ng *T-test* na 4.009 sa *level of significance* na .000, masasabing may makabuluhang pagkakaiba ang antas ng kakayahan ng mga mag-aaral sa pang-ugnay at pananda. Samakatuwid, tinatanggap pa rin ang haypotesis na may makabuluhang pagkakaiba ang antas ng kakayahan ng mga mag-aaral sa iba't ibang bahagi ng panalita kabilang na ang pang-ugnay at pananda.

Talahanayan 4. Pagkakaiba ng kakayahang panggramatika ng mga mag-aaral sa mga salitang pangkayarian

Antas ng Kakayahan	Pang-ugnay		Pananda	
	F	%	F	%
Very high (4.00-5.00)	26	10.83	22	9.17
High (3.00-3.99)	101	42.08	74	30.83
Average (2.00-2.99)	85	35.42	91	37.92
Low (1.00-1.99)	24	10.00	43	17.92
Very low (0.00-0.99)	4	1.67	10	4.17
Total	240	100.00	240	100.00
Mean	2.80-A		2.47-A	
F=4.009 - Significant; Sig. = .000				

Mas nadalian ang mga mag-aaral sa gamit ng mga pang-ugnay na kinabibilangan ng mga pang-angkop, pangatnig at pang-ukol kaysa sa mga pananda na kinabibilangan naman ng mga pantukoy at pangawing.



Nangangahulugan lamang na kulang pa ang kanilang mga kaalaman sa mga tuntunin ng paggamit ng mga pananda. Kung ibabatay naman sa *mean*, parehong hindi mataas ang kanilang mga iskor sa mga salitang pangkayarian kaya masasabing nahirapan sila rito.

Madalas na nalilito ang mga mag-aaral sa gamit ng pantukoy na sina at pang-ukol na nina. Pinapalitan nila ang “sina” ng “sila” gaya sa pangungusap na “Sila Maria ay pumunta sa ilog.” Kung susuriin, labag ito sa tamang tuntunin dahil ang pahayag dapat ay “Sina Maria ay pumunta sa ilog.” Gayundin, ang pang-ukol na “nina” ay pinapalitan ng “nila” gaya sa pahayag na “Malaki ang bahay nila Ana.” na dapat sana ay “Malaki ang bahay nina Ana.” Madalas na marinig ang ganitong kamalian pati sa telebisyon at radyo kaya nagagaya ng mga tagapakinig pati ang mga kamalian. Ang mga nabanggit ay mahalagang bigyang-diin sa pagtuturo ng mga guro ng wika.

Sa kabuuan, naging makabuluhang ang pagkakaiba ng antas ng kakayahan ng mga mag-aaral sa bahagi ng panalita ayon sa pangnilalaman at pangkayarian. Nagpapahiwatig lamang ito na nagkakaiba ang kanilang performans sa mga bahagi ng panalita.

### Pagkakaiba ng Kakayahang Panggramatika ng mga Mag-aaral Ayon sa Kolehiyo at Unang Wika

Sinikap na tingnan kung may makabuluhang pagkakaiba ang kakayahang panggramatika ng mga mag-aaral ayon sa kanilang kolehiyong kinabibilangan at unang wika.

### Pagkakaiba ng Kakayahan sa mga Salitang Pangnilalaman Ayon sa Kolehiyong Kinabibilangan

Sa University of the Cordilleras, ang College of Accountancy (COA) lamang ang may sinusunod na minimum average. Sa ginanap na pag-aaral na pinamagatang “Antas ng Pag-unawa sa Pagbasa ng mga Mag-aaral ng Filipino sa University of the Cordilleras,” lumabas na may makabuluhang pagkakaiba ang antas ng pag-unawa ng mga mag-aaral ayon sa kolehiyo. Ang mga nabanggit ang naging dahilan kaya nagkaroon ng interes ang mga mananaliksik na isama ang salik na ito sa pag-aaral.

Talahanayan 5. Kakayahan ng mga mag-aaral sa mga salitang pangnilalaman ayon sa kolehiyo

Kategorya	CHRMT	CITCS	CAS	COA	CBA	CEA	CTE	CCJE	F	Sig.
Pangngalan	15.87	13.97	14.80	15.97	13.53	14.00	14.40	13.07	3.929*	.000
Panghalip	17.33	14.50	15.70	16.37	14.50	14.33	14.17	13.30	8.499*	.000
Pandiwa	13.87	10.23	11.07	2.13	10.37	11.40	10.43	9.33	11.752*	.000
Pang-uri	20.33	14.97	17.37	18.43	15.43	15.77	15.30	14.00	12.008*	.000



Ipinakikita sa Talahanayan 5 na pawang makabuluhan ang pagkakaiba ng antas ng kakayahan ng mga mag-aaral sa mga salitang pangnilalaman ayon sa kolehiyo batay sa resulta ng *F-test* na 3.929, 8.499, 11.752, 12.008, at 7.651 sa .000 *level of significance* na mas mababa kaysa sa .05 *level of significance*. Nangangahulugan ito na ang kolehiyong kinabibilangan ng mga mag-aaral ay isang salik na maaaring batayan sa pagtataya sa kakayahan nila sa mga salitang pangnilalaman.

Mapapansing pinakamataas ang nakuhang iskor ng mga mag-aaral mula sa College of Accountancy pagdating sa pangngalan. Sa kabilang dako, pinakamababa naman ang iskor ng mga mag-aaral na mula sa College of Criminal Justice Education.

Ang pag-aaral ay sumang-ayon sa naging resulta ng pag-aaral nina Lartec (2009). Lumabas sa kanilang pag-aaral na may makabuluhang pagkakaiba ang antas ng pag-unawa sa pagbasa ng mga mag-aaral ayon kolehiyong kanilang kinabibilangan. Bagamat sa pagbasa ang tuon ng naunang pag-aaral, may kinalaman pa rin ang kanilang natuklasan sa pag-aaral na ito dahil parehong wikang Filipino ang tuon.

Sa panig ng panghalip, konsistent na pinakamababa ang nakuha ng CCJE at mataas pa rin ang COA bagamat naungusan sila ng CHRMT sa bahaging ito ng panalita. Sa panig ng CHRMT, konsistent ding mataas ang kanilang iskor sa pangngalan at panghalip dahil pangalawa sila sa pangngalan at nauna sa panghalip. Nagpapatunay ito na ang mga mag-aaral din sa naturang kolehiyo ay may mataas na kakayahan pagdating sa mga pangngalan at panghalip gaya ng mga mag-aaral mula sa COA.

Parehong nominal ang pangngalan at panghalip kaya makikita sa estadistikang pagsusuri na konsistent ang mga kolehiyong may matataas na iskor at mabababang iskor sa mga bahaging ito ng panalita. Nagpapahiwatig din ang resulta ng kahalagahan ng pagkakaroon ng intensibong pagsasanay para sa mga mag-aaral ng mga kolehiyong nakakuha ng mabababang iskor sa mga bahaging ito ng panalita gaya ng CCJE upang matulungan sila sa kanilang mga kahinaan sa mga nabanggit na bahagi ng panalita.

Sa pandiwa naman, kung ibabatay sa resulta, masasabing nahirapan ang mga mag-aaral sa pokus ng pandiwa anuman ang kolehiyong kanilang kinabibilangan. Ito ang kategorya ng pandiwa na pinakamahirap para sa mga mag-aaral. Nagpapatunay lamang ito na kulang ang kahusayan ng mga mag-aaral sa pagsusuri ng ugnayan ng mga salita sa loob ng pangungusap kaya hirap silang matukoy ang pokus ng pandiwa. Tumutukoy ang pokus sa ugnayan ng pandiwa at paksa ng pangungusap at matutukoy ito sa pamamagitan din ng pagsusuri sa mga panlaping ginamit sa pandiwa. May pitong pokus ng pandiwa sa Filipino na kinabibilangan ng aktor pokus, gol pokus, lokatib





pokus, instrumental pokus, kosatib pokus, benepaktib pokus, at direksiyunal pokus.

Nangunguna pa rin sa gamit ng pandiwa ang CHRMT at COA habang pinakamababa pa rin ang CCJE. Pinatutunayan lamang nito na mas matatas sa wikang Filipino ang mga mag-aaral ng CHRMT at COA kumpara sa ibang kolehiyo.

Sa gamit ng mga pang-uri, mapapapansin pa ring nangunguna ang CHRMT sa pang-uri. Hindi nakapagtataka ang resultang ito dahil nakatuon ang kanilang kurso sa paglalarawan ng mga mahahalagang lugar at sa pagpapakilala ng mga pinakamagandang resipe sa mga tagapakinig upang mahikayat sila sa kanilang paraan ng presentasyon. Dahil dito, nasasanay ang mga mag-aaral sa kolehiyo ng CHRMT na mangalap at pumili ng mga salitang naglalarawan o mga pang-uri upang magtagumpay sa kanilang gawain. Sumunod pa rin ang COA sa ranggo na may mataas ding *mean score*.

Gaya ng natuklasan sa mga naunang datos, nangunguna pa rin sa pang-uri ang CHRMT at COA. Nagpapatunay pa rin ito sa mga unang nabanggit na ang mga mag-aaral sa dalawang kolehiyo ay mas matatas sa Filipino kaysa sa mga galing sa ibang kolehiyo.

Pagdating naman sa gamit ng mga pang-abay, nangunguna pa rin ang COA at panghuli ang CCJE sa pagsusulit tungkol dito. Umaayon pa rin ito sa mga naunang bahagi ng panalita na ang mga mag-aaral ng COA ang pinakamagagaling pagdating sa gramatika ng Filipino at pinakamahihina pa rin ang mga mag-aaral ng CCJE.

Pinakamagagaling sa Filipino, sa larangan man ng pagbasa at gramatika ang mga mag-aaral ng COA dahil istrikto ang COA sa pagtanggap ng mga mag-aaral. Ang mga pumapasok sa naturang kolehiyo ay kailangang may average na 85% pataas at kailangan nilang mapanatili ang average na ito upang hindi sila matanggal sa kanilang kolehiyo. Hindi ito nangyayari sa ibang kolehiyo.

## Pagkakaiba ng Kakayahan sa mga Salitang Pangkayarian ayon sa Kolehiyong Kinabibilangan

Talahanayan 6. Kakayahan ng mga mag-aaral sa mga salitang pangkayarian ayon sa kolehiyong kinabibilangan

Kategorya	CHRMT	CITCS	CAS	COA	CBA	CEA	CTE	CCJE	F	Sig.
Pang-ugnay	8.47	7.27	9.47	10.33	8.50	7.67	8.00	7.60	5.831*	.000
Pananda	4.40	4.97	5.73	6.03	4.97	5.10	4.47	3.90	4.325	.000

\*Significant



Makikita sa Talahanayan 6 na parehong makabuluhan ang pagkakaiba ng kakayahan ng mga mag-aaral sa mga pang-ugnay at mga pananda ayon sa kolehiyong kinabibilangan. Samakatuwid, nakaapekto pa rin ang salik na ito sa mga bahaging ito ng panalita. Pinatunayan ito ng *p-value* na parehong .000 na mas mataas sa .05 *level of significance*.

Pinakamagagaling sa gamit ng pang-ugnay at pananda ang mga mag-aaral ng COA samantalang pinakamahihina pa rin ang mga mag-aaral ng CCJE. Napatunayan pang lalo na mas magagaling sa gramatika at mas matatas sa Filipino ang mga mag-aaral ng COA kumpara sa ibang kolehiyo.

Ang resulta ng pag-aaral ay umayon sa resulta ng pananaliksik nina Lartec (2009). Lumabas din na nakaapekto ang kolehiyo sa performans ng mga mag-aaral sa pagbasa at pinakamataas din ang COA sa antas ng pag-unawa sa pagbasa.

Sa pangkalahatan, makabuluhan ang pagkakaiba ng antas ng kakayahan sa gramatika ng mga mag-aaral na napapabilang sa iba't ibang kolehiyo na pinatunayan ng mga lumabas sa pagsusuring estadistika. Dahil dito, tinatanggap ang haypotesis na may makabuluhang pagkakaiba ang antas ng kakayahang panggramatika ng mga mag-aaral ayon sa kolehiyo.

### Pagkakaiba ng Kakayahan sa mga Salitang Pangnilalaman Ayon sa Unang Wika

Ang mga mag-aaral sa University of the Cordilleras ay nagmula sa iba't ibang panig ng bansa. Marami ring dayuhang mag-aaral sa nabanggit na unibersidad ngunit hindi lamang sila pinakukuha ng mga asignaturang Filipino. Dahil sa pagkakaiba-iba sa lugar na pinagmulan, ang mga mag-aaral sa UC ay may iba-ibang wikang nakagisnan. Sinasabi sa ibang pag-aaral na ang unang wika ng mag-aaral ay nakakaapekto sa pag-aaral ng pangalangang wika. Ito ang dahilan kaya naisama ang baryabol na ito sa pag-aaral.

May anim na pangkat ang mga respondente ayon sa kanilang unang wika: Ibaloi, Ilokano, Kankanaey, Ifugao, Tagalog, at iba pa. Kasama sa iba pa ang ibang wika gaya ng Ingles, Bikolano, at Pangasinan na pinagsama-sama dahil iilan lamang sila.

Talahanayan 7. Kakayahan sa mga salitang pangnilalaman ayon sa unang wika

Kategorya	Ibaloi	Ilokano	Kankanaey	Tagalog	Ifugao	Iba pa	F	Sig.
Pangngalan	12.86	14.27	13.94	15.21	14.64	14.39	1.623	.155
Panghalip	15.71	14.83	14.90	15.09	15.73	15.39	0.405	.845
Pandiwa	10.57	11.08	11.02	11.36	10.36	11.17	0.386	.858
Pang-uri	15.14	16.37	16.23	17.01	16.45	15.83	0.586	.711
Pang-abay	6.86	6.96	6.79	7.78	7.73	7.72	1.455	.206



Makikita sa Talahanayan 7 ang pagkakaiba ng kakayahan ng mga mag-aaral sa mga salitang pangnilalaman ayon sa unang wika. Gaya ng makikita sa talahanayan, hindi makabuluhan ang pagkakaiba ng kakayahan ng mga mag-aaral sa mga bahagi ng panalita na kabilang sa mga salitang pangnilalaman.

Kung titingnan ang resulta ng *overall mean*, pinakamataas ang iskor ng mga Tagalog sa pangngalan. Hindi naman ito nakapagtataka dahil ang Tagalog ang batayan ng wikang pambansa. Bihasa ang mga Tagalog sa gramatika ng Filipino dahil sa wika nila mismo nakabatay ang wikang pambansa.

Ang unang wika ayon kay Benton (1987) ay wikang nakabihasan ng bata sa kanyang pagtuntong sa paaralan. Ipinahihiwatig nito na malaki ang epekto ng unang wika sa pagkatuto ng mag-aaral ng pangalawang wika gaya ng Filipino. Ang epektong ito ng unang wika ay maaaring sanhi ng kadalian o kahirapan ng mag-aaral sa pagkabihasa sa pangalawang wika.

Sa panig na pandiwa, kung pag-uukulan ng pansin ang resulta ng estadistika, mas mataas ang *computed p-value* na .858 kaysa sa *.05 level of significance*. Nangangahulugan itong hindi makabuluhan ang pagkakaiba ng kakayahan ng mga mag-aaral sa pandiwa ayon sa unang wikang kanilang kinabibilangan. Ipinahihiwatig ng resulta na anuman ang wika ng mga mag-aaral, hindi nagkakaiba ang kanilang antas ng kakayahan sa pandiwa. Gaya ng unang nabanggit, pinakamahirap pag-aralan at ituro ang pandiwa dahil sa kalikasan nitong maraming aspekto at maraming mga katangian nitong dapat bigyang pansin sa pag-aaral ng wika lalo na sa pokus ng pandiwa.

Hindi rin makabuluhan ang pagkakaiba ng kakayahan ng mga mag-aaral sa pang-uri dahil mas mataas ang *p-value* na .711 kumpara sa *.05 level of significance*. Nagbibigay ito ng indikasyon na walang kaugnayan ang unang wika ng mga mag-aaral sa kanilang pagganap o antas ng kakayahan sa pang-uri. Tulad ng naunang nabanggit na, bagaman nangunguna sa ranggo ang Tagalog, hindi naman ito gaanong nalalayo sa iba pang mga mag-aaral na may iba't ibang unang wika. Halos pantay-pantay ang kanilang kakayahan sa pang-uri.

Pinatunayan din ng resulta ng pagsusuring estadistika, sa pamamagitan ng *p-value* na .206 na mas mataas kaysa sa *.05 level of significance*, na hindi makabuluhan ang pagkakaiba ng antas ng kakayahan ng mga mag-aaral sa pang-abay ayon sa unang wika.

Gaya ng ipinahihiwatig ng resulta, malaki ang nagagawa ng pagkakaroon ng kaalaman sa wikang pinag-aaralan dahil nakakatulong ito sa pagkakaroon ng mga mag-aaral ng dagdag na kaalaman sa pagpili ng mga salitang gagamitin sa paglalarawan. Hindi madali ang pagpili ng mga salitang gagamiting panlarawan o panuring sa iba pang salita sa loob ng pangungusap dahil nangangailangan ito ng imbak na kaalaman sa maraming mga salita. Sa



kaso ng mga Tagalog, dahil ito ang pinagbatayan ng Filipino na siyang pinag-aaralan, nagkakaroon sila ng bentahe sa pagsuri ng mga salitang ginamit sa pangungusap kumpara sa ibang mga mag-aaral na natututo o nangangalap pa ng mas maraming pang-uri.

### Pagkakaiba ng Kakayahan sa mga Salitang Pangkayarian ayon sa Unang Wika

Talahanayan 8. Kakayahan sa mga salitang pangkayarian ayon sa unang wika

Kategorya	Ibaloi	Ilokano	Kankanaey	Tagalog	Ifugao	Iba pa	F	Sig.
Pang-ugnay	7.43	8.53	8.52	8.34	8.09	8.39	0.313	.905
Pananda	5.29	4.99	4.69	5.10	5.27	4.50	0.561	.730

Makikita sa Talahanayan 8 na walang makabuluhang pagkakaiba sa kakayahan ng mga mag-aaral sa mga salitang pangkayarian ayon sa unang wika. Pinatutunayan ito ng resulta ng estadistika kung saan ang kabuuang *p-value* na .905 ay mas mataas kaysa sa .05 *level of significance*. Nangangahulugan lamang itong walang makabuluhang pagkakaiba sa kakayahan ng mga mag-aaral sa pang-ugnay ayon sa kanilang unang wika.

Ang resulta ay nagpapahiwatig na hindi salik ang unang wika sa kakayahan ng mga mag-aaral sa pananda batay sa kabuuang *p-value* na .730 na mas mataas kaysa sa .05 *level of significance*. Medyo sanay na ang mga mag-aaral sa paggamit ng pananda lalo na't isa ito sa binibigyang pansin upang makilala ang bahagi ng pangungusap. Hinding-hindi mawawala ang pagbibigay-diin sa pananda kung itinuturo ang bahagi ng pangungusap o ang pagtukoy sa paksa o panaguri ng pangungusap kaya ito ang isa sa dahilan kung bakit halos magkakapareho ang antas ng kakayahan ng mga mag-aaral.

### Kongklusyon at Rekomendasyon

Pagkatapos ng masusing pagsusuri sa naging resulta ng pag-aaral, nabuo ang kongklusyong hindi pa ganap na nalilintang ang kakayahang panggramatika sa Filipino ng mga mag-aaral sa University of the Cordilleras batay sa katamtamang iskor nila sa karamihang bahagi ng panalita. Magkakaiba-iba ang antas ng kakayahang panggramatika ng mga mag-aaral sa mga salitang pangnilalaman at mga salitang pangkayarian dahil lumabas na may makabuluhang pagkakaiba ang mga iskor nila sa mga salitang pangnilalaman at mga salitang pangkayarian. Masasabi ring may kaugnayan ang kolehiyong kinabibilangan ng mga mag-aaral sa kanilang kakayahang panggramatika ngunit walang kaugnayan dito ang kanilang unang wika na pinatunayan ng



makabuluhang pagkakaiba ng mga iskor ayon sa kolehiyong kinabibilangan at walang makabuluhang pagkakaiba ayon sa unang wika.

Mula dito, itinatagubilin ng mga mananaliksik na dapat pang paunlarin ang kakayahang panggramatika ng mga mag-aaral sa Filipino tungo sa pagkakaroon nila ng ganap na kakayahang panggramatika at komunikatibo. Magagawa ito sa pamamagitan ng pagbibigay ng mga guro ng marami pang pagsasanay sa mga bahagi ng panalita na mahirap para sa kanila. Ang pagwawasto at pagsasagawa ng incidental teaching sakaling nagkamali ang mga mag-aaral ay malaking tulong upang maiwasto ang kanilang mga kamalian sa gramatika. Mahalaga rin ang matamang pagwawasto ng mga komposisyon upang maitama ang mga kamalian sa gramatika.

Itinatagubilin din ang pagbibigay-diin ng mga guro sa mga bahagi ng panalita na sadyang nahihirapan ang mga mag-aaral gaya ng pandiwa, pang-abay at pananda. Makakatulong din ang pagbibigay ng mga karagdagang kagamitang pampagkatuto gaya ng mga modyul tungkol sa mga bahagi ng panalitang nabanggit.

Dahil may makabuluhang pagkakaiba ang iskor ng mga mag-aaral sa pagsusulit ayon sa kolehiyong kanilang kinabibilangan, dapat na mas pagtuunan ng pansin ang mga kolehiyong nagpakita ng mababang resulta gaya ng CCJE. Makatutulong sa kanila ang pagbibigay ng pansariling modyul at mga iba-ibang gawain na makakalinang sa kanilang kakayahang panggramatika sa Filipino. Hinihikayat din ang paggamit ng iba-ibang pamaraan at teknik sa pagtuturo upang masanay na magpahayag ang mga mag-aaral at nang malinang ang kanilang mga kakayahan sa wika.

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# Breaking the Dichotomy: Combining Geographic Information System (GIS) and Participatory Approach in Identifying Suitable Landfill Sites in La Trinidad, Benguet

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## Abstract

The need for an expansion site for a landfill will be required by La Trinidad since the existing Alno landfill site was projected to be inadequate to address the future waste generation. Landfill site selection is a complex process. The Department of Environment and Natural Resources Administrative Order (DAO) No. 98-50 criteria were adapted, converted to criteria maps, and combined using Geographic Information System (GIS) application, where possible sites were generated. These possible landfill sites were presented during a series of workshops among stakeholders who provided essential and substantial inputs and relaxed the DENR DAO No. 98-50 criteria. The Municipal Solid Waste Management Board (MSWMB) of La Trinidad were the respondents. Using the MSWMB's input, satellite image validation, area capacity screening, and Multi Criteria Evaluation (MCE), a final and feasible landfill site was identified. The study demonstrated the effectiveness of GIS as a decision support tool and the significance of public participation in landfill site selection.

**Keywords:** geographic information system, DENR DAO No. 98-50, landfill site selection, landfill siting criteria, multi-criteria evaluation, NIMBY, participatory approach, RA 9003

## Introduction

Waste management can be regarded as one of the most challenging areas of modern environmental management (Cummins *et al.*, 2001). A problem that has increasingly plagued urbanized society is the need to properly manage and dispose of waste. Urban populations are growing at an increasing rate, and as a result, there is more garbage produced, but less available land for its disposal (Leao *et al.*, 2001). Land supply is decreasing at a rapid rate; thus, proactive planning efforts must be done to establish a viable

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landfill site. Numerous laws were enacted to protect the environment from the negative effects of improper waste disposal. Daneshvar *et al.* (2005) also identified the following factors that contribute to the difficulty of landfill site selection: escalating environmental degradation and awareness, decreased government and municipal funding, extreme political and social opposition, increasing population densities, public health concerns, and less land available for landfill construction.

Landfill site selection is a complex process and it cannot be underestimated especially when the social implications are to be considered. Indeed, Leao *et al.* (2001) appraised that, "the location of waste facilities is an important component of the waste management process. Inappropriate allocation of waste facilities can lead to environmental damages, social and political conflicts and economic inefficiency;" And in relation to this, it was pointed out that, "Landfill site selection is an important step in implementing a waste management program. Proper siting can contribute to a reduction in design, construction, and operating costs, as well as help to minimize environmental impacts" (Qian *et al.*, 2002).

Among the constraints to landfill site selection were the prevalence of Not in my backyard (NIMBY) syndrome, Not in my term of office (NIMTOF) syndrome, budgetary constraints, and the lack of cooperation of the public. These substantial constraints were addressed by the study.

A paper entitled, "Customizing ArcMap Interface to Generate a User-Friendly Landfill Site Selection GIS Tool," written by Daneshvar *et al.* (2005), proved that, "NIMBY phenomenon is an important consideration and restraint to landfill siting. A site may be technically feasible and meet the environmental and engineering criteria, yet may have to be abandoned due to heavy public opposition." Thus, in a landfill site selection for any specific location, it is important that public involvement be considered.

An example of a successful landfill site selection involving public participation was cited in the article Canadian Innovations in Siting Hazardous Waste Management Facilities written by Ballard and Kuhn (1998). In this article, it was justified that, "Innovative siting processes used in the provinces of Alberta and Manitoba offer tangible evidence of the successful application of an innovative siting approach based on the principles of decentralization of decision-making authority and full and meaningful public involvement." The Alberta and Manitoba Hazardous Waste Facility Experience is a lesson that landfill siting efforts must emulate specially the significance of the role of public participation in the landfill site selection.

Numerous methods have been employed to ease the difficulty of landfill site selection. However, not all methods proved to be efficient. Recent



advances in technology led to the proliferation of GIS as a decision support tool in siting critical projects like a landfill. GIS is used in the landfill site selection because of efficiency and timeliness. A GIS-based methodology varies with goal based or what interest must be satisfied. This implies that at a certain degree, each method will be mutually exclusive. Say a stakeholder-based method will be different from an environment-constraint based method. As a new approach, the study will integrate public participation to an environment suitability approach using GIS.

Republic Act No. 9003 (RA 9003) otherwise known as the Ecological Solid Waste Management Act of 2000 prohibited open dump sites and sets a deadline for the conversion of these into sanitary landfills. All open dumps should be closed or converted to controlled dumps by February 16, 2004 and all controlled dumps should be closed by February 16, 2006. However, in spite of this law, only 80 Sanitary Landfill Facilities (SLF) and 382 Controlled Dump Facilities; out of 41,992 barangays, 1,510 municipalities, 118 cities and 71 provinces were established nationwide. The landfill site selection became more crucial with 790 open dumpsites nationwide that need to be closed. This study looked into the effectiveness of GIS as a decision support tool and the integration of public participation to landfill site selection.

According to the La Trinidad Solid Waste Management Plan (LTSWMP) of 2004, "La Trinidad's population is expected to grow from 82,833 in 2005 to 123,046 by 2015. Even assuming a constant per capita waste generated at half a kilo per person per day, this will translate to an increase in total waste generated from 44 to 67 metric tons a day by 2015." For a current population of La Trinidad of about 100,000, it is estimated that waste generation is about 54 metric tons of waste daily. Considering the current solid waste collection system, 34 truckloads of waste are expected daily.

In the light of RA 9003, the Buyagan open dump seized from operation. A landfill site located in Sitio Induyan, Alno, La Trinidad was then developed. Yet only 3.6 hectares of the 10 hectares or about 36% of the lot purchased by the municipality were found to be suitable for a landfill. With reference to the LTSWMP of 2004, the Alno Landfill Site's full capacity can reach only up to three years. It should be noted that the ideal capacity of a landfill site should be at least five years as prescribed by RA 9003 and 10 years as prescribed by the Department of Environment and Natural Resources Department Administrative Order No. 50 (DENR DAO No. 50) series of 1998. Therefore, with the landfill site's limitation in area capacity, it is imperative that La Trinidad must search for a landfill site to sustain future waste disposal.

From the Feasibility Study for Integrated Waste Management and Development in Baguio City, La Trinidad, Itogon, Sablan and Tuba (BLIST) Areas



of the Cordillera Region (1998), a French funded project, an earlier systematic investigation was conducted to locate potential landfill sites within the Urban BLIST. The landfill sites that were identified used a descriptive approach utilizing a set of predetermined criteria. Although the methodology used was appropriate, however, other potential landfill sites might have been overlooked. Also, the methodology employed in the BLIST Solid Waste Management Plan failed to include the salient component of public participation. Given the above plan, this study saw the necessity to combine GIS and public participation in the landfill site selection. Moreover, the study also tested the DENR DAO No. 50 landfill siting criteria to evaluate whether such criteria were applicable or not to landfill site selection. It was one of the main components of the study to appreciate and understand the usefulness of GIS in identifying candidate landfill sites in the holistic landscape of La Trinidad, Benguet.

### Methodology

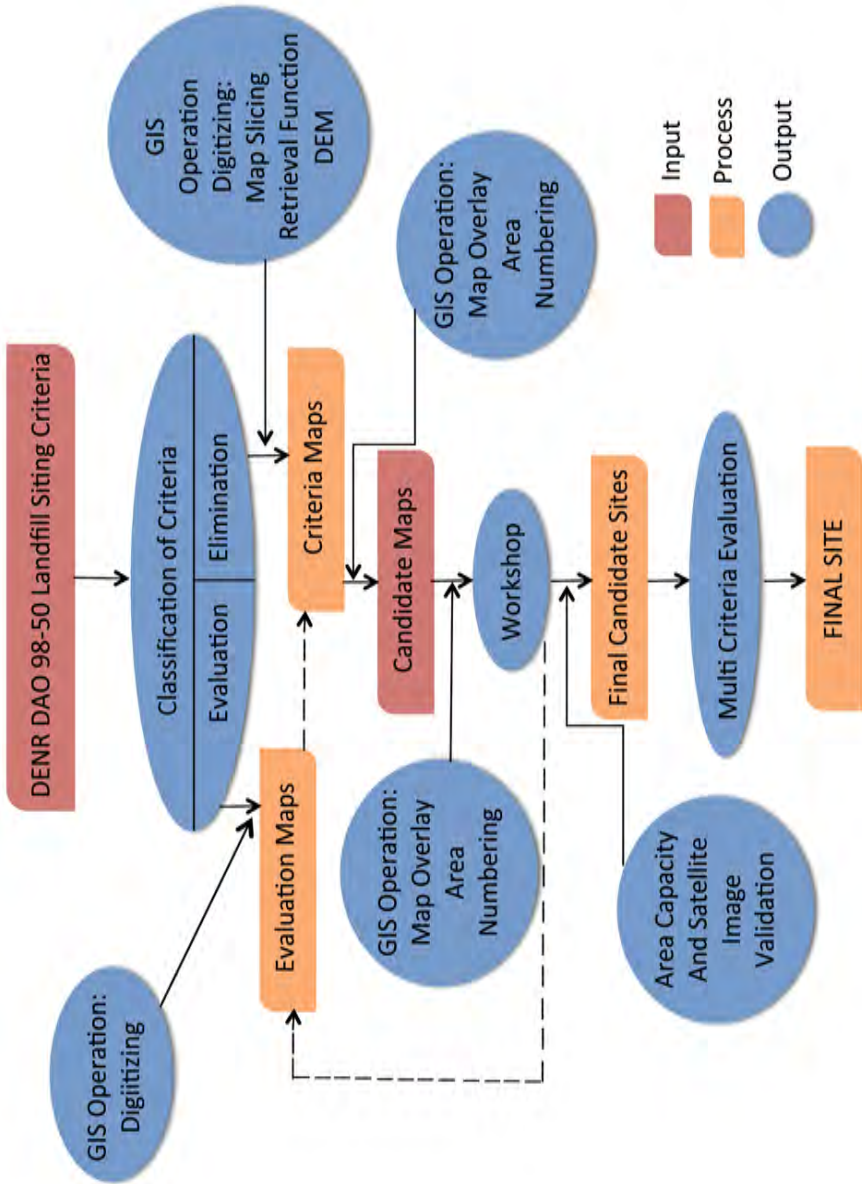
As shown in Figure 1, the landfill siting criteria found in Department of Environment and Natural Resources Department Administrative Order No. 50 Series of 1998 (DENR DAO 98-50) were adapted in the study after comparison with RA 9003 and reconciliation with international studies. These criteria were classified either as elimination or evaluation criteria and were converted to GIS Layers or thematic maps. Elimination criteria followed a strict membership which means that no landfill should be located within certain areas like buffer zones, inappropriate land use, and steep slopes. Evaluation criteria did not follow strict membership instead its role in the landfill site selection was to quantify through scoring the advantages and disadvantages of each candidate site.

Using GIS operation, the elimination for unsuitable landfill areas criteria were translated into criteria maps, and the evaluation criteria were translated into evaluation maps. After performing GIS operations, a list of candidate sites was identified. Elimination criteria were used to obtain candidate sites using the so-called negative mapping. According to Ball (2005), "Negative mapping is a preliminary tool used in the identification of candidate landfill sites. It is used early in the study to eliminate the unsuitable areas in a study area and to identify "positive window areas" for further investigation. This can be done on a small or large scale and makes use of overlay technology to exclude the unsuitable areas."

Evaluation criteria were used to obtain the raw scores of the candidate sites. The raw scores were presented during the workshop. The inputs of the workshop were incorporated in the landfill site selection process by relaxing the criteria and coming up with new candidate sites. The new candidate



Figure 1. Research Design



sites were screened with respect to area capacity and satellite image validation to identify with the final candidate sites. From the workshop, weights were assigned to each evaluation criteria during the conduct of the workshop, and ranked the final candidate sites using the MCE.

Data for GIS came from paper maps, digital maps, and a satellite image from the Local Government Unit (LGU) and other line agencies. Public participation was through the members of the Municipal Solid Waste Management Board (MSWMB) which were referred also as the stakeholders of the study. The researcher used the workshop as a data-gathering tool since the study required that the stakeholders fully understood the process of site selection. To objectively gather reliable data from the participants, the meta-cards were distributed during the first workshop while questionnaires were used for the second workshop. Open forum, observation method, and direct interview method were used to reinforce the gathering data during the workshop. Clarification, explanation, and discussion were done during the workshop while additional insights were gathered from the stakeholders.

The bulk of the study dealt with spatial analysis using the following GIS computing functions. The software ILWIS 3.3 was used in the study. Table 1 shows the various GIS operations and their uses in this study.

Table 1. GIS Operation

GIS Operation	Specific Operation	Use
1. Date Retrieval	Retrieval using the pixel window Retrieval of information by	Inspection of coordinates, class names, IDs or pixel values, in one or more maps and map related tables. The following were determined: What barangay a certain candidate site was located?, What are the coordinates of the final site selected?, and What are the lithology and soil type of a candidate site?
	Date Retrieval with a Boolean statement	A particular theme was retrieved from a map, e.g., retrieval of built areas from the land use



2. Reclassification	Reclassification with Map Calculation formulas	Criteria maps were reclassified within the buffer distances as exclusion or not suitable areas beyond the buffer distances as suitable areas
	Classifying value maps with Map Calculation formulas	In a DEM, contour intervals were re-classified into different ranges
	Map slicing	Buffer distances to point, segment, and polygon objects were assigned, e.g. a 300 meter buffer distance from rivers
3. Measurement operation	Distance between points	Distance of landfill from waste generation center and roads were obtained
4. Overlay operation	Overlay through Map Calculation	Overlay of the criteria maps to a single map with exclusion area or suitable area as output
	Overlay through cross	The area of each candidate site by crossing the suitable area map to the barangay map
5. Neighborhood	Distance calculation	With distance calculation: point, segment, and polygon maps were converted to respective distance maps prior to map slicing
	Area Numbering	Suitable areas were joined to its contiguous areas
	Filtering	In the contour map, the values between two contour intervals were interpolated along the x and y axis prior to creating a slope map

Spatial analysis was used to identify suitable areas or candidate sites for a landfill while the data gathered from the meta-cards were tabulated and used in the effects table for the MCE were ranked sites using the Definite Software.

### Results and Discussion

Landfill siting criteria vary across countries, cities, or even municipalities. In the Philippines, environmental laws like RA 9003 and DENR DAO No. 98-50 are guides for a landfill site selection. The landfill siting criteria found in



RA 9003 and DENR DAO No. 98-50 were reinforced through comparison and reconciliation with international studies related to this research (Baban *et al.*, 1998; Copper & Hibma, 2005; Dikshit *et al.*, 2000; Lunkapis, 2002; Walsh *et al.*, 2002; Kontos *et al.*, 2003; Bagchi, 2004; Lin & Kao, 1999; Zeiss & Lefsrud, 1995).

Results revealed that the DENR DAO No. 98-50 criteria were more stringent, comprehensive, and specific compared to RA 9003 criteria. International studies, on the other hand, set higher and complex restrictions than the DENR DAO No. 98-50. The researcher also noted that some international studies mentioned above failed to specify the criteria on the landfill distance from waste generation center; landfill distance from memorial sites, churches, schools and historical sites; and the area capacity stipulated under the DENR DAO No. 98-50. Based on the above notes of comparison and analysis, the researcher appropriately used the provisions cited in the DENR DAO No. 98-50 being consistent with existing environmental laws as reference and criteria guide in the study.

The landfill siting criteria which were based on the provisions of DENR DAO No. 98-50 were classified into two major categories: 1) elimination criteria, and 2) evaluation criteria. Table 2 shows the classification of the criteria.

Table 2. Elimination Criteria and Evaluation Criteria

Elimination Criteria (Exclusion Area)	Buffer Distance in meters	Evaluation Criteria
1. Proximity to surface water, creek, or river	300	1. Area capacity and availability
2. Proximity to wells/public water intakes	500	2. Distance of landfill site from the road
3. Landfill distance from tourist spots	500	3. Distance of landfill site from the waste generation center
4. Landfill distance from forest reserves	500	4. Distance of landfill site from faults
5. Landfill distance from settlements	250	5. Lithology
6. Landfill distance from schools	1000	6. Soil type
7. Landfill distance from schools	1000	
<i>Exclusion Area</i>		
8. Slope (12 degrees)		
9. Land use (agriculture, agroforestry, commercial, forest, institutional, residential, special use)		





The elimination criteria screened out areas prohibited to establish a landfill. The elimination criteria applied strict membership where an area either was suitable or unsuitable for a landfill.

The evaluation criteria provided a range for assessing the suitability of an area. With the unsuitable areas eliminated, the candidate sites were evaluated using the evaluation criteria.

Table 3 summarizes the findings during the first workshop. The inputs were classified into: 1) criteria adjustment; and 2) assigning of percentage weights. During the first workshop, the stakeholders felt that the slope restriction of DENR DAO No. 98-50 criteria needed to be adjusted because of the limitations of a mountainous municipality like La Trinidad. The participants felt that a slope restriction of 12 percent was more applicable to the lowlands. The stakeholders perceived that the 1,000 meter buffer distance of a landfill from memorial sites was very unrealistic and improbable; thus, adjustment was deemed to be necessary. Criteria not included in DENR DAO No. 50 were also identified and percentage weights were assigned to the evaluation criteria.

Table 3. Inputs from First Workshop

Criteria Adjustment	Assigning of Weights	
Other criteria were approved except:	Evaluation Criteria	Average Weight
a. Landfill Distance from Memorial Sites relaxed from 1000 to 500 meters	1. Area Capacity and Availability	30%
b. Slope Restriction relaxed from 12 to 18 degrees	2. Distance from Road	16%
	3. Distance from Waste Generation Center	16%
	4. Distance from faults	12%
	5. Lithology	13%
	6. Soil Type	13%
	Total	100%

The adjustment of the criteria resulted in more available areas in landfill sites. Before the first workshop, there were six (6) candidate sites but after the criteria modification, 10 candidate sites were generated.

Since the required area capacity for La Trinidad is 2.6 hectares for the current population of about 100,000, sites smaller than 2.6 hectares were eliminated. Areas having a capacity of more than 2.6 hectares served as a centralized landfill site for La Trinidad for a period of at least five years. Satellite image validation was performed to countercheck the compliance of the candidate sites using the modified DENR DAO No. 98-50 criteria. Specific criteria in the satellite image like the distance of a candidate site from surface

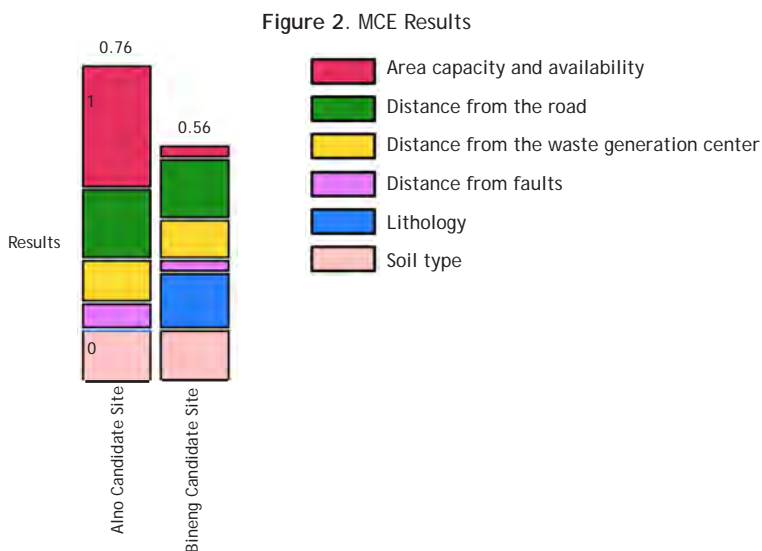




water and built areas can be reconciled and merged. Using area capacity requirement and satellite image validation, only 2 out of 10 candidate sites were suitable landfill sites. The final candidate sites were Bineng candidate site A and Alno candidate site D. Beckel site J was eliminated because of its proximity to the Itogon surface water.

The stakeholders were responsible for setting the priorities in terms of landfill site selection by setting the percentage weights of the criteria. In effect, the percentage weights determined how landfill site would be selected.

Figure 2 shows the summary of the MCE result. From this figure, Alno candidate site has a weighted sum of 0.76 from a perfect score of 1 but surpasses the Bineng candidate site by as much as 36 percent. This is possible since Alno's scores are higher by four out of five criteria. The results of MCE also ranked the Alno site as number 1.



### Conclusions and Recommendations

Based on the results, it is concluded that the DENR DAO No.50 criteria proved appropriate in selecting landfill areas specifically to mountainous areas like La Trinidad. However, finding suitable areas will be very difficult due to several other factors to be considered specifically public participation



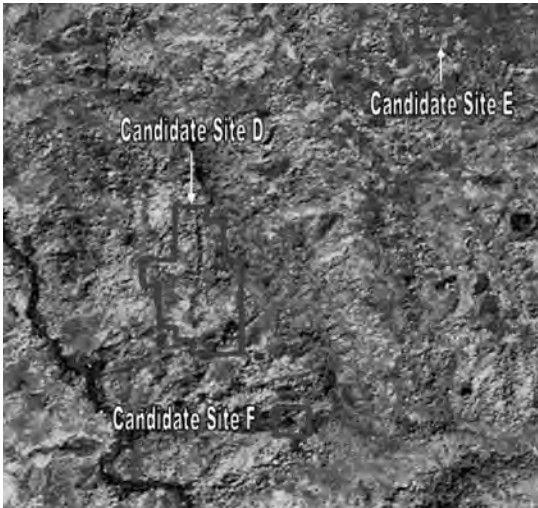


Figure 3. Location of the Most Suitable Site for a Landfill located in Alno (Candidate Site D), La Trinidad, Benguet

by the stakeholders. Figure 3 shows the most suitable landfill site for a landfill in La Trinidad.

Public participation plays a vital role in the selection process of a suitable landfill area. In fact, it will change the recommended landfill site selection criteria in the DENR DAO once the results of the site selection are presented. The public has the right to review and recommend suggestions if they observe the limited sites available and decide which criterion can be relaxed.

Public participation, a special component in the selection process of a suitable landfill area in La Trinidad, has significantly provided critical inputs. It contributed to the main aspects of the selection process, which were criteria adjustment and the assigning of percentage weights. Notably, involving the stakeholders during the early stage of the planning process was found to be highly significant.

The public participation based on the experience of the author is the critical phase after suitable areas were identified. Without seeing where the proposed landfill sites are located, the stakeholders find it difficult to relate to the impact of the criteria. They would only understand the impact of the percentage weights they assign and the criteria they define after they see the results of the entire GIS process.

The value judgment of the stakeholders was substantially consistent with the results of a technical evaluation using MCE because the stakeholders had a very good grasp of the physical characteristics of the two candidate sites. Moreover, the Alno site was superior to the Bineng site in four out of five criteria.

The general methodology used in the study proved successful. It was concluded that the landfill site selection process was able to incorporate the social criteria to the technical criteria of landfill site selection. Despite the strict criteria and screening procedures, the Alno Site emerged as the candidate site of highest priority. Moreover, DENR DAO No. 98-50 criteria were found to be a reliable guide in the landfill site selection for LGUs since



it is conservative and complete. However, finding a landfill site became a great challenge in selection process due to financial, environmental and social issues and requirements specific for a mountainous region like CAR. The fact that the stakeholders felt the need to relax the restrictions on slope and distance from memorial sites was an indication that other municipalities of CAR will be facing the same problem. It is therefore recommended in this study that DENR-CAR should review the provision on slope restriction by conducting a technical study and consultations with the stakeholders.

Using the GIS application in the integration of all the criteria maps was a lot useful in this study. It provided real time data support information available during the landfill selection process among stakeholders thereby achieving common systems to ensure fluidity in working together. While this can be done through manual map overlays, this could have been very tedious and time consuming. Moreover, changes in criteria cannot be easily be made. Without GIS, the whole procedure could take a year or more. It is therefore recommended that LGUs must consider using GIS applications to be able to identify suitable sites. Moreover, this study recommends that the Provincial Planning Office of Benguet or the Environmental Management Bureau should take a proactive responsibility in conducting site selection using GIS tools and present and endorse the same to LGUs to start their own site selection process. On the other hand, LGUs who received training in GIS can spearhead the landfill site selection process.

Lastly, the study concludes that despite the vast potential applications of GIS, the means of integrating the pervasive role and influence of the technology have not kept pace with the current developments and techniques. To put it simpler, the use of GIS has not reached its maximum potential because some stakeholders or even government line agencies are still unaware of the possibilities for an integrated GIS in situations where spatial location is involved such as the landfill selection process for La Trinidad.

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# Epidemiology of Soil-Transmitted Helminth Parasitism Among Schoolchildren in Tublay, Benguet

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## Abstract

Soil-transmitted helminthic (STH) parasitism remains a primary problem in underdeveloped countries as they affect mostly school age children. The infection rate is associated with environmental, socioeconomic, personal and clinical capabilities of the community. In this study, information is sought on the prevalence of soil-transmitted helminthic parasitism, and associated with factors contributory to its occurrence. Stool specimens of 428 schoolchildren were sampled for standard parasitological diagnostic test. The children and their parents or guardians also accomplished questionnaires on socio-environmental conditions. It is revealed that STH parasitism rate in the ten participating schools is only 2.34%, indicating a level of 'light infection.' There was no significant association with STH parasitism and knowledge of the parasites, but awareness of STH transmission is significantly associated with the level of STH parasitism. Higher STH cases among schools have low compliance to hand washing with soap, wearing footwear, and lesser clinic visitations. It is concluded that intensive education on STH infection prevention and control is recommended to sustain good behavioral practices in the community. Deworming and personal hygienic programs and activities should also be continued both in the school and at home to heighten awareness among pupils and their immediate members of the family regarding STH parasitism.

**Keywords:** Soil Helminth, parasitism, schoolchildren, Tublay, Benguet, epidemiology



## Introduction

Soil-transmitted helminthic (STH) parasitism is a global health menace especially among developing countries (Bethony *et al.*, 2006; Wani *et al.*, 2007). It is a serious affliction affecting 32% - 94% of the population, and is the cause of more than 150,000 deaths annually (Crompton, 1999; Montresor *et al.*, 2002; Hotez *et al.*, 2006). According to various studies, STH parasitism has a wide range of symptoms including intestinal manifestations (diarrhea and abdominal pain), general malaise, weakness and chronic intestinal blood loss. It impairs healthy nutrition through reduced food intake, poor appetite and malabsorption affecting physiological and cognitive development (Stephenson *et al.*, 2000; Crompton *et al.*, 2002). STH infection results to lower body-mass index, anemia, and undernourishment (Dantzer, 2001; Stoltzfus *et al.*, 2004; De Leon & Lumampao, 2005). These effects would then trigger sleeplessness, affecting motor development, and cognitive performance (Ezeamama *et al.*, 2005).

Furthermore, the STH infection tends to be convex; rising in childhood and declining in adulthood (Hotez *et al.*, 2008), the heaviest occurring among children aged 5-15 years. This pattern of infection is associated with the inherent development and gradual acquisition of protective immunity of growing children (Woolhouse, 1998). An added risk would belong to children with poor hygienic habits (Alemu *et al.*, 2011; Jarabo *et al.*, 1995).

The common causal agent of soil-transmitted helminthiasis are *Ascaris lumbricoides*, *Trichuris trichiura*, and hookworms (*Ancylostoma duodenale* and *Necator americanus*). Recent estimates of people infected with *A. lumbricoides* are over one billion, *T. trichiura* 795 million, and hookworms with 740 million. The bulk of its occurrence is found in sub-Saharan Africa, the Americas, China, and East Asia (Hotez *et al.*, 2006).

The alarming rate is highly associated with the economic status of these countries; whereby most of them are economically impoverished. Such countries experience financial constraints in hiring more health professionals and workers to conduct efficient health services and information dissemination (Hotez *et al.*, 2006). People in these developing areas, who were infected with soil helminths, could not avail of treatment because of economic reasons.

In the Philippines, the STH infection is high with prevalence rate from 54% to 67% (Belizario *et al.*, 2005, 2009). This high STH infection rate triggered aggressive initiation of curative interventions such as deworming programs. However, a relatively high STH prevalence rate is present in different areas of the country, despite the initiation of these interventions. For example,





a study by Sumagaysay and Emverda (2010) with the indigenous schoolchildren in Bukidnon, found an STH infection prevalence rate of 37.8%. Similarly in Davao del Norte, Belizario *et al.* (2009) found a high STH infection rate of 39.0%.

The Cordillera Administrative Region (CAR) is one of the regions in the country having a relatively high STH infection rate of 49.50% (DOH, 2006). The high incidence rate was associated with several factors such as climate, socioeconomic status, and poor eating habits (Lee *et al.*, 2000). Other factors include indiscriminate defecation, improper hygiene, poor water supply, inadequate drainage, and unhealthy sanitary behaviors and practices.

These findings, however, reflect a wide-scale STH epidemiology, which might not be totally true at the municipal and barangay level, especially that there are unique differences among municipalities in terms of their socioeconomic and environmental conditions. This study therefore aimed to come up with a localized analysis of STH parasitism to determine specific factors contributory to its occurrence. At the same time, it identified constraints to the control and prevention of the disease. This local-level analysis would provide specific information relevant in the prioritization and customization of STH parasitism programs in the community. With this, an evidence-based STH parasitism program for the community would hopefully be implemented at the end of the research.

The municipality of Tublay, Benguet was determined as the sampling area for this research due to the absence of previously published researches regarding STH parasitism in the said area. Tublay is a 5th class municipality, located in the western part of the province, having eight barangays and a population of 15,096 as of 2007 (Tublay Socio-economic profile, 2007). The major industry in the municipality is vegetable farming, though raw materials like gravel, sand and forest products are also available.



Figure 1. Map of Tublay, Benguet (Image from Tublay, n.d.)





## Methodology

### Locale and design of the study

This study was conducted in 10 randomly selected elementary schools in Tublay, Benguet, Philippines. It consisted of two major activities; STH parasitological examination and epidemiological survey among Pre-school, Grades 1 and 2 pupils and their parents.

### Parasitological stool analysis

Stool analysis was conducted to determine the prevalence rate of the three most common soil-transmitted helminthes, namely: *Ascaris lumbricoides*, *Trichuris trichiura*, *Ancylostoma duodenale* and *Necator americanus*, among schoolchildren of the participating schools. All students in the Preschool, Grades 1 and 2 of these schools were asked to provide stool samples for STH parasitological diagnosis. The specimens were analyzed using the Kato-Katz technique. The type and number of parasites were all noted in the samples. Positive STH ova were counted and used as basis in the calculation of prevalence rate.

### Knowledge, attitude and skill surveys

A series of epidemiological surveys and interviews, in addition with stool specimen collection, were also conducted among pupils and their parents or guardians. The responses of the children were cross-validated with the responses of their parents. The questionnaires generated information on the demographical and socioeconomic conditions of each respondent. The instrument also determined personal information, hygienic practices, and environmental factors like health and sanitation awareness. Data from the questionnaires were then correlated with the laboratory results.

### Consultation, training and capability building

The research proposal was presented to the local government unit (LGU) of Tublay for their approval and commitment. Upon gaining the commitment of the LGU, tasks and responsibilities of the different sectors (research team, teachers, parents, health service providers, etc.) were determined. Parents facilitated collection of stool specimen of their children; teachers recorded and checked the specimen; and the research team collected and analyzed the samples. Health personnel assisted the researchers in facilitating, floating, and retrieving the questionnaires.

Prior to the survey, a presentation on STH and parasitism was given to the community by representatives of the University of the Cordilleras.



A brief discussion among the group was also conducted with the parents on the proper procedures of collecting and handling stool samples. Further meetings were made with the survey team for clarification and unification of terminologies used in the instruments.

### Data Management and Statistical Analysis

Statistical data were tabulated in Microsoft Excel® and analyzed using SPSS® for Windows (version 18). Statistical significance was set at  $\alpha=0.05$ . Prevalence rate was expressed using descriptive statistics. Association of epidemiological and hygienic factors to STH prevalence was evaluated using the Chi-square test ( $\chi^2$ ) and the relationship to environmental and epidemiological factors was assessed using Pearson Moment Product Correlation ( $r$ ).

### Ethical considerations

Prior to the conduct of the study, the research design and methodology were presented to the local officials, to the health officers and education leaders. Opinions, suggestions, and comments were solicited and were incorporated in the scope and procedures of the research. After the public presentation, the research was introduced at the school level wherein parents were invited for a consultation and to get their consent to involve their children in the activity. It was also reiterated that each respondent could decline their participation in the sample collection activities, if they opt to.

## Results and Discussions

### Soil Transmitted Helminthic Parasitism Prevalence

A low prevalence rate (2.34% or 10 in 428) of STH parasitism was noted in 5 of the 10 participating schools. As shown in Table 1, the following elementary schools in the sample sites with the corresponding prevalence rates are illustrated: Moran (10.34%), Central Tublay (6.45%), Albis (5.25%), Dackias (3.03%), and Sto. Nino (2.94%).

The STH infection prevalence rate (2.34%) is considerably lower than the previous findings of DOH (2006) for the Cordillera Administrative Region (49.50%). Likewise, it is also lesser as compared to other indigenous communities in the Philippines like Bukidnon (37.8%) (Sumagaysay & Emverda, 2010) and Davao del Norte (39.0%) (Belizario *et al.*, 2010). It suggested that even if these areas share the same characteristics (i.e., mountainous, farming community, disadvantaged, less health facilities, etc.), STH infection could



change due to the disparities in environmental, hygienic, sanitary factors, clinical interventions, and the timing and design of the researches.

**Table 1.** Prevalence rate of soil-transmitted Helminthic parasitism among schools in Tublay, Benguet

Schools	No. of Cases	No. of Respondents	Prevalence Rate (%)	Extent of Infection
ALBIS	3*	57	5.26	light
AMBONGDOLAN	-	32	-	-
BAAYAN	-	40	-	-
BASIL	-	50	-	-
CENTRAL	2*	31	6.45	light
DACKIAS	1*	33	3.03	light
DORENCIO	-	38	-	-
MORAN	2* & 1**	29	10.34	light
PAOAD	-	84 (19.63)	-	-
STO. NINO	1*	34 (7.94)	2.94	light
TOTAL	10	428	2.34	light

Notes: \* - *Ascaris*, \*\**Trichuris*, (-) - Negative Results

One factor for the light infection rate may be due to the fact that the research was conducted from September to November, which preceded the deworming program of the LGU conducted every June of each year (Alave, 2008). It may also be suggested from the findings that the annual deworming program was effective, warranting its continuation as it lessened STH prevalence rates three to four months after its implementation.

### STH prevalence in relation to grade level and gender of children

It is revealed that Grade 1 (approximately aged 6-7 years) children have the highest prevalence rate (3.61%) in comparison with Grade 2 (approximately aged 8-9 years) and Preschool (age lesser than 6) pupils with rates of 1.56% and 1.48%, respectively. Among Grade 1, Moran (6.905%) and Central Elementary Schools (6.45%) recorded the highest prevalence rates, followed by Dackias (3.03%) and Albis Elementary Schools (1.75%). There were no cases recorded in the other schools. Among the Grade 2 children, there were only two STH cases in Albis (1.75%) and Sto. Nino Elementary Schools (2.94%). Among the Preschools, only two schools were diagnosed positive with soil helminth eggs (Albis and Moran Elementary Schools) with prevalence rate of 1.75% and 3.45%, respectively. Furthermore, 60% of the recorded STH infection occurred among the Grade 1 pupils, confirming that the most affected pupils are in this level. However, the differences are not statistically significant ( $\chi^2 = 1.364$ ,  $P < 0.05$ ).



Table 2. Prevalence rate of soil-transmitted Helminthic parasitism according to grade levels

Parameters	Number of Schoolchildren Examined	Number of Schoolchildren Infected (%)
Preschool	134 (31.31)	2 (1.48)
Grade 1	166 (38.79)	6 (3.61)
Grade 2	128 (29.91)	2 (1.56)
Total	428	10 (2.34)
$\chi^2 = 1.364$ - not significant; $P < 0.05$		

On the other hand, a higher STH infection was observed among male than the female respondents (2.43% vs. 1.04%). However, it was found that gender and the STH parasitism is not significantly associated ( $\chi^2 = 3.20$ ;  $P = 0.074$ ;  $df = 1$ ). This result was contrary to the findings of Flores *et al.*, (2001) and Odikamnoru and Ikeh (2004), but conforms the findings of Ukpai and Ugwu (2003); and Dakul *et al.*, (2004). It suggests that the prevalence of the STH infection in the area is not distinctly gender dependent.

Table 3. Prevalence rate of soil-transmitted Helminthic parasitism according to gender of children

Gender	Number of Schoolchildren Examined (%)	Number of Schoolchildren Infected (%)
Male	223 (55.10)	7 (2.43)
Female	205 (47.90)	3 (1.07)
Total	428	10 (2.34)
$\chi^2 = 3.20$ - not significant; $P = 0.074$		

### Extent of knowledge of STH parasitism and its transmission in the community

Table 4 presents a higher number of respondents with limited knowledge of STH parasitism (71.88%). A smaller number (17.36%) claimed highly knowledgeable. Respondents with limited knowledge admitted they have just heard or seen at least one soil-borne helminth, most probably *Ascaris* spp. (locally referred as *kedang*) but were not familiar on its epidemiology as well as its effects to the individual. On the contrary, respondents who claimed knowledgeable of STH parasitism pointed out that they understand the life cycle and epidemiology of the helminths. They further explained some of the curative and preventive measures.

Interestingly, it was found out that the extent of knowledge and STH prevalence rate are statistically significant ( $\chi^2 = 26.906$ ;  $P < 0.05$ ). Results imply that the likelihood of STH infection is higher in schools where most are unaware of soil-transmitted helminth epidemiology.



Table 4. Extent of knowledge regarding STH Parasitism

Knowledge on STH Parasitism	Number of Respondents (%)	Total Number of Infected Schoolchildren (%)
Highly Knowledgeable	50 (17.36)	1 (2.00)
Limited Knowledge	207 (71.88)	9 (4.35)
Not Indicated	31 (10.76)	-
Total	428	10 (2.34)
$\chi^2 = 26.906$ - significant; $P < 0.05$		

Almost half of the respondents (46.88%) are unaware of STH transmission (Table 5). Concomitantly, most of these respondents were enrolled in the schools found positive with soil-transmitted parasites. For example, Dackias Elementary School (with prevalence rate of 3.03%) has the most number of respondents who are unaware of STH transmission (83.87%). Data reveals that STH prevalence rate and awareness on the transmission are significantly associated as implied by the statistical finding ( $\chi^2 = 14.828$ ;  $P < 0.05$ ). It infers that STH infection is higher in schools with more pupils unaware of the transmission.

Table 5. Extent of Awareness of STH parasitism transmission

Awareness of STH transmission	Number of Respondents (%)	Total Number of Infected Schoolchildren (%)
Aware	109 (37.85)	2 (1.83)
Unaware	135 (46.88)	8 (5.93)
Not Indicated	44 (15.28)	-
Total	428	10 (2.34)
$\chi^2 = 14.828$ - significant; $P < 0.05$		

Environmental and human behavioral factors influence the transmission of soil-transmitted helminths. Evidently, the knowledge of the community plays a crucial role in the spread of the disease. It is therefore imperative to educate the community regarding the transmission, control, and prevention of these parasites as it is clearly revealed that health education is a decisive factor in controlling and preventing spread of the disease. In studies on other types of parasitism like diarrhea, education played a vital role on its reduction. For example, Feachem (1984) found out that hygiene education could reduce diarrheal morbidity rates by 14%-48%. Another study in Zaire (Haggerty *et al.*, 1994) found out an 11% reduction in diarrhea cases on areas where volunteer efficacy and community participation is high. Both studies indicate that educating the community is essential in controlling diseases that may include STH parasitism.



Knowledge and awareness of the transmission, prevention and control of a certain disease are the most critical considerations in parasitism control. Health promotion and awareness campaigns on how helminths are transmitted are essential for eradicating intestinal helminth cases.

**Latrine, water sources and hand-washing activities of the community**

The extent of STH parasitism like other diseases is influenced by epidemiological factors and hygienic activities of the individual. These epidemiological factors include poor hygiene and sanitation habits, weak immune system and inadequate toilets, soiled water source (Alemu *et al.*, 2011). Tables 6 to 8 present the toilet types used by the respondents, their source of domestic water supply, and hand washing practices after using a toilet.

Table 6 presents that out of the 428 respondents, 232 (54.17%) use pit latrine and smaller number (196 or 45.83%) use water sealed toilets. A higher rate (3.02%) of STH infection was diagnosed among respondents using pit latrine as compared to their water sealed counterparts (1.53%). In the case of Albis and Moran Elementary Schools, where most respondents have pit latrines (58.82% and 55.00%, respectively), were found positive with STH; while Sto. Nino and Central Elementary Schools have more respondents with flush toilets (77.51% and 76.47%, respectively) were also found positive with STH.

The type of latrine is not statistically significant ( $\chi^2 = 3.20$ ;  $P = 0.074$ ;  $df = 1$ ) with the occurrence of STH parasitism. This only implies that STH can affect households regardless of the toilet types they use. This finding contradicts some of the findings of similar researches wherein a significantly higher number of STH infection occurs in communities with open-pit toilets than those communities with water sealed toilets. For instance, a study in South Eastern Nigeria by Uneke *et al.* (2007) revealed a higher STH rate occurring with those using pit-latrine toilets. The variation of this finding from the usual trend can be a reflection that STH morbidity is not limited to those who could not afford water sealed toilets.

**Table 6.** STH prevalence rate and toilet type

Toilet type	Number of Schoolchildren Examined (%)	Total Number of Infected Schoolchildren (%)
Pit latrine	232 (54.17)	7 (3.02)
Water sealed	196 (45.83)	3 (1.53)
Total	428	10 (2.34)
$\chi^2 = 3.20$ - not significant; $P < 0.074$		



Table 7 presents more respondents (52.43%) washing their hands after using the toilet with water only and smaller number (47.57%) with water and soap. It presents that STH cases is higher (3.125%) among respondents washing with water only than those washing with soap and water (1.471%). It further reflects that hand washing activities and STH prevalence are significantly associated ( $\chi^2 = 7.20$  -significant;  $P = 0.007$ ;  $df = 1$ ). STH cases are more likely to occur among respondents that wash their hand with water only than those who use soap as well.

Table 7. STH prevalence rate and hand washing practices

Hand washing practices	Number of Schoolchildren Examined (%)	Total Number of Infected Schoolchildren (%)
With water and soap	204 (47.57)	2 (0.98)
With water only	224 (52.43)	8 (3.57)
Total	428	10 (2.54)
$\chi^2 = 7.20$ - significant; $P < 0.007$		

The finding in Table 7 can justify for an intensified campaign and promotion of proper hand washing. It is a well-known fact that proper hand washing minimizes and prevents transmission of diseases as demonstrated by several researches. Proper hand washing was considered the single most important intervention to prevent infections (Akyol *et al.*, 2006). It prevents clinical syndromes that cause largest number of childhood death globally (Luby *et al.*, 2005). In a study with diarrheal cases in Pakistan, households washing with soap reported 53% less diarrhea than other households (Luby *et al.*, 2006). Another study showed that students who received hand-washing intervention with soap experienced significantly fewer episodes and days of absence than students who did not (Bowen *et al.*, 2007).

Almost two-thirds (61.0%) of the respondents get their water primarily from natural sources (wells, rivers, or springs) and some (39.0%) are dependent on government-regulated water sources (Table 8). It was also noted that six (6) out of 261 respondents (2.30%) who got their water from natural sources are infected with STH parasites, while four (2.40%) cases were diagnosed from respondents using government-regulated water. Nonetheless, the association of STH prevalence rates and water source are not statistically significant ( $\chi^2 = 0.80$ ;  $P = 0.371$ ;  $df = 1$ ). STH parasitism could affect individuals using water from either source.

Water is among the most identified factors contributing to the spread of diseases. The poor access and inadequate water supply are serious factors contributing to high levels of STH infections (Alemu *et al.*, 2011).



This study, however, reflects that the water from these natural sources is not contaminated with fecal materials or with soil-transmitted helminths. It is therefore a big challenge for policy makers to look into programs and innovations preventing the contamination of these natural sources of water and at the same time looking on how to maintain sufficient and clean water supply for the community.

Table 8. STH prevalence rate and water source

Water source	Total Number of School-children Examined (%)	Total Number of Infected Schoolchildren (%)
Natural water sources	261 (61.0)	6 (2.30)
La Trinidad Water District	167 (39.0)	4 (2.40)
Total	428	10 (4.70)
X <sup>2</sup> = .80 - not significant; P = 0.371		

### STH infection and compliance to wearing footwear and Health Center visitation

A larger number of schoolchildren in the community wear footwear most of the time (Table 9). Out of the 428 respondents, more than a quarter (35.76%) wear footwear most of the time, few (20.14%) claimed they always wear and even fewer (11.81%) admitted they rarely do so. Analysis revealed a consistent pattern of relationship of wearing footwear and the prevalence rate of STH parasitism ( $r = 0.953$ ;  $P = 0.012 < 0.05$ ). Uneke *et al.* (2007) finding indicates that wearing footwear and other personal protective gears is crucial in minimizing STH transmission and infection.

Table 9. Footwear and STH parasitism prevalence

Wearing footwear	Total Number of Respondents (%)	Total Number of Infected Schoolchildren (%)
Always	58 (20.14)	1 (1.72)
Oftentimes	103 (35.76)	2 (1.94)
Sometimes	93 (32.29)	4 (4.30)
Rarely	34 (11.18)	3 (8.82)
Total	428	10 (2.34)
$r = 0.953$ - significant; Sig. (2-tailed) = 0.012; Mean = 3.06		

A very small number (9.34% each) claimed they visit health centers monthly and quarterly, while a higher percentage (39.79% and 17.65%) admitted they visit health centers semi-annually and annually, respectively (Table 10). An alarming number of almost a quarter (23.88%) honestly declared they only





visit health centers if they are experiencing health problems. Overall, the table points that most of the respondents visit the clinic only twice a year (as denoted by the mean of 2.63). The same table reveals that prevalence of STH infection is related to the frequency of visits to the health centers ( $r = 0.822$ , Sig. (2-tailed) = 0.002).

**Table 10.** Health Center visitation and STH parasitism prevalence

Visiting health centers	Total Number of Respondents (%)	Total Number of Infected Schoolchildren (%)
Monthly	27 (9.34)	2 (1.83)
Quarterly	27 (9.34)	8 (5.93)
Semi-annually	115 (39.79)	-
Annually	5 (17.65)	-
As needed	69 (23.88)	-
Total	428	10 (2.34)
$r = 0.822$ - significant; Sig. (2-tailed) = 0.002; Mean = 2.63		

### Conclusions and Recommendations

STH prevalence in the municipality of Tublay, Benguet is “light” or low. Mostly *Ascaris* spp. with one case of *Trichuris* spp. ova, were the only helminths identified. The following factors are significantly associated to STH prevalence: (1) Extent of knowledge about STH parasites; (2) Awareness of transmission; (3) Hand washing practices; (4) Wearing footwear, and (5) visiting health centers. Toilet types and water sources have no distinct relationship to STH parasitism in for Tublay.

Massive education and promotion campaigns on STH infection prevention and control are needed to bring behavioral changes among the community people. Deworming programs should also be sustained, in addition to awareness campaigns about personal hygiene and other healthy lifestyle promotion activities and programs to maintain low STH parasitism infection rates.

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