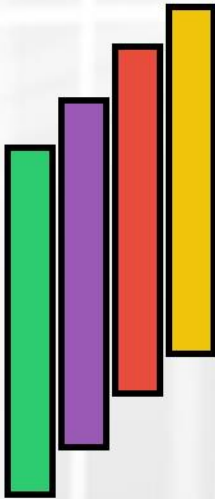


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## **1st SIMP-AAG-STEMHub Multidisciplinary Research Festival Abstracts**



SINGAPORE INSTITUTE OF  
MULTIDISCIPLINARY  
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**Singapore Institute of Multidisciplinary Professions, Ascendens Asia Group, and STEM Education Training Hub**



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Papers Presented	Page No.
Ad Hoc Board of Reviewers	6
Editorial Board	7
<b>Agricultural Chemistry</b>	
Phytoreductive-Hydrothermal Synthesis of Polyethylene glycol- coated Magnetic Iron oxide Nanoparticles for Drug Delivery Applications <i>Pete Gabriel L. Ledesma, Ronilo V. Aponte, Ronaniel A. Almeda, Mark Louis P. Vidallon, Jonel P. Saludes</i>	15
Multifunctional Textile from Green Synthesized Silver Nanoparticles using the Aqueous Extract of <i>Cladophora vagabunda</i> <i>Angelica Remillano, Lance Andre Maderal, Kamille Pangantihon, Kenneth James Gingco, Sofia Millen Cartalla, Clio Elizandre Villanueva, Ayra Patricia Alvero, Jose Isagani Janairo</i>	16
Effect of Essential Oils in Inhibiting Mold Growth on Muffins <i>Theresa G. Dangkulos, Koraine Ericka G. Gapuz, Glaiza B. Wagan, Sheila Marie D. Baluran</i>	17
Hapa-Based Rearing of Nile Tilapia ( <i>Oreochromis niloticus</i> L.) Fry Using Different Stocking Densities <i>Alicia C. Garcia, Joyce N. Suba, Ivan Dexter J. Tatum, John Lester L. Velasquez, Sheila Marie D. Baluran</i>	18
<b>Basic Biology</b>	
Malunggay ( <i>Moringa oleifera</i> ) and Ipil-Ipil ( <i>Leucaena leucocephala</i> ) Leaf Meals in Feeding Nile Tilapia ( <i>Oreochromis niloticus</i> L.) <i>Benedict Q. Collado, Cobe Bryan L. Cayan, John Mark B. Salonga, Rhey P. Tacaca, Cristina F. Pablo, Sheila Marie D. Baluran</i>	20
Growth Performance and Yield of Pechay ( <i>Brassica rapa</i> L.) and Mustard ( <i>Brassicajuncea</i> L.) in Aquaponics System <i>Benjie G. Mariano, Arlene Grace P. Gamora, Benjamin T. Baniqued Jr., Lorraine Jean C. Dumale, Joana Marie N. Luna, Cristina F. Pablo, Sheila Marie D. Baluran</i>	21
Fingerling Production of Nile Tilapia ( <i>Oreochromis niloticus</i> L.) in Hapausing Different Sex Ratios <i>Vladimir Larioza Dandan, Joyce Magalong Collado, Sheila Marie D. Baluran,</i>	22
<b>Biological Science</b>	
Teratogenic Activity of Exotic Mushrooms on the Developing Embryos of ZebraFish ( <i>Danio rerio</i> ) <i>Jayson Domingo Lazaro</i>	24
Antimicrobial Property of Extracted <i>Wrightia antidysenterica</i> (White Angel) Bark against <i>Salmonella typhimurium</i> ( <i>Salmonella</i> ) Bacteria <i>Patricia Mae V. Diaz, Danica Anne C. Estropia, Mary Jane A. Lumanlan, Carolina R. Tamayo, Ernest S. Cajucom Jr.,</i>	25



Analyses of Pigments, Antioxidants, Vitamins and Immunostimulatory Effect of Khasi Pine ( <i>Pinus kesiya</i> ) Pollen in Nile Tilapia ( <i>Oreochromis niloticus</i> L.) <i>Sheila Marie D. Baluran, Ravelina R. Velasco, Lexter R. Natividad</i>	26
Cilantro ( <i>Coriandrum sativum</i> ) leaves as an Adsorbent of Lead in Aqueous Solution <i>Maria Isabela Peña</i>	27
<b>Civil Engineering</b>	
Fabrication of Cement Tiles using Mussel ( <i>Perna viridis</i> ) shell as an aggregate <i>Angelo.T. Gerola</i>	29
<b>Education</b>	
Problem-Based Learning (PBL): A Heuristic Approach towards the Mathematical Achievement of Grade 8 Students in Solving Word Problems Involving Rational Algebraic Expressions <i>Rachelle Anne Marie S. Adriano</i>	31
The Comparability of ALS and NON-ALS Oral Communication Performance of Grade 11 Students <i>Ormon Angel L. Andes</i>	32
Development of Strategic Intervention Material: Its Effectiveness to Grade 7 Academically Challenged Learners on Concentration of Solutions <i>Gemmaline Bumanglag</i>	33
Application of Flipped Classroom: An Action Research in Enhancing Student Academic Achievement in Earth and Life Science Subject <i>Kristiane R. De Villa</i>	34
A Glimpse at the Learning Styles of Grade 12 STEM Strand Students of the University of the City of Manila as a Focal Point of their Learning Ability Concerning Spelling in Filipino <i>Bernardo F. Ramos, Victoria Ramos</i>	35
Quipper School Integration and Performance in Science of Grade 7 Students of Muntinlupa Science High School SY 2017-2018 <i>Peachy Ann M. Malacaman</i>	36
The Master Teachers As Catalysts In Bringing Schools To Greater Heights <i>Ramil G. Ilustre</i>	37
Utilizing Content and Language Integrated Learning (CLIL) in Enhancing the Reading and Writing Skills of Grade 11 Students <i>Rodolfo C. Calimag</i>	38
Loading Scheme for the Mathematical Proficiency of Secondary Sophomores <i>Riza R. Noceto</i>	39

Biology Activity Cards for Design Thinking: Effects on Student Creativity and Self-directedness <i>Hazel Elaine O. Custodio-Armas</i>	40
Effectiveness of Explicit and Implicit Methods in Teaching Selected Grammar Topics <i>Cyril Pascua Santos</i>	41
Factors Affecting the Academic Performance of Grade 8 Students in Technology and Livelihood Education in District 1, Caloocan City <i>Zenaida G. Acampado</i>	42
To Leave or To Stay?: A Qualitative Study on College Student Withdrawal in the Province of Laguna <i>Jonathan A. Marquez</i>	43
Audio-Visual Scaffold to Smart Speaking for Grade 11 Students <i>Shiela B. Esteban</i>	44
Hugot lines: A Technique in Improving the Academic Achievement and Creative Thinking Skills in Science <i>Jenny G. Belza</i>	45
A Supplemental Module to Improve the Conceptual Understanding of Hydrocarbons of Selected Grade 9 Students <i>Brigida A. Blanco</i>	46
Looking Crochet Arts Through the Lens of Mathematics <i>Khimberly T. Del Mar</i>	47
Bitterness on the Top of the Pie: Challenges in Arduino Robotics from A Public School Students' Perspective <i>Elgeene E. Dizon, Jerica Diane C. Bondoc</i>	48
The Teaching Styles of Mathematics Teachers and Students' Academic Performance in Mathematics: A Correlation Analysis <i>Haydee P. Falcutila</i>	49
Development and Validation of Competency-based Assessment tools in General Biology for Senior High School STEM Students <i>Sarina Mae B. Arciga</i>	50
<b>Literature</b>	
Presupposition in Philippine and American Editorial Headlines: A Contrastive Study <i>Lucile Ariette Adducul – Bautista</i>	52
<b>Management</b>	
Factors Contributory to Professional Growth and Development of Selected Public Senior High School Teachers in District 5, Quezon City <i>Louie F. Figueroa</i>	54

## **Plant Production and Environmental Agriculture**

- Potential of *Rhizoclonium riparium* as Biostimulant for Germination and Seedling Growth of Kidney Bean (*Phaseolus vulgaris*) and Winged Bean (*Psophocarpus tetragonolobus*) 56  
*Anika Raleigh S. Balingit, Alyssa Mei P. Bautista, Shanahi Chelledie B. Gonzales, Jaden Marie Martin, Rejimalyn Manalac, Amylene Y. Catayas*
- Production and Application of *Allium sativum* (Garlic), *Zingiber officinale* (Ginger), and *Origanum vulgare* (Oregano) on *Lycopersicon esculentum* Mill. (Tomato) as a Preservatory Agent 57  
*Denver Mendoza, Marlisha Naval, William Albert Henry Torres, Mary Rose Balmeo*
- Comparative Study of Potato Water and Sweet Potato Water in Extending the Shelf Life of Loaf Bread and Utilization of its Waster Pulp as Value-Added Surplus Product 58  
*Hanieline V. Emana, Jamaica S. Gonzales, Justine Joshua R. Tariman, Cristina F. Pablo, Sheila Marie D. Baluran*
- Effect of Different Plant-Based Substrates in Vermiculture 59  
*Emily Joy P. Eugenio, Joemar D. Flores, Mark Angelo L. Miguel, Kenneth Manangkil Venturina, Raymond Vincent O. Tomas, Sheila Marie D. Baluran*
- Effects of Growing Bed with Various Number of Holes in the Growth and Yield of Lettuce (*Lactuca sativa* L.) in Passive Hydroponics System 60  
*Karen M. Claveria, Melfred P. Pascua, John S. Salazar, Regina M. Magsino, Sheila Marie D. Baluran*
- Growth and Yield of Selected Variables of Lettuce (*Lactuca sativa* L.) Carlo Rossa and Carlo Rossa and Lollo Rossa in Aquaponics System 61  
*Sharlyn Kei B. Caricungan, Mary Ann F. Flores, Ricardo M. Salazar Jr., Mark Steven P. Hernaez, Sheila Marie D. Baluran, Caanawan National High School*
- Growth and Yield of Pechay (*Brassica rapa*) and Mustard (*Brassica juncea*) in Vertical Hydroponics System 62  
*Marinela M. Caparro, Jonel Vince G. Domingo, Rosemarie M. Oliveros, Art Arbhy B. Delizo, Cristina F. Pablo, Sheila Marie D. Baluran*
- ## **Psychology**
- "Help is finally here!" - Role of Tertiary Institute in the Promotion of Philippine Mental Health Law (RA 11063) 64  
*Jayson Amber T. Ong, Jimnah Naomi T. Ciron, Celinniel S.J. De Guzman, Jonathan P. Diokno*
- The Effect of Multiplayer Online Battle Arena (MOBA) Gaming on the Levels of Depression, Anxiety, and Stress of Students 65  
*Elmer L. Belza Jr.*
- Airplane Mode Off: Living a Life with Dynamic Behavioral Pattern of an ADHD (Attention Deficit Hyperactivity Disorder) Patient 66  
*Lordelyn Y. Pulmano, Pamela Joyce V. Tabago*

A Survey on the Relationship of Teenage Self-control and Anxiety as Basis for Drafting "PSALM" Personal Self-Control Anxiety Learning Map <i>Joshua Neil Lagman, Jericho Jesus Peria, Cellieza Belle Valmonte, Shaina Estrallado, Kimberly Santos, Julius Roland De Luna</i>	67
<b>Sociology</b>	
Level of Knowledge and Acceptability Towards Family Planning <i>Vincent V. Morales, Faith M. Singca, John Christian Espinola</i>	69
Robot – Assisted Temporary Shelter for Earthquake Victims <i>Eunice Joyce A. Raga</i>	70
Looking Beyond the Birds and the Bees: Internalized Homophobia of Lesbian Parent <i>Lordelyn Y. Pulmano, Renmar R. Canlas</i>	71
Development and Validation of Space Disaster Risk Reduction Management-Manual <i>John Mark S.J Jiao, Ryan Manuel D. Guido</i>	72
Frequency and Intensity of Land-falling Tropical Cyclone During Different ENSO Phases in the Philippines <i>Christian John V. Evangelista, Ryan Manuel D. Guido</i>	73
Determining the Most Light Polluted Area in Selected Areas of Mandaluyong City using a Low Cost Night Time Photon Meter <i>Diana Arpon, Rodelle Bryan Bastero, Denesse Campos, Kyle Michael Martinez, Chelsea Lyn Rogando, Ryan Manuel Guido</i>	74
<b>Sustainable &amp; Environmental Development</b>	
Feasibility of <i>Malus domestica</i> (Apple) Pomace as an Organic Corrosion Inhibitor for Carbon Steel in Hydrochloric Acid <i>Karen V. Tejada, Tracy Marine R. Busa, Jose Arman O. Montañano, Ernesto S. Cajucom Jr, Carolina R. Tamayo</i>	76
Branch of Water Spinach <i>Ipomoea aquatic</i> (Kangkong) as Main Component for Production of Biodegradable Pot <i>Melliza Jovel C. Castillo, Xander Clyde T. Ching, Carlos Miguel A. Dauz, Ernesto S. Cajucom Jr, Carolina R. Tamayo</i>	77
Phytoremediation Potential of <i>Solanum Melongena</i> (Eggplant) in Absorbing Contaminants in Soil <i>Curt Justine P. Mangalino, Hazelle Joyz D. Caseres, Carlo Miguel C. Nofiel, Ernesto S. Cajucom Jr, Carolina R. Tamayo</i>	78
Observation of <i>Moringa oleifera</i> (Malunggay) Leafstalk for Inhibitory Microbial Activity against <i>Salmonella typhimurium</i> <i>Jesus Enrique B. Cacacho, Keanu E. Francisco, Gerard Cristi Naparan, Carolina R. Tamayo</i>	79

Eco-Friendly Charcoal as Substitute to Commercial Charcoal <i>Arnie Peralta, Catherine Sablan, Desiree Manatad, John E. Cordero</i>	80
Call for Papers	81

# **AGRICULTURAL CHEMISTRY**

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## **Phytoreductive-Hydrothermal Synthesis of Polyethylene glycol- coated Magnetic Iron oxide Nanoparticles for Drug Delivery Applications**

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### **Abstract**

Iron oxide nanoparticles (IONPs) can facilitate the delivery and sustain release of therapeutic agents to target sites of action, but conventional techniques to synthesize IONPs use highly reactive solvents, expensive and specialized equipment and produce potentially hazardous by-products. This study aimed to use phytoreduction with hydrothermal treatment as an alternative approach in the synthesis of IONPs. The leaf extraction of *Chromolaena odanata* was used as a reducing, capping and stabilizing agent. The extract was combined with anhydrous ferric chloride, and treated in the hydrothermal reaction vessel. The IONPs produced were coated with polyethylene glycol for the entrapment of a model drug-ciprofloxacin. UV—visible spectrophotometry showed absorbance peaks at 322 nm and 271 nm attributable to pegylated IONPs and the entrapment of ciprofloxacin. The diameter ( $18.12 + 1.44$  nm) and quasi-spherical shape of PEG-IONPs determined by Atomic Force Microscopy suggests that it can traverse intracellular spaces and ultra-small capillaries. Vitro release tests demonstrated ciprofloxacin incorporation with an encapsulation efficiency of  $76.49 + 1.24$  %. The system exhibited controlled release, sustaining the liberation of  $56.02 + 3.75$ % of the drug over a 120-minutes observation period. Broth micro dilution assay determined system MIC at 2.35 and 4.7 ug/mL for *E.coli* and *S.aureus*, respectively, confirming that the therapeutic effect of the drug was uninhibited by encapsulation procedures. The study showed that the phytoreductive-hydrothermal method is a viable alternative for production of IONPs.

Keywords: IONPs, phytoreductive-hydrothermal method

## **Multifunctional Textile from Green Synthesized Silver Nanoparticles Using the Aqueous Extract of *Cladophora Vagabunda***

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Kamille Pangantihon  
Kenneth James Gingo  
Sofia Millen Cartalla  
Clio Elizandre Villanueva  
Las Pinas City National Science High School

Ayra Patricia Alvero  
Jose Isagani Janairo  
De La Salle University

### **Abstract**

The rise of nanotechnology involves the use of harmful chemicals that is why the study used green synthesis in order to lessen and further eliminate the production of toxic by-products. An unwanted algae in Taal lake, known as *Cladophora Vagabunda*, was utilized in the synthesis. Textile was treated with AgNPs to improve its usefulness and suitability in everyday usage. For the methodology, strips of cotton fabric were soaked in algae-silver nitrate solution, pure silver nitrate solution, pure algae extract solution, and pure deionized water. The setups underwent visual observation where in the experimental setup exhibited a change in color from green to yellow-brown. The setups were also characterized through Scanning Electron Microscopy where the sample showed aggregations of AgNPs ranging from 400-700nm and the Energy Dispersive X-ray further confirmed the presence of silver in the sample while the Fourier Transform Infrared Spectroscopy evaluated the organic profile of the textile. The contact angle measure was 51° which is caused by the high wettability and hydrophilicity of the surface. The conductivity of the textile was also measured through resistance testing. The Disk Diffusion Assay was then used to determine the antibacterial activity of the textiles. The zones of inhibition against *S. aureus* and *E. coli* ranging from 9-10 mm were recorded. Based on the testings, the cotton textile embedded with silver nanoparticles green synthesized using the extract of *Cladophora Vagabunda* exhibited antibacterial properties.

Keywords: multifunctional textile, green synthesized, silver nanoparticle



## **Effect of Essential Oils in Inhibiting Mold Growth on Muffins**

Theresa G. Dangkulos  
Koraine Ericka G. Gapuz  
Glaiza B. Wagan  
Sheila Marie D. Baluran  
Caanawan National High School

### **Abstract**

The present study assessed the visible mold growth in muffins treated with essential oils. The study aimed to test the efficacy of essential oils in inhibiting mold growth, and provide natural preservatives instead of synthetic ones, since essential oils are known to have antimicrobial, antifungal, and antibacterial activities. The treatments used on the study are the following: T1, olive oil; T2, palm oil; and T3, coconut oil which were incorporated with the mixture of muffin prior to baking. The mold growth on muffin samples were evaluated through observation based on its appearance in the surface of muffins using gridlines. Results revealed that all treatments were comparable in terms of preventing mold growth, and found that all were effective preservatives in muffin as it exceeded the standard 3-4 days of shelf-life (Lopez-Malo et al., 2013). Sensory evaluation was also conducted with regards texture, taste and color. Treatments varied in ranking in terms of each category (texture, taste, color). However, statistical analysis showed that all treatments have no significant side effects in the physical attributes of muffins. The study aimed to meet the demand of consumers, which is to remove synthetic substances from the food, so it must be replaced with natural preservatives. Commercial bakers may use the result of the present study to extend the shelf-life of their baked products by using the tested essential oils.

Keywords: essential oils, muffins, mold

## Hapa-based Rearing of Nile Tilapia (*Oreochromis niloticus* L.) Fry Using Different Stocking Densities

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Ivan Dexter J. Tatum  
John Lester L. Velasquez  
Sheila Marie D. Baluran  
Caanawan National High School

### Abstract

The study highlighted the effect of Nile Tilapia (*Oreochromis niloticus*) fry reared in hapa-based method using three different stocking densities of 1,000, 2,000, and 3,000 pieces per 2 m<sup>3</sup> nursery hapa. The study was designed to determine the survival rate of the Nile Tilapia (*O. niloticus*) fingerlings; determine the size distribution rate of Nile Tilapia (*O. niloticus*) fingerlings; and the water quality parameters (D.O and water temperature) that may affect the survival rate and size distribution rate of Nile Tilapia (*O. niloticus*) fingerlings. A total of 18,000 pieces fry were used in the study which were randomly divided into 3 treatments. Each treatment was replicated thrice. The fry was fed using locally-available commercial feeds (48% crude protein) at a feeding rate of 30% throughout the 21-day rearing period. Based on the results, T I obtained the highest mean of 63.3 ( $\pm 4.4$ ) compared to T II, 48.7 ( $\pm 11.0$ ) and TIII, 34.7 ( $\pm 3.3$ ). It is observable that the lower stocking density, the higher the survival rate gain. Supporting this finding is the result obtained by Hecht et al., (1996) in which lower stocking density attained the higher survival rate. The study shows the result on the size distribution of fingerlings using the size graders of #24, #22 and #17. Based on the results, values obtained were comparable across treatment groups which ranged from 3.5-32.4 in in size 24; 43.3-53.3 in size 22; and 17.5-53.2 in size 17. Despite the difference in the values, no significant differences were observed across 3 treatments. The study intended to explain the issues relating to the stocking density of fish in relation with health of the fish, as well as explaining how research has generated an understanding of the issues and how that understanding has been turned into productive farming practices.

Keywords: nile tilapia, stocking densities

# **BASIC BIOLOGY**

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**Malunggay (*Moringa oleifera*) and Ipil-Ipil (*Leucaena leucocephala*) Leaf Meals in Feeding Nile Tilapia (*Oreochromis niloticus* L.)**

Benedict Q. Collado  
Cobe Bryan L. Cayan  
John Mark B. Salonga  
Rhey P. Tacaca  
Cristina F. Pablo  
Sheila Marie D. Baluran  
Caanawan National High School

**Abstract**

The growth performance in terms of weight, length and survival rate of Nile Tilapia (*Oreochromis niloticus* L.) was evaluated. There were three (3) treatments used in the study; T1 (Control) or Commercial feeds; T2 (Malunggay leaf meal), (30% Fish Meal+33%Malunggay+31%Rice Bran+5%Corn Starch+1%Fish Oil); T3 (Ipil-Ipil leaf meal), (30%Fish Meal+38%Ipil-Ipil+26%Rice Bran+5%Corn Starch+1% Fish Oil. The analysis of variance indicated that in terms in weight, length and survival rate of Nile Tilapia (*O. niloticus*) showed no statistical differences across treatments ( $p>0.50$ ). The weight gain and length gain of Nile Tilapia (*O. niloticus*) in 30-day culture period also showed no statistical differences among treatments ( $p>0.50$ ). However, treatments fed with commercially-available feeds and prepared feeds supplemented with malunggay and ipil-ipil leaf meal revealed comparable values. The findings showed that prepared feeds could support the growth of Nile Tilapia (*O. niloticus*). The findings also exhibited that two plant-based ingredients are effective as alternative fish feeds in feeding Nile Tilapia (*O. niloticus*) and the prepared supplemented feeds can reach the value of the T1 (Control) or the commercial feeds. The study serves as reference for small-scale fish farmers of using a viable alternative fish feed.

Keywords: malunggay, ipil-ipil, Nile Tilapia

**Growth Performance and Yield of Pechay (*Brassica rapa* L.)  
and Mustard (*Brassica juncea* L.) in Aquaponics System**

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Benjamin T. Baniqued Jr.  
Lorraine Jean C. Dumale  
Joana Marie N. Luna  
Cristina F. Pablo  
Sheila Marie D. Baluran  
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**Abstract**

The growth rate in terms of height (cm), number of leaves produced and yield (g) of pechay (*B. rapa*) and mustard (*B. juncea*) were determined in the study. The following treatments were used in the study: T1- pechay(*B. rapa*) and T2- mustard (*B. juncea*) as experimental plants with 35 replicates in each treatment was cultivated in Aquaponics System. Results showed that there is a significant difference in the growth performance and yield (cm) of pechay (*B. rapa*) and mustard (*B. juncea*), in growth rate in terms of height (cm), number of leaves produced and yield (cm) of pechay (*B. rapa*) and mustard (*B. juncea*). The higher mean value in growth performance and yield (g) was obtained in T2-mustard (*B. juncea*) wherein the number of leaves produced, 9.00 ( $\pm 2.10$ ), plant height (cm) 21.34 ( $\pm 6.18$ ) and yield (g) 148.57 ( $\pm 90.45$ ), respectively was significantly higher as compared to T1-pechay (*B. rapa*) that attained the lower growth performance and yield wherein the number of leaves produced 6.00 ( $\pm 1.65$ ), growth rate in terms height (cm) 13.39 ( $\pm 2.31$ ) and yield (g) 62.86 ( $\pm 21.38$ ), respectively. The study revealed that there is a significant difference between the growth performance and yield of pechay (*B. rapa*) and mustard (*B. juncea*) in Aquaponics System. Also, the study emphasized that mustard (*B. juncea*) and pechay (*B. rapa*) can be grown in a soil-less agriculture, using the Aquaponics system. The study supports the advocacy of conserving the limited resources and can provide remedy to reduce utilization of synthetic fertilizer through Aquaponics system, which empowers households to have direct access to clean and safe foods.

Keywords: pechay, mustard, aquaponics system

## **Fingerling Production of Nile Tilapia (*Oreochromis niloticus* L.) in Hapausing Different Sex Ratios**

Vladimir Larioza Dandan  
Joyce Magalong Collado  
Sheila Marie D. Baluran  
Caanawan National High School

### **Abstract**

The study aimed to investigate the effects of different sex ratios of the Nile Tilapia (*Oreochromis Niloticus* L.) Broodstockon. It was produced under the conditions of hapa in a pond. Two Broodstock sex ratios: 1♂:3♀ and 1♂:5♀ were tested using the spawning Hapas, each measuring 2m<sup>3</sup> when suspended in an earthen pond. Broodstocks were stocked at a density of 8 fishes per 2m<sup>3</sup> equivalent to 24 fishes per treatment (1:3) and 12 fishes per 2m<sup>3</sup> equivalent to 36 fishes per treatment (1:5), respectively. The female broodstocks' performance in terms of spawning rate was significantly different ( $P<0.05$ ) while the Fry-produced fishes were insignificant ( $P>0.05$ ) between treatments. Male and female Tilapia Broodstock survival rates did not significantly ( $P>0.05$ ) affect the experimental treatments and all treatments had a 100% survival rate. Water temperature that was observed in the study was in the range of 26-27.5 °C which affected the low spawning rate and low fry production of tilapia breeders. The present study concluded that the 1:3 sex ratio is considered an ideal sex ratio in the Nile Tilapia reproduction. The study attempted to give information on the fingerling production rate of Nile Tilapia (*O. Niloticus*) using the sex ratios of 1♂:3♀ and 1♂:5♀ in supporting and meeting the local demand of grow-out operators; thereby, increasing the supply of fish.

Keywords: fingerlings production, nile tilapia

# **BIOLOGICAL SCIENCE**

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## Teratogenic Activity of Exotic Mushrooms on the Developing Embryos of ZebraFish (Danio Rerio)

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### Abstract

In the present work, the toxic and teratogenic activities of the three selected exotic *Pleurotus* species namely, *Pleurotus djamour*, *Pleurotus citrinopileatus* and *Pleurotus ostreatus* hot water extracts were examined on zebrafish embryos as *in-vivo* model. The bioactive compositions of the air-dried mushrooms were obtained through hot water extraction. Embryos at 12 hour post fertilization (hpf) were exposed to the different concentrations (3%, 2%, 1%, 0.5%, 0.1% and 0.0%) of the three extracts in the 96-well-ELISA plates. Mortality, hatchability, heartbeat rate and morphological malformations of zebrafish embryos were determined. The results of the study highlighted that the lethal effects of the three mushroom extracts were found dependent on dose and time of exposure. At 12 hpta, among the three extracts, 3% (highest concentration evaluated) of *P. djamour* extract showed the highest percentage mortality, with a mean of 83.33%, while *P. citrinopileatus* had the lowest with a mean of 41.67%. Percentage mortality of 100% was significantly recorded in embryo treated with 1% or higher concentrations of extracts of the three *Pleurotus* species after 48 hours of exposure. The percent hatchability of embryos treated with 0.1% and 0.5% of extracts of the selected mushrooms were significantly lower than the controlled embryos. No hatched embryo was recorded in 1% or higher concentrations for both *P. djamour* and *P. ostreatus* and in 0.5% or higher concentrations for *P. citrinopileatus* extract. Tail malformation was the most marked morphological abnormality in embryos at 72-hpta, which was obviously caused by 0.1% and 0.5% extract. Growth retardation was evident in embryos exposed to 0.5% of *P. djamour* and *P. ostreatus* extracts and 0.1% of *P. citrinopileatus* extract. Taken the data together, the three *Pleurotus* species exhibited toxic and teratogenic activities against zebrafish embryo model, which strongly suggests that these selected mushrooms could be important sources of bioactive teratogen compounds that could be developed as anticancer drugs.

Keywords: exotic mushrooms, zebrafish



**Antimicrobial Property of Extracted *Wrightia Antidysenterica* (White Angel) Bark against *Salmonella Typhimurium* (*Salmonella*) Bacteria**

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**Abstract**

*Salmonella* is a major pathogen that can result to deadly food borne illness. It is a facultative anaerobic bacterium that poses as a microbial hazard in animal feed. The control of *Salmonella* in food involves the use of harmful chemical compounds. In view of this, the plant extract from *Wrightia antidysenterica* bark (White Angel) has been used to observe for its antimicrobial property against *Salmonella tryphimurium* using Mueller-Hinton agar (MHA) agar for disc diffusion technique. An antibiotic, Amikacin 30 µg was used as a positive control. The samples, *Wrightia antidysenterica* bark (White Angel) extract 100 % and 50 % produced partial inhibitory activity with mild reactivity with a total mean zone of inhibition of 10.00 mm against *Salmonella tryphimurium*. However, the positive control Amikacin 30 µg produced complete inhibitory activity with moderate reactivity and a total mean zone of inhibition of 15.33 mm against the test organism. The negative control showed no inhibitory activity and no reactivity against *Salmonella tryphimurium*. The inhibitory activity of *Wrightia antidysenterica* bark (White Angel) extract had a clarity scale of 1 to describe a zone of almost complete inhibition and the positive control Amikacin 30 µg had a clarity scale of 0 to describe a zone of complete inhibition of growth against *Salmonella tryphimurium*. On the basis of the present findings, *Wrightia antidysenterica* bark (White Angel) can inhibit antimicrobial activity against *Salmonella tryphimurium*. Incorporating the extract in or onto food manufacturing processes can be effective against food borne pathogen, especially *Salmonella* species.

Keywords: antimicrobial property, food borne pathogen, inhibitory potential, *Salmonella tryphimurium*, *Wrightia antidysenterica*

**Analyses of Pigments, Antioxidants, Vitamins and Immunostimulatory Effect of Khasi Pine (*Pinus kesiya*) Pollen in Nile Tilapia (*Oreochromis niloticus* L.)**

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**Abstract**

The pigments, antioxidants, vitamins and immunostimulatory effect of Khasi pine (*Pinus kesiya*) pollen were evaluated. The result of laboratory analyses showed that *P. kesiya* pollen had a total carotenoid of 2.90 µg/g, β-carotene of 0.06 µg/g, Chlorophyll A of 409.41 µg/g and Chlorophyll B of 704.68 µg/g. Also, *P. kesiya* pollen exhibited an antioxidant property of 271.10 mg/L. Vitamins A and C contents were 0.103 µg/g and 0.500 µg/g, respectively. The treatments used in the study: T1 (Injected with Physiological Saline Solution + commercial feeds); T2 (Non-vaccinated + commercial feeds); T3 Non-vaccinated + fed with pine pollen supplemented feeds); T4 (Vaccinated with *A. hydrophila* + pine pollen supplemented feeds); and T5 (Vaccinated with *A. hydrophila* + commercial feeds). In the hematological analysis, T2, T3, T4, and T5 showed no statistical differences ( $P>0.05$ ) except for the hematocrit count ( $P<0.05$ ). Comparison of means showed that T3 with 26.33% was statistically different from T2 with 38.67% ( $P<0.05$ ). The cell mediated immune response on differential count of spleen cells and spleen somatic index also showed no statistical differences among treatments ( $P>0.05$ ). However, the immunostimulatory effect of *P. kesiya* pollen was observed in Microtiter Agglutination assay. Fish fed with pine pollen supplemented feeds showed positive agglutination in T3 at dilutions 1:2, 1:8 and 1:16; T4 at dilutions 1:8192 and 1:16834 and T5 at dilutions 1:32768 indicating production of antibodies. Findings showed that pine pollen is an effective immunostimulant as shown in Microtiter Agglutination test that can be used in aquaculture to control fish diseases.

Keywords: antioxidants, vitamins khasi pine

## **Cilantro (*Coriandrum sativum*) Leaves as an Adsorbent of Lead in Aqueous Solution**

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### **Abstract**

Philippines is currently facing one of the greatest causes of poverty which is the lack of access to clean drinking water. The lack of clean drinking water is becoming a major problem worldwide due to the increased demands of growing population and urbanization (Kaushik, et al., 2012). Water impurities deprive the environment from safe drinking water that serves as one of the major needs of different organisms including the human population. These environmental and health issues triggered the researchers to come up with a research study on how to combat these problems. The researchers came up with a research study that uses Cilantro in adsorption of heavy metals. They aimed to determine if Cilantro is an effective agent in the accumulation of Lead (Pb). Specifically, this study also determined its morphological structure, amount of lead adsorb and its biosorption capacity. This study proved that Cilantro is an effective material when it comes to adsorbing heavy metals. This study can help the country, especially now, when the world suffers from clean water shortage. Samples of aqueous solutions contaminated with lead were prepared with a constant concentration of 150ppm. On the other hand, cilantro leaves were pulverized to achieve its powdered form. Different amounts of the pulverized leaves, specifically 6g, 9g and 18g, were added to the contaminated solution and were mixed at a constant time in order to accumulate the heavy metal. The solution was filtered afterwards to separate the powder containing heavy metals from the filtered solution. Scanning Electron Microscope, Graphite Furnace Atomic Absorption Spectrometry and a formula were used to test the surface morphology, amount of Lead adsorb and biosorption capacity respectively. Cilantro leaves are significantly effective upon using them as a heavy metal accumulator because of their adsorption properties within the outer wall structure. Previous studies showed that there's a hydroxyl group present in the outer wall of Cilantro that is ideal for absorbing and adsorbing heavy metals. The scanning electron microscope revealed that there are holes and spaces on the structure of the cilantro leaves which are the reasons why these are capable of adsorbing lead. Determination of the heavy metal accumulation was done by conducting Atomic Absorption Spectroscopy. Setups A, B, and C were effective in accumulating Lead in the aqueous solution because all of these gave a zero concentration of Lead. Upon using the formula, all gave 100% biosorption capacity which supported the tests done. In obtaining the significant difference, Analysis of Variance was used. It shows a significant difference between the three setups and activated carbon. Therefore, it was concluded that Cilantro is a feasible agent in the adsorption of Lead in an aqueous solution.

**Keywords:** cilantro, lead, adsorption, surface morphology, atomic absorption spectrometry, biosorption capacity, heavy metals

# **CIVIL ENGINEERING**

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## **Fabrication of Cement Tiles Using Mussel (*Pernaviridis*) Shell as an Aggregate**

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### **Abstract**

In the past few years, different problems on different variations of cement tiles were discovered. One such visible problem in cement and concrete tile production is the chipping around the edges, a manifestation of weak mixture or poor quality control. Substandard cement tiles offered in the market compromise the well-being of the consumers and even the community. The main problem is the fabrication and availability of substandard tiles commercially, and how these attract consumers due to cheaper price. The fabrication of substandard tiles will endanger the lives of the consumers instead of providing security, like what these are supposed to do. Mussel shells took part in the increasing amount of solid waste in the environment. Mussel shells are built out of calcium carbonate. The outer layer or periostracum is made of mostly protein, basically an organic skin over the top of the shell. But somehow, mussel shells are being wasted because these have the least purpose after the flesh has been eaten. Discarded shells are usually used for decorative purposes. Pulverized mussel shells were used as an aggregate for their high amount of Calcium Carbonate, a hard substance recommended as additive to the concrete structures to ensure strength. This study fabricated an efficient type of cement tile that utilized pulverized mussel shells as an aggregate proved beneficial not only for consumers, but also manufacturers. The experimental variables comprised of cement tiles A, B, and C with 40g, 50g, and 60g of pulverized mussel shells and the controlled variables were the commercially-available cement tiles. The set-ups were mixed with Portland cement, sand, and water and allotted with 7 days of curing time. Percent water absorption, impact strength, and compressive strength tests were the assessments conducted upon the fabricated and commercially-available cement tiles. In Percent Water Absorption test, the fabricated tiles were more efficient than the commercial set-up particularly tile A having 1.53%. In Impact Strength Test, both tiles A and B have the same aptitude having 43.33 and 45.00 as mean value respectively as those commercially-available ones. In Compressive Strength Test, only tile A having 31.43 as mean value was as efficient as the commercial tile. Microscopic Structure Test was also conducted using a microscope (with a magnification of 10x) which served as a qualitative description of the cement tiles. One tail T test and One-way ANOVA Test were the statistical tools used in the study. Based on the results gathered by the researchers from the three set-ups (40g, 50g, and 60g) of fabricated cement tiles upon conducting the three tests, the fabricated cement tiles were better in terms of their Percent Water Absorption while the best of the three set-ups was set-up number one which contained 40 grams of mussel shells having only 1.53% as its percentage because the lesser its percentage of water absorption, the better it is when it comes to cement tiles standard characteristics. It was shown in the One-tail T test that the entire amount was significantly effective as an aggregate for fabricating cement tiles in terms of Impact Strength Test. On the other hand, it was shown in the One-way Analysis of Variance that only the amount with the lowest mussel shells is the optimum amount in contrast with the other two because more mussel shells took up space for cement which served as the binder for the whole cement tiles that make them compact and strong. To summarize the results, cement tile A, which contained 40 g of Mussel shells performed better than the commercial cement tile. This states the utilization of pulverized mussel shell; enhanced the percentage of water absorption, strength, and structure of cement tiles. The successful fabrication of an efficient cement tile using pulverized mussel shells as an aggregate guaranteed the safety of everyone and relieved the problem in the increasing amount of solid waste present in the environment.

**Keywords:** Cement Tiles, Mussels Shells, Impact Strength, Compressive Strength, Percent Water Absorption

# **EDUCATION**

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## **Problem-Based Learning (PBL): A Heuristic Approach towards the Mathematical Achievement of Grade 8 Students in Solving Word Problems Involving Rational Algebraic Expressions**

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### **Abstract**

This experimental design study primarily focused on the utilization of Problem-based Learning (PBL) on the mathematical achievement of grade eight (8) students in solving word problems involving Rational Algebraic Expressions. The respondents were currently enrolled at Florentino Torres High School for the school year 2017-2018. Two sections from the Grade 8 level have been equated academically using their 1st quarter grades. The two groups, which were classified, are the Non-PBL group, who were exposed to traditional approach, and the PBL group, those exposed to problem-based learning approach. Both were given a 40-item pretest. The students in PBL group have undergone small-group tutorial meetings composed of 4-5 students inside the classroom in the application of the lesson plan using the PBL's seven-step approach (Camp et al., 2014). The following steps are: (1) Clarifying unfamiliar terms, (2) Problem definition, (3) Brainstorming, (4) Analyzing the problem, (5) Formulating learning goals, (6) Self-study and lastly; (7) Reporting. There are student's roles throughout the session which include the chair, the scribe and the tutor. Both groups were given a 40-item post-test after instructing them the whole chapter using different approaches. The data were analyzed using statistical methods such as Weighted Mean, Standard Deviation, Paired-sample T-test, Independent T-test and Mean Learning Gains. Upon completion of the study, the researcher discovered the following: 1) There was no significant difference between the two groups as they were academically equated with each other; 2) Both the PBL and non-PBL group have a good performance level as revealed by their pre-test mean scores of 21.52 and 21.93, respectively; 3) The posttest performance of both groups hit a very good mark as supported by the mean scores of 32.83 and 29.02 correspondingly. However, the PBL group performed better than its counterpart. 4) Though, there was no significant difference in the pretest performance of the two groups there is a significant difference that existed in the posttest performance of two groups, between the pretest and posttest performance of the non-PBL group, and the pretest and posttest performance of the PBL group; 5) By comparison, the mean learning gains of PBL group is 19.20% higher than its counterpart; and 6) there was a significant difference that existed between the mean learning gains of the two groups. It can be derived from the study that: 1) The employment of the two approaches are both effective in raising the performance level of students; and 2) The utilization of problem based learning (PBL) in the lessons is more effective than teaching in a traditional way. The study recommends the following: 1) Teachers who are advocates of the Non-PBL approach may try discussing the problems comprehensively using Polya's four-step problem solving technique for the students to cope with the necessary skills needed to come up with a correct answer as this is deemed helpful in improving the students' performance; 2) Teachers should give PBL a try as this approach has been proven effective throughout the conduct of the study; 3) For the utilization of PBL to be more effective, trainings should be set for teachers as these will further expound the use and process of integrating PBL in different subject areas; and 4) Future research can be done with regards to the use of PBL, as it is a promising avenue for the further growth and development of both the teachers and the students.

Keywords: PBL, algebraic expressions

**The Comparability of ALS and NON-ALS Oral Communication  
Performance of Grade 11 Students**

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**Abstract**

The study focused on determining the comparability of ALS and NON-ALS groups' performance of Grade 11 students in Oral Communication in Context at Las Piñas City National Science High School. The researcher employed the two-group pre-test post-test quasi-experimental design and the statistical tools applied were Mean, Standard Deviation and Paired T-test. Upon completion of the study, the researcher discovered that there was a significant difference between the pre-test and post-test scores of both groups. The paired T-test also revealed that the performance of both groups in Oral Communication in Context were identical prior to the implementation of the teaching strategies. It also showed that the post-test scores of both groups increased but the ALS (active learning strategies) group had higher scores. Thus, for maximizing the learning capacity of students, active learning would be a better choice in teaching Oral Communication in Context among Grade 11 senior high school students.

Keywords: active learning strategies (ALS), non-active learning strategies (non-ALS), teaching approach, teaching strategies



## **Development of Strategic Intervention Material: Its Effectiveness to Grade 7 Academically Challenged Learners on Concentration of Solutions**

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### **Abstract**

Based on the first quarterly examination S.Y. 2014-2015, Grade 7 students had a difficulty in understanding solutions, especially on parts that need mathematical operation. Most of the students left the problems unanswered. Moreover, after the discussion of the concentration of solutions, specifically on percentage by mass and volume during the first quarter of S.Y. 2015-2016, several exercises were given, but still there were students who really needed remediation. Out of the 125 students handled by the researcher, there are 31 or 24.8% who needed remediation. In this regard, this study is geared towards the development of a strategic intervention material (SIM) in Grade 7 Science that enhances learning and remedies the least mastered competency of the students. The researcher identified the learners needing remediation in expressing concentration of solutions based from the result of their summative test. The students were divided into two (2) groups. The first group was exposed to the prepared strategic intervention material and the second group to the traditional method of teaching. Initially, there was no significant difference on the performance of the experimental and control group in the pretest. It implies that both groups of respondents have the same level of mastery before the strategic intervention material was introduced. Posttest results revealed that there is a significant difference between the two groups of respondents. There is also a significant difference in their mean gain scores. It means that the intervention materials were effective in addressing the least mastered competency than that of the traditional method of teaching. The test of difference between the pre-test and posttest results of the experimental group showed significant difference. This indicates that the experimental group had performed well in the posttest than in the pretest. These results imply that there was a positive transfer of learning in experimental group after the presentation of the strategic intervention material.

Keywords: SIM, strategic intervention material

## **Application of Flipped Classroom: An Action Research in Enhancing Student Academic Achievement in Earth and Life Science Subject**

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### **Abstract**

Flipped classroom approach is a constructivist approach that helps students build their own concepts and knowledge independently. In this method, instructions are typically given at home and assignment is done inside the classroom. Frequently, instructional videos are being developed or utilized to support the method to purposely introduce the concepts. The current study focused on the utilization of this approach to enhance students' academic achievement in the subject, Earth and Life Science. The academic achievement was determined using the test scores after the delivery of the instruction. Mixed research approach served as the framework of the study. Thus, in the quantitative aspect, a quasi-experimental method was used to compare the means of the control group and experimental group after given a pretest/post-test. Furthermore in the qualitative aspect, a semi-structured interview was employed to determine the perception of the students about the treatment of the approach. A significant p-value of 0.003 was computed from the scores of the post-test of both the control and experimental group. Hence, the application of Flipped Classroom in the subject Earth and Life Science showed a positive effect to the student's test scores. In addition, students were positive in the utilization of the approach however, some were not yet ready and still reluctant in the application of flipped classroom. Flipped classroom in general shows a positive effect in the academics of the students in terms of test scores. The approach may be utilized to enrich teacher's instructions to effectively enhance the academic achievement of the students.

Keywords: flipped classroom, action research

**A Glimpse at the Learning Styles of Grade 12 STEM Strand Students of the University of the City of Manila as a Focal Point of their Learning Ability Concerning Spelling in Filipino**

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**Abstract**

Each student is a totality of an individual; each has his/her unique characteristics and nature – a starting point of the realization of his /her effective learning. These said characteristics can be traced in the manner by which he/she learns as well as his/her liking and inclination towards the diverse teaching strategies of a teacher. The study aimed to have a glimpse of the learning strategies of the 149 Grade 12 STEM strand students of the University of the City of Manila and to use it as a focal point towards their being able to learn the rudiments of spelling in Filipino. Utilized in the study were Felder and Silverman’s Index of Learning Style (ILS) as well a researcher-made questionnaire that was administered to the students during the pre and post-tests. So as to determine the significant difference of the pre and post-tests, the t-Test of an Independent Sample was used. Based on the findings of the study, a slight improvement in the mean score of the post-test being 18.25 as compared to 15.82 mean score of the pre-test was observed. Similarly, a significant difference was seen in the score of the students before and after an intervention was made. However, the 18.25 post-test mean score out of 30 items is only equivalent to a grade of 75 that is, if one would consider the 60% passing mark set by the Department of Education. The result of the study implies that the three week teaching duration of the rules in spelling concerning Filipino Ortography is not enough considering that the subject is quite difficult to learn and not really a focus of the subject *Filipino sa Piling Larangan*. Nonetheless, it is still useful to consider the students’ learning styles. The study recommends the following: for the Department of Education and school administrators to develop a program that would promote the utilization of teaching strategies that take into account the different learning styles of the students, for the teachers to try out teaching strategies that would suit their students’ learning styles, and for the students to experiment on a suitable learning style which they can use to further improve their knowledge and maximize their development.

Keywords : learning styles, teaching strategies, spelling, ortography

**Quipper School Integration and Performance in Science of Grade 7 Students of Muntinlupa Science High School SY 2017-2018**

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**Abstract**

The 21<sup>st</sup> century learners are very engaged in the use of modern technology, as it is very helpful in social networking, recreation, communication and even in academic tasks. This study investigated the integration of an online learning portal, the Quipper School, to the study of Science and its effectiveness on the academic performance of the Grade 7 students. After a series of orientation, seeking permission from necessary individuals, and administering the pretest, the researcher had established 2 groups: The experimental group with Quipper School integration and the control group who received traditional method of teaching. Pretest results revealed that there was no significant difference between the control and experimental groups. At the end of the experiment, it was revealed that there was a significant difference in the post-test results between the experimental and control groups. It also showed that the experimental group achieved a mastery level in the post-test while the control group achieved near mastery level. This study concluded that the use of modern technology in the form of Quipper School is effective in improving the academic performance of the Grade 7 students. The researcher highly recommends to elementary and high school teachers the integration of Quipper School to their teaching because it will keep their students on task wherever they are. It is also recommended that the schools must have a strong Internet connection installed so that the students will be able to access the online learning portal.

Keywords: quipper school integration, 21<sup>st</sup> century learners

## **The Master Teachers as Catalysts in Bringing Schools to Greater Heights**

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### **Abstract**

This case study research, with the use of phenomenological analysis, explored the experiences of Master Teachers in high performing schools in the Division of Angeles City in their pursuit of achieving instructional effectiveness. The study was guided by a grand tour question, addressed by four sub-questions which elicited significant responses on the instructional effectiveness practice anchored in National Competency-Based Teacher Standards. Data collected, using analytic induction during the individual interviews with eight (8) master teachers in high performing school indicated in School-Based Management Level of Practice provided the basic understanding of the best practices and rich experiences in instructional effectiveness. Using open and axial codings, four (4) themes emerged from the interviews: cutting-edge professional development activities, responsive curriculum enrichment, superior teaching qualities, and 21<sup>st</sup> century learner-centered teaching strategies. Culled from the themes and categories, a proposed model of instructional effectiveness was built and developed. Implications of instructional effectiveness were carefully discussed as well as recommendations to achieving instructional effectiveness as a vital component in achieving internal efficiency. The new developed model for instructional effectiveness will set the standards for teachers, to be able to fulfill the necessary pedagogy and instructional knowledge they need to teach 21<sup>st</sup> century learners.

Keywords: instructional effectiveness, catalysts, phenomenological introspection, analytic induction, greater heights

**Utilizing Content and Language Integrated Learning (CLIL) in Enhancing the Reading and Writing Skills of Grade 11 Students**

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**Abstract**

The study focused on determining and investigating the effectiveness of Content and Language Integrated Learning in Enhancing the Reading and Writing Skills of Grade 11 students at Paliparan II Integrated High School. The researcher employed the quasi-experimental research with one group pre-test and post-test design and the statistical tools applied were Mean, Standard Deviation and Z-test. Upon completion of the study, the researcher discovered that there was a significant difference between the pre-test and post-test scores of the students in the reading and writing test after the utilization of the teaching strategy. The Z-test also revealed that the performance of the students in the reading and writing test was identical prior to the implementation of the teaching strategy. It also showed that the post-test scores of the students achieved significantly higher compared with the pre-test score. Thus, for maximizing the learning capacity of students, Content and Language Integrated Learning would be a better choice in enhancing the reading and writing skills of the students.

Keywords: content and language integrated learning, reading and writing skills, teaching strategies

## **Loading Scheme for the Mathematical Proficiency of Secondary Sophomores**

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### **Abstract**

This study is anchored in the Cognitive Load Theory which plays an important role in proficiency and mastery in Mathematics. Cognitive Load Theory refers to the load on working memory during problem solving, thinking and reasoning processes. It involves understanding how many discrete units of information can be retained in short term memory before information loss occurs. This theory has been designed to provide guidelines in the presentation of information in a manner that encourages learners to engage in activities which optimize intellectual performance. It is an instructional design theory which aims to assist instructional designers to reduce the load caused by poor design of the learning materials. The ultimate concern of this study is to determine the effectiveness of the loading scheme of Mathematical proficiency among second year students of San Joaquin-Kalawaan High School, during the school year 2011-2012. This research involved three groups of respondents, according to the loading scheme of below average, average and the above average. The teaching strategy applied in this study was anchored from the Cognitively Load Theory which utilized the worked-example method wherein students were believed to learn and increase their proficiency level in Mathematics. This study utilized the quasi-experimental research. Data were gathered by conducting the pre-test and post-test which were constructed by the researcher. The data gathered were treated statistically using Mean, Standard Deviation, t-Test for Dependent Sample and Analysis of Variance. To measure the statistical data, the researcher used the Statistical Package for the Social Sciences (SPSS) program. No significant difference was noted in the pre-test results of the three groups, namely; the below average, average and the above average groups. Since the topics and the intervention have not been introduced yet; the computed F value of 2.11828 is less than the F critical value of 3.199582 at 5 percent level of significance. The pre-test results revealed that each group of respondents had almost similar knowledge of the lessons at the start of the experimentation. With regards to the proficiency level of each group in the pre-post test using the loading scheme, it was found that there was a significant difference. Therefore, the null hypothesis was rejected. The marked improvement in the level of proficiency could be attributed to the effectiveness of the loading scheme. The post-test results of the three groups revealed that they performed better than in the pre-test. The computed value of 17.17889 is greater than the critical value of 3.195056 at 5 percent level of significance. This implies that the loading scheme in improving proficiency in Mathematics among second year students is effective. Since the method is effective, it is valid to be used. In the light of the previous findings, the researcher concluded that it is very helpful to classify the level of performance of the students based on their previous Mathematics grades, so as to determine their needs. The Cognitive Load theory has significant benefits in terms of reducing training time, and improved performance on tasks using the learned knowledge and skills in Mathematics. Moreover, the worked-examples strategy is considered valuable and helpful in increasing the level of mastery and proficiency among students. Furthermore, the loading scheme is effective in improving the proficiency of students in Mathematics. It is therefore recommended that teachers should utilize this teaching strategy since its effectiveness in improving proficiency has been established. The school administration should provide training to teachers on the utilization of the loading scheme to enhance the mathematical proficiency among the students. Likewise, instructional designers must develop materials that are cognitively efficient with the aim of assisting the students to reduce the cognitive load. The loading scheme of mathematical proficiency should be tested on a bigger scale and for a longer duration, so that the other aspects of the learning process can be explored. Finally, it is hereby recommended that further researches be conducted along the same line, probing on the variables related to students' proficiency and its relation to their academic performance in Math.

Keywords: mathematical proficiency, cognitive load theory

## **Biology Activity Cards for Design Thinking: Effects on Student Creativity and Self-directedness**

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### **Abstract**

With the increasing sophistication of everyday life, globalization, advancement of technology and tightening economic competition, innovative capacities comprised in the 21st century skills have become crucial for individuals to survive in an ever changing society. It is, nevertheless, essential to prepare learners who are not only equipped with academics, but also with the capacity to adapt well with the needs of the community. Content learning is important, but in order to effectively internalize knowledge, metacognitive competencies, attitudes, values, and action skills are crucial. With the beginning of the 21st century, many teaching practices developed in schools, such as student-centred and independent learning, project-based and cooperative learning, as well as authentic assessment seem to have gone main stream. Along with this list of main stream practices, some practices that cater specially to the growing interests of society are already being boarded across disciplines, one of which is Design Thinking. The approach has received attention in business, engineering, architecture, and design majors in universities because the process can change how students learn and solve problems (Dym, Agogino, Eris, Frey, & Leifer, 2005; Fricke, 1999; Nagai & Noguchi, 2003). Design thinking is generally defined as an analytical and creative process engaging a person in opportunities to experiment, create and prototype models, gather feedback, and redesign (Razzouk & Shute, 2012). Design thinking has been a millennium rave in revolutionizing the teaching of both chemistry and physics in both the secondary and undergraduate levels of instruction as it changes the dynamics of model creation and assimilation of interdisciplinary concepts and skills. Aside from this the educational system is into developing learners who are self-directed and goal efficient to create a more meaningful learning. In lieu of the absence of research literature that tackles Design Thinking as used in Biology. Biology is known as more abstract among the Science disciplines. Even so, Biology is one of the more engrossing, in terms of scientific development, environmental awareness, health and fitness awareness, and even into looking at the lucrative careers that are expected to boom in the next years. The study addresses the challenge of creating a meaningful science learning that caters to developing creativity and self-directedness. The study also takes the challenge in implementing Design thinking principles through the use of biology activity cards to build a student-centred, collaborative, and holistic platform that supports innovation.

Keywords: self-directedness, biological activity



## **Effectiveness of Explicit and Implicit Methods in Teaching Selected Grammar Topics**

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### **Abstract**

This study sought to determine and compare the effectiveness of two methods in teaching grammar: the explicit (or rule-driven) and the implicit (rule-discovery) method. Grammar is fundamental to effective communication; thus, teachers continuously need to explore methods and approaches to teaching grammar effectively. The experimental method with a pre-test and a post-test was used with 20 students taught using explicit method, and another 20 taught using implicit method. Results showed that both the explicit and implicit methods are effective in teaching grammar as indicated by the improvement in the post-test results of the two groups of students. Also, students taught using the explicit method performed significantly better, as indicated by the significant difference in the post-test results of the two groups. In connection to these findings, the following recommendations are offered. Teachers should continue explaining grammar rules to students, but these should be complemented by production and communicative activities. Likewise, teachers should expose their students to activities, which will allow them to analyze grammar used in context and to formulate hypotheses about how grammar features operate. Moreover, school administrators are encouraged to train language teachers in developing language lessons following the explicit and implicit methods.

Keywords: teaching grammar, language teaching methods, English language teaching

**Factors Affecting the Academic Performance of Grade 8 Students in Technology and Livelihood Education in District 1, Caloocan City**

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**Abstract**

The study determined the Grade 8 students' academic performance in District I, Caloocan City. The researcher wanted to know further the extent of the influences of different factors affecting students and what they implied on the academic performance in Technology and Livelihood Education. There were reasons behind each good performance; likewise, it was not only the student factors, but there were also teacher factors, school factors, and home factors as well. To achieve this goal, the researcher employed the descriptive survey method of research employing the questionnaire as the instrument in data gathering. There were 285 Grade 8 student respondents, chosen by the cluster method, using sections as clusters. Two sections were randomly selected from the Bagong Silang High School, Benigno Aquino Jr. High School, and Kalayaan National High School. Data were tabulated with statistical tools such as Frequency, Percentage, Weighted Mean, and Pearson r-correlation. The Likert Scale was used to investigate the students' perception about the relationship of these factors to academic performance in Technology and Livelihood Education, while the academic performance was gauged in the second grading grades results. Findings indicated that there was a significant relationship on the teacher factors and school factors affecting the academic performance of student respondents. Comparatively different from the findings for both student factors and home factors which were not significant. There was not enough evidence in relation to the students' academic performance. The conclusions were based on the results of highest and lowest weighted mean. Also, recommendations were made according to the findings.

Keywords: Technology and Livelihood Education, student factors, teacher factors, school factors, home factors and academic performance.

**To Leave or To Stay?: A Qualitative Study on College Student Withdrawal in the Province of Laguna**

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**Abstract**

This study undertakes an in-depth qualitative analysis on reasons for withdrawal among the SUC's, LUC's and Private Colleges in the province of Laguna to inform current and future approaches to student retention. The qualitative data gathered are used to elaborate the similarities and differences among higher education institutions, and aimed to offer a wider understanding of why students withdraw from higher education in this country. The findings pointed to the need for an efficient and humanistic approach to respond to the issue of student withdrawal, and the importance of a more systematic approach across the sector. Although this is true for a particular group of students, it should not be the sole lens through which withdrawal is viewed. The conclusions draw out the policy implications of the findings and point to areas that require further research. A more systematic approach to student withdrawal should be collaboratively developed by all higher education institutions. There is the need within higher education policy to adopt a broader perspective on student non-completion recognizing that student non-completion can actually be part of a student's broader career plan as well as being a potentially negative phenomenon. It is also suggested to have a more integrated approach to higher education provision needs to be developed, including recognition of the links between student non-completion and other public policies including the operation of the student grants system and transportation planning. Further qualitative studies to understand the "pull" factors that keep students in institutions when they have considered withdrawing would be the key to the evidence based inputs needed to further address attrition and retention.

Keywords: SUC, LUC, withdrawal

## **Audio-Visual Scaffold to Smart Speaking for Grade 11 Students**

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### **Abstract**

Pronunciation is definitely the biggest thing that people notice when one speaks in English (Cook, 2000). It creates the first impression one makes. In her Oral Communication class, the proponent observed that students tend to use their vernacular speech patterns when speaking in English. Furthermore, in the pre-assessment on production of 46 sounds in English among the students it was found out that 4 of the vowel sounds, 2 consonant sounds and 1 cluster sound ‘cannot be enunciated’; and 5 vowel sounds, 6 consonant sounds and 6 cluster sounds pose ‘some difficulty’ to the Grade 11 students in the TVL. But in the competencies of the subject, the learner proceeds immediately to communicative situations after the introduction of the communication process. Hence, this study aimed at injecting an intensive pronunciation instruction in the existing content of the subject to remind students of and provide them intensive drills on the sounds and speech patterns of Standard English. The teacher-made audio visual scaffold to smart speaking was specifically developed for this purpose. The before-and-after experimental design was used in this study with classes 1 and 2 purposively chosen based from the results of the pre-assessment and randomly assigned as experimental and control groups. The assessment tool was lifted from a module used for the English Proficiency Program (EPP) at the Language Skills Institute (LSI) of Technical Education and Skills Development Authority (TESDA). The pronunciation pre-assessment was done through reading aloud. The post-test was conducted after a week of intensive pronunciation practices. Parents’ consent was sought and assent forms were signed before the conduct of the study. After the instruction, participants in classes 1 and 2 were able to enunciate, though with difficulty, all the sounds. Moreover, those in class 1, who were taught and practiced with the audio-visual scaffold to smart speaking, were able to step two scales higher with the /ə/ sound. In addition, students in class 1 found some difficulties in producing the vowel sounds /ē/, /ū/, /ü/, and /ä/, the consonant sounds /p/, /t/, /r/, /z/, and /th/ (unvoiced), and the cluster sounds /thr/, /sp/, /fs/, /sks/, and /sts/ while students in class 2 found some difficulties in producing the vowel sounds /ē/, /ə/, /ū/ and /ō/, the consonant sounds /p/, /t/, /r/, /z/, /sh/ and /th/ (unvoiced), and the cluster sounds /thr/, /fs/, /sks/ and /sts/. After the pronunciation instruction, students in classes 1 and 2 were able to find no more difficulty in enunciating these sounds. The students still found some difficulties in enunciating the other sounds, but comparing the mean scores, it is noticeable that they have increased from the pre assessment. Comparing the results, it is noticeable that the increase in the scores of class 1 is higher than the scores of class 2. This implied that students who practice with the audio-visual scaffold enhance their speaking skills better than those who did it without the scaffold. The researcher recommends that students be exposed to more speaking activities to enhance their speaking skills especially in enunciating and pronouncing words properly. Furthermore, it is recommended that teachers develop audio-visual scaffold which they can use to enhance students’ speaking skills.

Keywords: pronunciation, enunciation, oral communication, audio-visual scaffold

## **Hugot Lines: A Technique in Improving the Academic Achievement and Creative Thinking Skills in Science**

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### **Abstract**

In this thinking world, teachers matter. The ability of a teacher to innovate and create techniques, strategies or tools to enhance the teaching and learning process ensures that problems in the educative process are taken into account. While students themselves are the most responsible for their own learning, good teachers accept the responsibility for the learning of their students. Teenagers are into using hugot lines as a means of getting something out from somewhere deep. Their lines may be related to the emotions they have for any situation. The researcher saw the connection of this pop culture to students, that's why a strategy was devised to improve understanding of concepts in Biology by developing hugot lines. This action research is geared towards the improvement of the academic performance and creative thinking skills of select Grade 9 students at Bagumbayan National High School through the use of Hugot Lines. Purposive sampling was employed in the study. Section A was taught using the Traditional Method while those in Section B were the experimental group that produced hugot lines. A total of 91 students formed part of the research. Forty- four students comprised Group A while forty- seven were in Group B. The quantitative- qualitative design was used to measure the academic performance of the respondents, scores in pre-test, post test and long test were compared. Descriptive statistics was employed in this study. The creative thinking skills on the other hand were measured through the use of rubrics. Interviews and observations formed part of the data gathering procedure. The results of the study showed that the control group performed better than the experimental group during the pre-test but was outperformed on the post test and long test. After the experimental group was exposed to Hugot lines, a marked improvement on the post test and long test scores was noted. Furthermore, the students were able to better ignite their creative thinking skills by making their own hugot lines. The intervention was well received by the respondents who noted having fun while learning. It is undeniable that many students find Science difficult. Some might even claim that it is a boring subject, since it entails a lot of effort and perseverance. Learning Science should include fun and excitement especially in Biology which requires a lot of concepts to be understood. The use of *hugot lines* in Science is a cheap, but effective way of making students better learn the subject. It can then be concluded that the use of Hugot Lines is effective in improving the academic performance and creative thinking skills in Biology of Grade 9 students at Bagumbayan National High School.

Keywords: hugot lines, academic performance, creativity, Biology

## **A Supplemental Module to Improve the Conceptual Understanding of Hydrocarbons of Selected Grade 9 Students**

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### **Abstract**

For so many years, instructional materials have been developed and utilized in different subject areas, but still the use of effective instructional materials in teaching has long been a concern. This study attempted to design and evaluate a supplemental module which aims to determine whether the students will have a better conceptual understanding of hydrocarbons. The subjects of the research were sixty (60) students of Muntinlupa Business High School during the school year 2015 – 2016. The students were divided into two (2) groups: thirty (30) of them had undergone learning with the use of the module marked as Group 1 and the other thirty (30) had undergone learning without the use of the module marked as Group 2. Researcher-made pre-test and post-test were the research instruments. The findings obtained from the quantitative data showed that there is a significant difference in the conceptual understanding of the students about hydrocarbons particularly those students who had undergone learning with the use of the module compared to the students who had undergone learning without the use of the module. This suggests that the supplemental module significantly contributed to the conceptual understanding of students about hydrocarbons. The use of the module, indeed, improved the quality of instruction making the entire teaching-learning process more meaningful and relevant.

Keywords: hydrocarbon, module, conceptual understanding, teaching-learning process, meaningful, relevant

## **Looking Crochet Arts Through the Lens of Mathematics**

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### **Abstract**

Textile arts had shown geometric transformations among their patterns, like in weaving and embroidery, as well as foreign crochet arts. Crochet art, compared to other textile arts, requires little material and time to be made. This study is about the analysis of Philippine crochet arts' modern geometry principles, specifically, transformational plane geometry principles. The researchers utilized the flowchart of geometrical transformation to determine the symmetry group of crochet arts. This includes the flowchart involving reflection, rotation, translation and glide reflection. Also, this study showed that symmetry groups, which include Frieze groups, Rosette groups and Wallpaper groups, are present in crochet arts, and can be all found in a single crochet art. Centerpieces, dresses, skirts and scarves have shown various geometric transformations and symmetry groups. This study serves as evidence of the existence of geometric and symmetry patterns of crochet arts, as well as an example for artisans in making ideas and designs of crochet arts.

Keywords: symmetry groups; geometric transformations; crochet arts; textile arts; modern geometry

**Bitterness on the Top of the Pie: Challenges in Arduino Robotics from A Public School Students' Perspective**

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Maliwalo National High School

**Abstract**

Robotics which has already become an essential part of the global economy is now considered as the best tool for Project Based Learning. However, literature shows that project-based work is not common in science classrooms and students do not have the expected level of skills and knowledge to execute project work. Therefore, the importance of this study was to find out the challenges that the Grade 9 researchers faced in conducting researches using Arduino robotics for the Science Investigatory Project. This research utilized descriptive qualitative study wherein the researchers interviewed the Grade 9 students under Science, Technology and Engineering Program (STEP) who faced the challenges in conducting researches using Arduino robotics, which is the main focus of this study, using a researcher-made interview guide. Findings revealed that the respondents encountered challenges in terms of the acquisition of the materials they needed, time management, sufficiency of fund, and they lack knowledge and background on Arduino robotics. Dealing with these challenges, the respondents looked for alternatives, filled their own minds with knowledge and they sought the help of professionals. Determining the challenges while preparing and conducting a project or understanding how project work is conceived vital. This may serve as basis for the future researchers to focus on these challenges in order to meet the desired level of project work.

Keywords: robotics, project-based learning



**The Teaching Styles of Mathematics Teachers and Students' Academic Performance in Mathematics: A Correlation Analysis**

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**Abstract**

This research study focused on assessing the teaching styles (Contemporary/ Modern Style of Teaching or Conventional/Traditional Style of teaching) of Grade 8 Mathematics teachers and academic performance of students handled by these teachers in the Division of City School – Manila during the school year 2017 – 2018. The respondents of the study were all the 67 Grade 8 Mathematics teachers from the public secondary schools in the City Division of Manila who are assigned in the different public secondary schools in all the six districts. This study used the descriptive method of research as it assessed the teaching styles of the teachers. It is also a correlational study, since it delved on finding the relationship between the teachers' teaching styles and students' academic performance in Mathematics. The data were analyzed using statistical tools such as Mean, Percentage, Standard Deviation, Pearson r, and One Way Analysis of Variance or F Test. The significance of the difference and influence of the variables were tested at 0.05 level. The study revealed that the students are generally fair in Mathematics. The teachers adhere to the contemporary way of teaching. The students' Mathematics performance is independent of the teacher teaching styles. The teachers exhibited the same teaching styles regardless of age, educational attainment, and length of service.

Keywords: teaching style, conventional style, traditional style

## **Development and Validation of Competency-based Assessment tools in General Biology for Senior High School STEM Students**

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### **Abstract**

Any change in the content and pedagogical focus of the curriculum needs a corresponding change in the assessment procedures. Assessments that enable to measure skills holistically are therefore important where such tools focus not solely on the knowledge but on skills and attitudes acquisition. Educators are therefore challenged to anchor assessment methods in the competencies of the subject. This is especially emphasized in the implementation of the K-12 curriculum in the Philippines. Senior High School is now in full swing. It is timely that the Department of Education provides a means of assessing student competencies in the different subjects including Biology. Attainment of competencies can only be evaluated using appropriate tools of assessment. Since Senior High has just been implemented, we do not have a standard tool in Biology for teachers to accurately gauge whether or not the students were able to develop the expected competencies in the said subject and to what extent. This descriptive-developmental study focused on developing assessment tools which were based on the competencies in General Biology for use in the Senior High School STEM. Specifically, it aimed to: determine what assessment tools may be developed which are competency-based and making use of traditional and performance-based assessments; determine the validity and reliability of the assessment tools developed through expert-validation and pilot-testing, respectively; revise the assessment tools based on the results of the validation process; and produce an assessment package out of the developed tools. There were two phases in the study, namely: assessment tool development phase and validation and pilot-testing phase. The first phase included the development of both traditional and performance-based assessments and the second phase involved the series of validation by expert-jurors of the content and technical aspects of the assessment tools. From the conduct of the study, the development of assessment tools were based on the competencies provided in the Curriculum Guide of Senior High School Biology under the STEM strand. They were both traditional and performance-based in nature. The development of the tools began with the use of Table of Specifications (TOS) made from the Curriculum Guide of STEM General Biology. Then, traditional multiple choice and performance-based assessments were developed based from the TOS. These were subjected to content validation by experts and then revised according to their suggestions for improvement. After revision, the traditional assessment was subjected to first pilot-testing to determine its discrimination and difficulty indices and in order for non-discriminatory items to be removed. The improved version was again subjected to second validation by a different group of experts to look into the technical aspect. Upon second validation, it was again revised and pilot-tested for the second time to a different group of students. The second pilot-testing allowed some more items to be discarded and yield the final version of the multiple choice assessment. This had undergone the final administration among selected STEM Students in Albay. The final administration yielded the reliability value upon subjecting the students' responses to statistical analysis. In the case of the performance-based assessments, the first revision of the tools as a result of first validation was followed by second expert validation and then second revision. After such, the performance-based assessments were pilot-tested to 62 STEM students. This yielded the reliability value upon subjecting the students' responses to statistical analysis. STEM students in the Tabaco City, Legazpi City, Ligao City and Albay Divisions who finished General Biology 1 and 2 served as the main respondents of the study. Selected students from schools covered by these divisions took the expert- validated test and perform performance-based assessment tasks. The first version of the traditional assessment had a mean rating of 3.9 out of 5. Aiken's validity test yielded 0.74, which falls within the acceptable value of validity. The inter-rater agreement was equal to 0.78 which means that the experts had a substantial agreement in rating the traditional assessment. The Cronbach Alpha value is equal to 0.873. This value indicates that the traditional assessment had an acceptable value of reliability based on cited literatures. The performance-based assessments had a mean rating of 3.98 out of 5 coming from the experts which means that the indicators were very satisfactorily observed in the tasks. Its reliability value using Cronbach alpha is 0.927 for the performance tasks. Revisions in terms of content and technical aspects were also made based on the comments and suggestions of the experts. Finally, an assessment package was produced featuring the developed assessment tools. This is titled the General Biology Assessment Toolpak (GBAT). The salient findings of the study were: the assessment tools developed were both traditional and performance-based and were based on the General Biology Curriculum Guide for Senior High School. They were therefore competency-based; both the traditional and performance-based tasks were reliable upon validation and pilot-testing; several revisions were made to refine the assessment tools and improve their content and technical construction. Following the validation procedures, an assessment package was produced featuring the assessment tools developed. The researcher therefore, recommends the following: administering the assessment tools to other STEM students outside the province of Albay; using assessment tools that are appropriate to the expected competencies of students in the STEM strand; making use of the results of assessments to reflect on the extent of student participation, engagement and commitment in the learning process.

Keywords: competency-based assessment; Performance-based assessment; traditional assessment; validity; reliability

# **LITERATURE**

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## **Presupposition in Philippine and American Editorial Headlines: A Contrastive Study**

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### **Abstract**

Presupposition, as one of the properties of language which impinges on readers' understanding of facts and events through using subtle linguistic devices and constructions, is considered as an interesting topic in a linguistic research. Particularly, its role in newspaper editorial headlines is of great importance as it aids the writers in propagating their ideologies. This paper aimed to describe the forms and functions of presupposition in Philippine and American English editorial headlines. To support the study, the research sheds the light to semantic presupposition and employed the 'constancy under negation' technique. Furthermore, this study focused on the linguistic devices that trigger presupposition as proposed by Yule (2010) respectively. Through a contrastive textual analysis of the 60 randomly selected headlines, the author identified that the most dominant presupposition trigger in both groups is existential presupposition. It revealed that there are various similarities between the two groups rather than their differences as far as presuppositions are concerned. This study also showed that presupposition is important in enabling the editorial writers to make claims without actually asserting them directly in the headlines.

Keywords: editorial headlines, Philippines, America

# **MANAGEMENT**

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**Factors Contributory to Professional Growth and Development of Selected Public Senior High School Teachers in District 5, Quezon City**

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**Abstract**

This study sought to determine the factors contributory to growth and development of selected Senior High School Teacher in District 5, Quezon City with the guiding principles of Guskey on Teacher's Change. It is believed that the most important ingredient in quality education is a competent teacher. Students can learn without books, desks and all other education resources for as long as there is a good teacher in the classroom. Teaching demands the highest order of ability. As a matter of fact, there should be no room for mediocrity in the teaching profession. If he/she is to provide learned, equipped and productive students that are necessary in producing able citizens, then the teacher must be equipped with wealth and depth of knowledge that he/she can impart to the students. Thus, to improve the teacher's career development path is to take a look at the different factors that may influence them. This may include different classroom practices, student learning outcomes, and beliefs/attitudes of the teachers with regards to continuous growth and development in the profession. This paper used the descriptive method to better help the researcher in the study. And as a result from the gathered data, it came out that these factors that contribute SHS teachers professionalism varied when differentiated from the respondents' profile – like age, sex, length of service, education attainment, and their track being taught. Thus, it's recommended that the teachers should work on levelling up education, encourage students to speak up their minds, innovations, and short visits by the principal to every classroom. Various levels of presenting the lesson depending on the level and interest of the students, "Repeat Strategy" for mastery of the lesson, and integration of the old and new education system. All these would give teachers better feedback primarily for growth. Likewise, things would only be possible if the teacher is capable of changing his or her belief and thereby, emerging good attitudes in the profession. So, the foregoing discussions provide the rationale of the research, which aimed to determine the factors that contribute to teachers towards their professional growth and its implications to career enhancement. It hopes to gather benchmark data that could be used in professional enhancement in particular with the senior high school educators.

Keywords: professional growth and development

# **PLANT PRODUCTION AND ENVIRONMENTAL AGRICULTURE**

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**Potential of *Rhizoclonium riparium* as Biostimulant for Germination and Seedling Growth of Kidney Bean (*Phaseolus vulgaris*) and Winged Bean (*Psophocarpus tetragonolobus*)**

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**Abstract**

According to the Food and Agriculture Organization of the United Nations, we need to increase the world food production by 60-70% to feed the rapid growing human population. *Rhizoclonium riparium*, a genus of filamentous green algae has been used in this study. The influence of green algal extract from *Rhizoclonium* partitioned into different concentrations on germination and growth performance of Kidney Bean (*Phaseolus vulgaris*) and Winged bean (*Psophocarpus tetragonolobus*) was evaluated. Treatments were as follows: Controlled, 25% aqueous extract with 75% distilled water, 75% aqueous extract with 25% distilled water, 50% aqueous extract with 50% distilled water, Urea fertilizer (46:0:0), and EM-1 Bio-fertilizer (containing photosynthetic bacteria). Germination associate parameters and growth parameters such as speed of germination, peak value, mean daily germination, mean germination time, mean daily germination, leaf area index, and crop growth rate were recorded with a much higher rate in the treatment with equal ratio of aqueous extract and distilled water in both crops. Thereby, there is a very promising evidence of the potential use of *Rhizoclonium riparium* as plant biostimulant.

Keywords: *rhizoclonium*, bio-stimulant, green algae



**Production and Application of *Allium sativum* (Garlic), *Zingiber officinale* (Ginger), and *Origanum vulgare* (Oregano) on *Lycopersicon esculentum* Mill. (Tomato) as a Preservatory Agent**

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William Albert Henry Torres  
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**Abstract**

Fruit waxing is a preservation technique, where a thin layer of edible coating is applied on the surface of the fruit that, in turn, reduces gas exchange and weight loss, and maintains firmness of the fruit. Meanwhile, ginger, oregano, and garlic, are known to have natural anti-fungal compounds that had been incorporated into coating-forming formulations. In this study, coating was produced out of garlic, ginger, and oregano extracts and was sprayed on the exterior of each tomato. Physical parameters of the coated tomatoes such as color, firmness, smell, texture were evaluated which were then compared with that of the unsprayed ones. The duration until the different sets of tomatoes reached complete rotting was also documented. It was found that those unsprayed ones showed signs of rotting such as appearance of brown spots earlier than those with coating at 7<sup>th</sup> day versus 21<sup>st</sup> day. A swab test that uses multiple tube fermentation technique was also done on a different set of tomatoes to check the presence of coliform before and after the coating was applied. As a result, coliform was confirmed to be present on the unsprayed tomatoes with most probable number (MPN) value of less than 8 per 100 mL. Moreover, that amount stayed the same after 48 hours after the coating had been applied.

Keywords: *allium sativum*, *zingiber officinale*, *origanum vulgare*, *lycopersicon esculentum* mill

**Comparative Study of Potato Water and Sweet Potato Water in Extending the Shelf Life of Loaf Bread and Utilization of Its Waster Pulp as Value-Added Surplus Product**

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Cristina F. Pablo  
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**Abstract**

Bread is a commercial necessity of Filipinos next to rice; it is a culture to every Filipino to eat bread for his daily life. Potato water are usually used as substitute milk in bread and Sweet potato water has an Anthocyanin, that has an antifungal properties and several advantages, including low level of toxic side effects. There were three (3) treatments used in the study namely: T1 (No Preservative added); T2 (Potato Water) and T3 (Sweet potato water). The Potato and Sweet potato water effects in the shelf-life of loaf bread were evaluated. The result of the mean of the daily mold growth showed that T1 gained the highest mean on the same day of observation which is 81.83 followed by T2 with the mean of 74.25 and T3 gained the lowest mean of 9.83 on the 7<sup>th</sup> day of observation which showed the highest effect in preventing mold growth. In Sensory Evaluation, T3 got the highest range in every characteristic of the sensory test verified that T3 (Sweet potato water) has an effect to the taste, texture and color of the loaf bread. The study is beneficial to small scale productions of bread, in prolonging its shelf – life on the use of potato water and sweet potato water, substituting milk and water.

Keywords: potato water, sweet potato water

## Effect of Different Plant-based Substrates in Vermiculture

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### Abstract

This study aimed to determine the effect of different plant-based substrates in Vermiculture. This study was designed to (1) determine the African night crawler produced; (2) determine the vermicast produced; and (3) vermicompost harvested using rice straw, mahogany leaf materials and banana bract as plant-based substrates. Three treatments were used in the study: T1, Rice straw; T2 Mahogany Leaf Materials; and T3, Banana bract. Each treatment used was replicated thrice. Based on the  $p < 0.05$  level of significance using One-way Analysis of Variance (ANOVA), there was a significant difference across treatments in African night crawler (*E. eugeniae*) and vermicast produced and vermicompost harvested. T1 gained the highest mean value with 753.33 ( $\pm 35.12$ ) followed by T2 with 381.67 ( $\pm 54.85$ ) and T3 with 235.00 ( $\pm 60.32$ ) in terms of African night crawler (*E. eugeniae*) produced using different plant-based substrates. In vermicast produced and vermicompost harvested T2 gained the highest mean value with 6.33 ( $\pm 1.15$ ), 4.23 ( $\pm 1.15$ ) followed by T1 with 4.50 ( $\pm 2.78$ ), 2.33 ( $\pm 0.58$ ) and T3 with 1.42 ( $\pm 1.01$ ), 0.47 ( $\pm 0.06$ ), respectively. The study concluded that the use of different plant-based and animal-based substrates is an effective organic waste in vermicomposting. Using the above-mentioned substrates is indeed becoming a feasible way of converting waste to a valuable product, while also growing more worms to increase the capacity of the worm farms.

Keywords: plant-based substrates, vermiculture

**Effects of Growing Bed with Various Number of Holes in the Growth and Yield of Lettuce (*Lactuca sativa* L.) in Passive Hydroponics System**

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**Abstract**

This study assessed the effect of growing bed with a different number of holes in cultivating crops. Hence, this study aimed to determine the growth performance of Carlo Rossa variety of Lettuce (*Lactuca sativa*) planted in above mentioned condition. The treatments used in the study are the following: T1, growing bed with 8 holes; T2, growing bed with 10 holes; and T3 composed of 12 holes. The growth performance of lettuce (*L. sativa*) was observed per week. And the water parameters such as pH level (5.80-6.80), electrical conductivity (600-1200ms) and water temperature (22°C) were maintained every day. As the 35 days of culturing period of lettuce, the results from the data gathered showed that T1 gained the highest mean among all treatments in all factors probably because it has the fewest number of holes in growing bed. Therefore, the competition of absorption of nutrients is low when there are fewer plants which made each plant absorbed higher nutrients just like what happen in T1. On the other hand, T3 with 12 holes gained the lowest record in all factors due to the high competition on nutrients absorption. The study promotes the soil-less cultivation of lettuce crops using passive hydroponics system which provides high resource efficiency because water and fertilizer consumption is minimized in passive hydroponics, there is no run off and minimized evaporation. It is also profitable to small holder farmers in urban zones, the ones with no access to land and has poor soil fertility.

Keywords: growing bed, lettuce, passive hydroponics system

**Growth and Yield of Selected Variables of Lettuce (*Lactuca sativa* L.) Carlo Rossa and Carlo Rossa and Lollo Rossa in Aquaponics System**

Sharlyn Kei B. Caricungan  
Mary Ann F. Flores  
Ricardo M. Salazar Jr.  
Mark Steven P. Hernaez  
Sheila Marie D. Baluran  
Caanawan National High School

**Abstract**

The purpose of this study is to determine the growth and yield of selected varieties of lettuce (*Lactuca sativa*), Carlo Rossa and LolloRossa in Aquaponics System. The study determined the (1) growth rate in terms of height (cm), (2) number of leaves and (3) yield (g). The study used two lettuce varieties as treatments, namely: T1- Carlo Rossa and T2- LolloRossa. Fifty samples in each treatment were evaluated and the mean data in each treatment were compared. In the t-test with  $p < 0.05$  level of significance, results showed a significant difference between means of the height (cm) and number of leaves in the two treatments. In yield (g) T1 and T2 were comparable and the results revealed that despite the differences in the values, no significant differences were observed between means of yields. The study concluded that in terms of obtaining the higher mean height (cm) T2 – (LolloRossa) was more effective than T1 – (Carlo Rossa), while in attaining the higher mean number of leaves T1 – (Carlo Rossa) was more effective than T2. In terms of yield, both treatments can be grown in Aquaponics system. The study recommends the regular spraying of nutrient solution to lettuce plants for at least 3 times a day thereby limiting the culture duration in 30-40 days. Verification trial should be performed to validate results. The study is indeed a great advantage to numerous farmers, as well as to our environment because the Aquaponics system is advocating a safe and clean production system, due to its full reuse of waste and nutrients.

Keywords: lettuce, aquaponics system

## **Growth and Yield of Pechay (*Brassica rapa*) and Mustard (*Brassica juncea*) in Vertical Hydroponics System**

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Art Arbhy B. Delizo  
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### **Abstract**

The study evaluated the growth and yield of pechay (*B. rapa*) and mustard (*B. juncea*) in vertical hydroponics system. The study aimed to determine the growth in terms of height (cm), number of leaves produced and yields in 6-week cultivation of period. It was conducted to produce a clean and safe food as well as to help the farmers produce higher yield of a suitable crop using small space. The treatments used in the study were the following: T1, pechay(*B. rapa*) and T2, mustard (*B. juncea*). Each treatment consisted of 25 replicates. Each treatment was assessed through monitoring and data gathering throughout the duration of the study. The results revealed that T1 (P) ( $21.54 \pm 2.93$ ) obtained a significant higher mean height (cm) compared to T2 (M) ( $18.53 \pm 2.610$ ). Mean number of leaves produced and yield obtained in both treatments showed no significant differences. Based on the study, there is a significant difference in terms of height and no significant differences were observed in the number of leaves and yields. It is concluded that the crops can be grown in vertical hydroponics system since yield in terms of number of leaves produced and volume produced are given much weight as basis in observing the effectivity of the crops in hydroponics system. The study has a significant contribution in the understanding of soilless agriculture; hydroponics as a popular way to grow plants indoors that reduces the risk of crops being exposed to pests and harsh weather conditions.

Keywords: pechay, vertical hydroponics system

# **PSYCHOLOGY**

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**"Help is finally here!" - Role of Tertiary Institute in the Promotion of Philippine Mental Health Law (RA 11063)**

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**Abstract**

All human beings, regardless of background, age, gender, status and educational qualifications are vulnerable to mental health concerns. Stigmas of the society hinder the prevention and cure of such concerns. To support the mental health well-being and to correct negative stigma, the Philippines enacted RA 11036, otherwise known as the Philippine Mental Health Law. Using exploratory qualitative method of research, this study mapped the perceived (a) source of mental health concerns, (b) hindrances in the promotion mental health well-being and (c) activities to promote RA11036 in tertiary institutes. Participants of this study are teachers and administrators. Maximum variation sampling was used to saturate the collected data of the study. Using thematic analysis, it was revealed that there were six perceived sources of mental issues in the institutes and these are: Self-acceptance, culture, financial status, technology, environment and organizational crisis. It was also found out that there are three hindrances in promoting the law – unawareness, anxiousness and inactivity. However, there were six perceived activities and solutions to support mental health law – peer counselling, trainings, social activities, religious activities, sharing of experiences and conduct of research. Proper budget allocation is needed to implement the mapped activities and a solution is needed.

Keywords: mental health law, RA11036, tertiary institutes



## **The Effect of Multiplayer Online Battle Arena (MOBA) Gaming on the Levels of Depression, Anxiety, and Stress of Students**

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### **Abstract**

Much of the research on video games focused on the negative effects of playing them, particularly the violent ones. Relatively, few studies have examined the relationship of video gaming to mental health. That's why this study was conducted to bridge the gap in the literature. This research investigated the relationship of an online video gaming termed as Multiplayer Online Battle Arena (MOBA) on mental health in terms of depression, anxiety, and stress levels of students at the Bagumbayan National High School in Taguig City. The target sample respondents consisted of 346 students. Convenient sampling procedure was used to identify the sample size that was selected. Descriptive correlational research design was employed. Two instruments were used to gather data. The Game Addiction Scale developed by Lemmens, et al. in their study was used to determine whether the respondents are addicted to MOBA gaming or not. The 21-item Depression, Anxiety, and Stress Scale (DASS-21) developed by Lovibond, et al. was used to determine symptoms of mental health problems. Descriptive statistics such as Mean, Standard Deviation, Inferential Statistics (t-test and ANOVA) and Pearson Moment Correlation were used to analyze the data. The study established that only twenty (20) students are addicted to MOBA gaming. Majority have normal levels of depression, anxiety, and stress. Only 50 or 14.45% have mild depression while 11 or 3.18% have moderate depression, fifty eight or 16.76% have mild anxiety, and 11 or 3.18 % have moderate anxiety. On the stress levels, 14 or 4.05% have mild stress, and 1 or 0.29% has moderate stress. The results further showed that there was a significant difference on the depression levels of gamers. Similar results were obtained in the anxiety and stress levels of the respondents. Correlation results showed that MOBA gaming has low positive correlation with depression, anxiety, and stress. Depression and anxiety have moderate positive correlation, while anxiety and stress implied a high positive correlation. In the light of the findings, it is suggested that a comparative study be undertaken to further establish the influence of MOBA gaming on depression, anxiety, and stress levels as well as other symptoms of mental health.

Keywords: MOBA, mental health, depression, anxiety, stress, video games

**Airplane Mode Off: Living a Life with Dynamic Behavioral Pattern of an ADHD (Attention Deficit Hyperactivity Disorder) Patient**

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Maliwalo National High School

**Abstract**

ADHD is a disorder that includes inattention, hyperactivity and impulsivity of a certain child or person. As claimed by Matthew Smith in his study, ADHD is present in 5.29% of the world's children, with an increasing number every year. This study sought to describe the behavioral pattern of an ADHD patient. The study aimed to describe the pattern of behavior, uniqueness of the patient, and the intervention done by the teacher. The researchers processed a letter that seeks for the permission of the school heads and other people involved for the study to be conducted. The data were gathered via interview, which consisted of questions concerning the objectives of the study. The data gathered relevant information. Also, based on the interview, it proved that the patient is unique because of his capability to read very well compared to the other pupils, yet consists of flaws that a normal ADHD patient would experience.

Keywords: ADHD, behavioural patterns

**A Survey on the Relationship of Teenage Self-control and Anxiety as Basis for Drafting  
"PSALM" Personal Self-Control Anxiety Learning Map**

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**Abstract**

Anxiety is a feeling of fear and worry, typically about an event or an uncertain outcome. When anxiety and its resulting depression overtake adolescents' lives, it can impact health, relationships and even personal and academic success. The ability to handle emotions in the face of difficult situations is called self-control. Self-control is the battle between the cognitive and emotional brain. Fear and worry are part of the emotional brain, while logic and reason are part of the cognitive brain. When these two are understood, it will be easier for people to understand and recognize how they control reactions to stressors in life. To assess the respondents' anxiety as one of the variables, the researchers utilized a standardized instrument borrowed from SADAG (South Africa Depression and Anxiety Group). For the other variable, which is self-control, the researchers administered Tangney, J.P., Baumeister, R.F., Boone, and A.L. (2004). There were 300 participants with ages ranging from 16-18 coming from Brgy. Ususan, Taguig City. Descriptive Statistics such as Frequency and Percentage were used in analyzing the profile of the respondents and Pearson Correlation of Coefficient was used in computing for the strength of relationship of the variables. The results were also taken as bases for prototyping Personal Self-Control and Anxiety Learning Map, which is suggestive in nature. With a total of 300 respondents most of them aged 17 years old, with a frequency of 98 and a percentage of 32.67%. Majority of the respondents are female with a frequency of 153 and with a percentage of 51%. Majority of the respondents are mostly self-controlled with a frequency of 206 and with a value of 68.67%, while none of the respondents are extremely self-controlled. Most of the respondents have moderate anxiety levels with a frequency of 132 and with a percentage of 44%; followed by the second highest value, mild anxiety with a frequency of 84 and a percentage of 28%. Using the Pearson Correlation Coefficient, the results showed that anxiety and self-control have a very low relationship and are inversely proportional. The results also indicated that as self-control increases, the anxiety decreases or vice versa. In the development of Personal Self-Control and Anxiety Learning Map, the researchers made a 20-page self-help prototype map that aids self-discovery of teenagers. It was presented in a panel of five experts (Guidance Counselors) for scrutiny and suggestions.

Keywords: anxiety, self-control, PSALM

# **SOCIOLOGY**

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## **Level of Knowledge and Acceptability Towards Family Planning**

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### **Abstract**

Family planning widely promotes developing countries a means to decrease fertility rates and advance economic development. Ensuring healthy lives and promoting well-being for all people are very important goals of UN Sustainable Development Goal (SDG, Good Health and Well-Being). This study was conducted with the general objective of determining the level of knowledge and acceptability towards family planning in one particular barangay located in Manila City and one of the important things is to know the demographic profile of respondents including the source of information of each respondent regarding Family Planning and usage of contraceptives and the method used in Family Planning. The researchers utilized a Quasi-Experiment research design, which is used to test a single group with pre-test and post-test. An adapted survey-questionnaire by Edna R. Javier was used and the pre-test and post-test method. Citizens from a selected barangay in Manila were chosen randomly through simple random sampling; a total of 30 respondents attended the seminar. The researchers utilized T-Test of Dependent Means to compute, analyze and interpret the data and determine if there is a significant difference on the level of respondents' knowledge and acceptability towards family planning before and after the seminar. The researchers used the Likert Scale of questionnaire; to gather data, they first chose a barangay that allowed them to conduct a survey and a family planning seminar. On March 21, 2018, the researchers were able to conduct a pre-test questionnaire before starting the family planning seminar; the seminar was held at the seminar hall of the barangay health center. The researchers started the seminar with the brief knowledge about family planning; afterwards the health workers also repeated what the researchers did, to ensure that there will be no questions and confusion after the family planning seminar. The researchers went to the respondents' houses for another test assessment which is the post-test done on April 22, 2018. In the end, the results were sought. The primary sources of information of the respondents towards family planning were the Barangay Health Workers. Majority of the respondents practiced family planning methods; the most widely used contraceptive is hormonal pills. There were changes and differences in the level of knowledge before and weeks after the seminar, from the mean of 3 before the seminar increased into 4 which implies that the respondents gained knowledge weeks after the discussion about family planning and contraceptives. The result showed that there is a significant difference in the level of acceptability before and weeks after the seminar, wherein the respondents have gained more knowledge after the researchers and health workers discussion about Family Planning. It showed that the respondents were aware about family planning, but do not have further knowledge about the different methods used in family planning. There's a significant difference between pre-test (before the seminar) and post-test (after seminar) regarding the topic and the level of knowledge and acceptability towards family planning. The review and the study and especially, Family Planning itself, can help people be aware on family planning, and can help reduce the fertility rate and overpopulation and can easily promote the economic development in the country to lessen poverty and environmental stress.

Keywords: education, social sciences, family planning, comparative study

## **Robot – Assisted Temporary Shelter for Earthquake Victims**

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### **Abstract**

The Philippine archipelago, located near the western edge of the Pacific Ocean, is in the direct path of seasonal typhoons and monsoon rains, which bring floods, storms, storm surges, and their attendant landslides and other forms of devastation. The Philippines also sits on the "ring of fire" where the continental plates collide and thus experience periodic earthquakes and volcanic eruptions. Evacuation centers are needed in almost every disaster. They should be safely located and equipped with the required amenities. In disaster-prone areas such as the Philippines, schools and community centers should not be designated as evacuation centers, unless they are equipped with adequate sanitation services. The purpose of the robot is to create a safe place and build a temporary shelter for the victims. It can lessen the human work and quickly create a temporary evacuation area. The robot involves different materials designed, modified and combined together. It is divided into 3 main parts; the main chassis, the conveyor, and the pulley. The tent is one of the main structures. The tent is designed to stand alone once the hook gives it a lift. Minimal human interventions are needed to secure the base and other foundations. The covering of the tent is also designed to be locked by human. The researchers concluded that a robot can function as a machine that can set-up a temporary evacuation center for the victims. It is designed to create a safe place and shelter for the family. It provides the necessary needs and space for the family, especially health issues that may arise on certain conditions.

Keywords: robot, temporary shelter, earthquake

## **Looking Beyond the Birds and the Bees: Internalized Homophobia of Lesbian Parent**

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### **Abstract**

Internalized Homophobia (IH) has linked it to both emotional health and mental illness outcomes. Lesbians with planned families reported significantly higher Internalized Homophobia specific to disclosure of sexual identification. Therefore, this study aimed to identify the challenges and struggles of having IH as a barrier to understanding their identity or coming out to others, including their children and to make people understand what the struggles of LGBT members are, especially the lesbian identity in the context of parenthood and the impact of social isolation, decision pressure, financial strain and other emotional issues that trigger IH. The researchers of the study used qualitative study. This study focused on the challenges, struggles and other issues that affect the participant. Thus, the Descriptive Qualitative research was selected so that the challenges and struggles of the lesbian parent were further explored. The researchers found associations between sexual orientation, relationship to the people around her, or social support characteristics and internalized homophobic discrimination. The researchers found that people's perceptions and sayings affect the emotional aspect of the participants, which is also connected to the triggering of internalized homophobia. According to the participants, in the challenges of the lesbian parent including financial problems, they do not experience shortage. In social isolation, the attitudes and perceptions of the people about being part of LGBT community are not easy to deal with, and a lot of parenting problems influence the decision making of the lesbian parent. Therefore, providing a positive support for LGBT members can reduce experiencing internalized homophobia and other mental illness.

Keywords: internalized homophobia, mental illness, LGBT

## **Development and Validation of Space Disaster Risk Reduction Management-Manual**

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### **Abstract**

The purpose of this research is to develop and validate a manual created for selected space hazards. The Space Disaster Risk Reduction Manual was validated by the selected Astronomers and City Disaster Risk Reduction Offices in Metro Manila. The researchers selected some of the space hazards and created a manual about risk reduction management of these. The validation of the manual by the respondents was characterized by the level of acceptability in the criteria of objectiveness, appropriateness, comprehensiveness, practicability and competency. This research used developmental research method to design the perspective of the researcher about the topic. This method is very useful in exploring a phenomenon, developing and testing new instruments like the manual that was created. The validation form that was developed used a Likert Scale type of questionnaire that was validated by the faculty members of the Department of Earth and Space Sciences and was given to the respondents of this research. The form was used to gather statistical data from the respondents who have read the developed manual. Using the SPSS, the Cronbach's Alpha score of the five criteria of the manual was gathered. The Objectiveness, Appropriateness, Comprehensiveness, Practicability and Competency scored .729, .703, .804, .613, .864 and an overall score of .912, making the space disaster manual acceptable overall. The manual has received a positive feedback from the respondents. Through this Space Disaster Risk Reduction Management Manual, people can now be fully aware and address concerns and strategies to do when hit by space disasters.

Keywords: space disaster, risk reduction, manual



**Frequency and Intensity of Land-falling Tropical Cyclone During  
Different ENSO Phases in the Philippines**

Christian John V. Evangelista  
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**Abstract**

The study was designed to discuss the relationship between the regular appearing differences in sea surface temperature and mean sea level pressure or known as El Niño Southern Oscillation (ENSO). The anomaly values during different ENSO phases to landfalling Tropical Cyclones (TC) frequency and intensity in the Philippines which covered the period of 54 years from 1954 to 2008. This research aimed to fulfill the research gap between the several types of research conducted over the west coast of the United States and North Atlantic Ocean. A correlational research design was utilized to assess the relationship between the selected weather parameters of landfalling tropical cyclones (LTC) and ENSO phases in the Philippines. This research used the historical data of landfalling tropical cyclone on record from Department of Science and Technology-Philippine Atmospheric Geophysical and Astronomical Services Administration (DOST-PAGASA). It was revealed that TC frequency has a slightly inverse relationship with TC intensity. This shows that there are other factors affecting the intensity of tropical cyclones formed over PAR, in that case, it is necessary to consider other meteorological factors and mechanisms that drive the formation and intensification in examining the interconnectivity between the sets of variables.

Keywords: land-falling tropical cyclone, ENSO

**Determining the Most Light Polluted Area in Selected Areas of Mandaluyong City  
Using a Low Cost Night Time Photon Meter**

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Chelsea Lyn Rogando  
Ryan Manuel Guido  
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**Abstract**

Busy cities are the main contributors to light pollution in our world today, bringing unnoticed health hazards to people like distorted sleeping patterns, however not only people are affected but also the local wildlife and the environment. In the Philippines, Metro Manila is the busiest thus it is the subject of the research conducted by Xyrene Angeles, a BS Astronomy Technology student, in which her study revealed that Mandaluyong City is the most light-polluted area in Metro Manila. With this alarming result, the researchers developed a night-time photon meter, a low-cost light pollution meter, then identified the most light-polluted area in Mandaluyong City. The researchers established criteria such as (i) the number of billboards in the area, (ii) establishments and buildings, and (iii) volume of traffic from commuting vehicles. Through the use of the Bortle Scale at the limitations of data gathering, the researchers were able to measure the night sky's brightness, as it quantifies astronomical observability of celestial objects and the interference caused by light pollution. Based on the gathered data, it revealed that Ortigas Avenue along Mandaluyong is the most light-polluted area in the city with a value of 25 lux. This shows that there is an extreme usage of light in the area and has less chance of seeing high magnitude astronomical objects.

Keywords: light pollution, Mandaluyong City, low-cost light pollution meter, Bortle Scale, astronomical observability

# **SUSTAINABLE & ENVIRONMENTAL SYSTEM DEVELOPMENT**

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**Feasibility of *Malus domestica* (Apple) Pomace as an Organic Corrosion Inhibitor for Carbon Steel in Hydrochloric Acid**

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Jose Arman O. Montañano  
Ernesto S. Cajucom Jr  
Carolina R. Tamayo  
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**Abstract**

Carbon steel is one of the most widely used metals in construction and manufacturing industries. Corrosion is one of the problems in the industrial environment because of its structural effects that include the loss of strength, fatigue, reduction of bond strength, limited ductility, and reduced shear capacity in metals. Pectin of *Malus domestica* (apple) pomace was extracted and liquefied. Three sets of carbon steel specimens with four pieces of steel were used in the experiment. The number of coating of *Malus domestica* (apple) pomace extract was different in each set of metal specimen. The same procedure for salt-spray test using hydrochloric acid (HCl) was conducted after the application of the extract. Weight loss measurement and rust formation were evaluated. The result showed that the steel carbon set with three coatings of *Malus domestica* (apple) pomace yielded the lowest amount of metal weight loss of 0.12g compared to the untreated carbon steel with 0.24g. Steel specimen with two and one extract coating yielded 0.21g and 0.18g weigh loss respectively. The rust formation is also more evident in the untreated carbon steel compared to the treated samples. Thus, *Malus domestica* (apple) pomace is an effective inhibitor of corrosion of carbon metal in an acidic solution.

Keywords: extract, corrosion, rust, acidic

**Branch of Water Spinach *Ipomoea Aquatic* (Kangkong) as Main Component for the Production of Biodegradable Pot**

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**Abstract**

Plastic is the most exploited material in the society because of its versatility to be used in thousands of product from food storage to plastic bags even to some furniture. Unfortunately, the use of plastic is also the biggest source of soil, water and air pollution. Plastics cannot be degraded and will take hundreds of year before it will decompose in landfill. Plasticulture uses plastic for agricultural purposes like soil film and plastic pots. Water spinach, *Ipomoea aquatic* (kangkong) branch, a waste material, was used as the main component for bioplastic pot. Bioplastic pots were prepared and moulded mixing 10g and 25g of water spinach pulp in 12x12 glass plate. The film was tested for Strength Test or the Tensile Test (ASTM D882) in the Department of Science and Technology. Soil burial method was done for the biodegradability of the film. The result showed that both samples with water spinach undergo rapid degradation in 5 days after calculating the weight loss. The biopot film with 25g of water spinach tensile strength has mean of 28.6 MPa, which is close to 22.8MPa mean tensile strength of biopot with 10g of water spinach. The elongation at yield for biopot with 25g and 10g water spinach pulp has a mean of 5.17% and 2.52% respectively. The bioplastic pot made from water spinach, *Ipomoea aquatic* (kangkong) branch exhibits fast degradability and the result of the tensile and elongation allows the film to be used as pots for plants, which may replace the use of non-biodegradable plastics.

Keywords: biodegradable, bioplastic, plasticulture, tensile, elongation yield

**Phytoremediation Potential of Solanum Melongena (Eggplant) in  
Absorbing Contaminants in Soil**

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**Abstract**

The continuous development of urbanization and industrialization has caused harmful effects to the environment. Soil had become contaminated by the accumulation of heavy metals which threaten ecosystems, water sources and human health. Phytoremediation is the use of plants to clean up contamination. It is a plant-based process of eliminating harmful chemicals that are found in soil using the natural ability of plants to absorb contaminants. Same amount of soil per set up was contaminated using Iron (III) Chloride solution with three different amounts (10 ml, 20mL and 30 ml). Solanum Melongena (Eggplant) was used as phytoremediation agent to absorb the Iron (III) in the soil. Fresh harvest roots were subjected to Flame Atomic Absorption Spectrometry (AAS) after eight weeks of treatment. The result showed that the set-up with 10mL amount of iron solution yielded the highest amount of absorption 40, 931 mg/kg. The amount of iron absorbed by the roots in 20mL and 30mL is 39 823 mg/kg and 28 173 mg/kg respectively. In conclusion, Solanum Melongena (Eggplant) is an effective accumulator for high levels of Iron III contamination.

Keywords: atomic absorption, phytoremediation, contaminants, heavy metals

**Observation of *Moringa oleifera* (Malunggay) Leafstalk for Inhibitory Microbial Activity against *Salmonella Typhimurium***

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Carolina R. Tamayo  
Statefields School Inc.

**Abstract**

Innovations utilizing chemical preservatives in the prevention of food spoilage caused by bacteria have negative impacts on human health. Some cases of food borne illnesses are caused by *Salmonella*, a pathogen that gets into the human body via ingestion of food and fluids. The common serovar of *Salmonella* in pigs, pork and humans is the *Salmonella typhimurium*. Scientific studies have investigated on the use of plant extracts to control food poisoning diseases. For this purpose, the plant extract from *Moringa oleifera* leaf stalk (Moringaceae), a part of the plant that is often discarded is used to observe for its inhibitory effect against *Salmonella tryphimurium* using Mueller-Hinton agar (MHA) for disc diffusion technique. The antibiotic, Amikacin 30 µg was used as a positive control. The samples, *Moringa oleifera* leaf stalk (Moringaceae) extract 100 % and 50 % produced complete inhibitory activity with mild reactivity and a total mean zone of inhibition of 10 mm against *Salmonella tryphimurium*. On the other hand, the positive control Amikacin 30 µg produced complete inhibitory activity with severe reactivity and a total mean zone of inhibition of 16.22 mm. The negative control showed no inhibitory activity and no reactivity against *Salmonella tryphimurium*. The inhibitory activity of *Moringa oleifera* leaf stalk (Moringaceae) extract was comparable to the positive control Amikacin 30 µg wherein both had a clarity scale of 0 as shown by the zone of complete inhibition against the test organism. In brief, *Moringa oleifera* leaf stalks showed potential inhibitory microbial activity against *Salmonella tryphimurium*. It can be further used in the control of *Salmonella* in the Feed Manufacturing Environment.

Keywords: food spoilage, inhibitory activity, microbial activity, *Moringa oleifera* , *Salmonella tryphimurium*

## **Eco-Friendly Charcoal as Substitute to Commercial Charcoal**

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Catherine Sablan  
Desiree Manatad  
John E. Cordero

### **Abstract**

The production of charcoal has hazardous impacts, not only on human beings but also in the environment. The direct environmental impact is deforestation caused by cutting of trees to produce charcoal. It disturbs forest ecology by destroying plant and animal habitats. This can also affect biodiversity produce by cutting of trees, reducing agricultural productivity, and causing soil erosion. Charcoal is a practical substitute for fuel, even with these hazardous effects in human and environment. An idea to produce charcoal as a substitute to fuel in everyday lives is an approach to create an alternative for charcoal with the use of charcoal materials such as wood debris or *kusot* and newspapers. This study aimed to lessen the dangerous impacts of commercial charcoal to human health and environment. The study also intended to lessen waste materials, to maximize and make use of the waste materials in a more productive way. To make an alternative charcoal, the following materials, such as *kusot* and newspapers were mixed in an alcohol based solution; then molded using the hands or a piece of cloth. After molding, the product was dried for about two (2) days. The test included the duration of flame, duration of charcoal completely burned, soot produces, and the type of combustion release. All tests showed positive results. The alternative charcoal made by waste materials, such as wood debris (*kusot*) and newspapers, released blue flame, which is good for complete combustion. The product also lasted for about 15 minutes without its complete ignition. Therefore, this alternative charcoal made by waste materials was able to substitute and be comparable to commercial ones.

Keywords: eco-friendly charcoal, commercial charcoal



## Call for Papers

On behalf of the SIMP-AAG JOINT MULTIDISCIPLINARY RESEARCH CONFERENCES' (JMRCs) organizers - the Singapore Institute of Multidisciplinary Professions and the Ascendens Asia Group, the JMRC Research Review Committee is sponsoring a call for papers across multiple disciplines. JMRCs are open-to-all research conferences to celebrate researchers who continue to strive for excellence in pursuit of knowledge enhancement for world and human development.

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Timely submission of the papers is critical to the success of the program. The procedures and timetable enumerated below will apply.

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Deadline for full paper submission

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*depends on scheduled JMRC*

*depends on scheduled JMRC*

*depends on scheduled JMRC*

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