

# ARAL 2019



## 4TH INTERNATIONAL CONGRESS ON ACTION RESEARCH, ACTION LEARNING

May 16-18, 2019 | De La Salle University, Manila, the Philippines



# CONGRESS PROCEEDINGS

4<sup>th</sup> INTERNATIONAL CONGRESS ON  
Action Research,  
Action Learning

# **ARAL 2019**

Action Research for  
Innovations in Education

May 16-18, 2019

De La Salle University  
Manila, the Philippines  
Lasallian Institute for Development and Educational Research (LIDER)  
Br. Andrew Gonzalez FSC College of Education

ARAL 2019  
Philippines

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De La Salle University  
Manila, the Philippines

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Hosted by:

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Br. Andrew Gonzalez FSC College of Education (BAG-CED)  
De La Salle University, Manila (Philippines)

**CONGRESS  
PROCEEDINGS**

# Table of Contents

<b>Project LoveR (Love for Reading): Exploring DERAS in Improving the Reading Proficiency Level of Students</b> William C. Agomana, Hasima N. Salic & Mary Flor C. Babia <i>Cagayan De Oro National High School</i>	<b>...1</b>
<b>Counselor Educators' Teaching Practices: A Perspective from the Students</b> Alvin O. Insorio & Annalyn A. Delfino <i>Philippine Normal University – Manila</i>	<b>...8</b>
<b>Roy A. Molanda: An Effective Edtech Model</b> Roy A. Molanda <i>Pineda Elementary School, Pasig City</i>	<b>...17</b>
<b>Activity-Based via Multimedia Learning through ISIM to Science 7</b> Dharyl C. Del Mundo <i>Cayetano Arellano High School</i>	<b>...26</b>
<b>Impact of Flipped Classroom on the Mastery of Identified Competencies in Grade 8 Science</b> Eleanor T. Gonzales <i>Trece Martires City National High School, Cavite</i>	<b>...35</b>
<b>Improving Performance and Attitude Towards Science Using Strategic Intervention Material in Teaching with Augmented Reality (SIMATAR) Mobile Application</b> Melandro D. Santos <i>Antonio J. Villegas Vocational High School, Manila</i>	<b>...44</b>

**Numeracy Enhancement Tool (NET):  
Mobile App for Mathematics Students** ...58

Alvin O. Insorio & Robert Matthew J. De Castro  
*San Pedro Relocation Center National High School*

**Visual Model Approach in Solving Algebraic Word Problems  
among Grade 7 STE Students** ...68

Margareth H. Macabodbod & Perry Jane Q. Cañete  
*Cagayan de Oro National High School-Junior High School*

**Designing Realistic Mathematics Lessons Toward Improving  
Mathematical Productive Disposition** ...76

Von Christopher G. Chua  
*De La Salle University, Manila*

**Designing Software for Children with High Functioning  
Autism Spectrum Disorder (HFASD)** ...85

Melody Angelique C. Rivera  
*Silliman University, Dumaguete City*

**Reaching digital native learners using Kahoot  
in Earth and Life Science** ...92

Jonalyn G. Poserio  
*Ignacio Villamor Senior High School*

**Effectiveness of SIM (Strategic Intervention Materials) in  
Improving Competency among Grade 5 Pupils of Valeriano  
E. Fugoso Memorial School** ...101

Marites B. Halcon  
*Valeriano E. Fugoso Memorial School, Manila*

**Problem-Based Learning Module in the Conservation of Ecosystem** **...108**

Gary Z. Regala  
*Division of City Schools, Manila*

**Electronic Strategic Intervention Materials (e-SIMs) in Chemistry for Grade 9 Students** **...114**

Maejen Clovelle T. Ebojo, Katya Amelia A. Valido, Juvelyn A. Raguini, Erika Joyce A. De Ramos, Esralyn P. Ignacio, Crisdane R. Alicante, & Joey-Nell T. Marzan  
*University of Northern Philippines, Ilocos Sur*

**Computer Engineering Students Performance Using the Udemy and Khan Academy Videos in Learning Differential Equations** **...122**

Rafael J. Eusebio Jr.  
*Universidad de Manila, Manila*

**SMART Management Plan for an Outcome-Based Research in the K to 12 Curriculum** **...130**

Mac Millan C. Tobeo  
*Alupay National High School*

**Custom-Fit Learning: Integration of Industry-based Instructional Materials in the Senior High School – Automotive Strand** **...140**

Dareen Louise M. Guisehan  
*Quezon National High School, Panabo City*

**Pragmatics of Prosody in Meranaw Conversations: A Grounded Theory Research** **...148**

Rohaida Maunting-Derogongan  
*Mindanao State University, Marawi City*

**Multimodality: Stimulating an Ambiance of Fun and Effective Learning of Oral Communication** ...157

Arlyn B. Dawadias  
*Valencia National High School, Bukidnon*

**Rule-Output-Correction at Output-Rule-Output Strategy sa Pagsulat ng Komposisyon** ...165

Jerick T. Gonzales  
*Naglaoa-an National High School-Senior High School*

**Worksheets: Improving the Performance of BSED Mathematics Students in Calculus** ...174

Sharon M. Galicha  
*Romblon State University, Romblon*

**Aplikasyung Android WattPad sa Asignaturang Filipino para sa Baitang Walong (8) Mag-aaral sa Ika-21 Siglong Pagkatuto** ...182

Ian M. Cristobal & Jonaline M. Closa  
*Kagawaran ng Edukasyon-Dibisiyon ng Oriental Mindoro*

**Life Dynamics as a behavioral program for student leaders of Jose Rizal University** ...192

Jonathan W. Chiong & Jayces C. Catipunan-Francisco  
*Jose Rizal University, Mandaluyong*

**TalkHANGG (Talk with Heads of Agencies Needed for Good Governance): An Inter-Agency Campaign Regulating Entry of Learners to Computer Shops** ...200

Mary Joan J. Cajella, William C. Agomana, Maurita M. Donasco, Dinah Zoraida B. Zamora, Margarita B. Enerio, & Leah Lyn A. Lingatong

**History within History: Tracing the Development of the History Program in the University of Santo Tomas (1951-2017)** ...208

Archie B. Resos  
*University of Santo Tomas, Faculty of Arts and Letters, Manila*

**Knowing the Art Capital: Understanding the Appreciation of Art through Poblacion Ibaba and Poblacion Itaas of Angono Rizal**

Lara Marinnete G. Landayan  
*University of the Philippines Diliman*

**...218**

**Sabay-Kaon sa Buntag: Panacea to Students' Tardiness, Absences, Inactiveness and Lack of Focus (TABINLACK)**

Nympha P. Rodriguez, Fe S. Guzman, Dindo W. Cuevas,  
& Minerva R. Conag  
*Pedro "Oloy" N. Roa Sr. High School, Misamis Oriental*

**...225**

**Teachers Commitment and Job Satisfaction**

Myleen P. Acebes  
*COC-PHINMA Cagayan de Oro City, Misamis Oriental*

**...231**

**Vocabulary Notebook for Teaching and Learning Technical Vocabulary**

Gefilloyd L. De Castro  
*Zamboanga State College of Marine Sciences and Technology*

**...240**



## Project LoveR (Love for Reading): Exploring DERAS in Improving the Reading Proficiency Level of Students

William C. Agomana, Hasima N. Salic<sup>1</sup> & Mary Flor C. Babia

Cagayan De Oro National High School

[hasima.salic@deped.gov.ph](mailto:hasima.salic@deped.gov.ph)<sup>1</sup>

**Abstract.** This study determined the root cause of the students' tardiness in the Science Technology and Engineering Program of Cagayan de Oro National High School. The primary aim of the study was to improve the punctuality of identified STE students from Grade 8 to Grade 10 level by providing them counseling and giving them responsibility by participating in the community service and this is coupled with rewards and incentive on the observation of each decrease in their tardiness through the Perfect Attendance and Early Riser Awards. In addition, it focused on facilitating and transforming the behavior of the students from being students to student-leaders. Action research design was applied and the participants who accumulated three green forms were chosen for the intervention of determined strategies. 10-week intervention was planned for the identified students and incentives were attached for them for coming on time. After the weeks of intervention, the average of tardiness in the STE program was determined. The data included observations in two phases; pre-intervention observation and a post intervention observation by reviewing the attendance register. The results revealed a positive change in the students' tardiness in the STE program's post intervention. These findings highlight the importance of a relationship between institutional practices of counseling and community service coupled with reward and behavior modification in students.

### 1 Introduction

The school is considered as a hub for transformational learning and life skills. Students are enrolled not only to acquire knowledge and understanding of the world phenomenon but also to become better citizens and human beings. With this in mind, The Science, Technology and Engineering Program of Cagayan de Oro National High School is committed in holistically honing and moulding the students in this program to become great leaders in the community that they foresee in serving. In this regard, schools through their curriculum inculcate the significance of social skills in the learners in order to aid with the required skills to be become responsible beings. On the other hand, the students and families are equally held responsible for the learning they acquire from the school and attitude and behaviour that exhibit towards school and learning. Hence, the students in the school are not only assessed for the demonstration of their intellectual capabilities but also their behavior.

In addition, schools are deemed to secure the welfare of the students hence the DepEd Order 40 series 2012 or also known as DepEd Child Protection Policy. This is taken seriously by the STE Program of CDONHS, as the provisions in the policy is integrated in moulding the students to become better versions of themselves --- in all aspects. It is stated in the Child Protection Policy that it obliges the government to take measures to

encourage regular attendance in school and reduce dropout rates. Further, the policy also mandates that all appropriate measure be undertaken to ensure that school discipline is administered in a manner consistent with the child's human dignity and in conformity with the Convention on the Rights of the Child. Because of this, the performance of the students including their character is being monitored. From last year's monitoring of tardiness, it has become very alarming when the advisers observed STE students demonstrating two types of attitudes towards punctuality in the school. One set of students make it a point to reach school on time whereas, the others present relaxed attendance habits. They arrive late almost every day and appear to have varying attitudes for their repeated tardiness. Therefore, the researchers viewed student tardiness as one of the most crucial problems in today's classrooms. This was further analyzed from the teachers' perspective where almost all teachers who take first period in the school find first five to ten minutes of the class a sheer waste because of the students who do not come on time. Teachers find it very inconvenient as the momentum of the class does not remain smooth and coherent if any of the students enter late. Furthermore, it also distracts teachers' normal pace and hinders in the time management plan of the teachers.

The STE Program believes that one of the characters that an STE student should develop is the attitude on being conscious of the time or to apply time on task by heart but unfortunately the students do not seem to see it significant as it can be deemed from Table 1 how the students number of times of tardiness seem to be more than what is expected from the students. Hence the researchers found this problem to be significant in the school context and it is observed that not much research work has been carried out to address this problem. Therefore, in order to fully understand student tardiness, the researchers evaluated the external causes. Additionally, the researchers looked at students' perceptions and behaviors regarding student tardiness. Tardiness is often discussed as an important topic in magazines and newspapers but seldom in research. Hence, the researchers deemed that this problem should be addressed creatively and effectively specifically through the PROJECT EARLY (Early Arrival Regularly, Learning Yaply). Project EARLY is an intervention implemented by the STE coordinator together with the STE Prefect of Discipline and STE advisers. This is a close monitoring of the students' tardiness and is being addressed through counseling and community service. The administrator of STE Program believes that through counseling, the students will be able to realize the root cause of their tardiness and they will be able to own up to the reasons why they are late, while the community service will teach them the essence of holding a responsibility and committing to the responsibility.

### **1. 1 Strategy/Intervention**

The students are given orientation on the existing policies together with their parents. When they have fully understood the policies the parents and students are asked to sign the policies as a sign of their commitment to abide by the rules and regulations. One of the regulations that is given emphasis is the tardiness. The STE program believes that one of the qualities that an STE student should acquire is to be able to inculcate and apply the essence of task on time which includes being in class early or at least on time. Each time the student is late in class, the beadle hands out a green form to the student and is

asked to proceed to the adviser and/or Prefect of Discipline for brief counseling. The counseling will just be about the reason why the student is late and an agreement that he/she will not be late in the succeeding days. If the student accrues 3 green forms then the student is asked to proceed to attend the 5-session counseling with the guidance or the STE coordinator. Together with the counseling, the STE coordinator and the concerned student will agree on the community service that he/she would be committing to. The community service usually includes tree planting, clean-up drive and peer tutorials.

The counseling will help the student and at the same time the STE program, through the STE coordinator and/or guidance counselor, the reason behind the student's tardiness and address a possible solution. The community service, as cited by Mead (2016), develops student's real-world skills which include leadership, problem-solving, time management and collaboration among others. This insight is aligned with the STE programs vision that through the EARLY intervention program, the students will realize through counseling and community service that students will not only hone their leadership skills but at the same time be responsible and committed to their roles. Though the realization and the commitment to becoming responsible students is a reward itself but the administration of the STE Program rewards the students' improved behavior through Perfect Attendance award and Early Bird award every E-CARD or the recognition of honors.

## **1.2 Research Questions**

This study sought to find answers to the following questions:

- a. What is/are the top reason/s why the students are late to class?
- b. How does the Project EARLY decrease students' tardiness?
- c. How does the intervention help the students be responsible of their time?

## **1.3 Scope and Limitations**

This study focused on the PROJECT EARLY intervention program of the students from the Science Technology and Engineering Program. This specifically included the students who have 3 tardiness in a week. The sections of the students are from Grade 8 Pasteur and Mendel, Grade 9 Einstein and Curie and Grade 10 Newton and Edison of the School Year 2018 – 2019.

## **2 Research Methods**

The methods utilized were descriptive and quantitative. These methods were necessary in order to analyze the data and answer the questions raised. The descriptive method was essential to explain the learning situation of the STE students who are usually late to class. Further, this was deliberated to improve the students' punctuality and reduce tardiness by counseling the students and asking them to commit to their role in the community service given to them. Ten weeks was planned, and intervention was implemented for the identified students. Triangulation in data collection was applied by

opting for qualitative and quantitative modes of data collection and tools. On one hand, quantitative method was utilized to get the numerical description during the pre-test and post-test.

## **2.1 Sampling**

This study employed purposive sampling in choosing the participants. According to Black (2010) purposive sampling is a non-probability sampling method that occurs when elements selected for the sample are chosen by the judgment of the researcher. The participants in the study were those identified to have been tardy more than thrice in a week.

## **2.2 Data Analysis**

This study employed quantitative-descriptive method in analyzing the data. Quantitative-descriptive method is used to quantify and measure data and generalize results from a given sample. It is fit to the study as it measured the outcome of students after implementing the PROJECT EARLY Program.

## **3 Results and Discussion**

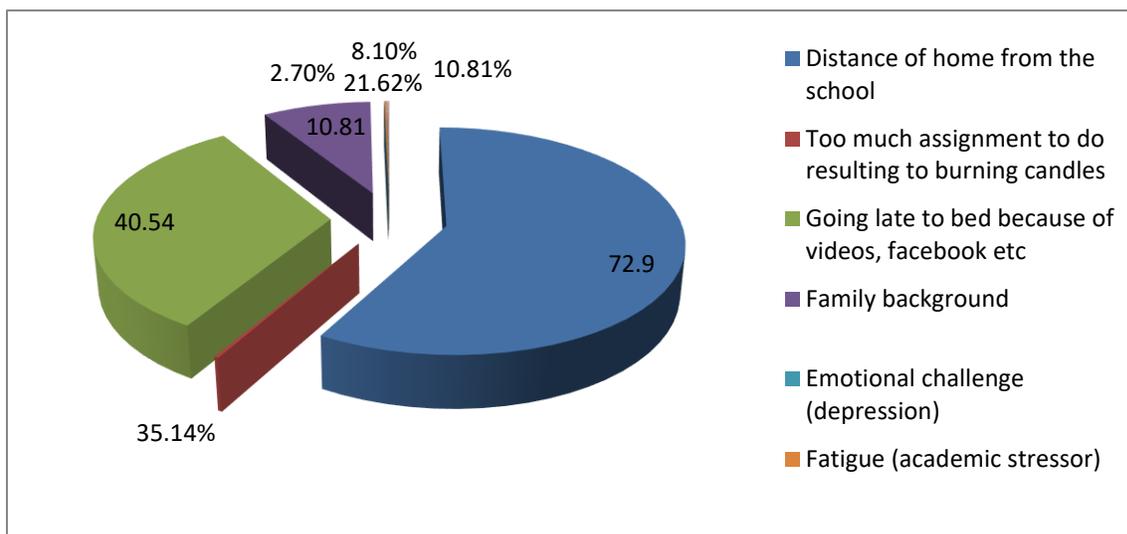
This study assessed the effectiveness of the PROJECT EARLY intervention program among the STE students who have been tardy consecutively. The results obtained were put through a statistical analysis and are presented in this part of the research. For better understanding, the results were divided and presented under the following questions:

a. What is/are the top reason/s why the students are late to class?

As shown in Figure 1 that majority with 72.9% of the students' tardiness is the distance from home to school, it is followed by 40.54% which is going to bed late because of social media then followed by 35.14% saying that there are too much assignment to do which results to staying up late at night and the rest of the reasons contribute to family background, emotional challenge and fatigue.

This implies that the students see the distance as a burden for them to go to school. It was revealed also in the FGD that the reason why they are usually late does not only contribute to the distance but because they slept in and was not able to wake up early. Some even admitted that because they do not have time management and do not know how to prioritize their tasks, they procrastinate which led to them being tardy. Some also admitted that because of social media, they lose track of time hence waking up early and being in class on time.

b. How does the Project EARLY decrease students' tardiness?



**Figure 1.** The Reasons Behind the Students' Tardiness

As shown in Table 1.1, the number of students who are tardy is very alarming as it averages to 13.9 for all sections. The number of students with the highest average of tardiness is from the Pasteur section with 15.8, Einstein with 14.1, Galileo, Aristotle and Mendel with an average of 13.7 and 13.5 respectively. This implies that the students have not inculcated the essence of time and need to be corrected with an intervention that will help them avoid tardiness and be early in class or at least be on time in class.

**Table 1.1** Science, Technology & Engineering (Ste) Curriculum Lists of Tardy Days School Year 2017-2018

Section	Average
Aristotle	13.5
Galileo	13.7
Mendel	13.5
Pasteur	15.8
Einstein	14.1
Curie	12.8
<b>Average</b>	<b>13.9</b>

After the implementation of PROJECT EARLY, a tremendous decrease of the average of tardiness from 13.9 to 2.75 is observed. This implies that the PROJECT EARLY is effective especially on the part that the students become responsible of their actions thus, committing to their responsibilities. Further, as cited in [www.sunyjc.edu](http://www.sunyjc.edu), that when students take on responsibilities and take an active role in their learning by recognizing they are accountable for then it eventually will lead to their academic success.

**Table 1.2.** Science, Technology & Engineering (Ste) Curriculum Lists of Tardy Days School Year 2018 – 2019

<b>Section</b>	<b>Average</b>
Mendel	1.57
Pasteur	1.5
Einstein	2.9
Curie	2.6
Newton	4.4
Edison	3.5
<b>Average</b>	<b>2.75</b>

c. How does the intervention help the students be responsible of their time?

Based from the opinions and insights of the student-participants from the conducted focus group discussion, the strategy employed allowed the student-participants to realize the essence of their actions and that, as one of the students stated, all their actions have corresponding consequences. The student-participants appreciated also the community service because it taught them how their actions might affect other people either it be positive or negative. The student-participants seem to realize that their decisions and actions may affect other students or even their teachers; they have realized that they are also capable of being responsible students by committing to the roles given to them.

**4 Conclusions**

It can be concluded that the intervention has positively brought a change in routine. Whilst there is a need to understand the hidden factor behind this positive change whereby in the current context it can be related to the interventions that were planned by the researchers. The strategies that were planned for this behavior modification consisted of counseling and community service. This can be referred with a two-fold perspective that is theoretical perspective and cultural perspective. As for the theoretical perspective many authors have suggested that students given a reward and incentive tend to show improvement in their school behavior and practices. The reward in the PROJECT EARLY is the students' ability to recognize that they play a role in their community. The responsibility and importance of holding a role in a community will eventually lead them to become responsible students. They are given recognition awarding of certificates after they have completed their counseling and community service. Another incentive given to students is the awarding of the Perfect Attendance and Early Bird every quarter. This can be linked from Skinner's theory of behavior where a positive stimulus leads to a positive response and the increase in reward leads to a permanent response of the positive desired behavior.

#### 4.1 Recommendations

The researchers suggest and recommend that operant conditioning should be devised to give rewards to those who are early comers and reinforce consistency all through-out the school. The implementation of a school-wide tardy policy should be enforced where the teachers the administrators should go hand in hand to implement the PROJECT EARLY to effectively enforce against tardiness. Since it is observed through the study that providing counseling and giving them responsibility in community service at the same time rewards and incentives are awarded for not being tardy to the school worked, therefore this strategy can be applied as school-wide policy. However, it can also expand to more tangible rewards such as homework passes. The benefit of this is that students who are following the rewarded, hopefully reinforcing their positive behaviors. This research is one of the initiatives that will facilitate school policy makers, teachers and parents to explore the ways of creatively decreasing the student tardiness.

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## Counselor Educators' Teaching Practices: A Perspective from the Students

Alvin O. Insorio<sup>1</sup> & Annalyn A. Delfino

Philippine Normal University – Manila

[alvininsorio0413@gmail.com](mailto:alvininsorio0413@gmail.com)<sup>1</sup>

**Abstract.** This study aimed to determine the counselor educators' teaching practices in terms of teaching methods and strategies, assessment, follow-up activities and assignment on the eyes of their students. The authors believed that the greatness of the teaching practices of teachers is based on how their students perceived those practices and their relevance to their lives. So, their teaching practices were reported by their students by answering the questionnaire and interview questions. This study was explanatory sequential design where quantitative data were collected first followed by qualitative. A total of eighty-two participants purposively selected were voluntarily joined the study from Region IV - A and it was revealed that counselor educators facilitate transfer of learning by linking conceptual learning to real-life experiences following constructivist philosophy. Reflective teaching practices were used with mini lecture and utilization of technology was observed during the teaching and learning process. Various assessment tools were utilized by the counselor educators to evaluate the needs of the students and to measure the learning outcomes. Counselor educators maximize the potential of the students by allowing them to explore their learning in the community. In terms of assessment, both traditional and authentic forms were utilized by counselor educators. Moreover, they make themselves available for consultation and interview as means of extending their services.

### 1 Introduction

The students can tell how productive and influential the teacher is in the teaching practices in relation to the students' lives. Students observed what the teachers are doing inside the classroom. Seemingly, it is a great indicator on how good the teachers are. More recently, the salience of students' voices has become explicit in the growing body of research. For instance, available empirical research findings have shown that collaborative work between teachers and students not only generated a better relationship between teachers and students but contributed much to a better understanding of learning that eventually enhanced engagement, motivation, and enthusiasm within the learners (Cook-Sather, 2002; Arnot, McIntyre, Pedder, & Reay, 2004; Bovill, Cook-Sather, & Felten, 2011; Cook-Sather & Alter, 2011).

Authorizing students' perspectives can directly improve educational practices because when teachers listen and learn from students, they can begin to see the world from those students' perspectives (Clark, 1995; Heshusius, 1995). This is more than simply an interesting experience; it can help teachers make what they teach more accessible to students (Commeyras, 1995; Dahl, 1995; Lincoln, 1995; Johnson & Nicholls, 1995). Furthermore, it can contribute to the conceptualization of effective and productive teaching. Authorizing student perspectives introduces into critical conversations the

missing perspectives of those who experienced the effects of existing educational policies-in-practice (Cook-Sather, 2002).

Counselor educators may use different teaching strategies at their disposal. These strategies can be separated into action methods, audio/video material and self-exploration methods (Morrissette and Gadbois, 2006). Typically, action methods and audio/video review happen within a group setting, whereas self-exploration exercises are completed independently. However, a combination of methods is not unusual. For example, students may participate in role-plays and reflective journal writing simultaneously. The purpose of combining both approaches is to help students understand how personal issues can influence their work.

Brian, Griffith and Frieden (2011) argued that counselor educators can facilitate reflective thinking in students through the practices of Socratic questioning, journal writing, interpersonal process recall and reflective teams. These pedagogical methods are described and applied to counselor education programs. Students' expectations of the acquisition of insights, knowledge and mastery of life skills will be gained more easily in an atmosphere of friendly understanding and non-threatening interaction. This is also confirmed by Brian, Griffith and Frieden (2011) that new insights can be gained as counselors and clients collaborate in a non-threatening atmosphere.

Latif & Miles (2013) conducted a study about instructor characteristics and teaching practices that student's value most highly. They found out that students perceived the most important characteristics of an effective teacher based on his/her knowledge, ability to explain material clearly, and adequate preparation. Students perceived the most important teaching practice to be provision of practice questions and the least important to be class time dominated by traditional lectures.

In the Philippine context at present, students are encouraged to fully participate in the counselor's educators' teaching process. Students are now being asked to use their cognitive development, academic knowledge, and language skills to read, interpret comprehend, synthesize, analyze, compare, contrast, relate, articulate, write, evaluate and more. This encouragement builds the foundation for alternative forms (formative) of assessment to be used on the counselor educators' teaching practices so that the instructors can measure incremental gain. Although various definitions are given about alternative assessment in the literature, Hancock (1994), Cooper (1999), Crawford and Impara (2001), Linn and Miller (2005), and Diaz-Rico and Weed (2006), maintain that alternative assessments which are generally developed directly counselor educators' teaching practices and instruction, group work, and related practices provide an alternative to traditional assessment.

The present study was anchored on situated learning theory by Lave and Wenger (1991) which is relevant in explaining teaching practices. Situated learning suggests that learning takes place through the relationships between people and connecting prior knowledge with authentic, informal, and often unintended contextual learning (Oregon Technology in Education Council, 2007). Students are more inclined to learn by actively participating in the learning experience. Teaching practices like teaching methods and

strategies greatly effect on how the students learned the lesson. Moreover, assessment conducted by the professors drives the will of the students on how to study the lesson more effectively.

This study aimed to determine the perspectives of the students about the teaching practices of counselor educators. Specifically, it sought to answer the following questions: 1. What are the perspectives of the students on the teaching practices of counselor educators in terms of: a) teaching methods and strategies; b) assessment; and c) follow-up activities and assignment? 2. What extent is the counselor educators' teaching practice can be most influential to the student learning? 3. How do counselor educators' teaching practices affect the students' learning?

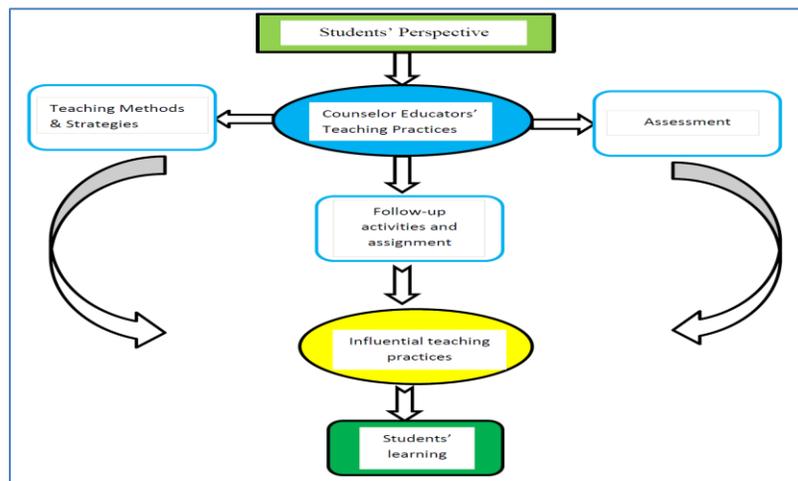


Figure 1. Conceptual Paradigm

The figure above shows how the students' perspectives on counselor educators' teaching practices were sought in terms of teaching methods and strategies, assessment, follow-up activities and assignment. Likewise, it aimed to identify the most influential teaching practices on the eyes of their students and how did those practices affect students' learning.

For the past ten years, lots of researches were conducted about counselor education and supervision in abroad. However, in the Philippine setting, guidance counseling is one of the courses offered in graduate studies, but few studies conducted about the practices of counselor educators. Through this study, practices of guidance counselor may reveal based on the eyes of their students which serve as an eye opener for many educators in graduate studies.

**2 Methods**

The design of this study was explanatory sequential in which the researchers combine fundamentals of qualitative and quantitative research approaches for the purposes of enriching the data and to gain deeper understanding of the results (Johnson, Onwuegbuzie, & Turner, 2007). The rationale of using this kind of mixed methods was significant enhancement because we hoped to reveal richer meanings and implications

based on the result of combining qualitative and quantitative methods. Using a survey format for the quantitative component of the study as well as phenomenological strategies for the qualitative component, the researchers believed the data would give increased awareness on how graduate students in guidance and counseling experienced teaching practices of their educators.

The participants of the study were students from master's degree program of Guidance and Counseling in different schools such as fifteen from Tomas Claudio Colleges, eight from University of Rizal System, five from Laguna College of Business Administration, thirty-five from Laguna State Polytechnic University San Pablo City Campus, 10 from Union College and nine from Laguna State Polytechnic University Sta. Cruz Campus. Total of eighty-two students were participated in the study by answering the questionnaire and interview questions. Purposive sampling was used to determine the target respondents using the criteria of students who are currently enrolled in master's degree program for Guidance and Counseling and the professors who are currently teaching those students.

The instrument for survey was a researcher-made questionnaire formulated by the researchers based on the emerging themes of the related literature. The first draft was criticized by the peers to exclude the unnecessary items. After that, a letter was given to the three experts in the field of Psychology, Guidance and Counseling to validate the instruments. The expert rated the questionnaire to establish its content validity. After the validity has been established, questionnaire was pilot tested to ten non-respondent students from the target population to determine its reliability. Using Cronbach's alpha, the instrument was reliable at 0.86 which means good instrument. For qualitative data, interview questions were formulated by the researchers based on the related literature. It has five item open-ended questions about the teaching practices of counselor educator in terms of teaching methods and strategies, assessment, follow-up activities and assignment to elicit the students' experiences on the teaching practices of their counselor educators. Moreover, class observations were conducted to see the actual practices inside the classroom as means of triangulating the findings.

The researchers asked permission to the authorities by giving a formal letter to conduct data collection to the students during their free time. Moreover, students were also asked their voluntary participation to the study by orienting them on the purpose of the study and eliciting their voluntary consent. They were free anytime if they want to quit or not to participate in the study. Similarly, professors in graduate studies who are teaching the student-participants were informed about the objective of this study. Their consent was secured first before the distribution of questionnaire, conduct of interview and class observation. Moreover, their identities were secured, and data collected from them were treated with utmost confidentiality. In addition, contact numbers of the researchers were given to the participants whenever they have queries on the present study so that they were free to clarify or ask something about the study.

A letter of request for the respondents was attached to the questionnaire to inform them about the nature of the present study. Ample time was given to the respondents

so that they were free to answer the questionnaire without any interference from others. After which, they were instructed to retrieve the questionnaire on the next week. The researchers collected the answered questionnaire one week after the administration. Once the survey responses were analysed, the researchers considered further analysis of the text through semi-structured interview and class observation to clarify the true meaning of the responses of the respondents. This study stands for the beliefs that additional findings would not have been revealed without the mixed research approach. Member checking was used to check the accuracy and completeness of data and verify if the collected data were represented by student's experiences on the teaching practices of counselor educators. Moreover, peer debriefing was conducted by asking help of counselor educator to carefully examine the process of this study to increase its credibility.

**3 Results**

**Table 1.** Summary of responses of the students on teaching practices of counselor educator in terms of teaching method and strategies

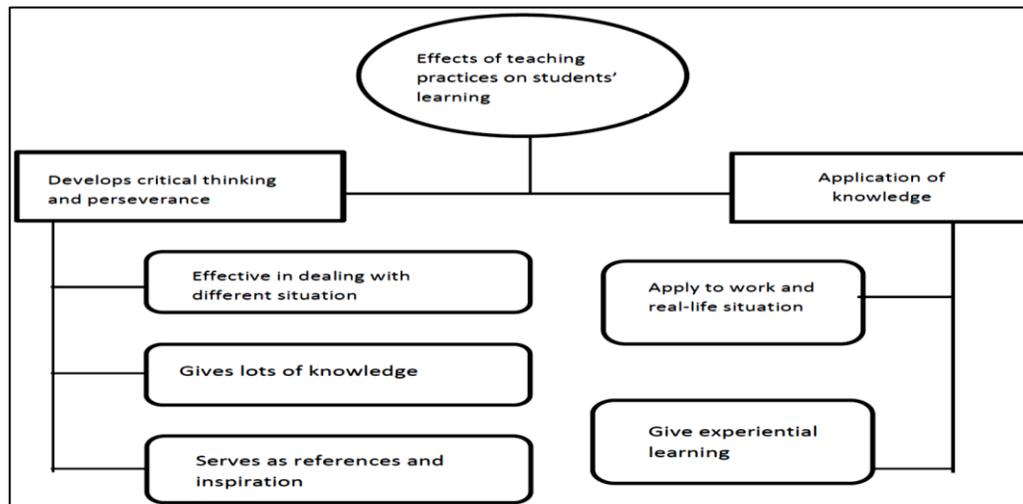
<b>Teaching Methods and Strategies The counselor educator</b>	<b>Mean</b>	<b>s</b>	<b>Interpretation</b>
entails reflective practices in your lessons.	3.61	.56	Highly Evident
uses an out of class learning activities.	3.20	.79	Moderately Evident
adopts technology in teaching	3.54	.61	Highly Evident
connects experiential education and reflections.	3.66	.53	Highly Evident
applies distance learning in teaching.	3.13	.58	Moderately Evident
employs role playing to stimulate emotional response that contributes to the learner's understanding of different points of view, concept and situational pressures.	3.52	.59	Highly Evident
engages the student's journal writing.	3.17	.78	Moderately Evident
connects learner with construct personal meanings.	3.71	.48	Highly Evident
facilitates transfer of learning by linking conceptual learning to real – life experiences.	3.80	.40	Highly Evident
enhances mini lecture to solicit feedback in terms of the lessons.	3.57	.50	Highly Evident
<b>Average</b>	<b>3.49</b>	<b>.58</b>	<b>Moderately Evident</b>

Table 1 shows that counselor educators embraced reflective teaching practices, adopt technology in teaching, connected experiential education and reflections. Likewise, it employed role playing to stimulate emotional response that contributes to the learner's understanding of different points of views, concepts and situational pressures, employed constructivist teaching, acted as facilitator in transfer of learning by linking conceptual learning to real-life experiences, and utilized mini lecture to solicit feedback in terms of the lessons. Various teaching methods and strategies were employed by the counselor educators.

**Table 2.** Summary of responses of the students on teaching practices of counselor educator in terms of assessment

<b>Assessment The counselor educator</b>	<b>Mean</b>	<b>s</b>	<b>Interpretation</b>
creates an objective type of test for his/her students focusing on situational basis related to the practice	3.73	0.50	Highly Evident
introduces assessment tools to his/her students to evaluate the needs of the students.	3.59	0.72	Highly Evident
uses different tools in assessing the learning outcomes of the students.	3.60	0.54	Highly Evident
makes use the result of assessment to modify teaching practices.	3.52	0.61	Highly Evident
assesses students through questioning, quizzes, mini assignments and presentation.	3.67	0.61	Highly Evident
asks feedback from the students about the examination or activities done by them.	3.53	0.69	Highly Evident
makes use appropriate assessment tool based on the level of the students.	3.51	0.61	Highly Evident
selects and devices appropriate tools for intervention or problem solving.	3.51	0.63	Highly Evident
gives just grades based on the scores or performance of the students.	3.52	0.65	Highly Evident
identifies students' problems with the help of appropriate tools.	3.37	0.75	Moderately Evident
<b>Average</b>	<b>3.56</b>	<b>0.63</b>	<b>Highly Evident</b>

Table 2 reveals that counselor educators utilize different tools in assessing the learning outcomes of the students which are appropriate to the level of the students. They used assessment tool to evaluate the needs of the students. Those assessments are in the form of questioning, quizzes, mini assignments and presentation. They employed objective type of test in test construction focusing on situational basis related to the practice of counseling. It means traditional paper-and-pencil test was still used by counselor educators.



**Figure 2.** Effect of teaching practices on students' learning

The figure 2 shows the effects of teaching practices on students' learning based on the experiences of the students. Counselor educators teaching practices developed the critical thinking and perseverance on the part of their students. Students realized how they going to put the concepts in guidance and counseling into practice and make use of what they have learned from their professors. They also want to pursue to finish graduate studies to become more competitive guidance counselor. In addition, students apply what they have learned from their professors in their work especially in dealing with the client.

**Table 3.** Summary of responses of the students on teaching practices of counselor educator in terms of follow-up activities and assignment

<b>Follow-up Activities and Assignment The counselor educator</b>	<b>Mean</b>	<b>s</b>	<b>Interpretation</b>
creates extension services for the students to apply their learning in the community.	3.27	0.79	Moderately Evident
designs strategies for collaborating and communicating with various stakeholders in guidance and counseling programmers.	3.33	0.84	Moderately Evident
implements the action plan in collaboration with internal and external stakeholders of their institutions.	3.23	0.84	Moderately Evident
develops leadership skills in curriculum development and school development.	3.45	0.79	Moderately Evident
solicits feedback from stakeholder's experiences in guidance and counseling services.	3.28	0.76	Moderately Evident
allows the students to apply their learning in the community.	3.51	0.69	Highly Evident

coordinates with other institutions for student's visitation and exposure to the different guidance services	3.33	0.72	Moderately Evident
serves as model to the students to take the lead in school improvement and success	3.68	0.59	Highly Evident
makes himself/herself available for consultation and interview of the students taking graduate study in guidance and counseling.	3.60	0.75	Highly Evident
maximizes the potential of the students by allowing them to explore on their own learning.	3.68	0.54	Highly Evident
<b>Average</b>	<b>3.44</b>	<b>0.73</b>	<b>Moderately Evident</b>

Table 3 shows how counselor educators rendered follow-up activities and assignment to their students. They allowed their students to explore on their own learning in order to apply their learning in the community. They served as model to the students to take the lead in school improvement and success; and making themselves available for consultation and interview as way of extending their hands. Follow-up activities and assignment were moderately practiced by counselor educators.

**4 Conclusion**

In light with the findings, this study concluded that counselor educators used reflective teaching and experiential methods following constructivist perspective in delivering the lesson. Discussion and group work were the common teaching practices experienced by their students which they think effective in linking the conceptual learning to real-life experiences. They used different assessment tools in assessing the learning outcomes of their students both traditional and authentic. Assessment was highly perceived by their students as part of teaching-learning process. Moreover, they allowed their students to explore on their own learning in the community. Research work as evidence of learning served as requirement given by the counselor educators. However, outdoor activities and distance learning were moderately practiced. The counselor educators may use these two approaches in teaching to cater kinesthetic-interpersonal learners because this type of students enjoys doing outside the class. Also, distance learning reaches the students from different places which may help the students not to be with school just to reach their professor.

Students perceived that discussion, explanation with examples, sharing experiences, reflective activities and collaboration with brainstorming were influential teaching practices of counselor educators where they can easily grasp the learning well and relate the topic to their lives. Those practices developed critical thinking and perseverance to continue graduate studies on the part of the students. These inspired the students to learn more in counseling process because these make the learning more interesting. It is highly recommended that counselor educator continues to motivate their students to keep abreast with the latest trend and current practices in counseling

through attending professional works, trainings, seminar, and workshop, and finish graduate studies.

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## Roy A. Molanda: An Effective Edtech Model

**Roy A. Molanda**

Pineda Elementary School, Pasig City

[royapostolmolanda@gmail.com](mailto:royapostolmolanda@gmail.com)

**Abstract:** Learning is an endless and lifelong process. It must be accessible, purposeful and intentional to every learner to help him or her survive, achieve his or her goals and showcase his or her potential to its fullest. In the past hundred decades, books are widely used and the most available print reading material. Due to the rise and advancement of technology, it affects most of the learners' interest to read, use and being dependent to books and other materials imprinted on paper. To make use of the purpose of its ascent, the teachers and administrators have revitalized (R) the learning competencies, observed (O) and identified the best and least mastered skills, yielded (Y) results from the assessment, analyzed (A) the data, managed (M) resources, organized (O) the knowledge and skills, leveled-up (L) to strengthen the weak skills, applied (A) what have learned, nurtured (N) the model, drawn (D) feedbacks, and assessed (A) the content of the model. The ROY A. MOLANDA model was disclosed that the teachers in public school regardless of their teaching competency levels, who are the first of the two respondents have concluded to have the social concern with their clientele and that the diverse elementary school learners learn most in an environment with courtesy, respect, and gender-fair, with parents involvement to school activities, and with teachers who are abreast with the current trends and thrust related to pedagogy. The administrators, who are the second respondents, have to know the pupils' problem quickly and veraciously but with respect to their rights. The ROY A. MOLANDA used descriptive method and had found out that this was an effective and helpful model to teachers who are teaching and students who are taking Edukasyong Pantahanan at Pangkabuhayan (EPP) subject, and which can be accessed, learned and taught online.

### 1 Introduction

Learning is an ongoing process that must be purposeful and intentional for each student so that they may reach their potential to its fullest. E – Learning nowadays is not just an add-on inside the classroom, but an integral part of pedagogy. Regular books are of heavy tons to carry while e – learning offers a lot of more visual and interactive components considering that 21st century learners are digital natives. Thus, an e-learning culture is one in which the emphasis is on the teacher, the student, and the technology used to facilitate that learning experience (Kok, 2013). The Basic Education Curriculum (BEC) of 2002 implementation under the leadership of the Department of Education (DepEd) Secretary emphasized the integration of using e-learning in the subject areas. According to Saavedra and Opfer (2012) argue that learners must hone their skills and enhance their learning as a matter of urgency to be able to address persistent global challenges. However, in spite of worldwide agreement that learners need skills such as critical thinking and the ability to communicate effectively, innovate and solve problems through negotiation and collaboration, pedagogy has not adapted to address these new challenges. The 'transmission' or lecture model still prevails as the dominant instructional approach in education throughout much of the world (Saavedra

and Opfer, 2012). Senthil-Kumaran and Sankar (2013) found that content is also a motivational factor in adapting to e-learning. They believed that content can be more effective when being customized according to individual needs as it boost proactive delivery to the users. This scenario deliberately enhanced users' motivation in using e-learning.

### **1.1 Problem Statement**

The main objective of this study assessed and evaluated the NCBTS – TSNA domains of teaching Edukasyong Pantahanan at Pangkabuhayan (EPP) as basis for an educational technology model.

Based on the result of EPP teacher's level of teaching competencies, what were the identified strengths and weaknesses of the respondents in seven domains? Is there a significant difference in the assessed level of teaching competencies of the EPP teachers and their administrative heads when grouped according to school type? What differentiated instructional tool was design and developed? What was the method of implementation of the differentiated instructional tool in EPP? Based on the documented phases, what EdTech Model was developed? What was the academic performance of the pupils in assessment of learning in fourth grading period using ROY A. MOLANDA Model?

## **2 Method**

In this section, population and sample of the study, data collection tools and statistical methods used for data analysis are described.

### **2.1 Population and Sample of the Study**

There were two groups of respondents, the (28) administrators; (135) EPP teachers of public school of Pasig City. These groups were chosen purposively based on the criteria, that the respondents have taught EPP subject.

### **2.2 Data Collection Tools**

The researcher requested permission for authorities from the Department of Education on the use of the NCBTS – TSNA Tool kit. While securing the authorization, the researcher formally sought permission to the Schools Division Superintendent to conduct the study. After authorization and permission were done and granted, the researcher requested clearance from respective principals of purposely selected respondents from 28 elementary schools teaching EPP subject. The respondents were brief on the objectives of the study and the nature of their involvement before they were asked to respond to the instruments. After which, the researcher has got their commitment before the study commenced. The researcher facilitated the conduct of the study. The EPP teachers and their administrative heads were subjected to an unstructured interview after taking the Electronic version of the NCBTS in order to implore reasons behind their responses. The

completed questionnaires were reviewed for completeness; data then were tabulated and analyzed.

### 2.3 Data Analysis

The Statistical Package for Social Science (SPSS version 20), was employed to treat the data and survey responses for fast and accurate results using the following statistical tools, to wit:

Mean and Standard Deviation were utilized to describe the level of teaching competencies of teachers based on NCBTS-TSNA as assessed by the teacher themselves and their respective administrative heads at public and private schools in terms of social regard for learning, learning environment, diversity of learners, curriculum, planning, assessing & reporting, community linkages and personal growth & professional development. Moreover, the standard deviation was used to describe the position of individual scores around the mean scores in order to explain the homogeneity and heterogeneity of perceptions. The small value of standard deviation indicates homogeneous perceptions while large value indicates heterogeneous perceptions. Ranking was utilized to show the position of importance of an item to others. In the study ranking was employed in assessing the level of teaching competencies and to identify the strength and weaknesses of EPP teachers as confirmed by their administrative needs. T-Test of Independent Samples was utilized to determine the difference in the assessed level of teaching competencies of the EPP teachers, and their administrative heads when grouped according to school type. The researcher has adopted the decision criteria to determine the results of significant differences which states that, "If sig value is equal or less than ( $\leq$ ) 5% level of significance, reject the null hypothesis, otherwise accepted if it is greater than ( $>$ ) 5% level of significance."

### 3 Results

**Table 1.** Identified Strengths and Weaknesses of EPP Teachers in Public School according to Seven Domains on the Level of their Teaching Competencies

Indicators	Public School							
	Teacher-Respondents				Administrative Head-Respondents			
	Composite Mean	SD	Interpret	Rank	Composite Mean	SD	Interpret	Rank
Social Regard for Learning	3.5725	.47496	High	1	3.8839	.27068	High	3
Learning Environment	3.5145	.57296	High	2	3.8734	.32144	High	4
Diversity of Learners	3.4433	.53080	Satisfactory	6	3.8646	.33782	High	5
Curriculum	3.4592	.54723	Satisfactory	4	3.8494	.35498	High	6
Planning, Assessing and Reporting	3.4472	.54655	Satisfactory	5	3.8074	.39485	High	7
Community Linkages	3.4235	.56834	Satisfactory	7	3.8929	.31497	High	2
Personal Growth and Professional Development	3.4910	.51240	Satisfactory	3	3.8952	.28953	High	1
<b>Grand Mean</b>	<b>3.4787</b>	<b>.53618</b>	<b>Satisfactory</b>		<b>3.8667</b>	<b>.32632</b>	<b>High</b>	

Scale: 3.51-4.00 High; 2.51-3.50 Satisfactory; 1.51-2.50 Fair; 1.00-1.50 Low

In terms of the identified strengths of EPP teachers in public school according to seven domains on the level of their teaching competencies, it could be gleaned in the above table that social regard for learning, learning environment and personal growth & professional development are the top 3 variables which can be considered as strengths of public school teachers as assessed by themselves. On the other hand, the lowest among the rankings of seven (7) variables was community linkages which can be considered as weakness of public school teacher-respondents. While, administrative head-respondents, the top 3 variables which could be considered as strengths of teacher-respondents are personal growth & professional development, community linkages and social regard for learning. While, the lowest ranking among the seven (7) variables is evident by the planning, assessing and reporting of public school teacher-respondents.

**Table 2.** Difference in the Assessed Level of Teaching Competencies of the EPP Teachers and their Administrative Heads

Indicators	Public School			
	T	Sig	Decision Ho	Interpret
Social Regard for Learning	-4.713*	.000	Reject	Significant
Learning Environment	-5.004*	.000	Reject	Significant
Diversity of Learners	-5.383*	.000	Reject	Significant
Curriculum	-4.770*	.000	Reject	Significant
Planning, Assessing and Reporting	-5.008*	.000	Reject	Significant
Community Linkages	-5.665*	.000	Reject	Significant
Personal Growth and Professional Development	-6.064*	.000	Reject	Significant
Composite	-5.230*	.000	Reject	Significant

\*Significant at 5% level of significance

Using the T-Test of Independent Samples, it could be gleaned in the above table that difference between the assessments of teacher and administrative head-respondents in the level of teaching competencies according to school type yielded significant results to both public and private schools in terms of the seven (7) domains. It means that whether public or private school the level of teaching competencies differ vis-à-vis the seven domains as assessed by the teacher themselves and their respective administrative heads. The sig values across all variables are less than 5% level of significance thus rejecting the null hypothesis to denote significant differences.

**3.3 Project Structure and Description of the Differentiated Instructional Tool**

The figure shows the project structure and description of the instructional tool. The Roy Apostol Molanda E – Learning develops by the researcher and it design the content based on the lesson in Edukasyong Pantahanan at pangkabuhayan (EPP).

Webpage

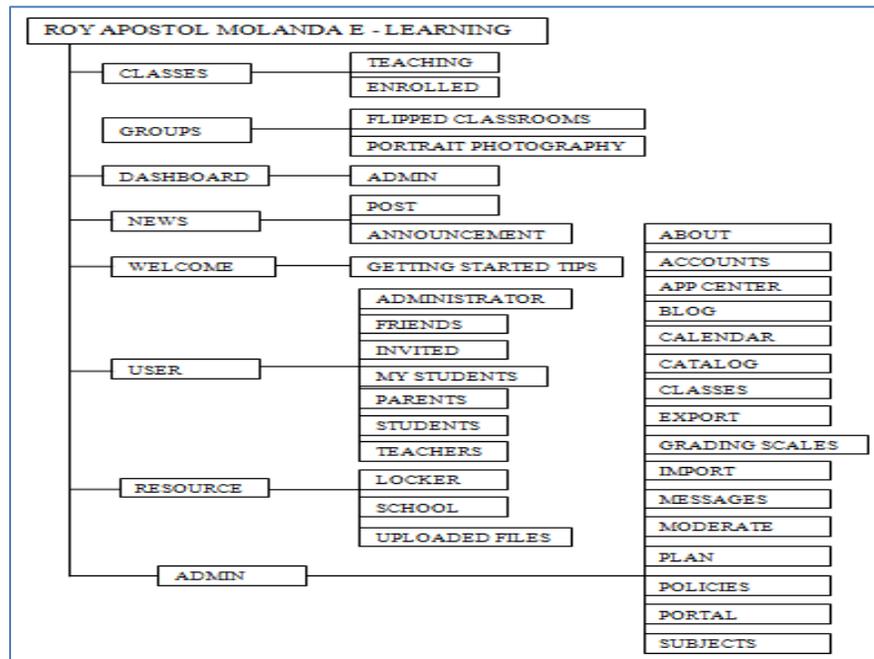


Figure 1. Structure of Webpage of Roy Apostol Molanda E – Learning

3.4. Implementation of the Differentiated Instructional Tool in EPP

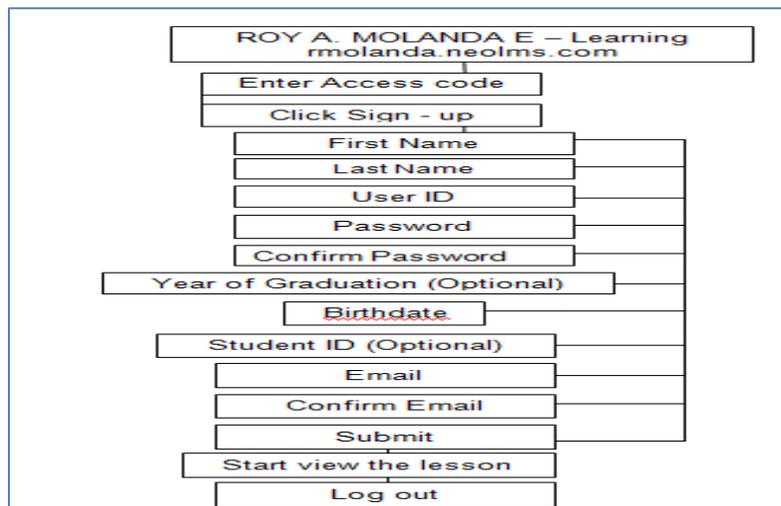
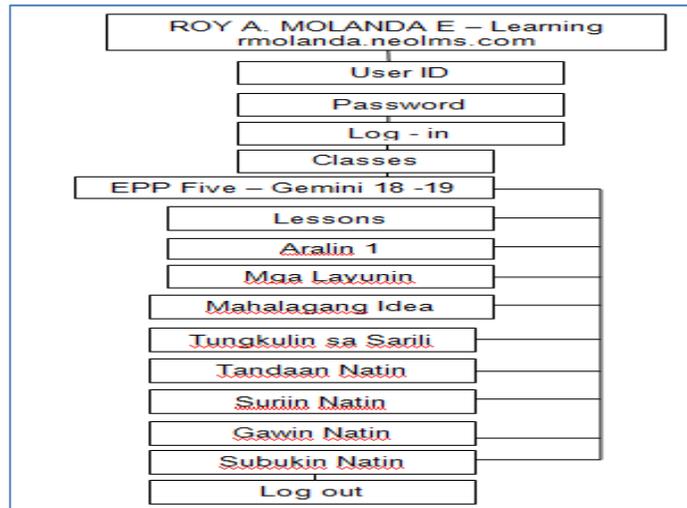


Figure 2. Process to enroll Roy Apostol Molanda E – Learning

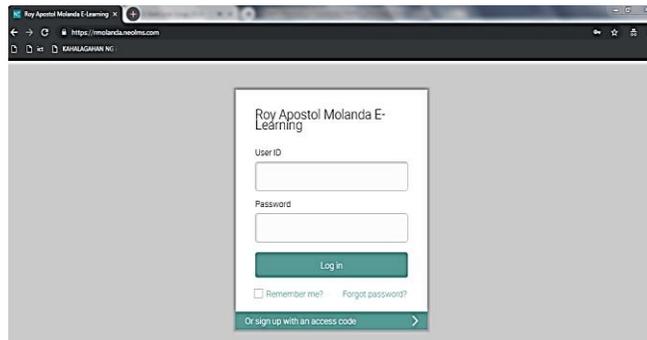
The figures show the activity on how to access or logging in the ROY A. MOLANDA E - Learning.



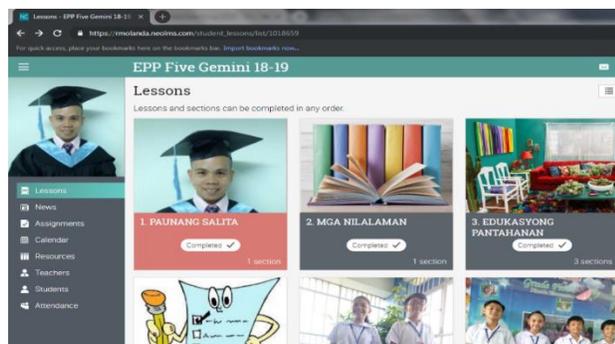
**Figure 3.** Process to access or logging in Roy Apostol Molanda E – Learning

**Screenshots**

The following images presented how to enroll in ROY APOSTOL MOLANDA E – Learning.



**Figure 4.** Roy Apostol Molanda E – Learning Website



**Figure 5.** Content of Roy Apostol Molanda E – Learning

**3.5. Develop EdTech Model**

ROY A. MOLANDA MODEL is a model in teaching Edukasyong Pantahan at Pangkabuhayan (EPP). This can be accessed on or by logging at [rmolanda.neolms.com](http://rmolanda.neolms.com).

**I. Rationale**

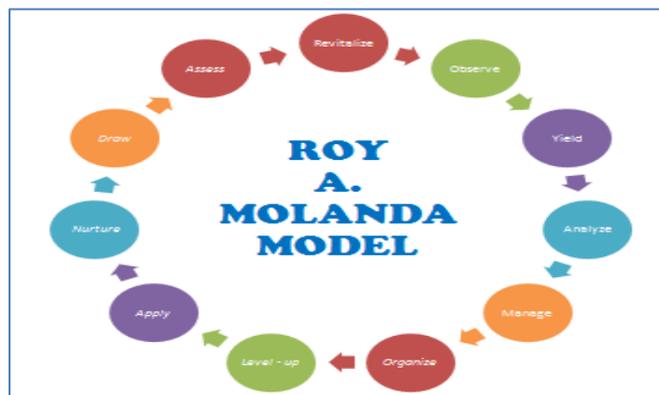
To organize and develop an instructional model through Information Communication Technology (ICT) in teaching Edukasyong Pantahanan at Pangkabuhayan (EPP); and to answer the call for quality education in the EPP subject.

**II. Objective**

a. Apply or use Roy A. Molanda Model as an instructional model to Edukasyong Pantahanan at Pangkabuhayan (EPP) lessons.

**III. Process**

Revitalize the learning competencies of Curriculum Guide. Observe, identify and mark pupils' best and least mastered skills. Yield results from the pupils' assessment. Analyze the data based from the results. Manage resources that focus on pupils' need anchored from the model. Organize the knowledge and skills to be used in every lesson. Level – up and strengthen the skills and knowledge least mastered skills. Apply and share the learning learned from the e–learning module. Nurture and enhance the model. Draw feedbacks from clientele and teachers for improvement. Assess the content of Roy A. Molanda model in teaching Edukasyong Pantahan at Pangkabuhayan (EPP).



**Figure 6.** ROY A. MOLANDA Model

**3.6 Academic Performance of the Pupils in Fourth Grading Assessment using ROY A. MOLANDA Model**

**Table 3.** Assessment of Learning Using ROY A. MOLANDA Model

<b>Grade</b>	<b>DepEd Grading Descriptors</b>	<b>F</b>	<b>%</b>
90 – 100	Outstanding	43	100
85 – 89	Very Satisfactory	0	0
80 – 84	Satisfactory	0	0
75 – 79	Fairly Satisfactory	0	0
Below 75	Did Not Meet Expectations	0	0
<b>Total</b>		<b>43</b>	<b>100</b>

Table 3 presents the academic performance of the pupils in fourth grading assessment by using ROY A. MOLANDA Model. It can be gleaned from the table that most of the pupils obtained of the 90 to 100. This shows that the ROY A. MOLANDA Model is effective in teaching EPP.

**4 Discussions**

The findings in the present study in terms of the identified strengths of EPP teachers in public school according to seven domains on the level of their teaching competencies was gleaned to have a social regard for learning and their weakness was gleaned to community linkages while the Administrator Heads was gleaned to have personal growth and professional development and their weakness was gleaned to planning, assessing, and reporting. According to Saavedra and Opfer (2012) argue that learners must hone their skills and enhance their learning as a matter of urgency to be able to address persistent global challenges. However, in spite of worldwide agreement that learners need skills such as critical thinking and the ability to communicate effectively, innovate and solve problems through negotiation and collaboration, pedagogy has not adapted to address these new challenges. The 'transmission' or lecture model still prevails as the dominant instructional approach in education throughout much of the world (Saavedra and Opfer, 2012). This approach typically leads to indifference, apathy and for most learners, boredom. Instead, learners need to dedicate time to interacting with mentors and peers and practicing and applying newly acquired skills and knowledge. New learning must be assessed and shared with peers through well designed collaborative encounters that support individuals in adapting their learning to new problems and contexts.

Based on the assessment of learning using ROY A. MOLANDA Model most of the pupils obtained of the 90 to 100 grades. The ROY A. MOLANDA Model is effective in teaching Edukasyong Pantahanan at Pangkabuhayan (EPP). Senthil-Kumaran and Sankar (2013) found that content is also a motivational factor in adapting to e-learning. They believed that content can be more effective when being customized according to individual needs as it boosts proactive delivery to the users. This scenario deliberately enhanced users' motivation in using e-learning. Content when being tailored carefully can further intensify e-learning user motivation to use e-learning, according to Calli et al.

(2013), content effectiveness had a significant effect on perceived usefulness by the users. Content richness in e-learning has been identified as extrinsic factors in the inquiry model of e-learning (Lee & Faulkner, 2011).

## 5 Conclusions

Based on the findings of the study, the following conclusions were drawn: The strength and weaknesses of teachers and school heads on the domains of level of teaching competencies from public school which similar became the basis for the development of the EdTech Model. The ROY A. MOLANDA Model is an effective E-Learning Tool to teach Edukasyong Pantahanan at Pangkabuhayan (EPP) of public school. It can help the EPP Teachers to be more effective and productive in teaching EPP subject. It can help the clientele learn even at home since it accessible online.

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## Activity-Based via Multimedia Learning through ISIM to Science 7

**Dharyl C. Del Mundo**

Cayetano Arellano High School

[dharylkabio17@gmail.com](mailto:dharylkabio17@gmail.com)

**Abstract.** This research was made possible to measure the effectiveness and the Mastery level of the learners in the utilization of Activity-Based via Multimedia Learning through ISIM (Interactive Strategic Instructional Material) to improve the academic performance of students in Science 7 specifically about Heat Transfer, which is one of the least mastered skills in Physics. At first the ISIM was validated by the Science Department heads of Grade 7, followed by the validation of tests and other instruments, right after that, the researcher identified the respondents by random sampling technique. Then, a pre-test was given to diagnose the chosen respondents. Afterwards a discussion was executed and grouped as the ABML or ISIM group and the NABML or (Non- ABML). After that, the Mastery level of each (ABML) cards were computed, then, a post-test was administered to see if there's a significant difference between the 2 groups and between the pre-test and post-test of both groups. Two-tailed and Correlated t-test was used to know its effectiveness. As a result, the researcher found out that using ABML through ISIM has enormous impact in engaging the students to manipulate the Computer Simulated Materials that helps them to increase their performance academically.

### 1 Introduction

Change is coming like what our President is always saying, and now Change has come. As the world changes from time to time it affects the world holistically. Generation from generation, era after era, a rampant innovation happened not just in political aspect, but also in education, we even felt the change when K-12 was introduced to our country, some opposed others agreed.

This is considering as a huge breakthrough in the educational system, and in line with this is the inclusion of technologies in teaching strategies. Furthermore, as the 21st century is advancing the teachers and strategies must also develop and innovate, more engaging and technology activity- based learning approach. Learning is very essential for He defines learning as "a persisting change in human performance or performance potential...[which] must come about as a result of the learner's experience and interaction with the world" (Driscoll, 2000, p.11). This definition encompasses many of the attributes commonly associated with behaviorism, cognitivism, and constructivism – namely, learning as a lasting changed state (emotional, mental, physiological (i.e. skills) brought about because of experiences and interactions with content or other people). Many traditional learning methods are now very much intertwined. No matter what theories of learning with which you are familiar, today's students can learn with assurance that each method is still very relevant in the digital age. In addition to this, the learners

must connect by the teacher to the lesson in a deeper understanding and to create a meaningful learning experience with the use of technologies. Learners also can learn a lot through and by experiencing it or sometimes known as hands-on activity where it is like the Experiential Learning of Kolb "it is concerned with the learner's internal cognitive processes" (Saul McLeod, 2010). Together with this is the Activity-based learning (ABL) as defined by Prince (2004) is a learning method in which students are engaged in the learning processes. These two types of method must connect to the interest of the learners to arouse their thirst for knowledge.

The term multimedia was introduced in the 1960s to describe the combined use of several media, such as text, film, video, still images, and audio (Vincent & Shepherd, 1989). Schnotz and Lowe (2003) define the term multimedia as the combination of multiple technical resources for the purpose of presenting information represented in multiple formats via multiple sensory modalities (Lowe and Schnotz, 2003)

At this moment the Department of Education adapts the utilization of Multimedia by means of (ICT) Information and Communication Technology that is why DepEd has DO 62, s. 2009 - Guidelines in Managing Existing Multimedia Materials in Schools. And in DO 57, s. 2011 - Policy Guidelines in the Implementation of the Special Science Elementary Schools (SSES) Project wherein Section 17, Article II of the Philippine Constitution mandates the State to give priority to Education, Science and Technology to foster patriotism and nationalism, accelerate social programs and promote total human development. Section 10, Article XIV further states that Science and Technology are essential for nationalism, development, invention, innovation and their utilization. Providing opportunities for the development of scientific attitudes, technological skills and higher order thinking skills among learners of Basic Education in an environment supportive of their nurturance is the primary responsibility of the Department of Education (DepEd).

This was made because Science is perceived as one of the hardest subject and cannot be learned in an instant without the real experiment or the hand-on activity, hence The researcher therefore made innovative way through the inclusion of (ABML) Activity Based Multimedia Learning approach simply because "Students assume greater responsibility for their own learning when they use (ICT) Information and Communication Technology, working more independently and effectively... ICT offers learners assignments better suited to individual needs and makes it easier to organize their own learning, through the use of, for example, digital portfolios" (Balanskat, 2006) "Peer-based learning has unique properties that suggest alternatives to formal instruction." (Mizuko, 2008). Activities via Multimedia are means of presentation to the child both problems and solutions of life's experiences w/c emphasize lessons of discipline knowledge, skills, innovation, integration and values vital for growth and development.

## **2 Significance of the Study/ Rationale**

The following will benefit with the finding of this study that will show the effect of the utilization of (ABML) Activity Based Multimedia Learning approach through (ISIM) Interactive Strategic Instructional Material in teaching Science 7.

## **2.1 To the students**

This will make them more active and participative in every activity through the aid of the (ABML) Activity Based Multimedia Learning approach through (ISIM) Interactive Strategic Instructional Material. That learners have opportunity to solidify understanding over periodic intervals for students to learn, rather than simply memorizing equations to pass a test and revolves around the understanding that human cognition evolved in a step-by-step process of learning, which relied on environmental interaction and experience to form intuition and knowledge.

## **2.2 The Teacher**

The aid of (ABML) Activity Based Multimedia Learning approach through (ISIM) Interactive Strategic Instructional Material where the subject teacher improves and develops their strategies in teaching which cater the needs of the 21st Century learners. This could make them realize the benefits then get using Multimedia as a mode to transfer learning in a creative way. As a matter of fact, this will help them to develop scientific innovative skills and attitudes in teaching gives the learners opportunity to ask questions, time to observe, see the relationships and develops action based on their own thinking.

## **2.3 Curriculum planner**

This will serve as an additional eye opener to the curriculum planner to integrate an (ABML) Activity Based Multimedia Learning approach through (ISIM) Interactive Strategic Instructional Material in teaching Science as a technique for motivating active involvement of students as can be manifested in their achievement.

## **2.4 The future researchers**

For those who are interested to investigate further in the utilization of (ABML) Activity Based Multimedia Learning approach through (ISIM) Interactive Strategic Instructional Material the result of this study might help them as their reference.

## **3 Research Problems/Questions**

The research sought to answer the following specific questions:

1. What is the mastery level of the (ISIM) Interactive Strategic Instructional Material content in:
  - 1.1) Activity Card
  - 1.2) Enrichment Card
  - 1.3) Assessment Card
2. What is the pre-test mean score performance?
  - 2.1) (ISIM) Interactive Strategic Instructional Material group
  - 2.2) (NISIM) Non-Interactive Strategic Instructional Material group

3. What is the post-test mean score performance?
  - 3.1) (ISIM) Interactive Strategic Instructional Material group
  - 3.2) (NISIM) Non-Interactive Strategic Instructional Material group
  
4. Is there a significant difference between the pre-test and post-test score of the respondents as to:
  - 4.1) (ISIM) Interactive Strategic Instructional Material group
  - 4.2) (NISIM) Non-Interactive Strategic Instructional Material group

**3. 1 Methodology**

Research Design The pretest-post-test none-equivalent (ABML) Activity Based Multimedia Learning approach was used in the study, a quasi- experimental design as illustrated below:



Where:

\*E is the with (ABML) Activity Based Multimedia Learning approach through (ISIM) Interactive Strategic Instructional Material.

\*C is the without (ABML) Activity Based Multimedia Learning approach through (ISIM) Interactive Strategic Instructional Materials and (NABML) Non- Activity Based Multimedia Learning approach

\*O1 is the administration of the pre-test

\*O2 is the administration of the post-test

\*X is the administration of the treatment

**3.2 Participants/Data source**

The study of the Utilization of Activity Based Multimedia Learning approach through (ISIM) Interactive Strategic Instructional Material of the Grade 7 Integrity Science learners was ministered at Cayetano Arellano High School, a public school located at Teodora Alonzo St. Sta. Cruz, Manila.

**3.3 Data Gathering/ Procedures and Instruments**

To be able to measure the effectiveness of the utilization of ABML through ISIM in the academic performance of students in Grade 7 Science (Physics), pretest and post-test were administered. A researcher-made questionnaire used to determine the improvement of the academic performance of student respondents towards Science 7 (Physics). Moreover, the basis of the grouping is by Random sampling technique then divide them into ABML (ISIM) group and NABML (NISIM) group. Data and results of a month-long experiment focusing on topics: About Heat Transfer as one of the least mastered skills of grade 7 Science which covers: Conduction, Convection and Radiation and were supported and verified by observations and interview.

**3. 4 Data Analysis**

The gathered data were treated statistically by getting the Mean score, Standard Deviation, T-test and Mastery level of each activity to be able to see the improvement and effectiveness of integrating ABML (ISIM) approach in teaching Science 7 (Physics).

**4 Results and Discussions**

Analysis and interpretation of the gathered data were summarized in the following tables.

**Table 1.1** Activity, Enrichment and Assessment Card

<b>ISIM Part</b>	<b>Mean Score</b>	<b>Standard Deviation</b>	<b>Mastery Level</b>	<b>Interpretation</b>
Activity Card	25.83	0.48	99.36%	High Mastery
Enrichment Card	40.47	1.18	98.70%	High Mastery
Assessment Card	14.80	0.63	98.67%	High Mastery

**Table 1.2** Mastery Level

<b>Numerical Value</b>	<b>Descriptive interpretation</b>
76 - 100 %	High mastery
51 - 75 %	Mastered
26 - 50 %	Low mastery
0 - 25 %	Very low mastery

Tables 1.1-1.3 shows that the students highly mastered each category namely: Activity card, Enrichment card and Assessment card. It simply shows that learning with

the use of ISIM highly affects the student's cognitive ability and improve class performance.

**Table 2.** Pre-test Scores of responds on a 20-item test

	<b>Mean score</b>	<b>SD</b>
<b>ISIM group</b>	7.87	2.95
<b>NISIM group</b>	6	2.67

Table 2 shows the pretest score which has 15 respondents in each group that conduct a 20- item test. Based on the computed data the NISIM group has less mean value of 6 than the ISIM group, and has greater mean value which is 7.87, the researcher computes the standard deviation of different groups the NABML group got the lesser SD value of 2.67 than the experimental group that has SD value of 2.95 respectively. Meaning to say both groups are comparable.

**Table 3.** Post-test Scores of responds on a 20-item test

	<b>Mean score</b>	<b>SD</b>
<b>ISIM group</b>	13.6	3.06
<b>NISIM group</b>	5.6	1.59

Table 3 show the post-test scores of the ISIM (Interactive Strategic Intervention Material) group, has 13.6 mean value while on the other hand the NISIM (Non-Interactive Strategic Intervention Material) group has 5.6 mean value only.

The table shows the computed mean value of the experimental group is greater than the control group and the standard deviation of ISIM group is greater than the NISIM group which are 3.06 than 1.59, respectively. Meaning, the students in the ABML group scores increased much.

**Table 4.1** Test of difference of the pre-test and post-test scores between pre-test to pretest group

<b>Subject</b>	<b>Respondent</b>	<b>Mean</b>	<b>SD</b>	<b>Computed t-value</b>	<b>Tabular t-value; 0.05,29 df</b>	<b>Decision</b>	<b>Interpretation</b>
(ISIM) Experimental group	15	7.87	2.95	1.82	2.042	Accept the Null Hypothesis	Not Significant
(NISIM) Control group	15	6	2.67				

Since the computed value is 1.82 lesser than the tabular value of 2.042, then accept the null hypothesis. Therefore, at 0.05 level of significance of the pre-test performance of ABML or ISIM is greater than NABML.

**Table 4.2.** Test of difference of the pre-test and post-test scores  
Between post-test and post-test scores of both groups

Subject	Respondent	Mean	SD	Computed t-value	Tabular t-value; 0.05,29 df	Decision	Interpretation
(ISIM) Experimental group	15	18.53	4.46	8.97	2.042	Reject the Null Hypothesis	Significant
(NISIM) Control group	15	15.53	2.70				

According to the computed value of 8.97 is much greater than the tabular value of 2.042, reject the null hypothesis. Therefore, by conventional criteria, this difference is significant. between the post-test performance of ISIM and NISIM group.

**Table 4.3.** Pre-test and Post-test of ABML through ISIM group

Test	Mean	SD	Computed t-value	Tabular t-value; 0.05,14 df	Decision	Interpretation
Pre-test	7.87	2.95	-9.02	2.145	Accept the Null Hypothesis	Not Significant
Post-test	13.6	3.06				

Since the computed value of -9.02 is less than the tabular value of 2.145, accept the null hypothesis. Therefore, at 0.05 level of significance the Post-test score is higher than the Pre-test score of ABML or ISIM group.

**Table 4.4** Pre-test and Post-test of NABML or NISIM group

Test	Mean	SD	Computed t-value	Tabular t-value; 0.05,14 df	Decision	Interpretation
Pre-test	6	2.67	0.76	2.145	Accept the Null Hypothesis	Not Significant
Post-test	5.6	1.59				

Based on the table above the computed value of 0.76 is less than the tabular value of 2.145, accept the null hypothesis. Therefore, there is no significant difference between the Pre-test and Post-test scores of NABML or NISIM.

## 5 Conclusions and Recommendations

### 5.1 Summary of Findings

In the light of the foregoing findings, the following conclusions were drawn: the following conclusion had been gathered and interpreted by the researcher, wherein the use of Activity Based via Multimedia Learning Approach (ABML) through Interactive Strategic Instructional Material (ISIM) was effective and efficient in the development of learners' academic performance in studying Science 7 (Physics).

5.1.1 The respondents both in the ABML and NABML group have equal entry of knowledge thus; they are equal in terms of mental ability. Both groups of respondents have the same outlook and perception in the study of Science.

5.1.2 The use of Multimedia such as the Computer Simulated Materials such as ISIM, Boardworks and Phet during the lesson proper as an activity indicates that this could be an effective intervention to break the ice in learning Science especially in Physics.

5.1.3 The non-treated of ABML during the activity proper could still be effective method of transmitting knowledge. The attitude of the learners towards the subject matter is passive. Engaging the students in an Activity-Based Multimedia Learning enhanced their learning, in such a way that they were motivated to study and stimulate their mind to think and understand the lessons taken up

5.1.4 There was an effect in the gain scores in test of the NABML and ABML group, but ABML is more effective than that of the NABML because the students responded actively during the treatment period. Thus, the intervention (ABML) and non-intervention (NABML) during the activity proper affect the academic performance towards Science concepts.

## **5.2 Implications/Reflection and Recommendations**

Based on the conclusions of the study, the following are hereby recommended:

5.2.1 Since the study last only for a week, a recommendation regarding the Boardworks and ISIM (Interactive Strategic Instructional Material) simulations utilization must be applied for a long period of time e.g. within 3 months or more than.

5.2.2 The intervention of ABML (ISIM) during the lesson proper segment could be extended on other activity of the students such as the assessment or evaluation the students at the end of every topic or lesson. Since the intervention of ABML (ISIM) is more effective during the activity proper, this could be utilized in other specializations of Science.

5.2.3 A similar study maybe conducted considering the following variables such as ABML (ISIM) will be used for remediation. A remedial class where the ABML (ISIM) approach must be contacted to fertilize the futile young mind of today's generation with the use of Multimedia to alleviate their knowledge for the future purposes.

5.2.4 To make this study as a reference for the future studies which is merely connected to this one. Unlike this random sampling type of study, a purposive sampling technique.

5.2.5 A larger group of respondents must be used and even the availability of gadgets and equipment, a computer laboratory room perhaps.

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## Impact of Flipped Classroom on the Mastery of Identified Competencies in Grade 8 Science

**Eleanor T. Gonzales**

Trece Martires City National High School, Cavite

[eleanorgonzalestmcnhs@yahoo.com](mailto:eleanorgonzalestmcnhs@yahoo.com)

**Abstract.** A bulk of literature suggests the effectiveness of the flipped classroom in the tertiary level. However, its effectiveness in the secondary level has not been investigated much. Thus, this action research generally aimed to determine the impact of flipped classroom on the mastery of the identified competencies in Grade 8 Science among the students of Trece Martires City National High School. In this study, the pretest-posttest nonequivalent groups design was used. The control group received the traditional approach to teaching the competencies while the treatment group utilized flipped classroom where lessons were videotaped and watched by the students at home prior to classroom discussion. Results showed that both groups scored low in the pre-test while both improved their scores in the post-test. Moreover, results revealed both class groups are homogenous and are on the same level prior to the experiment. Meanwhile, testing for significant difference between the posttest scores of the class groups reveals that the posttest scores of the groups significantly differ resulting to higher scores for the experimental group. This means that the flipped classroom improved the mastery of the students of the identified competencies in Grade 8 Science and a viable teaching strategy in high school.

### 1. Introduction

#### 1.1 Context and Rationale

Public school has traditional way of teaching which is done by lecturing and then assigning students to work using their textbooks and perform other sets activities outside the classroom premises (Nwosisi, Ferreira, Rosenberg, & Walsh, 2016). More so, in traditional teaching, the skill enrichment is done outside school by doing book and problem exercises while lecturing and test answering are done in school (Papalexiou, 2017). This scenario sounds in contrary with the flipped learning developed by Baker (2000) who had a study titled "The classroom flip: Using the web course management tools to be the guide by the side". In flipped learning, lecturing is done at home through online and offline videos designed or prepared by the teacher. Initially, exposure to the actual lesson is done at home or even during their dismissal or breaktime. During the actual flipped instruction, face-to-face class, pondering of concepts through various skills enhancement activities are done (Camiling, 2017).

According to Mzoughi (2015), flipped classroom is a form of blended learning because it combines online delivery and active class participation in the lecture per se. In the online delivery of the course content, the videos that can be used are professionally done by the instructors or a Youtube videos which are readily available online (Chen, et al, 2010; Riendeau 2012 cited in Mzoughi,2015).

Flipped classroom is usually done in higher education. Studies show that it is effective among adult learners. A study conducted by Mzoughi (2015) in Kennesaw State University (KSU) Georgia found out the flipped in Physics has been perceived as effective by the students. Mzoughi made a so called "web-enhanced" which was used as an online tool which could allow learners to have forums, lecture, exams and e-homework. Doing lecture was done at home through a short recording uploaded in the web-enhanced tool. Student were tasked to listen to the online lecture at home so when they were ready to do activities in the classroom. There were online forms which were submitted in order to assess their learning and at the same time assess their difficulties in the lesson. Prior to the use of web tool, instructors and students were initially exposed to web orientation. As a result of the intervention, it was found that flipping learning was effective; however, as shown in the qualitative data, students said that they would also prefer face-to-face lecture interaction with the professor.

In the context of senior high school, flipped learning was used in senior high students in Dubai. A master's thesis written by Marlowe (2012) titled "The effect of the flipped classroom on student achievement and stress" found out that lower stress level was noted among students who were exposed to flipped learning resulting in higher academic performance upon four-month flipping. There 19 students were trained in flipping in the course Environmental Systems and Societies. Lectures were done thru recorded and published videos on YouTube. There were answers to the questions which were submitted to teachers and further questions were used to stimulate class discussion. Results of the use of flip promoted independent learning and positive attitude towards learning environmental issues. In the same manner, the grades of those who were exposed to flip were significantly different as they were increased of grades from one semester to another. It should also be noted that flipped addressed low performing students since the instructors were able to have more time for person-to-person contact and small group work than that of traditional. As a result, outputs could be accomplished easily in class with teacher assistance which consequently decreased students stress level.

Locally, a study conducted by Cagande and Jugar (2018) titled "The flipped classroom and college physics students' motivation and understanding of kinematics graphs" proved the effectiveness of flipping in the college level as there was a higher gain score noted in the experimental group as compared to the control group. It was evident that with the use of flip learning, the post test scores of the experimental group were positively affected. Through the use of mixed method, as research design, this study was able to validate the quantitative findings at which the instructors claimed that flipping generally helped the learners to understand graphs in kinematics. Flipping may be something new to the instructions but they found that a systematic use of relevant technology would be of big help to teaching-learning process. Meanwhile, flipped a learning had no direct effect to student's motivation level as there was a sustained high level of motivation from pretest to post test.

From the foregoing literature, it is clear that flipped has been effectively used in the college level and senior high too. Another local study was conducted by Camiling (2017) titled "The flipped classroom: Teaching the basic science process skills to high

performing 2nd grade students of Miriam College lower school. In this study, elementary pupils were divided into two groups: experimental and control group. The experimental group was exposed to an instructional design following flipped learning methodology while the control group were taught using the traditional way. The instructional designed for flipped could allow the learner to be exposed home-work lecture videos crafted by the teacher and then, during fact-to-face instruction, understanding of skills were deepened through various tasks in order to master basic science process skills. With the use of pretest and post-test, it was confirmed that a significant difference was noted between scores thus suggesting that flipped could be effectively implemented among elementary pupils.

Even in the elementary level, flipped has been used one of the successful teaching methodologies. It should be noted that above studies were done in colleges and private schools where facilities were provided. In the context of this study, this present paper will assess the impact of flipped learning in a public junior high school level. Even if flipped teaching is one of the most popular methodology, there is lack of evidence that shows that flipped has been practiced in the public schools (Mzoughia, 2015).

Furthermore, above literature clearly shows that flipped learning is effective in the private school. The present study will take into consideration the conditions of the public school in implementing flipped learning. Specifically, since the studies show that flipped has been usually practiced in sciences subjects as evident in the said literature, this action research proposed an instructional design which may fit the context of the public school.

## **1.2 Action Research Questions**

This action research generally aimed to answer the question: Does the flipped classroom in Grade 8 Science impact the mastery of the identified competencies among the students?

Specifically, this action research sought to answer the following questions:

1. What is the result of the pre-test and post-test scores of the students from both the flipped classroom and the traditional classroom in the identified competencies in Grade 8 Science?
2. Is there a significant difference between the pre-test and post-test scores of both the flipped classroom and traditional classroom in the identified competencies in Grade 8 Science?
3. Is there a significant difference between post-test scores of the flipped classroom and traditional classroom in the mastery among students of the identified competencies in Grade 8 Science?

### 1.3 Proposed Innovation, Intervention, and Strategy

This action research proposed an instructional design called flipped learning which was specifically designed for Grade 8 Science.

The competencies which this study aimed to be mastered by the students are the following:

1. Illustrates how diseases of the digestive system are detected, prevented, or treated; and identifies healthful practices that affect the digestive system. The students of the traditional classroom who belonged to the control group were taught using the already existing DepEd recommended approach while the students of the experimental group were taught in a flipped classroom.

The intervention was used for two sessions with one competency each session. Each lesson lasted for 50 minutes. Prior to the lesson and before coming to class, the students were asked to watch the instructional videos on the topics at home to ensure that they already know the topics to be discussed in the classroom.

The pre-test aimed to determine the existing knowledge of the students about the topic. The scores in the pre-test were compared with the scores in the formative assessment to elicit what the students have learned about the topic after exposing them to the intervention.

After the pre-test, the students were asked to prepare questions about the instructional videos they have watched at home. Since they have been exposed to the lesson already, the students were given the freedom to control the discussion based on what they have understood from the instructional video and which parts of the lesson they needed more information and clarification.

The teacher then facilitated the discussion. She let the students ask questions and had these questions answered by themselves. Those students who have fully understood the lesson helped those who had difficulty mastering the lesson. The teacher provided inputs and clarified the lesson when it was needed. Likewise, the teacher instructed the students about their Application activity.

The students then performed the Application activity. The Application activity aimed to help the students internalize the lesson. Contextualization, localization, and differentiated instruction were exploited by the teacher in this part of the lesson.

Finally, the teacher administered the formative assessment to check how well the students have learned from the session. Afterwards, the teacher provided instructions for the next homework which was again watching instructional videos about the next topic at home.

## **2. Action Research Methods**

### **2.1 Participants and/or other Sources of Data and Information**

The participants of the study were the students from the Grade 8 classes' sections Maalalahanin which has 55 students and Masunurin which has 60 students respectively. The said sections performed almost similarly in Science with grade means of 81% and 80.5% respectively during the third quarter of the School Year 2018 - 2019. All the students from both sections were completely enumerated.

Grade 8 - Maalalahanin and Grade 8 - Masunurin were conveniently selected by the researcher as they are sections currently handled by her. Also, of the three sections the researcher is currently handling, the researcher deems that these two sections are the ones which need to develop mastery of the target competencies.

Meanwhile, since all the participants are minors, the researcher sought their parental consent. The parents were guaranteed that their children's identity would be kept anonymous and confidential and that their children would not be harmed during the conduct of the study.

### **2.2 Data Gathering Methods**

Once the proposal had been approved, the researcher asked the advisers of the sections involved in the study to help her distribute the parental consent letter among them. After the parental consent letters have been retrieved, the researcher started gathering data.

Both classes were given a pre-test with a 10-item test before each session. Their existing knowledge of the lessons were noted. Afterwards, the lesson proper ensued. The control group was taught using the traditional approach while the experimental group used the flipped classroom for the two sessions. After the lesson proper for each of the two sessions, both classes were given a 10-item post-test to check how much the students have learned the lessons.

The items in the pre-test and post-test were validated by the experts in Biology from Trece Martires City National High School.

### **2.3 Data Analysis Plan**

The study used the pretest post-test non-equivalent groups design in which there is a treatment group that is given a pretest, receives a treatment, and then is given a post-test. But at the same time there is a non-equivalent control group that is given a pretest, does not receive the treatment, and then is given a post-test. In this study, participants were not randomly assigned to the control group and experimental group. The groups

are already existing, but their similarity is almost guaranteed as their grade means for the second quarter of the School Year 2018– 2019 are almost identical.

The following statistical techniques were used to analyze the data: To determine the result of the pre-test and post-test scores of the students, data were subjected to descriptive statistics such as frequency counts, mean, SD and MPS. To determine the significant difference on the mastery of the identified competencies in Grade 8 Science among groups of participants, the t – test (paired) was used. Likewise, the t-test (independent) was used to compare the post-test scores of the two groups.

### 3. Results and Discussion

The following are the results and the analysis done from the data and answer the following problems:

1. What is the result of the pre-test and post-test scores of the students from both the flipped classroom and the traditional classroom in the identified competencies in Grade 8 Science?

**Table 1.** Pretest and Post-test Scores of the Control and Experimental Groups for the Identified Competencies

	<b>Pretest</b>	<b>Post-test</b>
<b>Control</b>	4.51	6.49
<b>Experimental</b>	4.93	7.59

The results of the pretest show that the control group obtained a mean of 4.51 while the experimental group obtained mean of 4.93. Both means are interpreted as average mastery. Meanwhile, the result showed that the post-test scores of the experimental group taught in the flipped classroom is remarkably better as compared to those who belong to the control group which was taught using the traditional approach because students who belonged to that group are moving towards mastery while those who belonged to the traditional method remained average in the mastery after the experiment.

2. Is there a significant difference between the pre-test and post-test scores of both the flipped classroom and traditional classroom in the identified competencies in Grade 8 Science?

**Table 2.** Significant Difference between the Pretest Scores and Post-test Scores of the Control Group

<b>Control Group</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>Computed t</b>	<b>Tabular Value at 0.05 Level of Significance</b>	<b>Decision</b>
Pre-test	5.18	1.47	2.012895599	4.11588E-32	Reject Ho
Post-test	7.57	1.58			

df = 54

Table 2 presents the significant difference in the pretest scores and post-test scores of the control group.

Since the computed p value of 4.11588E-32 is way lower than 0.05 level of significance, we can say that there is a significant difference in the performance of the control group in their pretest and post-test. There is a remarkable improvement in the mastery of the students of the competency.

**Table 3.** Significant Difference between the Pretest Scores and Post-test Scores of the Experimental Group

Control Group	Mean	Standard Deviation	Computed t	Tabular Value at 0.05 Level of Significance	Decision
Pretest	5.65	1.74	2.005745995	2.07365E-14	Reject Ho
Post-test	8.57	0.95			

df = 59

Table 3 presents the significant difference in the pretest scores and posttest scores of the experimental group.

Since the computed p value of 2.07365E-14 is way lower than 0.05 level of significance, we can say that there is a significant difference in the performance of the experimental group in their pretest and post-test. There is a remarkable improvement in the mastery of the students of the competencies.

**Table 4.** Significant Difference between the Post-test Scores of the Control Group and Experimental Group

Groups	Mean	Standard Deviation	Computed t	Tabular Value at 0.05 Level of Significance	Decision
Control	7.57	1.58	1.990847069	0.000429554	Reject Ho
Experimental	8.57	0.95			

df = 113

Table 4 presents the significant difference in the performance of the control group and experimental group in their post-test.

Since the computed p value of 0.000429554 is way lower than 0.05 level of significance, we can say that there is a significant difference in the performance of the control group and experimental group in their post-test. While mastery of the competency has been improved in both groups, it is notable that it is the flipped classroom which resulted to better performance. In other words, flipped classroom is much effective than the traditional classroom in achieving the mastery of the first competency among the students.

#### **4 Conclusion**

Flipped classroom is applicable for lessons which require skill development among learners. In the context of this study at which the identified competencies for Grade 8 are as follows: (1) Identify Healthful Practices that Affect the Digestive System and (2) Illustrate how Diseases of the Digestive System are Detected, Prevented, or Treated, hands-on activity and teacher-student interaction are deemed necessary. Thus, the experimental group received a flipped classroom wherein video lectures were done at home while activities for skills development (application activity) were reinforced in the classroom setting. Results show that the said group received higher mean score than the control group which means flipping is effective.

According to Camiling (2017), flipping as an instructional approach is effective when used in the right context. In this study, flipping is found to be a supplementary approach to traditional approach. In the context of the public school, flipping is just a second option or not an option at all, since traditional classroom setting is highly practiced. It should be noted that flipping the classroom is challenging on both teachers and students considering the limited internet connections and resources. Despite the limitations, this approach created an impact on the learning experiences of the Grade 8 students.

#### **5 Recommendation**

It is challenging to implement flipping in the public school. However, students themselves could find means to make their learning meaningful. They are enticed with the approach because they are digitally literate and have an advance knowledge on digital technology. Along with learning the required skills, in flipping, students note taking skills should be assessed and then taught. Listening and watching lecture videos require them to be good in note taking skills. A learning log or template should also be provided to them while watching the video.

In doing flipping, learner's profile and capacity to have an access on the internet should also be considered since not all students in the public school could afford to have an android phone with internet access. For teachers, proper training on flipping is required to implement the approach properly.

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# Improving Performance and Attitude Towards Science Using Strategic Intervention Material in Teaching with Augmented Reality (SIMATAR) Mobile Application

**Melandro D. Santos**

Antonio J. Villegas Vocational High School, Manila  
[melandro.santos001@deped.edu.gov](mailto:melandro.santos001@deped.edu.gov)

**Abstract.** This study emphasized the benefits of using mobile augmented reality application by measuring the student learning outcomes and determining the improvement of motivation and attitude towards science learning. This study also examined the feasibility and practicality of utilizing the SIMATAR augmented reality mobile application as a teaching tool in science. Since 81.5% of the student-participants had no experience of using augmented reality technology, the researcher advocated the inclusion and utilization of a mobile augmented reality application as a teaching strategy to address the students' competency gap on ICT skills and to enhance their learning outcomes and attitude towards science. The results supported the feasibility and practicality of utilizing SIMATAR as a teaching tool in addition to the traditional hands-on minds-on laboratory activities. It was observed that the use of a mobile augmented reality application in classroom teaching yielded high engagement among students and improved their time on-task compared with non-digital learning activities. Through data analysis and discussion, we concluded that there is significant improvement in student's learning outcomes as well as their attitude towards science after SIMATAR implementation. All indicators of students' attitude towards science including perception to science teacher (3.52), enjoyment of science (3.31), anxiety level (1.61) and relevance of science in society (3.16), showed improvement after implementing SIMATAR mobile augmented reality application in science teaching. Moreover, there is a significant difference found between the post-test of experimental (81.00) and control group (75.00). Substantial difference was noted on the performance of experimental group compared with the control group after the implementation of SIMATAR mobile augmented reality application. Students have an excellent index of satisfaction (4.53) in using SIMATAR supporting the premise that AR can increase the learning interest and motivation of students that eventually improve performance. Finally, findings of the study revealed that the utilization of a mobile augmented reality could substantially improve the teaching and learning process.

## 1 Introduction

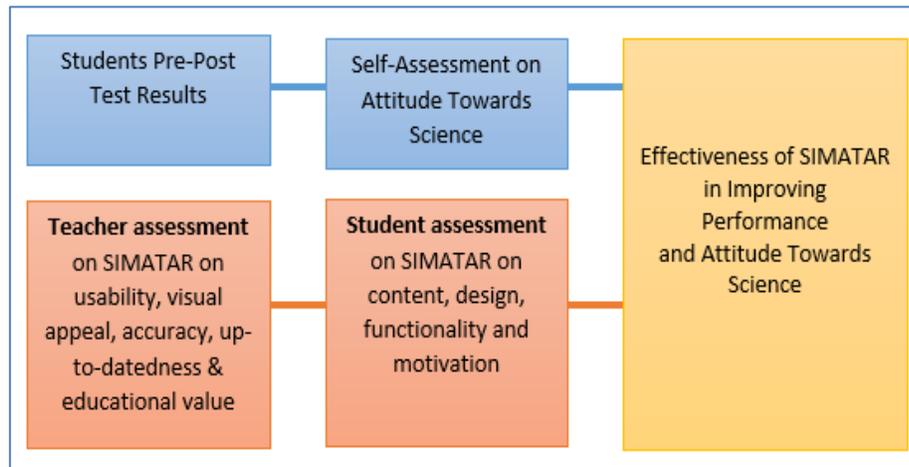
With the commencement of the adoption and implementation of Professional Standard for Teachers (PPST), the elements of high-quality teaching for the 21st century in the Philippines has been clearly defined. These standards describe the expectations of teachers' increasing levels of knowledge, practice and professional engagement. Based on its dimensions of teacher practices, a quality teacher in the Philippines should exhibit the needed teaching skills in the use of communication strategies, teaching strategies and technologies to promote high-quality learning outcomes. Moreover, a quality teacher should model exemplary skills in the development and evaluation of ICT teaching and learning resources and promote the effective strategies in the positive and appropriate use of ICT to facilitate the teaching and

learning process. (D.O. 42, s.2017) Cognizant with the necessity to improve the teaching profession and quality teaching in the Philippines, public school teachers should find the means to integrate complementary technologies that can be utilized to enrich the traditional technology-free type of learning environment. Public school teachers are challenged to select, evaluate and develop appropriate educational technology learning resources such as augmented reality.

Augmented reality is the process of overlaying digitally rendered images onto our real-world surroundings. Using a mobile software application, a tablet or mobile phone's camera identifies and interprets a marker and finally creating a virtual image overlay on the screen. In 2018, the Department of Science and Technology-Science Education Institute (DOST-SEI) launched the project "21st Century Classroom Model" which aims to help teachers to access new and emerging integrative educational and instructional technologies and resources to improve pedagogy and to make teaching and learning more relevant. This classroom setup is equipped with facility designed for mobility and connectivity to promote collaborate teaching and learning with information and communication technologies to support student centered active learning. Along with the project's goal to support teaching and learning science, Strategic Intervention Material for Teaching with Augmented Reality (SIMATAR) was conceptualized and pilot tested. DOST-SEI describes SIMATAR as a collection of teaching and learning materials in Science 7 and 8 using augmented reality technology to improve knowledge transfer, explore spaces and places and improve teaching and learning experiences and process through digital immersions in different 3D and 4D worlds.

A pilot study on the use of mobile augmented reality for Interactive experimentation conducted by Villegas (2015) cited the use of new technological elements such as augmented reality for educational purposes improving the learning interest and motivation of students. Villegas revealed that the use of AR technology can help to enhance the teaching and learning process in classrooms and motivates the students and can be an alternative technology to revolutionize the learning paradigm in the future.

For the past years, the school has been obtaining low National Achievement Test (NAT) scores in both Science and Mathematics. The problem has been linked to different facets, such as poor economic and nutritional status, poor reading comprehension, low motivation and interest of students in their studies, and the lack of cooperation among parents in monitoring student's progress. Based on the scenario faced by the teachers and learners, the it was best to emphasize the importance of improving student's performance, attitude and motivation in learning through the integration of augmented reality mobile application in the classroom setting. The necessity of using technological elements such as augmented reality suggested the determination of student's motivation and attitude towards science and its effect in academic performance. Drawn from the cited concepts, the study came up with the research design as shown in Figure 1.



**Figure 1.** Research Design

This study assessed the effect of using SIMATAR in improving student performance, motivation and attitude towards science. It also assessed the SIMATAR mobile augmented reality application as a tool in teaching and learning science. Specifically, this study sought answers to the following questions:

1. What is the assessment of student-participants in using SIMATAR mobile augmented reality application in terms of content relevance, visual appeal and design practicality, functionality and student's motivation?
2. How did the students perceive the mobile augmented reality application as a tool in learning science?
3. What is the assessment of teacher-researchers in using SIMATAR mobile augmented reality application in terms of usability, visual appeal, accuracy and educational value?
4. What is the effect of SIMATAR mobile augmented reality application to students' performance based on pre and post-test mean?
5. What is the effect of SIMATAR mobile augmented reality application to students' attitude towards science?
6. Is there any significant difference between the mean performance of the control and experimental group in the pre and post-test?

## **2 Methodology**

### **2.1 Research design and participants**

The study made use of descriptive and quantitative method of research. The descriptive method established the impression of students in using SIMATAR Augmented Reality Mobile Application which consists of a strategic intervention material booklet and its mobile software application. The quantitative method, on the other hand, measured the students' level of attitude towards science, student and teacher assessment on SIMATAR

Augmented Reality Mobile Application as a tool in learning science. This study involved seventy (70) Grade 7 and 8 students of Antonio J. Villegas Vocational High School. The instrument was administered to the research population before and after the implementation of SIMATAR on the first to third grading period. The teacher observations with interview were employed for assessing student's attitude towards science. The researcher also performed informal observations and checked student's activities while circulating among the groups.

**2.2. Instruments**

The assessment instruments underwent revisions based on expert's comments, suggestions and pilot testing results. The pilot group was composed of three (3) science teachers and ten (10) grade 7 students. There are four data gathering instruments used in the study:

Attitude towards science assessment form evaluates the student's before and after attitude towards science in terms of science teachers, anxiety in science, enjoyment in science, and relevance of science. This instrument is adopted from Attitude Toward Science Inventory (Gogolin & Swartz, 1992) and Attitudes Toward Science Questionnaire (Prokop, Tuncer, & Chuda,2007)

Focus group discussion interview form contains questions on student's thoughts, ideas, feelings, perceptions about the program implementation and its effects as well as suggestions on possible modifications or revisions in the program. Teacher's assessment form evaluates the mobile augmented reality application in terms of usability, visual appeal of graphics and pictures, accuracy and up-to-datedness of information and educational value.

Students' assessment form evaluates the mobile augmented reality application in terms of content relevance, visual appeal and design practicality, functionality and motivation. Pre- and Post-test to determine students' performance before and after the implementation.

**2.3 Statistical treatment**

To determine the student's level of attitude towards science and their assessment on SIMATAR augmented reality mobile application, the interpretation of the mean scores on the questionnaire form was based on the table below.

**Table 1.** Interpretation of the mean scores on Students' Level of Attitude Towards Science and Assessment on SIMATAR Mobile Application

<b>Verbal Interpretation</b>	<b>Rating</b>
Strongly Agree	3.46-4.00
Agree	2.50-3.45
Disagree	1.50-2.49
Strongly disagree	1.00-1.49

**Table 2.** Interpretation of the mean of Students' Index of Satisfaction using SIMATAR mobile application

Verbal Interpretation	Rating
Highly satisfied	4.50- 5.00
Satisfied	3.50- 4.49
Moderately satisfied	2.5-3.49
Unsatisfied	1.50-2.49
Strongly Unsatisfied	1.00-1.49

## 2.4 Data Analysis

Qualitative data were processed using DOST SPSS, with descriptive statistics which includes the frequencies, percentages, standard deviations, means and t-value generated.

## 3 Results and Discussion

### 3.1 Student Assessment on SIMATAR mobile application

**Table 3.** Student- assessment on SIMATAR mobile application

Criteria	Weighted Mean	Verbal Interpretation
<b>Content Relevance</b>		
showed scientific models as explained by the teacher	3.74	Strongly agree
represented the concepts as explained by the teacher	3.51	Strongly agree
facilitate in understanding science concepts easily and in a better way	3.37	Agree
<b>Composite Mean</b>	<b>3.54</b>	<b>Strongly Agree</b>
<b>Visual Appeal and Design Practicality</b>		
Visually attractive and appealing	3.54	Strongly agree
Uses legible text for reading	3.58	Strongly agree
Uses appropriate color of pictures and graphics	3.60	Strongly agree
Visible buttons and icons for correct manipulation and execution of commands	3.20	Agree
<b>Composite Mean</b>	<b>3.48</b>	<b>Agree</b>
<b>Functionality</b>		
User-friendly	3.51	Strongly Agree
Ease of manipulation and viewing 3D images	3.40	Agree
Adequacy of task controls for manipulation and execution of commands	3.23	Agree
<b>Composite Mean</b>	<b>3.38</b>	<b>Agree</b>
<b>Students' Motivation</b>		
expressed interest in attending school	3.34	Agree
shared the AR experience at home and friends	3.20	Agree
believe that science lessons using AR are interesting and exciting	3.46	Agree
believed that AR helped in understanding the lesson and learning material better	3.54	Strongly Agree

believed that AR helped in improving grades	3.60	Strongly Agree
<b>Composite Mean</b>	<b>3.50</b>	<b>Agree</b>
<b>Overall Mean</b>	<b>3.47</b>	<b>Agree</b>

Table 3 showed the students' perceptions on SIMATAR mobile application in terms of relevance of content, visual appeal and design practicality, functionality and student's motivation. This also revealed that 2 indicators of student-assessment were rated as agree while 2 indicators rated as strongly agree. Students strongly agreed that SIMATAR mobile augmented reality application helped in understanding the lesson (3.54) and learning material better and improving their grades (3.60). Moreover, students also strongly agreed that AR application's content showed scientific models (3.74) and represented concepts explained by the teacher (3.51). In terms of design, students strongly agreed that AR is visually appealing and attractive, uses legible text and uses appropriate colors for graphics and pictures.

In terms of functionality, results showed that students agreed that AR application contains adequate task controls (3.23) and 3D images can be manipulated and viewed with ease (3.40). In terms of design, students agreed that AR contains visible icons and buttons for correct manipulation and execution of commands (3.20). Moreover, students believe that AR motivates them (3.50) and h helped in understanding the lesson (3.54) and helped in improving grades (3.60).

### 3.2 Students' perception on using SIMATAR mobile application

When the student-participants were asked about their perception on using AR mobile application in science learning, 100% of the students showed positive response with high index of satisfaction (4.53). Students are also showed eagerness to use AR technology application in the future to learn other science lesson in the future such as weather, planets, microscopic organisms, cells, human body systems, other heavenly bodies and insects. The students expressed their excitement in using technology inside the classroom. Students' feedbacks are comparable with the findings of Su Chai et al. (2012). The study mentioned that AR is most applicable in the cases when the phenomenon cannot be simulated in reality such as the solar system, when real experiments have conspicuous shortcomings such as usage of fire and when the teacher face instruction that cannot be observed in reality. Below are the feedback that shows that integrating technology helped the teachers to improve student's time on task during science classes.

#### Positive response in using AR technology

- "I am excited, enjoyed and happy in using SIMATAR"
- "SIMATAR help me in understanding the science lessons" "Science lessons becomes easy to understand using SIMATAR"
- "I understand the lesson the lesson very well because of the SIMATAR"
- "I am excited because it is my first time to see augmented reality pictures"
- "The activity in the study of plant and animal cells using SIMATAR is very interesting"
- "At first I am quite nervous in using the tablet but after using SIMATAR, me and my classmates enjoy studying science lessons"

**SIMATAR facilitates science learning**

“Each of us participated in the activity and the lesson become clear and understandable”

“It helps us to see objects which cannot be seen under the compound microscope.”

“SIMATAR is very easy to use and I find it easy to study our lessons using the tablet”

“I find the 3D graphics and pictures in SIMATAR amazing”

“I am amazed how the graphics in SIMATAR looks like so real”

**SIMATAR motivates the students to study**

“I am willing to use SIMATAR again because our lesson becomes easy to understand using technology”

“I am so amazed in using SIMATAR and we are very excited using it during our science class.”

“We want to use the tablet every day in studying our lessons”

“I think SIMATAR will help me improving my grades”

“I am very much excited because it is my first time to use AR in studying science lessons”

“I am afraid in handling the tablet but after our teacher orient us about proper handling, I feel at ease and comfortable using SIMATAR”

“I am happy using the tablet in studying science lessons because it is our first time to use tablet inside the classroom”.

**3.3 Teacher- assessment on SIMATAR mobile application**

**Table 4.** Teacher- assessment on SIMATAR mobile application

Indicators	Weighted Mean	Verbal Interpretation
<b>Usability</b>		
Appropriateness of language to the intended user	3.00	Agree
Provided clear instructions and outcomes	3.25	Agree
Easy to use based students time and effort	3.75	Strongly Agree
Can be used in varied learning environments	3.50	Strongly Agree
<b>Composite Mean</b>	<b>3.37</b>	<b>Agree</b>
<b>Visual Appeal</b>		
Simple and recognizable	3.75	Strongly Agree
Clarify and supplement the text	3.75	Strongly Agree
Realistic with appropriate colors	4.00	Strongly Agree
Attractive and pleasing to look at	4.00	Strongly Agree
Engaging and interesting	4.00	Strongly Agree
<b>Composite Mean</b>	<b>3.90</b>	<b>Strongly Agree</b>
<b>Accuracy and Up-to-Datedness of Information</b>		
Clear science misconceptions	3.75	Strongly Agree
Contains accurate and factual information appropriate for intended learners with respect to maturity and cognitive abilities	3.25	Agree
Up to date information	3.25	Agree
<b>Composite Mean</b>	<b>3.42</b>	<b>Agree</b>

<b>Educational Value</b>		
Helps the learners to visualize and understand the concept better	4.00	Strongly Agree
Raises interest and degree of engagement	4.00	Strongly Agree
Supports deeper understanding within the content domain	3.75	Strongly Agree
Makes learning more fun, exciting and interesting	4.00	Strongly Agree
<b>Composite Mean</b>	<b>3.93</b>	<b>Strongly Agree</b>
<b>Overall Mean</b>	<b>3.60</b>	<b>Strongly Agree</b>

Table 4 showed the teacher’s perceptions on SIMATAR mobile augmented reality application. It revealed that 2 indicators of teacher-assessment were rated as agree while 2 indicators rated as strongly agree. Teacher strongly agreed that SIMATAR mobile AR application’s graphics and pictures are simple, recognizable, realistic with appropriate colors, attractive, engaging, interesting, clarify and supplement the text. In terms of educational value, teachers strongly agreed that AR application helps the learners to visualize and understand the concept better (4.00), raises interest and degree of engagement (4.00), supports deeper understanding within the content domain (3.75) and makes learning more fun, exciting and interesting (3.93).

Overall, students-participants strongly agreed that SIMATAR mobile augmented reality application covered the provisions under the indicators for content relevance and student motivation. On the other hand, they agreed that it demonstrated the provisions under the indicator for functionality and, visual appeal and practicality of design.

When it comes to accuracy and up-to-datedness of Information, results showed that teachers agreed that SIMATAR mobile AR application contains updated accurate and factual information appropriate for intended learners with respect to maturity and cognitive abilities (3.42). In terms of usability, teachers also agreed that AR application contains appropriate language for the intended user (3.00) and provided clear instructions and outcomes (3.20).

### 3.4 Attitude Towards Science Before and After Using SIMATAR Mobile Application

**Table 5.** Attitude Towards Science Before and After Using SIMATAR Mobile Application

<b>Attitude Towards Science</b>	<b>Student Mean</b>	<b>Weighted Mean</b>	<b>Verbal Interpretation</b>	<b>Mean Difference</b>
<b>Science Teacher</b>				
shows more interest in their students.	after before	3.84 3.16	strongly agree agree	0.68
presents materials in a way that I understand.	after before	3.71 3.58	strongly agree strongly agree	0.13
does seem to enjoy teaching science	after before	3.45 3.18	Agree agree	0.26
is willing to give me individual help.	after before	3.37 3.18	Agree agree	0.18
does like students to ask questions.	after before	3.21 3.16	Agree Agree	0.05
<b>Overall</b>	<b>after before</b>	<b>3.52 3.25</b>	<b>Strongly Agree Agree</b>	<b>0.26</b>

<b>Anxiety in Science</b>				
If I try harder, I cannot understand science.	after before	1.84 2.24	Disagree disagree	0.39
I feel at not ease and comfortable when someone talks to me about science.	after before	1.61 2.21	Disagree disagree	0.61
I often think, "I cannot do this," when a science assignment seems hard.	after before	1.68 2.23	Disagree disagree	0.63
Working with science frustrates me.	after before	1.45 1.92	strongly disagree disagree	0.47
It makes me nervous thinking about doing science.	after before	1.53 1.55	Disagree disagree	0.03
It scares me taking science class.	after before	1.47 1.47	strongly disagree strongly disagree	0.00
If I do not see how to do a science assignment right away, I will certainly not get it.	after before	1.68 2.26	Disagree disagree	0.58
<b>Overall</b>	<b>after before</b>	<b>1.61 2.00</b>	<b>Strongly Disagree Disagree</b>	<b>0.39</b>
<b>Enjoyment of Science</b>				
I enjoy learning science very much.	after before	3.55 3.34	strongly agree agree	0.21
I do very well in science.	after before	3.32 2.82	Agree agree	0.50
I feel at ease in a science class.	after before	3.45 3.13	agree agree	0.32
I would like to do some extra reading in science.	after before	3.29 3.08	agree agree	0.21
I would like to spend more time in school studying science.	after before	3.13 2.63	agree agree	0.50
I read ahead in our science book.	after before	3.00 2.13	agree disagree	0.87
It does not disturb or upset me to do science assignments.	after before	3.39 3.13	agree agree	0.26
I would like a job that does use any science.	after before	3.03 2.50	agree agree	0.53
I enjoy talking to other people about science.	after before	3.16 2.53	agree agree	0.63
I enjoy watching a science program on television.	after before	3.45 3.08	agree agree	0.37
I like the challenge of science assignments.	after before	3.21 3.05	agree agree	0.16
I am comfortable taking a science class.	after before	3.61 3.37	strongly agree agree	0.24
I have a good feeling toward science.	after before	3.26 2.97	agree agree	0.29
Science is one of my favorite subjects.	after before	3.32 3.11	agree agree	0.21
I have a real desire to learn science.	after before	3.53 3.13	strongly agree agree	0.39
<b>Overall</b>	<b>after before</b>	<b>3.31 2.93</b>	<b>Agree Agree</b>	<b>0.38</b>
<b>Relevance of Science</b>				
Science is useful for solving the problems of everyday life.	after before	3.08 3.08	agree agree	0.00
There is need for science in most of today's jobs.	after before	2.95 2.79	agree agree	0.16

Most people should study more science.	after	3.26	agree	0.26
	before	3.00	agree	
Science is of great importance to a country's development.	after	3.37	agree	0.11
	before	3.26	agree	
It is important to know science in order to get a good job.	after	2.97	agree	0.45
	before	2.53	agree	
You can get along perfectly well in everyday life with science.	after	2.97	agree	0.50
	before	2.47	disagree	
Most of the ideas in science are very useful.	after	3.53	strongly agree	0.03
	before	3.50	strongly agree	
<b>Overall</b>	<b>after</b>	<b>3.16</b>	<b>Agree</b>	<b>0.21</b>
	<b>before</b>	<b>2.95</b>	<b>Agree</b>	

Table 5 showed that the effect of the mobile augmented reality application to student's attitude towards science. Looking at the first indicator of attitude towards science, students' perception about science teacher improves from agree to strongly agree (overall mean of 3.25 to 3.52) after using SIMATAR. Students recognize that their science teacher showed more interest in students and presented learning materials in a way that they understand after the utilization of the mobile application. In the second indicator, results revealed significant decline in of students' anxiety level on science from disagree to strongly disagree (overall mean of 2.00 to 1.61) after using SIMATAR. Students disagreed that working with science frustrates them. Even though, student-participants claimed to disagree having anxiety in science, their anxiety level decreases after utilizing SIMATAR.

In the third indicator, student-respondent agreed that they had a positive enjoyment of science before the usage of SIMATAR. This positive attitude towards science continued to increase after the usage of the AR mobile application (overall mean of 2.93 to 3.31). It is worthy to observed that students' perception of enjoyment of learning of science, comfortability in taking science class and the real desire to learn science increased from agree to strongly agree (3.34 to 3.55, 3.34 to 3.61 and 3.13 to 3.53, respectively) Furthermore, students seemed to realize the importance of reading science books after the usage of SIMATAR. A significant improvement was noted from disagree to agree (2.13 to 3.00) on reading science books ahead of class.

Overall, teachers-researchers strongly agreed that SIMATAR mobile augmented reality application possessed that provisions under the criteria for visual appeal and educational value while agreed on the provisions under the criteria for usability and accuracy and up-to-datedness of information.

In the last indicator, student-participants agreed on the relevance of science in the society and in every life before the usage of SIMATAR. This positive outlook in science continued to improve after the usage of the AR mobile application (overall mean=2.95 to 3.16).

### 3.5 Pre and Post-test Mean of Control and Experimental Group

**Table 6.** Pre and Post-test Mean of Control and Experimental Group

Group		Mean	SD	Difference	Df	t-value at 0.05	Computed t-value	Interpretation
Control	Pre-Test	67.00	4.25	8.00	29	2.045	23.94	Significant
	Post Test	75.00	3.30					
Experimental	Pre-Test	67.00	3.96	14.00	29	2.045	13.20	Significant
	Post Test	81.00	6.20					

Table 6 indicates the significant difference found between the pre and post-test mean of both experimental and control group. When tested for significant difference between the pre and post-test mean of control group, the computed t-value of 23.94 was greater than the tabular value of 2.045 which implied that the null hypothesis is rejected. The rejection of the null hypothesis stated that there is a significant difference between the pre- and post-test mean of the control group.

There is a considerable improvement in both group after regular science teaching using traditional hands-on minds-on laboratory activities. Therefore, there is a positive effect on using the traditional hands-on minds-on laboratory activities during regular classroom teaching of both control and experimental group.

### 3.6 Significant Difference in the Post-test Mean

**Table 7:** Significant Difference in the Post-test Mean

Post Test	Mean	SD	Mean Difference	Df	t-value at 0.05	Computed t-value	Interpretation
Control	75.00	3.30	6.00	58	2.002	4.62	Significant
Experimental	81.00	6.20					Significant

Table 7 showed the significant difference between the post-test mean of control and experimental group. When tested for significant difference between the post-test mean of control and experimental group, null hypothesis was rejected since the computed t-value of 4.62 was greater than the tabular value of 2.002. The rejection of the null hypothesis suggests that there is a significant difference between the post-test mean of the control and experimental group. As a result, we can conclude that the SIMATAR mobile augmented reality application has significant improvement on the mean score performance of the experimental group compared with the control group.

Although, there is a considerable improvement on both groups' performance after regular science teaching using traditional hands-on minds-on laboratory activities, table 7 indicates the significant difference found between the post test of experimental and control group. Substantial difference was noted on the performance of experimental group after the implementation of SIMATAR mobile augmented reality application. Therefore, there is a positive effect on using the traditional hands-on minds-on laboratory activities with SIMATAR mobile augmented reality application to students' performance.

### **3.7 Teachers' Reflections on SIMATAR Mobile Application in Teaching Science**

After integrating a technology driven teaching strategy using augmented reality mobile application, the teacher researchers were determined to promote technology in science teaching. The utilization of augmented reality in teaching science gained positive responses among the student-participants because it motivated them to participate in the class, increase their learning interest and eventually leads to improve performance. The realization of the researcher is consistent with the findings of the study conducted by Fonseca et al. (2014) which investigated the relationship among the usability of tool, student's participation and academic performance after using AR. Fonseca et al. (2014) revealed that the use of mobile devices in the classroom as well as motivation and academic achievement are highly correlated.

The teacher-researcher recognize the feasibility and practicality of utilizing SIMATAR as a teaching tool in addition to the traditional hands-on minds-on laboratory activities. It was observed that the utilization of a mobile augmented reality application in classroom teaching yielded high engagement among students-participants and improved their time on-task compared with non-digital learning activities. The use of this kind of technology would likely serve as a supplementary teaching material for student intervention and enrichment on science lessons.

### **4 Conclusion and Recommendations**

100% of the student-participants showed positive response with high index of satisfaction using SIMATAR mobile augmented reality application in science learning. Student-participants "strongly agreed" that SIMATAR mobile augmented reality application is a good learning material in terms of relevance of content and student's motivation and "agreed" in terms of visual appeal and design practicality, functionality.

Overall, teacher-researchers "strongly agreed" that SIMATAR mobile augmented reality application is a good teaching learning material in terms of visual appeal and educational value and "agreed" in terms of accuracy and up-to-datedness of Information.

There is a positive effect on using the traditional hands-on minds-on laboratory activities with SIMATAR mobile application to students' performance. The four indicators of students' attitude towards science including perception to science teacher, enjoyment of science, anxiety level and relevance of science in society, had improved after using SIMATAR mobile reality application

There is a significant difference found between the post test of experimental and control group. Substantial difference was noted on the performance of experimental group after the implementation of SIMATAR mobile application.

The Department of Science and Technology-Science Education Institute and Schools Division Office of Manila may consider the following recommendations for improving teaching and learning experience of both students and teachers.

Integration of technology in science teaching which may improve students time-on-task and promote high student's engagement on several science interactive and manipulative mobile applications. This could provide learners with an opportunity to develop information, media, and digital literacy as part of the 21st century skills. We could also apply SIMATAR mobile application to other subject areas such as social sciences and study its implementation.

Building capacity (school-based and division in-service trainings) for science teachers on handling AR technology driven classrooms emphasizing the relevance of 21st century learning environment and integration of 21st century skills into classroom practice. Welsey (2018) emphasized that adequate training makes our teachers capable of implementing this technology into the classrooms and encourage them to access its full capacity. He also explained that AR technology takes learning beyond memorization and observation, impacts on personalized learning and makes knowledge accessible through experiential learning opportunity.

Budget allocation and support from the external stakeholders such as local government unit (LGU) could facilitate the improvement of school ICT facilities and internet connection. The integration of technology in classroom teaching requires full support of the school heads in allocating funds through school operating budget. This support could translate into school improvement programs focusing on innovations, technologies and technology resources.

The school administration should support the teacher's initiative of conducting demonstration lessons utilizing teaching technology such as augmented reality.

The findings of this study on the effect of technology in student performance and attitude towards science could be used for further study and as a baseline data in the future school programs concerning integration of technology in classroom teaching as part of the teacher's innovative instructional strategies.

In line with the future replication and upscaling of strategic intervention material in teaching with Augmented Reality (SIMATAR), the researcher suggested the adoption of the SIMATAR project in teaching science at the Division level for a systematic indorsement from the education program supervisors. The implementation to other year levels and further study to determine its effectiveness in improving students' motivation, attitude and performance. SIMATAR is recommended to be released as a learning resource package consisting of a mobile application and printable worksheets in CD, teacher version with answer key, student version without answer key and PDF hard copy of printable worksheets ready for reproduction. Separation of the student version without the answer card and teacher version with answer card is recommended since the students have the tendency to look at the answers in the end of the SIMATAR print copy and mobile app copy. For teaching purposes, the researcher also suggests to provide augmented reality icon indicating its presence.

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## **Numeracy Enhancement Tool (NET): Mobile App for Mathematics Students**

**Alvin O. Insorio & Robert Matthew J. De Castro**  
San Pedro Relocation Center National High School,  
San Pedro City, Laguna  
[alvininsorio0413@gmail.com](mailto:alvininsorio0413@gmail.com)

**Abstract.** The basic mathematical skills were highly required for Grade 11 students wherein their academic performance based on mean percentage score (MPS) in examination was below average. In this study, offline mobile game app in the form of quiz was utilized to increase the basic mathematical skills of the students. This study used practical action research with pilot testing of pre-test-post-test design for two sections and roll-out in all Grade 11 students. Using paired sample t-test, it was found out that the mobile app helped the students to increase their basic mathematical skills. It was revealed that there is a significant difference between the pre-test and post-test results and between the control and the experimental groups. So, the study pursued mobile app implementation for the whole grade level in senior high school. All Grade 11 students were encouraged to use the mobile app for two months during third grading period. It shows that there was an increase in mean percentage score in third periodical examination which indicates that the use of mobile app has positive effects on the mathematical skills of the students. It means using mobile phone in learning mathematics concepts may increase the passion, conceptual knowledge and computational skills of the students.

### **1 Introduction**

Numeracy is one of the fundamental skills needs to develop by every student which enable them to live in the modern world. It is the basic mathematical skill needed to cope up with higher mathematics. It is not merely the ability to make use of numbers nor to perform basic operation, but rather it encompasses the use of mathematical understanding and skills to solve everyday problems and meet the requirements of everyday living in this past changing world. Numeracy is vital in dealing with higher mathematics where complex operations and concepts come inculcated with the mathematical problem. If the students have low numeracy skills, they were not being able to understand the higher mathematics which may cause frustration on the part of the students.

In the recent years, education setting changed from more traditional school environment, in which classroom setting is almost structured and with limited sources of knowledge, into a more open setting with distance and virtual education inclusion, and the use of Information and Communication Technology (ICT) in classroom teaching. With such changes that come along with a fast change into the way people communicate and learn about life around them, mobile phones become popular tools especially for the millennial, as they become the center in such environment. This gives birth to the acceptance of mobile phones as a new and flexible method of learning in the 21st

century (Fetaji, 2008; Richtel 2010). Adding the interest of the students on using mobile phones, these devices may be used as tools for learning.

The use of technology to investigate problems and design solutions improved their understanding of the process and also the content (Klopfer et al., 2004). With this in mind, educators believed that mobile technology provides a key to engaging students through the use of video and audio that goes beyond reading textbooks. The use of mobile provides opportunities for all sensory perceptions—auditory, visual, and kinesthetic—to be engaged during the learning process (Saylor, 2004). These new technologies provide opportunities to improve the educational process. According to Shin, Norris, and Soloway (2011), mobile gaming creates an individualized learning environment that allows students to select their own learning paths based on their prior knowledge and learning progress. Bano et al. (2018) revealed that the trend of investigation on technology used was specifically self-developed apps in science; however, in mathematics more generic downloaded apps were used in the previous studies on mobile learning. It implies that less mobile app was produced for mathematics lessons.

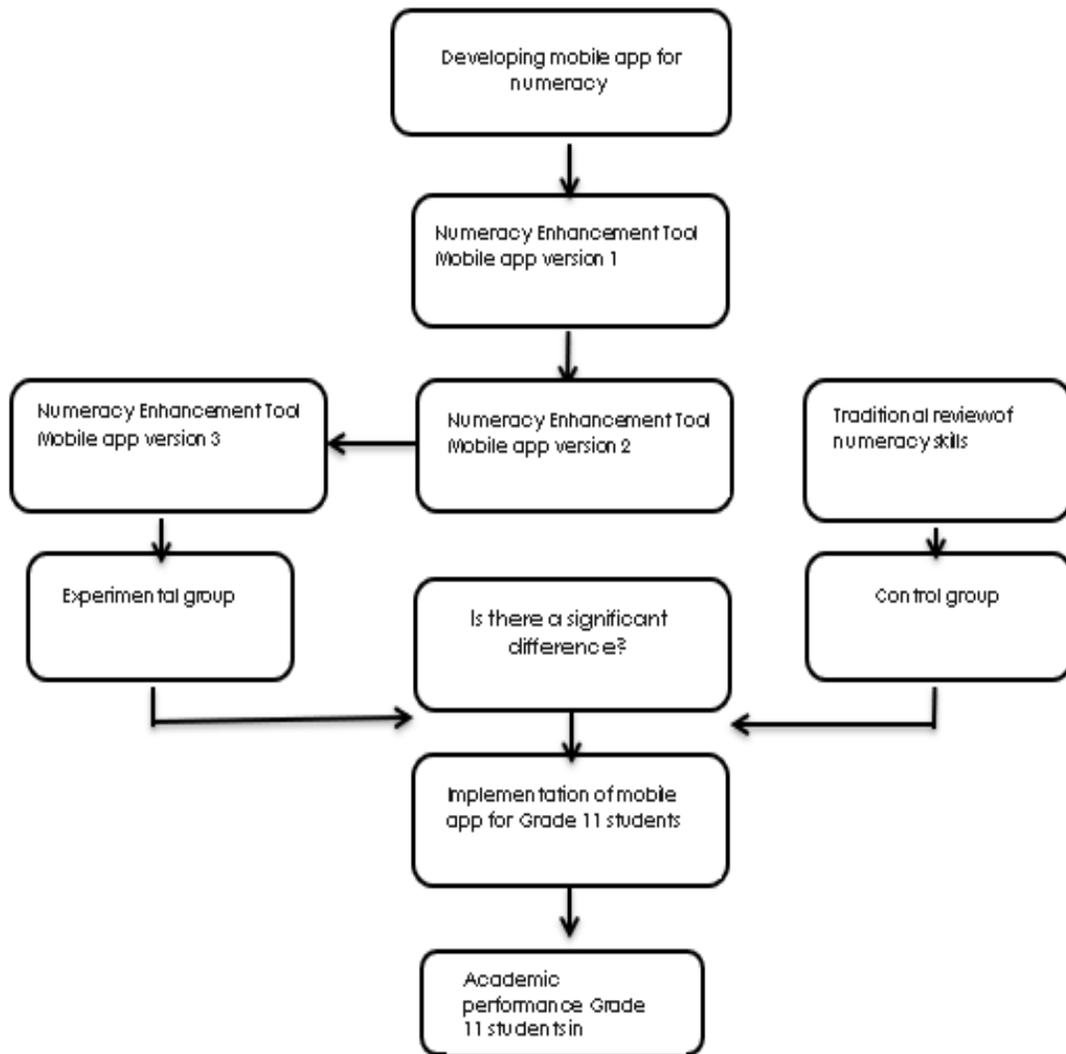
From sociocultural perspective, numeracy like other social and cultural practices develops from interactions between people as they attempt to communicate ideas, plan events, distribute resources, ensure equitable exchanges, adjudicate disputes, and reach agreements etc. (Cole & Engestrom, 2003). Technologies transform both activity and the human person, and create new forms of social practice, particular relevance, and new forms of numeracy. Numeracy, as a feature of social practice, is part of a functional system that is stretched across the context, the activity, the meditational tools, and the individual-in-interaction-with partners (Cole & Engestrom, 2003). From this perspective, this study was anchored where mobile app was used in improving the numeracy skills of the students to interactions with others.

At present, the San Pedro Relocation Center National High School (SPRCNHS) – Main Campus is facing a problem wherein Mathematics obtained the lowest mean percentage score (MPS) in the National Achievement Test (NAT) in 2015. Thus, considering the first grading period of Grade 11 school year 2016 – 2017, it has been found out that the Mathematics MPS were 53.53%. This was far from the target MPS which is 75% as an indicator of mastery of the subject matter. Moreover, two sections from this grade level have low mastery level which calls the attention of the mathematics teachers.

To address this, initial interviews were conducted to the mathematics teachers and students to understand what was going on and why this problem occurred. Similarly, classroom observations were carried on to verify the data collected through initial interviews with the permission of the head teacher. Based on the data collected, it was revealed that the main reason why students found difficulty in dealing with Mathematics is the low mastery level of the pre-requisite skills which were supposed to be acquired from the lessons on the previous years or grade levels. These skills are pertaining to the basic mathematical skills – numeracy. So, the researchers concluded that the

intervention to improve the numeracy must be on the interest of the students, easy to access, efficient and at hand.

The study used the pre-test and post-test scores for pilot testing of the final version of mobile app to determine if this may increase the numeracy skills of the students and roll-out on all Grade 11 sections. This mobile app may use by the students anywhere even without internet connection. Basic numeracy skills such as number sense and basic operations were tested in this mobile app which was considered vital in coping Senior High School Mathematics.



**Figure 1.** Conceptual paradigm

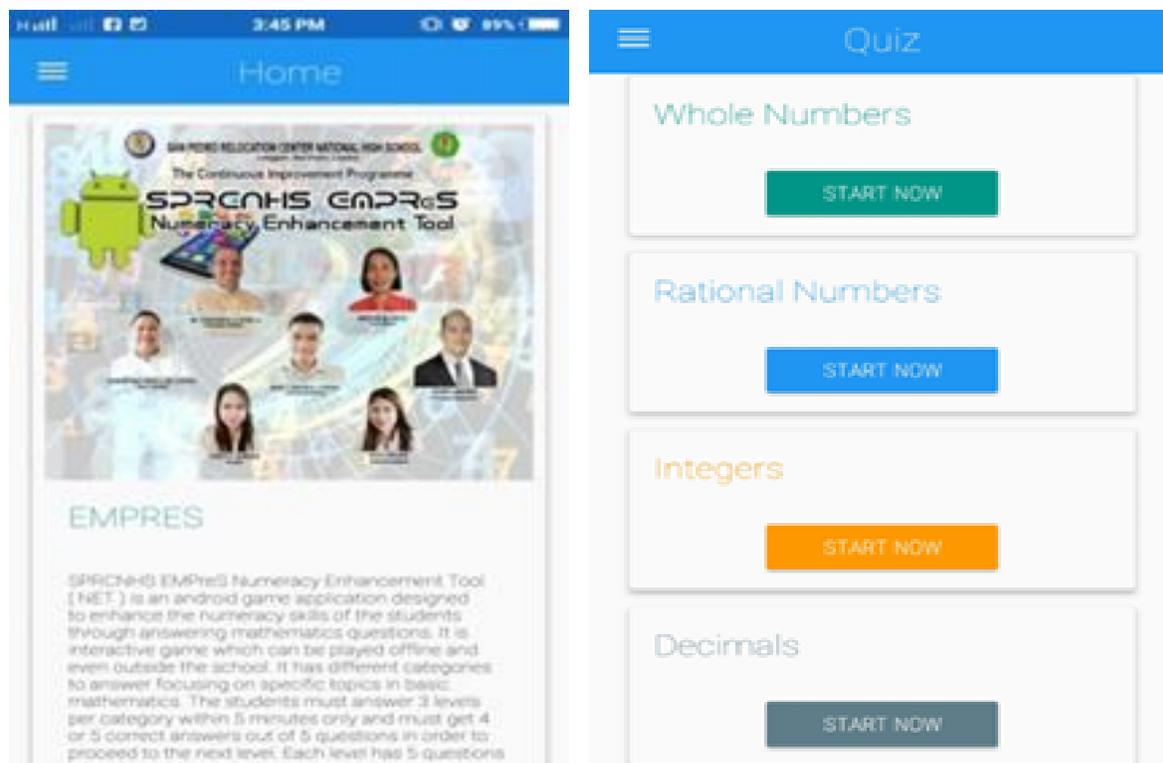
The figure above shows how the mobile app was developed and the third version was pilot tested with one section against another section that did not use mobile app. After pilot testing, implementation of mobile app use in all Grade 11 students was introduced to determine the effect on the academic performance of the students in Mathematics in terms of examination result.

This study aimed to determine the effectiveness of the Numeracy Enhancement Tool (NET) as the mean of increasing the basic mathematical skills of the students through the use of android cell phone for school year 2016 - 2017. Specifically, it sought to answer the following questions: 1. What are the level of performance in the pre-test and the post-test of experimental group and control group? 2. Is there a significant difference between the two groups of respondents in pre-test and post-test scores? 3. Does the mobile app use have effect on the academic performance of the students in Grade 11 Mathematics in terms of results in examination?

## **2 Methodology**

This study was practical action research using quasi experimental design where pre-test and post-test scores were utilized between the control and the experimental groups for pilot testing. Forty students in each group were considered to make paired comparison of the results. The experimental group was exposed to the use of mobile app for six weeks to review and enhance their numeracy skills, while the control group was exposed to the traditional way of reviewing numeracy skills like drill using flash cards, games, simulation etc.

The mobile app was developed through the help of the alumnus named Efrai Vyxen M. Rivera where items/questions were taken from the learning materials in Numeracy Inventory Tools for Laguna Learners (NIT2L) developed and validated by the Mathematics teachers of Laguna intended to assess and evaluate the numeracy of the students. Little twist was put in the app to make it interesting game for the students. The first version of the app was pilot tested to the Grade 10 students for ten days to ensure it usefulness. Their suggestions such as colourful interface, more questions installed and score displayed were considered for the second version. The second version was pilot tested in Grade 12 students for ten days. Their inputs on enhancing the app like more categories to choose, no repetition of question installed and total score display were considered for the final version. After twenty days of pilot testing in Grade 10 and 12, the final version was developed for another one week, suggestions from Mathematics teachers and students were considered until the final version of the mobile app was materialized.



**Figure 2.** Final version of mobile app

The figure above shows the final version of NET which was used in pilot testing and roll-out phases of the study. Pictures of mathematics teachers and school administrators who contributed much for the development of mobile app were pasted on the interface on the mobile app.

Letter addressed to the principal and head teachers were secured first before the study was conducted. After that, orientation to the students was conducted right after the first grading period so that the students will be familiarized with the application. Parents were also informed about the mobile app so that they did not prohibit their children on using mobile phone. Moreover, identity of the sections was not revealed to protect the participants of the study. Confidentiality of data was strictly followed.

The test material was used taken from the Numeracy Inventory Tool for Laguna Learners (NIT2L) after asking permission to the authority which was validated by the Head Teachers and Master Teachers in the Division of Laguna and its reliability was established before it was implemented to use. The pre-test with 40 items was given first on the two sections to determine their numeracy skills. Scores were checked by the Mathematics teachers and kept confidential. After six weeks of using the mobile app, post-test with similar items of the pre-test was administered and scores were kept to compare with the pre-test scores. After pilot testing, the researchers reported to the school administrators

the results; they asked permission for the roll-out of the intervention in mathematics class. The study was full implemented in the third quarter of the school year 2016 - 2017 to investigate the effect of mobile app in increasing the basic mathematical skills of the Grade 11 students. The roll-out ran for eight weeks during third grading period. Results from the first to third periodical examination were considered to determine the effect of mobile app. Data were treated statistically using percentage, mean and t-test independent samples and paired under SPSS 23.

**3 Results**

**Table 1.** Independent Samples Test for Significant difference

		Group	Mean	t-test for Equality of Means				
				T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Pre-test	Equal variances assumed	EG	11.850	.093	78	.926	.07500	.80227
	Equal variances not assumed	CG	11.775	.093	77.992	.926	.07500	.80227
Post-test	Equal variances assumed	EG	28.850	12.085	78	.000	7.82500	.64752
	Equal variances not assumed	CG	21.025	12.085	77.928	.000	7.82500	.64752

EG = Experimental Group; CG = Controlled Group

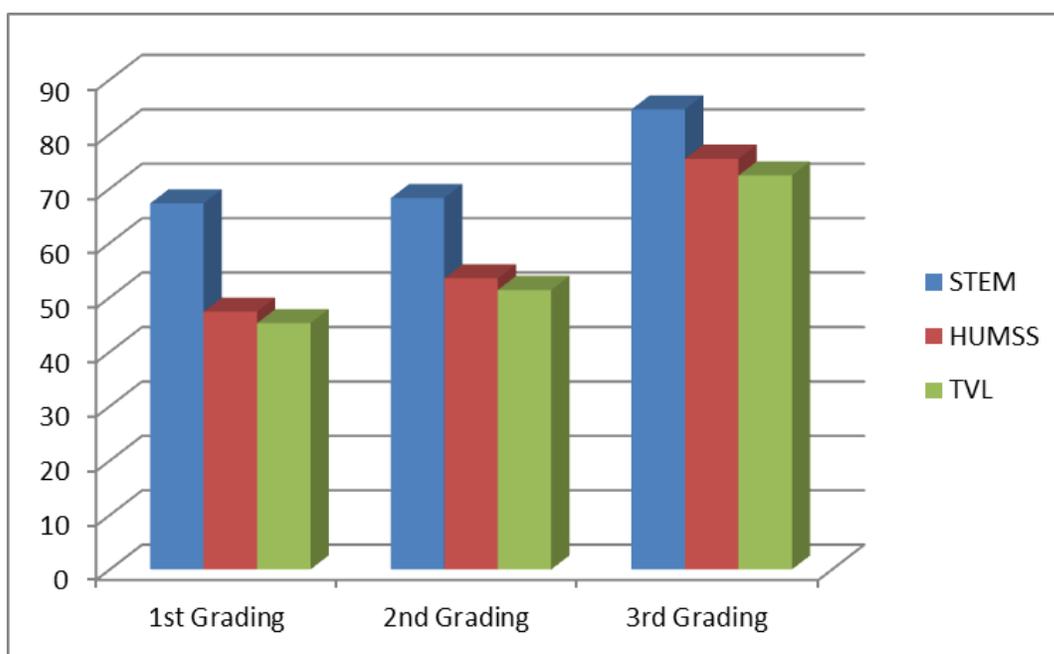
It is revealed from the table 1 that the computed t-value of the comparison of pre-test of experimental and control group scores of the students was .093 with p-value equal to .926. It shows that there is no significant difference between the scores in the start of the experimentation. This is good indicator for the experiment to be conducted. On the other hand, the computed t-value of the comparison of post-test of experimental and control group scores of the students was 12.085 with p-value equal to .000. It shows that there is a significant difference between the scores in the end of the experimentation. It means the experimental group performed better than the control group. These data intensify the usage of NET android application in reviewing basic concepts in mathematics. The students can use the mobile app everywhere and with convenience.

**Table 2.** Paired Sample t-test for Significant Difference between the pre-test and post-test scores

		Paired Differences			t	df	Sig. (2-tailed)
		Mean Difference	Std. Deviation	Std. Error Mean			
EG	Pre-test – Post-test	17.0000	4.21231	.66603	40.539	39	.000
CG	Pre-test – Post-test	9.2500	4.85561	.76774	25.074	39	.000

It can be gleaned from the table that the computed t-value of the comparison of pre-test and post-test scores of the students in the experimental group was 40.54 with p-value of .000. It shows that there is a significant difference between the pre-test and post-test scores of the students in experimental group. The same with the control group obtaining 25.074 for t-value with .000 p-value which means that there is a significant difference between pre-test and post-test of the control group. Both sets of students obtained the difference but comparing the average difference, the experimental group obtained the higher mean difference than the control group. It implies that the mobile app can be used in senior high school students for the development of basic mathematical skills called numeracy.

The figure below shows the result of the two months implementation of the mobile app in Grade 11 students with 20 sections and three strands in Senior high School.



**Figure 3.** Mean Percentage Score (MPS) in Mathematics of Grade 11 students

It can be gleaned from the figure 3 the mean percentage score of Grade 11 students increased from first grading to third grading period. There was 19.78 increase from second to third grading which indicates the effect of the use of mobile app. After two months of use of mobile app, the students' performance in examination was improved.

#### **4 Conclusion**

In this study, the authors presented how mobile game app helps the student to increase their numeracy skills while he/she playing or having fun. This may lessen the work of the mathematics teachers in reviewing the fundamental mathematical skills of the students. Based on the findings in pilot testing on the third version of mobile app, two groups performed at the same level in pre-test which makes them comparable in the start of the experimentation which means the scores in pre-test of the selected students both control and experimental groups were the same. However, there are some students who performed better in post-test from the experimental group. On the other hand, there is a significant difference between the post-test scores in the end of the experimentation. This study intensified the use of mobile application in reviewing basic concepts in mathematics. The students can use the mobile app everywhere, anytime they want with convenience.

Significant difference was shown on the pre-test and post-test results of the students in experimental group wherein the post-test obtained higher scores than pre-test result. Similarly, there is a significant difference between pre-test and post-test of the control group. Both sets of students obtained the difference but comparing the mean, the experimental group obtained the higher mean than the control group. The roll-out of the mobile app produced positive effect on the performance of the students in periodical examination. This study proven that NET android application can replicate the traditional teaching of the teachers while reviewing the basic mathematics concepts in Senior High School Mathematics.

It is more convenient for both teacher and student to use the mobile app whereas the students can use it anytime, anywhere. This mobile app follows differentiated learning, where the students can answer questions in their own pace. Replication of the application is recommended in other subjects to determine if mobile app really increase the academic performance of the students. Still NET can be improved by providing teacher editing facilities and redesigning its interface. In addition, a qualitative research should follow after this research to confirm the experiences of the participants to this application. Moreover, similar study may be conducted in Junior High School to validate its effectiveness and gathered more suggestions for the improvement of the mobile app.

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**Appendix**

**Timetable/Gantt Chart**

<b>Date</b>	<b>Process</b>
July 15, 2016	Meeting with the mathematics teachers to talk about the problem of the students
July 18, 2016	Conduct interview with the students about their struggles in mathematics
July 19, 2016	Development of first version of mobile game app
July 22, 2016	Secured letter of validation and permission from the head teacher
July 25, 2016	Initial survey for the number of students with smartphones
July 26, 2016	Classroom observation to identify the problem
August 1, 2016	Pilot test of mobile app version one in Grade 10
August 11, 2016	Reprogrammed of mobile app for the second version
August 15, 2016	Pilot test of mobile app version two in Grade 12
August 26, 2016	Reprogrammed of mobile app for the final version
August 30, 2016	Secured letter of permission from the principal for pilot testing of the version three for the two sections
September 2, 2016	Pre-test administration of the two pilot sections
September 5, 2016	Launching of the third version of mobile app to the two sections
October 19, 2016	Post-test administration on the two pilot sections
November 4, 2016	Secured letter of permission from the principal for roll-out in Grade 11
November 7, 2016	Orientation of the students and dissemination of the mobile app
November 8, 2016	Launching of the final version of mobile app and start of the use of mobile app
December 8, 2016	First monitoring of the scores
January 9, 2017	Second monitoring of the scores
January 12-13, 2017	Third periodical Examination
February 3, 2017	Writing the results of intervention
March 20, 2017	Finalized the action research

## Visual Model Approach in Solving Algebraic Word Problems among Grade 7 STE Students

**Margareth H. Macabodbod & Perry Jane Q. Cañete**

Cagayan de Oro National High School-Junior High School, Misamis Oriental

[margarethmacabodbod@gmail.com](mailto:margarethmacabodbod@gmail.com)

**Abstract.** In this action research study, the researchers investigated the effectiveness of a strategy in solving algebraic word problems in Cagayan de Oro National High School. The purpose of this was to observe Grade seven STE students' mathematical abilities and investigate whether teaching the visual-model approach in solving word problems in linear equations in one variable will enhance students' mathematical thinking and ability to comprehend, solve word problems and fully promote the love of solving math word problems. The study used the descriptive research design. Purposive sampling was used. All students had undergone the intervention and data were analyzed. Students took a pre and posttest designed to measure and give students practice on mathematical skills. Students worked individually on practice problems and answered questions. The students who were exposed to the said strategy have a higher level of conceptual understanding and proficiency level in the topic. The result showed that there is an improvement in the proficiency level. This indicates that the visual approach played a vital role in helping students' sequential learning to bridge prior knowledge and new concepts. Results also revealed that it helps develop a better understanding and increases students' mastery of the concepts and comprehension or proficiency level.

### 1 Introduction

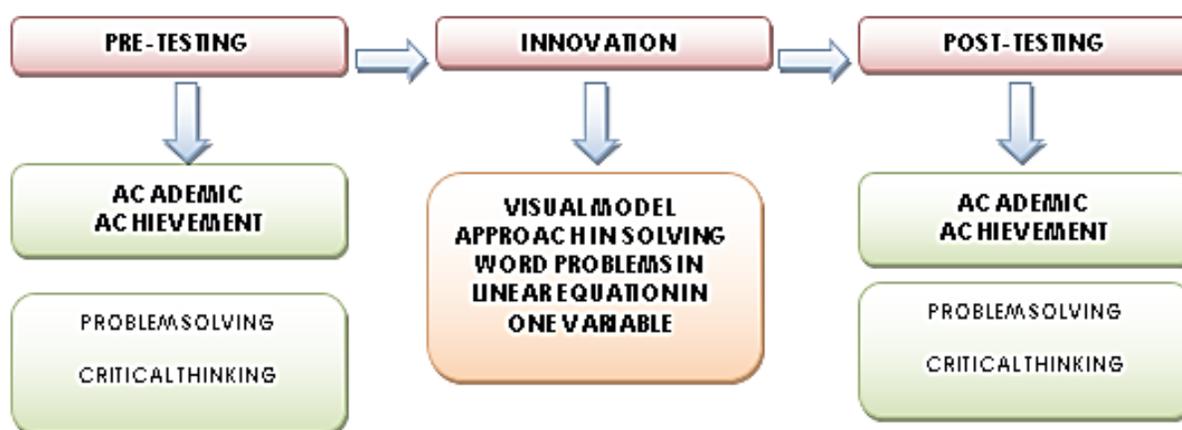
Problem solving is an important part of Mathematics education. There is a gap where you are and getting started on an oath to a solution which means that your students require thinking and playing-with-the-problem time. They need to test out ideas, to make conjectures, to go up "dead ends" and adjust their thinking in the light of what they learn from this, discuss ideas with others and be comfortable to take risks.

Teachers of mathematics in the primary and middle years will find the Model Method valuable as one of the key strategies for solving word problems. With a general strategy that is applicable from lower primary years, they can help their students' progress beyond working on fluency with numbers, fractions, ratio and percentage to applying these concepts to a variety of challenging word problems, making the learning of mathematics more meaningful and successful.

Cagayan de Oro National High School offers the program Science, Technology, Engineering (STE) curriculum for outstanding students. From the several classroom assessments, it has been observed that some students are not performing satisfactorily as they are expected.

The researchers made a teacher-made test (pretest and posttest) to facilitate in the respondents to verify the subject teacher's observation regarding their low performance in critical thinking skills. Both sections – Galileo and Aristotle will take the pretest to evaluate their prior knowledge regarding the given topic on algebra. After some time, posttest will be facilitated. Furthermore, the results of the two (2) sections will be compared and analyzed. In addition, being equipped with a tool for problem solving and knowing that they will not be lost among the quantities given will build students' confidence and a positive attitude towards word problems.

## 2 Conceptual Framework of the study



**Figure 1.** Interrelationships of the variables studied and analyzed

In Figure 1, the innovation will be given to students for them to improve their critical thinking skill. The Visual Model Approach in solving word problems believed to develop their logical processes. The researcher would like to know if there will be an improvement in their problem-solving skills. The Pre- and Posttests will measure their problems solving and critical thinking skills in the topic.

## 3 Literature

Model drawing, often called “bar modeling” in the U.S., is a systematic method of representing word problems and number relationships that is explicitly taught beginning in second grade and extending all the way to secondary algebra and that students are taught to use rectangular “bars” to represent the relationship between known and unknown numerical quantities and to solve problems related to these quantities (Cavendish, 2014).

In the given problems, the student knows the whole and one part, and can solve for the missing part either by adding up or subtracting, so students understand the relationship between addition and subtraction. Students solve for an unknown variable at a pictorial stage, which aids the transition into the abstract.

These rectangles, which will become variable expressions in algebra, enable students to construct more abstract representations of problems as they continue in mathematics.

Representing number relationships, comparisons, proportions, and changes becomes second nature as students do this from grade level to grade level.

What is most exciting is that rather than using the usual student favorite—guess and check, or at least guess—students tackle word problems with efficient and strategic visual models that lead to generalizations. In summary, this puts them on the road to algebra and future success in higher-level mathematics. The development of successful problem-solving skills is a key part of mathematics learning. At the core of teaching Mathematics is the systematic development of these skills tied directly to the arithmetic. With model drawing approach, students gain the skills they need to tackle more and more complicated word problems from grade level to grade level. The program fosters both good number sense and the ability to solve complex problems. We can all agree these should be the goals of any good math program.

The Bar Model Method plays an important role in the primary school mathematics curriculum in Singapore since its introduction by the Ministry of Education in the 1980s which is an innovation in teaching and learning (Kho, Yeo & Lim, 2009), to address a national problem in the 1970s where students were not achieving basic numeracy skills and were not able to solve word problems sufficiently well.

The aforementioned studies and related literatures highly strengthened the research study.

#### **4 Research Questions**

The study in general attempts to examine the effect of the use of visual model approach in problem solving of the grade 7 STE students on problem solving performance in mathematics. Specifically, it seeks to answers the following questions:

- 1) What is the students' performance in terms of the results in the pre-test and post-test?
- 2) Did the Visual Model Approach strategy enhance the Grade 7- STE students' critical thinking skills in solving algebraic word problems?

#### **5 Scope and Limitation**

The study is focused on the teacher's use of strategies that will enhance the capabilities of students in answering any word problems in mathematics and increase achievement in Math. This was conducted to two sets of Grade 7 STEM students of Cagayan de Oro National High School. The study covered only one topic of the Grade 7. The topic to be covered in Algebra is SOLVING WORD PROBLEMS OF LINEAR EQUATIONS IN ONE VARIABLE.

## **6 Innovation**

The method in applying the Visual Model Approach process was given by the researchers during their Math classes. The researcher gave the learning competencies based from the K to 12 Curriculum guides of Grade 7 Mathematics: solves problems involving equations and inequalities in one variable with code M7AL-IIj-2. The researcher presented through power point presentation wherein different word problems were exposed to them. One problem was given a time and for the first 2 problems, many of the respondents use algebra to solve them.

The researcher then introduced to the respondents that there is another strategy that can also be used in solving the word problems with equal effectiveness. This approach was known as the Visual Model Approach which is based on pictorial models. This approach serves a tool to help students solve arithmetic and algebraic word problems. With this approach, students can derive algebraic expressions, construct algebraic equations and simplify algebraic equations. In this approach, students are translating information from words into diagrams such as blocks. These diagrams help students understand the relationship between and among variables. They can use colored blocks so that they can clearly picture out the known and the unknown variables in the problem.

The researchers believed that understanding the relationships, in turn help students in making relevant algebraic expressions and equations. The researchers also interviewed the students and facilitated focus group discussion (FGD). After which pre-test was given to the students and the researchers personally corrected the papers and found out that most of them solve the problem algebraically. After a series of session on Visual Model Approach through the integration of ICT in the teaching-learning process, post-test was administered by the researchers. The papers were checked and recorded. The data were calculated and tabulated.

## **7 Methodology**

This part presents the research design, research locale, respondents of the study, instrumentation, validation, data gathering procedure, statistical treatment, and data analysis.

### **7.1 Research Design**

The descriptive research method was used in the study. According to Best (2003), descriptive research describes and interprets the study that is concerned with conditions or relationships that are present or opinions and processes that are presently happening. This procedure commenced by selecting the respondents of the study who will be the STEM Grade 7 students in Cagayan de Oro National High School. The respondents will answer a researcher-made test about solving word problems of linear equations in one variable. The respondents were notified and let their parents signed the consent.

## **7.2 Research Locale**

The study will be conducted in Cagayan de Oro National High School- Junior High School, 28<sup>th</sup> streets Nazareth, Cagayan de Oro City.

## **7.4 Respondents of the study**

The study will involve Science, Technology, Engineering Curriculum (STE) Grade 7 students of the school. It is composed of 2 sections only namely Grade 7- Galileo and Grade 7- Aristotle.

## **7.5 Instrumentation**

This study upholds the highest ethical standards possible. The respondents will be given prior notice and orientation on the conduct of the study and its significance to the students.

Additional instruments were used such as request letters sent out to the principal and assistant principal of Cagayan de Oro National High School and STEM Grade 7 students seeking permission to conduct the researcher-made test and ultimately to the parents as well, since almost of the respondents are minors and thus consequently to be approved by school principal and assistant to the principal.

## **7.6 Data Gathering Procedure**

The study made use of a test questionnaire to be conducted by the researchers.

One of the important procedures in the study is the giving out of a *Researcher-made Questionnaire* answered by every participating respondent. The test comprised of five (5) statements about solving word problems of linear equations in one variable in which students showed their complete solution.

## **7.7 Statistical Treatment**

The statistical tools used in this study are:

Descriptive Statistics such as frequency, number of respondents, mean, and the proficiency level of the results of the pretest and posttest of the respondents.

**8 Results and Discussion**

**Table 1.** Comparative results of Grade 7-STE students of their mean and proficiency level in their pre-test and post-test.

Sections	PRE-TEST		POST-TEST	
	$\bar{x}$	P.L.	$\bar{x}$	P.L.
7-Galileo	23.77	47.54	34.94	69.89
7-Aristotle	20.54	41.09	32.20	64.40

Based on the table above, it is very evident that there is relative increase of the mean and PL of the respondents. In Grade 7- Galileo, there is a difference of 22.35% of the PL of the pre-test and post-test while in Grade 7-Aristotle, there is a difference of 23.31% PL difference.

The digits of improvements among the respondents tell us that probably they were able to understand the problem and identify a solution through picturing the problem. Teachers teach students many problem-solving strategies but probably the most effective and flexible way is “making a picture, drawing bars and visualizing diagrams”. Apparently, this strategy also helped the students got the solution and correct answer since Visual Model Approach serve as prompts to help students keep track of what they need to find out in the multi-step problem. During the pre-test, almost all of them used algebra in solving the problem. But when this approach was introduced to them, they were able to learn to represent simple and multi-step word problems by drawing bars to indicate the known elements of the problem and eventually relate to one another, and then place one or more questions marks and variable (x) to indicate what they need to find out. The students' performance was excellent in terms of the mean difference and proficiency level difference.

The Visual Model Approach strategy really helped enhance the Grade 7- STE students' critical thinking skills in solving algebraic word problems. With this, they can easily use and draw bars in dealing with solving for the unknown quantities. Bar models are simple and powerful ways to represent part-whole and whole-part relationships and to represent problems dealing with ratios. Bar modeling helps make abstract problems more concrete and facilitates algebraic reasoning among students. Thus, they were able to think critically and that they were ready to solve for the complex algebraic word problems. Román (2005) argues that the development of critical thinking skills becomes a crucial educational aim to provide students with accurate tools for a continuous life-learning process. Visual images are a crucial instrument to develop critical thinking because they portray ideas around diverse social aspects through multiple layers of meaning (Emmison & Smith, 2000). Therefore, visual literacy and development of a critical approach around images have become an important educational responsibility

to ensure the reflective involvement of teenagers in their communities (Eco, 1983; Eisner, 2002; Freedman, 2003; Duncum, 2010; Grushka, 2009; Gude, 2007; Hogan, 2006). Critical thinking supports learning in the long term because it enables students to recognize significant information to solve new and complex situations (Cottrell, 2005; Hogan 2006). With these studies, it was strengthened that this Visual Model Approach enhanced their critical thinking skill in solving word problems.

## **9 Findings, Conclusion and Recommendations**

The Visual Model Approach is comprised of labeling bars and identifying the given data and missing information of a given word problem. Thus, most of the students found this approach very helpful especially in solving word problems. However, there were also students who found this approach not that helpful in the said topic. What distinguishes the model method from other forms of paradigm is that it provides a framework that makes logic to students. Students who have difficulty understanding the logic behind the steps of a paradigm may have an easier time understanding the practice of drawing bars. When reflecting on the Visual Model Approach, a student commented that it was "It was helpful because I can see what is going on in my calculations. The visual bar method helps me to solve most of the problems."

It is mentioned in the Mathematics K to 12 Curriculum Guide that the twin goals of mathematics in the basic education levels, K-10, are Critical Thinking and Problem Solving. These two goals are to be achieved with an organized and rigorous curriculum content, a well-defined set of high-level skills and processes, desirable values and attitudes, and appropriate tools, taking into account the different contexts of Filipino learners.

It is encouraged across the curriculum so this research fit appropriately into the school improvement goals. The researchers strongly believed that integrating this approach helped the students improve their problem-solving skills and critical thinking skills in Mathematics. The process that they went to helped them to become confident problem solvers which the researchers believe that they can be ready for the real-life problems that they will be facing in the future to come.

The researchers also recommend for future action researchers on the feelings, ideas and perception of students especially when they are asked to solve math problems. Their honest answers were very alarming to the point that they feel nervous, worried, and not confident. The researchers wanted to look for consideration on the future researches on the academic performance and attitude towards Mathematics among the Cagayan de Oro National High School-Junior High School Science, Technology and Engineering (STE) students.

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## Designing Realistic Mathematics Lessons Toward Improving Mathematical Productive Disposition

**Von Christopher G. Chua**

De La Salle University, Manila

[von\\_christopher\\_chua@dlsu.edu.ph](mailto:von_christopher_chua@dlsu.edu.ph)

**Abstract.** This action research developed from a need to advance my competence in designing lessons that improve learners' mathematical productive disposition. I incorporated principles of realistic mathematics education and used socially-relevant situations in teaching Permutations to a Grade 10 class, and I identified opportunities and challenges in the implementation. As part of gauging participants' productive disposition, I asked them to represent their perception of mathematics through metaphorical conceptualizations. Analysis of participants' pre-intervention metaphorical conceptualizations of mathematics revealed four categories of learners: eager learner, puzzled gamer, problematic solver, struggling pessimist. After the intervention, some participants modified their metaphorical conceptualizations and post-intervention analysis revealed more desirable representations of mathematics. From the interpretation of the data and my critical introspection of experience in adopting realistic mathematics, I conclude that making mathematics matter to learners can be achieved if teachers make considerable and devoted attempts at making what matters to learners mathematical. There are challenges in designing lessons that conform to realistic mathematics including developing and enabling learners' awareness of their social, and cultural environment, and encouraging critical thinking. However, consistent exposure to lessons that present mathematics as contextually and socially-relevant can potentially improve learners' mathematical productive disposition together with other strands of their mathematical proficiency.

### 1 Plan: Acknowledging the need to foster productive disposition

Mathematical proficiency is composed of five interdependent, interweaving strands of conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive disposition that are collectively essential for successfully learning mathematics (Kilpatrick, Swafford, & Findell, 2001). Conceptual understanding is the accuracy in comprehension of mathematics, operations, and relations. The ability to perform appropriate procedures with flexibility, precision, efficiency is called procedural fluency. Strategic competence is the aptitude for formulating, representing, and solving problems. Adaptive reasoning is the capacity for logical thought and reflexivity. Finally, productive disposition is the consistent inclination toward sensing mathematics as useful and worthwhile, thus, leading to diligence and belief in one's own efficacy. In principle, a mathematics teacher must make certain that all five strands are addressed by how lessons are designed and that all these strands are evident in aspects of the learning experiences of the learners. However, productive disposition is usually left out in the periphery by teachers due to the nature of assessment common to mathematics

(Groves, 2012). Most tests used as leverage for instructional success only measure the ability to perform mathematics along the first four stands. These tests are either unable to or weakly capture productive disposition.

An examination of the learning plans I developed over the past three years has helped me gain insights on how holistic my approach has been in developing mathematical proficiency. From this analysis, I noted that I focused too much on procedural fluency and conceptual understanding with around 70 percent of the plans following either an inductive or a deductive approach. Also, approximately 30 percent of the plans manifested a desire for learners to develop their own methods for solving problems, reflective of adaptive reasoning and strategic competence. Moreover, I have realized that while I was certain of the importance of building a positive attitude in math, I often did not regard how the lessons helped learners sense mathematics as relevant and necessary. I viewed productive disposition as a result of the development of the other strands. Consequently, learners who may have already had poor disposition to begin with were deprived of the opportunity to find reason to progress with mathematics right at the start of the lesson – an opportunity that could have prompted them to persevere through the difficulty because they understood why and how learning mathematics would matter to them.

Hence, with the aim of developing my ability in designing lessons that explicitly target the improvement of learners' productive disposition, I forged a partnership with a mathematics teacher and her class of 33 tenth graders in a public secondary school in one of the provinces in the Philippines.

### **1.1 Gauging productive disposition**

In capturing the participant's productive disposition, I developed a survey that includes a prompt asking the participant to think of and justify a metaphorical conceptualization (MC) of mathematics, that is, "*For me, mathematics is like... because...*" The first phrase produces a metaphorical vehicle – an object, phenomenon, or activity that the participant understands possessing some characteristic which he or she best associates with mathematics and mathematics learning. Continuing the response with "*because...*" allows for a description and reasoning of the association between the vehicle and mathematics. This is the metaphorical ground. Holman (1980) describes a metaphor as an imaginative analogy from which one can imply how a subject identifies an object with another. It serves to illuminate an abstract phenomenon through another phenomenon (Quale, 2002). In this light, a metaphor is useful when exploring and seeking to understand the "esoteric, abstract, novel, or highly speculative" (Yob, 2003). In this research that abstract phenomenon is mathematics, and the assumption is a learner's MC of mathematics can reveal productive disposition.

**1.3 Participants' pre-intervention conceptual metaphors of mathematics**

The pre-intervention MCs of mathematics of the learner-participants have been analyzed leading to the conceptual categories presented in Table 1.

**Table 1.** Thematic Classification of Participants' Pre-Intervention Metaphorical Conceptualizations of Mathematics

<b>Conceptual Category (Frequency)</b>	<b>Metaphorical Vehicles</b>	<b>Description</b>	<b>Sample conceptual metaphor</b>
<b>Eager Learner (8)</b>	riding a bike, learning something new (e.g. dance), climbing or planting a tree, climbing Mount Everest, walking the Great Wall of China	appreciates the need to start with the basics; understands that the process is marked by some difficulties but gets easier through consistent practice; senses the process as ultimately rewarding; process- and goal-oriented	<i>"For me, Mathematics is like <b>climbing a tree</b>. In order for you to go to the top, you encounter difficulties along the way. Sometimes you might hurt yourself but when you've finally reached the top, you will slowly see its beauty"</i>
<b>Puzzled Gamer (10)</b>	puzzle, maze, joke, paradox, Rubik's cube, a tangled thread, a doctor's prescription	perceives mathematics as a game or a riddle that needs to be understood, "untangled", and solved; goal-oriented	<i>"Mathematics is like a <b>Rubik's cube</b> that you have to play with. sometimes you get the color(s of one side) right but still not enough... But when you get to complete it, it feels satisfying."</i>
<b>Problematic Solver (4)</b>	life problem, obstacle, <i>pagsubok</i> (trial),	views mathematics as a solvable problem, a problem nonetheless, and takes the task of finding an existing solution.	<i>"Mathematics is like an <b>obstacle in life</b>, because whenever there is a problem you need to find a solution to make the problem solved."</i>
<b>Struggling Pessimist (4)</b>	parents, girls, thick book, life, crush, rock, fly	senses math as plainly difficult to learn	<i>" Mathematics is like a <b>fly</b> because it is always hard to get"</i>

From the 29 individual MCs generated by the participants, four conceptual categories emerged which essentially captures their mathematical productive disposition: eager learner, puzzled gamer, problematic solver, and pessimist. These four categories which are grounded on the actual responses of the learners are represented by labels that I believe best captures their mathematical productive disposition. Only 26 of the 29 participants' MCs are accounted for in the table. The unrepresented responses did not fit any of the identified conceptual categories and I chose not to force them into any.

Eager learners see mathematics as a process of developing a skill. They describe this process as marked by challenges they need to overcome. They manifest awareness that these challenges are sequential; that development of one competency is necessary to progress to the next. Ultimately, going through the process leads to the attainment of a major goal that justifies all difficulties encountered in the process. In comparison, the puzzled gamer likens Mathematics to a game or worthwhile task that can initially be difficult to understand but with consistent effort, the exercise leads to desirable results and a feeling of gratification. Learners in this category share with eager learners the ability to see mathematics as worthwhile and rewarding. The defining characteristic, however, is that puzzled gamers have a more simplistic view of mathematics as a set of independent tasks rather than a process composed of a multitude of interrelated tasks that collectively define an overarching objective - such is a characteristic of eager learners. The problematic solver perceives learning Mathematics to be an obstacle to a greater objective. Despite this negative perception, problematic solvers explain that all problems have solutions and that with continuous efforts, they are likely to find that solution. Finally, learners who simply describe Mathematics as hard, difficult to learn and understand are labeled as pessimists.

From the descriptions enumerated in Table 1, I posit that eager learners and puzzled gamers have relatively more desirable dispositions that allow them to be more productive in learning Mathematics. The problematic solver, to a certain degree, may understand the essentiality of learning Mathematics and is, therefore, able to persevere through the difficulty. However, in the performance of tasks, the problematic solver continuous to harbor a less desirable attitude toward gaining proficiency in the subject in comparison to the previous categories. In contrast, a pessimist has a weak, undesirable disposition that impedes success in learning mathematics.

## **2 Do: Capitalizing on learner's context**

Aligned with the objective of the research, I examined and employed various principles of realistic mathematics education (RME) in planning a unit of content on combinatorics found in the curriculum guide mandated by the Department of Education (2013) for tenth-grade mathematics. RME is a domain-specific theory for mathematics instruction that is characterized by the prominent utility of rich and "realistic" situations in the learning process (Van den Heuvel-Panhuizen & Drijvers, 2014).

As part of the intervention, I now clarify the following underlying assumptions I have made that ground my theory for improvement: (1) that a mathematics teacher should not just rely on learners being able to develop their productive disposition as a result of

improvement in the four other strands of mathematical proficiency; (2) that adopting the principles of RME may help learners establish direct associations between the mathematical content and skill they are asked to learn in class and the mathematical knowledge they perceive to be essential to their socio-cultural context; and (3) that the metaphorical conceptualizations of mathematics of the learners provide a window into their mathematical productive disposition.

## **2.1 Teaching Permutations through a socially-relevant perspective**

Integral to my improvement theory is a set of four one-hour-session lesson plans on Permutations aligned with the relevant learning standards and competencies in the curriculum guide for Grade 10 Mathematics. In comparison to most of the plans I designed in the past, this set of lessons encourage collaborative construction of knowledge among learners through problems that are of socio-cultural relevance.

Based on the assumptions that guided my improvement theory, I have developed a plan for action. The pre-implementation commenced with a review of relevant academic literature on productive disposition, RME, and content and pedagogical considerations of Permutations. This fostered a deeper understanding of the mathematical proficiency framework and increased awareness of approaches to teaching Permutations which ensured that the conceptualization of the research and plan for analysis are complementary. Reviewing the literature also informed me of the challenges, opportunities, and intervening factors that could have influenced the research which I considered in designing the lesson plan along with insights from the participants' mathematics teacher.

Then, I collected the baseline data on pre-intervention productive disposition of the class through which I formed conceptual categories of participants according to their metaphorical conceptualizations. The findings helped me reassess the initial version of the lesson plan and gave me valuable information on how to better implement the lessons. The intervention was carried out in four days. During implementation, I wrote down reflections right after every class. I evaluated my progress in every phase and modified the subsequent plan to ensure that I capitalize on the opportunities revealed through my insights. Finally, post-implementation involved the analysis of the data from the survey form, teacher interview, my reflective journal, and observation field notes. To ensure that my personal bias did not affect my interpretation of data, the teacher and participants were asked to clarify responses that were unclear and confirm my understanding of what these responses implied. Moreover, I had the teacher independently classify the responses of the learners according to the categories which I have developed from my own analysis and we negotiated our analysis to decide on the final categories.

## **3 Study: Analyzing comparisons of conceptual metaphors**

From the four conceptual categories of mathematical conceptual metaphors presented in Table 1, the analysis of post-intervention metaphorical conceptualizations revealed that participants' responses were consistent with the descriptions of only three

categories. None of the post-intervention responses subscribed to the descriptions of a pessimist. Several participants still implied through their written responses some level of difficulty in dealing with mathematics, but some added that they realized a positive aspect from their experience in learning about Permutations. Comparison was done between each participant's pre- and post-intervention metaphors. As example, I present two pairs of these responses, as follows,

- [Pre-int, pessimist] Mathematics is like a fly because it is always hard to get.
- [Post-int, problematic solver] Math is like a fly because it is hard to get but the teacher gave us a trap to get the fly. [P25, male]
- [Pre-int, pessimist] Mathematics is like my parent because sometimes they (sic) are hard to understand.
- [Post-int, unclassified] Mathematics is like my parents – maybe, sometimes they are hard to understand, but if I just listen to them I will realize it was just easy. [P15, female]

I note that there is an obvious difference in the P25's response, that is, he started with the same phrase and used the same vehicle to describe his pre-intervention experience with mathematics, but his post-intervention response reflected a sense of appreciation of how important the teacher's role is in helping him deal with the difficulty in the subject. The added phrase allowed me to recategorize him from a pessimist to a problematic solver.

In the case of P15, her post-intervention MC may have been hard to classify because it did not conform with my understanding of any of the four categories, but it reflected an important change in learner's thinking – that, similar to P25, granted that mathematics is difficult for her to understand, she must make an effort because when she does she may find it easier. In all, 12 of the 29 learners (41 percent) changed a certain aspect of their MT with ten being different enough that their post-intervention responses did not anymore reflect the category they were placed under prior to the intervention.

### **3.1 Participants' comments about the lesson**

Participants were also asked to reflect on their overall experience in learning Permutations and identify, if any, the features of the lesson that they do not commonly encounter in math classes. I identified five common perceived traits of the lesson, as follows: (1) centered on discovering and making sense of formulas; (2) represented real-life, relatable problem situations; (3) involved fun and interesting activities that made learning easier; (4) encouraged thinking and analysis; and (5) induced collaborative learning. These perceptions of the lesson, together with the findings from the metaphorical conceptualizations support the argument that the lessons were, to some extent, successful in helping participants see mathematics in a more desirable state –

one in which they are able to maintain a level of mathematical disposition that encourages productivity in developing mathematical skills and learning new knowledge.

#### **4 Act: Articulating implications for continuous improvement**

From the planning, implementation, and analysis, I raise three plans for continuous improvement aligned with the objective of this research. First, having earned a greater understanding of productive disposition as critical to what makes a “good” mathematics lesson, I now aspire to design lessons that purposively promotes productive disposition alongside the other strands of mathematical proficiency. Any mathematics lesson should stimulate in learners the development of these strands in a complex, integrative manner through activities that invoke as many strands as possible. Arguably, lessons that have been planned in this perspective may lead to better results in terms of learners understanding and appreciation of mathematics. Second, while I recognize the challenges with employing RME, such as understanding the context of the learners, and strategically selecting the most topic-relevant and appropriate situations, I am convinced that grounding instruction on realistic problems is essential for holistic mathematical development. I will continue to seek improvement in employing RME through research, and reflective practice. Third, the findings and my experience in doing this research have motivated me to pursue a second cycle that involves a variety of conditions. These conditions are captured by the following questions: (1) How would lessons following principles of RME be perceived by a class of mathematically-challenged learners; (2) What other topics in mathematics provide opportunities for realistic and critical mathematics education; and (3) What other measures can I use to gauge learners’ productive disposition?

#### **5 Reflect: Making math matter is making (what) matters mathematical**

The goal of this action research was to improve my ability relative to developing and implementing lessons that explicitly seek to improve productive disposition among the other components of mathematical proficiency. This practice was a departure from what I typically had been doing for the past eight years where I placed more emphasis on conceptual understanding and procedural fluency in the design of my plans. This goal captures one question that propelled the whole inquiry, that being, “*How can I make mathematics “matter” to learners?*”

The process I went through from planning, doing, and studying led me to critically assess and redefine my understanding of what makes a mathematics lesson “good” – that quality now including the extent of how well the lesson helps the learner create obvious, and meaningful connections between mathematical tasks and life events, and encourages perseverance in dealing with those tasks. These insights come were spurred by unexpected learner responses and ways by which learners think about, discuss, and generalize the processes they go through while solving problems – insights that came from reflecting on certain, independent, isolated events in the intervention.

However, when I had to consider of the research in its entirety, I had to ask: What caused the participants to take active roles in the discussion? What is it about using socio-

culturally-relevant problems that led to a more productive mathematical disposition, as evidenced by the changes in MCs?

In thinking about these questions, I raise two conjectures grounded on my analysis. First, the data supports the claim that the approach to mathematics matters to making the act of doing mathematics worthwhile. That “approach” provides a perspective to problems as either having known, pre-established answers that needed to be discovered, or being open-ended inquiries that encourage variation of answers and endorses the need for negotiation. The former of these two approaches is highly evaluative. This means that the kind of classroom discourse that is typical to a Math class is one where the teacher has in his or her possession the correct answers and is responsible for providing feedback to learners’ responses to help them get the correct answer. Learners’ awareness that such a perspective is enforced can consequently lead to him or her to find answers not to satisfy his or her own curiosity but to get a sense of affirmation from the teacher. It is, in this sense, that mathematics is able to maintain a quality of being absolute and definite – a characteristic that neither encourages active participation nor invokes a sense of responsibility and ownership from learners for their answers. This evaluative perspective further restricts any attempt to inspire the construction of knowledge through investigations that is essential in constructivism. In contrast, the second approach encourages the construction and negotiation of understanding among peers to determine the most logical and sound conclusion. Therefore, it is necessary that teachers try to be critical about their approach to teaching mathematics to determine how evaluative the form of mathematics they present. From what I was able to experience in the intervention, I gained a greater appreciation of exposing learners to reflective dialogue essential in realistic mathematics education.

Second, math matters when what matters becomes mathematical. Hence, the context of the problems that I present to learners makes a difference to developing productive disposition. I now understand that problems should be designed to consider both the skill and the situation, so they do not appear contrived and artificial to the learners. Planning lessons through a realistic or critical perspective is anchored on the construction of contextually-relevant problems that allow learners to make direct connections between what they experience, what mathematics they are encouraged to learn, and how knowing this mathematics can help them widen their understanding of their own experiences. The challenge is for the teacher to find opportunities in what already matters to the learners and invoke a sense of mathematics from those meaningful situations leading to lessons that capitalizes on and improves disposition in mathematics that engenders productivity.

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## Designing Software for Children with High Functioning Autism Spectrum Disorder (HFASD)

**Melody Angelique C. Rivera**

Silliman University, Dumaguete City

[melodycrivera@su.edu.ph](mailto:melodycrivera@su.edu.ph)

**Abstract.** Children with Autism Spectrum Disorder (ASD) exhibit a wide range of developmental issues that includes communication, comprehension, behavioral and socialization skills. Although most children with HFASD are verbal, they could still have some communication and comprehension deficiencies. To help them, parents turn to intervention (or therapy) such as Applied Behavior Analysis (ABA) programs. Technology has aided ABA therapists in intervention sessions to make them more interesting for these children. The aim of this paper is to establish the usability and user experience (UX) criteria that must be present in the software that can be used during therapy sessions. Taken into consideration are the communication and comprehension deficiencies of these children and their learning styles. The opinions of 38 ABA therapists on this matter were gathered through an online survey. Results show that regardless of the learning style, if the child has both communication and comprehension deficiencies, the software should have utility, should be effective, efficient, easy to learn, easy to remember, fun, enjoyable, helpful, motivating, and rewarding; that the software needs to be entertaining for visual and kinesthetic learners; that visual learners who have both communication and comprehension deficiencies need the software to be aesthetically pleasing; that the software should support the creativity of an auditory learner who has a communication deficiency, and of visual and kinesthetic learners who have both deficiencies; and that being safe, satisfying, and emotionally fulfilling are not expected of the software.

### 1 Introduction

Autism Spectrum Disorder (ASD) is a neurological condition that affects the way a person communicates and behaves (Ministry of Children and Family Development, 2017). The Mayo Clinic (2018) staff describes the term spectrum in ASD to indicate people that exhibit a “wide range of symptoms and severity”. Children in the spectrum show varying degrees of the symptoms from the very severe (e.g. complete loss of language) to only mild manifestations (e.g. becoming anxious with the change in routine) (Disability Credit Canada, n.d.). This means that each one is unique that no two children have the same characteristics (SickKids, 2009). SickKids further stated that children who have been diagnosed with ASD usually exhibit disorders or delays in language (e.g. receptive or expressive) or speech, difficulties in social interaction or communication (e.g. maintaining eye contact), sleeping problems, repetitive behaviors (e.g. hand flapping) and sensitivity to noise, among others. Mody and Belliveau (2013) mentioned that the language abilities of children with ASD range from nonverbal to a peculiar language with echolalia (or

repetition of speech) and unusual prosody (or the pattern of stress and intonation in a language).

In terms of intelligence, the Mayo Clinic staff mentioned that some children have below normal intelligence and have difficulty in learning (low functioning autism spectrum disorder (LFASD)), while others have normal to high intelligence and can learn quickly but have difficulty with communication and comprehension (high functioning autism spectrum disorder (HFASD)). According to the National Institute on Deafness and Other Communication Disorders (2018), some children with HFASD can usually read by the age of 5 but may not be able to comprehend what was read. In communicating, these children have a hard time determining the feelings and thoughts of other people because they cannot understand non-verbal cues such as facial expressions and body language (The Hanen Centre, 2016). Vicker (2009), in her article on children and adults who are verbal and have HFASD, enumerated numerous language characteristics, social communication behaviors, and other characteristics that can impact communication in an indirect way.

Prelock and Nelson (2012) stated that children with ASD who have been diagnosed earlier and can receive early intervention will be able to develop their communication skills and will have less uncontrollable behaviors. Paul (2008) outlines several communication interventions for improving the communication and comprehension skills of non-verbal children and those who are speakers. The Applied Behavior Analysis (ABA) approach is one such intervention. According to Autism Speaks (2018), the goal of the ABA therapy is to "increase behaviors that are helpful and decrease behaviors that are harmful or affect learning". An ABA therapy program is flexible enough to cater to the needs of a child with ASD as it can cover, but is not limited to, communication and social skills, self-care, motor skills, learning and academics, and play and leisure.

Stephen Edelson (n.d.) wrote about the "learning styles" concept, which tries to describe the ways on how a person gets information from his or her environment. He mentioned that there are three (3) types of learners—visual, auditory, and kinesthetic. Visual learners learn through seeing (e.g. reading a book), auditory learners through hearing (e.g. listening to a lecture), while kinesthetic learners through touching (e.g. manipulating an object). According to him, in general, most people use two or three learning styles. But based on his experience and that of his colleagues, they observed that individuals who have ASD tend to rely on only one learning style. For teachers dealing with students with different learning styles, the best way is to use all three (3) together. He recommended that the learning style of a child with ASD must be determined so that teachers will be able to adjust their teaching styles with the strength of the child. This will make an impact on how the child will be able to focus on the information that is being presented. Although it was assumed the children with ASD are visual learners, a study by Trembath, Vivanti, Iacono, and Dissanayake (2015) found no evidence of noticeable visual learning in their experiment among children with ASD, children with global developmental delay, and children who are typically developing.

According to Robert Szczerba (2016), technology has improved the lives of people with ASD by allowing them to communicate, socialize and learn. He also mentioned that there has been substantial research on user interface (UI) design for people with disabilities (PWD) but were more focused on visual, auditory, and mobility impairments. He listed down the best practices of UI design recommendations for people with ASD that Nikolay Pavlov of Plovdiv University in Bulgaria collected. Rasche (2013), in her thesis, outlined and discussed a four-step design strategy cycle in developing software applications for autism, which she called Literacy Labels. Kamaruzaman, Rani, Nor and Azahari (2016) explained their design process in creating their touchscreen-assistive learning numeracy app (TaLNA), which taught basic numbers and calculation for children with ASD. Putnam and Chong (2008) wrote a paper on determining what users want out of software and technology that will be designed for people with ASD. The output of the survey was a first step toward knowing how people with ASD use software and technology, and what they are expecting out of the software that can be aligned to their interest and strengths.

In this paper, some Interaction Design (IxD) concepts were examined, specifically the usability and user experience (UX) goals or criteria of software to be developed. Preece, Rogers, and Sharp (2002, p. 14) enumerated the following usability criteria, which are explained in Section 2.1: effective, efficient, safe, has utility, easy to learn, and easy to remember. They also mentioned the following UX criteria: fun, enjoyable, entertaining, satisfying, helpful, motivating, aesthetically pleasing, supportive of creativity, rewarding, and emotionally fulfilling (Preece et al., 2002, p. 18). Since children with HFASD have varying attitudes, different learning styles and a spectrum of communication and comprehension deficiencies, there might be criteria that are given importance over the others. Because of this, the opinions of ABA therapists were obtained since they have had experience in handling such children. It is the goal of this paper to understand and establish which usability and UX criteria a software must satisfy to fit the learning style, and the communication and/or comprehension needs of children with HFASD.

## **2 Methodology**

### **2.1 Understanding Usability and User Experience (UX) Criteria**

User experience (UX) focuses on how a user feels when using a software product. A software is expected to make a user feel "happiness" before, during, and after using it. Usability focuses on improving the performance of users with the use of the product. For software to be *effective*, it must be good in doing what it is supposed to do. To be *efficient*, the software must allow the user to carry out his or her task(s). Being *safe* means that the software must protect the user from undesirable situations by preventing perceived fears of the user in making mistakes. A software that has *utility* is expected to have the right functions so that the user can complete his or her task(s). A software that is *easy to learn* allows a user to understand and use its functions in a short period of time and with minimal effort. Software that are used infrequently must be *easy to remember*, that is, the user must be able to remember how to complete the tasks without relearning them (Preece et al., 2002).

## 2.2 Respondents and Data Gathering

An online survey using Google Forms was created to get the opinion of ABA therapists on what they expect from software that can be used in therapy sessions with children with HFASD. Thirty-eight (38) ABA therapists were able to answer the online survey—thirty-four (34) of whom are currently working for the TeamWorks Behavioral Therapy organization (2019) whose main office is in Mandaluyong City, Metro Manila. The other four (4) respondents are former ABA therapists of TeamWorks.

The survey was divided into two (2) sections—one for usability criteria and the other for UX criteria. Each section was further subdivided into three parts focusing on the learning styles of the children (e.g. visual, auditory, kinesthetic). Each part contained three (3) questions about certain conditions of a child with HFASD. The conditions are: (1) the child is a visual/auditory/kinesthetic learner, has no problem with comprehension but has a problem with communication, (2) the child is a visual/auditory/kinesthetic learner, has a problem with comprehension but has no problem with communication, and (3) the child is a visual/auditory/kinesthetic learner, has a problem with both comprehension and communication. For each condition, the therapists were asked to choose (or check) the usability and UX criteria that they believe must be present in the software that will be used during therapy sessions. Their responses were tallied and are summarized in Figure 1.

## 2.3 Survey Results

Figure 1 shows the results of the online survey that was conducted from January 22 to March 4, 2019. The numbers show the tallied votes of the ABA therapists. Those that have a blue highlight indicate the criteria that the therapists believe the software should satisfy.

Making use of a “majority vote”, which is 50% plus 1 of the number of respondents (i.e. twenty votes and above), the results show that the usability and UX criteria that a software must satisfy would depend on the learning style and deficiency of a child.

USABILITY CRITERIA	Visual Learner			Auditory Learner			Kinesthetic Learner		
	Comm Def	Comp Def	Both Def	Comm Def	Comp Def	Both Def	Comm Def	Comp Def	Both Def
Effective	23	19	20	20	21	24	22	21	20
Efficient	20	15	22	19	18	23	19	22	24
Safe	16	11	17	15	10	16	13	14	19
Has Utility	23	18	22	22	21	23	21	21	22
Easy to Learn	14	23	26	14	22	23	14	23	21
Easy to remember	17	24	23	21	20	23	15	18	24
UX CRITERIA									
Fun and Enjoyable	22	30	28	19	22	22	24	24	26
Satisfying	12	9	16	15	14	15	20	15	18
Helpful	24	21	23	28	25	22	20	20	24
Motivating	25	28	25	29	27	22	26	24	23
Aesthetically pleasing	16	13	21	8	9	10	13	17	17
Supportive of creativity	19	18	23	20	19	15	16	17	21
Rewarding	24	21	22	18	18	21	18	20	23
Emotionally Fulfilling	15	11	18	14	14	19	15	13	19
Entertaining	14	20	20	17	19	17	22	24	24

 Important Criteria for the ABA Therapists (50% + 1 votes)  
**Comm Def** - Communication Deficiency  
**Comp Def** - Comprehension Deficiency  
**Both Def** - Communication and Comprehension Deficiencies

**Figure 1.** Summary of the Survey Results

By looking at the table, it can be observed that regardless of the learning style, if the child has both communication and comprehension deficiencies, the software should be effective, efficient, have utility, easy to learn, easy to remember, fun and enjoyable, helpful, motivating, and rewarding. We can also see that for a child who has both deficiencies, the software needs to be entertaining if he or she is a visual or kinesthetic learner, and aesthetically pleasing if he or she is only a visual learner. The software must be able to support the creativity of an auditory learner who has a communication deficiency, and of visual and kinesthetic learners who have both deficiencies. What is also noticeable is that being safe, being able to give satisfaction, and emotional fulfillment to the children are not expected of the software.

### 3 Conclusion

Usability and user experience (UX) criteria are important in designing and developing any software. Although the results of the survey are not conclusive, they give the software developer an idea on the criteria to focus on as some criteria are not the priority. Because of the varying learning styles and communication and comprehension deficiencies of the children with HFASD, the software must be designed to be customizable and can help in keeping the children focused during sessions with their therapists. However, it must be emphasized that the software that will be developed should not replace the therapist but will only be used as a tool to enhance the learning of the children.

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## Reaching digital native learners using Kahoot in Earth and Life Science

**Jonalyn G. Poserio**

Ignacio Villamor Senior High School  
poseriojonalyn0011@gmail.com

**Abstract:** The study aimed to compare the effectiveness of using Kahoot between the Academic and Technical Vocation Livelihood (TVL) tracks of the Senior High School learners specifically Accountancy, Business and Management (ABM) and Information Communication Technology (ICT) in Earth and Life Science. The study explored the conceptual understanding of the ABM and ICT strands and determined whether there was a significant difference between their post-test scores in Photosynthesis after using Kahoot in class. Moreover, the researcher also explored the learners' satisfaction and impressions and employed quantitative and qualitative data analysis. The results revealed that there was no significant difference between the post-test scores of ABM and ICT tracks in Photosynthesis after using Kahoot in class. Furthermore, the learners' satisfaction survey indicated that SHS learners enjoyed using Kahoot and found it easy to use. Key findings showed that Kahoot brings excitement and fun, improves learning, and enhances the learning experience of the learners. Overall, the results demonstrated that the incorporation of Kahoot was effective both to the Academic and TVL tracks of the Senior High School learners and enhanced their learning experience in Earth and Life Science.

### 1 Introduction

The kind of learners we have today are no longer the same as the learners we had before. This kind of learners is known as digital native learners. They are exposed and surrounded by various kinds of technology and learn best through their use. They prefer games than the traditional method of teaching (Prensky, 2017). Kahoot is online game-based technology, free and available online. This platform allows the teachers and the learners to create their quizzes and other forms of assessment such as survey, discussion questions, and jumble. Moreover, its gamified environment makes learning enjoyable through its friendly competition. Kahoot provides points for every correct answer depending on how fast the learners are in giving their answers. Kahoot has been found useful in motivating, engaging and improving learning (Licorish, Owen, Daniel & Li George, 2018; Pede, 2017; Plump & LaRosa, 2017). According to Bolkan (2017), Kahoot is a game-based learning platform that allows the teachers to create their preferred learning games or utilize the available games online. The learners can answer games as homework which allow them to practice anywhere, anytime they would like, alone or with others. The study of Bicen and Kocakoyun (2017) revealed that among the gamified applications such as Kahoot, Class Dojo, Classcraft, and Socrative, Kahoot was the most preferred application for gamification by the undergraduate students of Information and Technology. Bicen and Kocakoyun emphasized that "Kahoot would be the learning platform of the future and it should be integrated into the classroom activities" (p. 1). The study of Poserio (2019) found that the integration of Kahoot enhanced the teaching and learning experiences of the Grade Eight teachers and learners in Biology.

Meanwhile, students' attitude and interest were correlated with the students' academic performance in Biology in Senior Secondary High School (Omatade, Funke & Oyewumi, 2016). The study indicates that when the learners are interested in the subject learning can take place. Also, the findings demonstrate a positive correlation between the students' attitude in Biology and their academic performance in Biology.

Photosynthesis is one of the topics in Biology with several alternate conceptions (Lawsin, 2016; Sodervik, Virtanen & Erdmann, 2014). It was ranked second with low conceptual understanding and least mastered competency (Lawsin, 2017). According to Sodervik et al. (2014), college students had misconceptions of photosynthesis similar to younger students. The study of Espinoza (2017) suggested the following strategies in teaching the topic effectively: discussion; watching of educational videos; hands-on activities; and answering of hand-out.

The K-12 program is relatively new to the Philippines and started the school year 2016-2017. The country offers four different tracks in the Senior High School (SHS) curriculum: academic, tech-voc, sports and arts and design. The enrolment data from the Department of Education reported 60.6% of SHS enrollees went to the academic track while around 39% went to the tech-voc track, and 0.5% chosen the sports, arts, and design (Sarmiento & Orale, 2016). According to Sarmiento and Orale, there is a stigma that tech-voc and other courses are poor performing or problematic students.

The present study explored if there was a significant difference between the conceptual understanding of both the academic and tech-voc SHS learners in Earth and Life Science after employing Kahoot. The new SHS curriculum provides little literature especially to the conceptual understanding of the learners across the four tracks in the SHS. The above conditions served as the research gap in the present study to provide knowledge specifically, through the use of Kahoot to the digital native SHS learners: the academic and tech-voc tracks.

### **1.1 Research Questions:**

The purpose of this study was to demonstrate whether there was a significant difference between the conceptual understanding of academic and tech-voc tracks of the Grade 11 SHS students in Earth and Life Science after using Kahoot. Specifically, the study sought to address the following research questions: (1) What is the conceptual understanding of the ABM and ICT learners in Earth and Life Science? (2) Is there a significant difference between the posttest scores of the ABM and ICT learners in Earth and Life Science after using Kahoot? (3) What is the learners' satisfaction after using Kahoot in Earth and Life Science? (4) What are the impressions of the learners after using Kahoot in Biology?

## **2 Methodology**

### **2.1 Research Design**

The purpose of the study was to find out if there was a significant difference between the post-test scores of academic and tech-voc SHS learners in Photosynthesis after using Kahoot. Also, the study aimed to discover the learners' satisfaction and impressions after integrating Kahoot. The research design of the study was a quantitative research design which includes both quantitative and qualitative data. The two kinds of data were analyzed differently to address the different research questions stated in the previous chapter.

### **2.2 Data Source**

The study began on the First Semester of the 2018-2019 school year. The participants were the Accountancy, Business, and Management (ABM) under the academic track and the Information Communication and Technology (ICT) from the tech-voc track of the Senior High School (SHS) students in Manila. The participants were taking Earth and Life Science subject as a core subject in their curriculum.

### **2.3 Data Gathering Procedure**

The study initially started on September 11- October 9, 2018, during the Second Quarter of the said school year. The researcher was also the teacher of the SHS learners in Earth and Life Science class. The ABM and the ICT learners used Kahoot in the review and evaluation phases of the lesson. The teacher asked the learners to go to Kahoot.it, get the game pin, type their team names and wait for the start of the game. Once all the groups in the class are connected, the game would immediately start. The learners were seated collaboratively with their members and used one mobile phone to participate in Kahoot. Initially, the ABM and ICT learners answered a two-tier multiple choice questionnaire in Photosynthesis. After two weeks, they answered the post-test, and Kahoot survey.

#### **2.3.1 Research Instruments**

##### **a. Two-tier multiple-choice questionnaire**

Three content-experts in Biology validated the researcher-made two-tier multiple-choice questionnaire in Photosynthesis. The content-expert validation tool was given to three experts to evaluate the questionnaire, three as the highest and zero as the lowest. The average score and standard deviation were determined in each criterion. The Grade 11 ABM and ICT learners answered the two-tier multiple in which served as the pretest and posttest.

**b. Kahoot Survey**

The Kahoot survey was adapted and modified from the study of Pede (2017). The ABM and ICT learners answered the survey after the implementation of Kahoot in Earth and Life Science. The survey measured their satisfaction with the use of Kahoot and also provided qualitative data regarding their impression with its use. The term impression was limited to how the learners perceived or viewed the integration of Kahoot cognitively.

**2.4 Data analysis**

**2.4.1 Quantitative Data**

To analyze the collected data in the first research question, what are the conceptual understanding of the ABM and ICT learners after using Kahoot in Earth and Life Science class? The researcher used mean and standard deviation as statistical tools and the t-test to test the hypothesis of the study. Meanwhile, the Likert scale was used to interpret and analyze the learners' satisfaction after using Kahoot in Earth and Life Science class. Table 1 shows the options, range, and interpretation.

**Table 1.** Likert Scale options and its verbal interpretation

<b>Options</b>	<b>Range</b>	<b>Verbal Interpretation</b>
5	4.50 - 5.00	Strongly agree
4	3.50 - 4.49	Agree
3	2.50 - 3.49	Undecided
2	1.50 -2.49	Disagree
1	1.00-1.49	Strongly Disagree

**2.4.2 Qualitative Data**

The qualitative data consisted of the ABM and ICT learners' views after using Kahoot. The study followed a step-by-step process of qualitative data analysis. The researcher made initial coding or open coding in organizing the vast amounts of data. The second step was coding which refers to the process of making notations next to the bit of data which struck the researcher with the potentially relevant answers based on the purpose of the study coding allowed the researcher to categorize the focus of the data further. The next step was axial coding which led the researcher to define categories further.

**2.5 Ethical Considerations**

For the implementation of the study, the researcher observed ethical considerations and emphasized the potential ethical issues that this study interferes. The researcher discussed the assent form to the learners showing a detailed description of the study. The researcher communicated to the participants that their participation was voluntary, and they could withdraw from the study anytime for any reason. The learners read and signed the assent form after the said session.

**3. Results and Discussion**

The study sheds light upon the incorporation of Kahoot to the academic and tech-voc tracks of SHS in Earth and Life Science. The study provides both qualitative and quantitative data gathered from the researcher-made and adapted research instruments.

**Table 2:** Conceptual understanding of ABM and ICT learners

Groups	Number of Students	$\mu$	$\Sigma$
ABM	26	5.58	1.70
ICT	26	5.35	1.06

Table 2 shows the conceptual understanding of ABM and ICT learners in Photosynthesis. Data exhibit that the average means and standard deviation scores of ABM and ICT learners in Photosynthesis are close to each other. This indicates that the nature of the learning ability of the two different tracks: academic and tech-voc SHS learner is homogenous. Although there was a slight difference in scores, the researcher did not presume that one group has higher learning ability than the other group.

**Table 3.** Difference between ABM and ICT after incorporating Kahoot

Group	Mean	Std. Deviation	t value	sig.	Decision	Interpretation
ABM	11.27	3.08	0.910	0.067	Accept Ho	Not Significant
ICT	10.62	1.98				

Note. The maximum score is 20.

Table 3 reveals the difference between the mean scores of the ABM and ICT learners in Photosynthesis after incorporating Kahoot in Earth and Life Science class. The results show that the computed p-value of 0.067 is higher than the significance level of 0.05. Hence, the null hypothesis was accepted. Thus, there was no significant difference between the posttest scores of the ABM and ICT learners. The findings reveal that Kahoot can be incorporated into the SHS learners in Earth and Life Science classroom whether academic or tech-voc tracks. Also, the findings suggest that the SHS tracks may not be a factor whether to use Kahoot or not in the Science classroom. Therefore, teachers of both academic and tech-voc tracks may utilize game-based technology like Kahoot to their digital native learners in Earth and Life Science.

**Table 4.** Learners' Satisfaction using Kahoot in Earth and Life Science

Statements	ABM		ICT	
	Weighted mean	Interpretation	Weighted mean	Interpretation
1. I found Kahoot easy to use.	4.46	Agree	4.70	Strongly agree
2. I enjoyed using Kahoot.	4.81	Strongly agree	4.78	Strongly agree
3. I would like to use the Kahoot game in other classes or settings to help me study.	4.27	Agree	4.26	Agree
4. I am prepared for tests and quizzes after using Kahoot.	4.04	Agree	4.37	Agree
5. I would like to share this technology with friends and other students.	4.42	Agree	4.25	Agree
<b>Overall mean</b>	<b>4.40</b>	<b>Agree</b>	<b>4.47</b>	<b>Agree</b>

Table 4 demonstrates that ABM learners agreed that Kahoot was easy to use, while the ICT learners strongly agreed to it. Both the ABM and ICT learners strongly agreed that using Kahoot in Earth and Life Science was enjoyable. Meanwhile, the two tracks yielded similar results wherein both only agreed that they preferred to use Kahoot in other classes, perceived that they are prepared for the exam after using Kahoot and would share the technology to others. Overall, with the weighted mean of 4.44, the ABM and ICT tracks were satisfied with the utilization of Kahoot in Earth and Life Science.

**Table 5.** Summary of the Learners' Impressions after using Kahoot

ABM	ICT	Interpretation
<b>Exciting, fun, and enjoyable</b> makes students active, exciting and easy to use, interesting and enjoyable	<b>Enjoyable and easy to use</b> enjoyable and fun, exciting and enjoyable, enjoyable and helpful in learning, fun, makes the students alive	The ABM and ICT learners perceived that the use of Kahoot was exciting, fun, and enjoyable. Moreover, ICT learners pointed out the ease of using Kahoot in the classroom.
<b>Improves learning</b> Increases knowledge, lessons become easier, tests the learners, challenging, beneficial for teachers and students, builds unity	<b>Students learn easily</b> Enhances students' knowledge, helpful in the study, activates brain cells, fun while studying	The ABM and ICT learners viewed Kahoot as a useful and effective platform to improve their learning in the subject.

	<b>Motivating</b> Students cooperate, fun while studying, enjoyable class	The ICT learners found the use of Kahoot motivating as their learning experiences become fun and enjoyable
<b>Interesting app</b> useful, has a time limit, gives unique activity, intense, provides hard quiz	<b>Needs phone and Internet</b> time-consuming needs Internet	The ABM learners viewed Kahoot as a useful application, on the other hand, the ICT learners pointed out the needs of the mobile phone and the Internet for them to use Kahoot in the class.

Table 5 exhibits the ABM and ICT learners' impressions after using Kahoot. Both the ABM and ICT learners yielded positive views regarding the integration of Kahoot in Earth and Life Science class. They viewed Kahoot as an effective and useful application in learning the subject. Also, their impressions supported their satisfaction in using Kahoot in the subject wherein the learners enjoyed and had fun using it. The literature supports the result of how Kahoot enriched the learners' engagement, motivation, and the teaching and learning process (Licorish et al., 2018; Pede, 2017; Poserio, 2019).

Despite the advantages reported in this study, some learners from the ICT class expressed the challenges they perceived when using the technology. The ICT class noted that the use of Kahoot was time-consuming, required mobile phones, and the Internet. The need for the Internet connection was also the disadvantage mentioned in the literature (Cutri et al., n.d.). The study of Poserio (2019) supported the notion that the Internet and mobile phones are needed when using Kahoot in the classroom. Moreover, one prevalent difficulty encountered from the study of Poserio was the poor Internet connection which was not reported by the ABM and ICT learners. The said problem was not encountered since both ABM and ICT learners had access to the Internet using their mobile phones.

**4. Conclusions**

Based on the results presented in the previous chapter the following conclusions are deduced:

- (1) the use of technology can enhance the conceptual understanding of both the academic and tech-voc SHS learners in Science;
- (2) the teachers of the SHS curriculum may integrate technology in the classroom regardless of the tracks of their learners;
- (3) the use of game-based technology like Kahoot can yield positive and negative impressions to the learners which may affect their motivation and learning experiences in the subject.

#### 4.1 Recommendations

The following recommendations are made based on the results of the study:

- (1) use Kahoot to a more diverse population in the Senior High School curriculum
- (2) explore the incorporation of other game-based technology to the SHS learners
- (3) compare the motivation, engagement, and scientific literacy of the learners after integrating Kahoot in the lesson.

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## Effectiveness of SIM (Strategic Intervention Materials) in Improving Competency among Grade 5 Pupils of Valeriano E. Fugoso Memorial School

**Marites B. Halcon**

Valeriano E. Fugoso Memorial School, Manila

[marites.halcon001@deped.gov.ph](mailto:marites.halcon001@deped.gov.ph)

**Abstract.** Instructional scaffolding is the support given during the learning process which is tailored to the needs of the pupils with the intention of helping pupils achieves his/her learning goals. Once pupils have done the work that they needed the scaffolds for, these can be removed. Just like the Strategic Intervention Materials (SIM), these supports are temporary and adjustable. As learners master the assigned tasks, the supports are gradually removed. SIM have been known to improve the performance level in various schools and learning areas. Various studies have proven this claim and various SIM have been prepared for different learning areas and competencies. Some of these materials, however, are not fitted for the type of learners in the locality. Hence, this research aims to determine the effectiveness of the Intervention Material that used scaffold in teaching science among the fifth graders. The statistical treatments used in the study are weighted mean and t-test. Based on the data gathered, the mean gained by experimental group is higher than the mean gained by the control group. The computed t-value showed that there is significant difference between the mean of two groups. Therefore, the strategic intervention materials are an effective way of improving pupils' competence.

### 1 Introduction

Science is an important part of the foundation for education for all children (Jessica Cook, eHow). According to the Basic Education Curriculum Primer 2002, Science and Health aims to help the Filipino children gain a functional understanding of science concepts and principles linked with real life situations, acquire science skills as well as scientific attitudes and values needed in solving everyday problems. However, pupils' performance in the National Achievement Test shows that Science continues to be the most difficult field of study in basic education. The results are intended to guide the Department of Education its efforts towards the improvement of quality education in public schools and to provide appropriate intervention for the pupils.

Moreover, fifth graders find it hard to organize and understand each skill due to the learning gap. Pupils are too immature for the content of the four learning areas in science due to the content that they had learned in their previous levels. Pupils lack deeper understanding of the given skills. Although the pupils' materials are cleared and easy to understand, pupils are having hard time in the skills and it was found out in the study of Javier (2013), that the science skills and competencies that were expected to the pupils are not on the highest level. This embarks the researcher to make strategic intervention materials that will help improve pupils' competency using scaffolding strategy.

### **1.1 Statement of the Problem**

This action research aimed to improve pupils' competency using Strategic Intervention Materials in Science that will enhance teaching-learning process using scaffolding strategy. Specifically, it attempted to answer the following questions:

1. Is the strategic intervention material that used scaffolding instruction effective in improving pupils' competency?
2. Is there significant difference between the mean of experimental and control group?

### **1.2 Brief Review of Related Literature**

Hill and Hannifin (2001) categorize four types of scaffolds; conceptual, metacognitive, procedural and strategic scaffolds. Conceptual scaffolds could be maps, outlines and clarifying examples which support the learners to make choices about the selection or to prioritize what is important information. Metacognitive scaffolds may include reminders to reflect on the goal or a cognitive model, which helps the learners to focus on the target or to estimate what he/she knows and what to do next in the learning process. Procedural scaffolds could be textual, charts, graphic representations, site navigation maps or instructions about the working procedure which will help the learner to value resources and at the same time reduce the cognitive load in the procedure of navigation. Strategic scaffolds may include suggestions for alternative approaches to tackle a task that helps the learner to develop an alternative perspective of an issue. Two categories which Hill and Hannafin don't include are the affective and the technical scaffolds which are found in Master's and Yelland's research (2002). The affective scaffolding can consist of encouragement and praise. The technical scaffolding includes technical instruction and technical recovery in a form of prompts or guiding questions to recover a technical mistake.

Scaffolding can be seen as the support a teacher offers to move the learner toward his/her potential understanding (Wood et al. 1976). According to Barredo (2010) intervention materials help teachers provide the learners the needed support to make progress. It increases and deepens their skills, knowledge and understanding from one concrete science to what is abstract. It gives the learners the opportunity to explore their understanding and make sense of new scientific ideas.

### **1.3 Synthesis**

Learners need support to engage in and understand scientific practices. The science process can be complex for pupils because of its multi-faceted nature which includes a range of concepts, many of which will be new to fifth grader pupils. Therefore, pupils need a range of support to help them manage, navigate, and understand individual process activities and the overall process as a whole. Scaffolding features can support learners in managing their scientific inquiry in several ways. Aside from describing the nature of tasks, SIM can also support pupils by embedding expert guidance about scientific practices to illustrate the purpose of different science terms. Such support can

make the rationale for different science activities explicit to pupils so they can decide on their next steps at different points in the learning process. On the other hand, Barredo enumerated the importance of intervention materials in improving learners' competence.

**1.4 Theoretical Framework**

In general, the researcher takes a socio-cognitive perspective to scaffolding that incorporates a range of ideas about supporting learners to engage in complex practices. As a theoretical basis, researcher uses the traditional notion of scaffolding put forth by Wood, Bruner, and Ross (1975) and draw further from cognitive apprenticeship models (Collin, Brown, & Newman, 1989) and other models of cognition (e.g., Anderson, 1983) to describe the types and nature of assistance that can be provided to learners. The researcher also considers social constructivism (Vygotsky, 1978) and situated cognition (Lave & Wenger, 1991) to further elaborate on the contextual and social aspects of learning and how they impact the timing and sources of scaffolding. These diverse theoretical ideas provide a general foundation for scaffolding that can be applied in a range of contexts. The key ideas that emerge include the identification of specific difficulties that learners encounter as they attempt to engage in a given practice, the provision of assistance to the learners by a more capable agent or agents, the potential for multiple agents in a social setting to provide different types of support to the learner, and the notion that this assistance is temporary and should "fade" away as the novice becomes more capable and no longer requires the support.

**1.5 Conceptual Framework**

While the traditional concept of scaffolding involves support as provided by a human agent, the notion of scaffolding has also been extended to Strategic Intervention Materials (SIM), where the SIM itself acts as the more capable agent or the independent variable that is supporting the learner. The researcher introduced the notion of SIM-realized scaffolding by illustrating how some conceptual aspects of scaffolding could be implemented in SIM. In particular, focused on how SIM could implement different scaffolding techniques to model tasks, provide coaching, and elicit articulation. As the learner's abilities increase the scaffolding provided by the more knowledgeable other is progressively withdrawn. Finally, the learner is able to complete the task or master the concepts independently. Therefore, the goal of the educator when using the scaffolding teaching strategy is for the learners to become an independent and self-regulating learner and problem solver.

Independent Variable

Intervention Materials

Dependent Variable

Competent Learners

## 2 Methodology

The researcher used design-based research (cf. Barab & Squire, 2004) and subsequently evaluated data collected in this project to answer the two aforementioned research questions. It used single group with pre-test and post-test design. In this design, the experimental group is exposed to the intervention materials using scaffold strategy. It was validated by Mrs. Arlen S. Gatpo, Public Schools Division Supervisor (PSDS) and the VEFMS teachers. Before the start of the experiment the experimental and control group will be given pre-test, then after the experiment period they will be given post-test. The scores will be analyzed after the post-test.

### 2.1 Subject of the Study

This study was conducted in Valeriano E. Fugoso Memorial School. It utilized 180 Grade V pupils of the school year 2018-2019.

### 2.2 Population and Sampling

Purposive sampling is used in this study.

### 2.3 Instrument

The SIM is used in teaching Science in Grade Five which designed to help teachers provide the pupils needed support. To identify if it will help improve the learners' competency, the experimental group used the intervention materials while the control group used the learner's material given by the Department of Education. Likewise, a pre-test was administered to both groups of respondents before the experiment and a post-test after the end of the lesson. Both pre-test and post-test given to the experimental and control group were the same.

### 2.4 Data Collection

The score of each group was collected and their weighted mean was computed. The mean of each group were compared using t-test. The data were collected using the pre-test and pot-test of the two groups (experimental and control group). The experimental group was exposed to the intervention materials. The scores of pre-test and post-test were collected and analyzed.

### 2.5 Statistical Treatment

**Table 1.** Pre-Test and Post-Test Results of the Experimental & Control Group

Score Bracket	Control Group				Experimental Group			
	Pre-Test		Post-Test		Pre-Test		Post-Test	
	F	%	F	%	F	%	F	%
38-50	0	0	0	0	0	0	10	11.11
25-37	11	12.22	27	30	0	0	73	81.11
Below 25	79	87.78	63	70	90	100	7	7.78

Total	90	100	90	100	90	100	90	100
Mean	18.63		21.77		14.57		30.10	
SD	5.40		5.50		4.17		5.57	
MPS	37.26		43.54		29.14		60.02	

The statistical treatment used in this research was weighted mean and t-test. The formula for T-test is

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}}}$$

Where:  $t$  is the t-value  
 $\bar{x}_1$  is the mean of the first group  
 $\bar{x}_2$  is the mean of the second group  
 $s_1^2$  is the variance of the first group  
 $s_2^2$  is the variance of the second group  
 $n$  is the number of the population of the group

$$\bar{x} = \frac{\sum_{i=1}^n x}{n}$$

= sum of all values of variable x, and n = number

The formula for the weighted m  
 Where  $\bar{x}$ = sample mean, of respondents.

### 2.6 Intervention Procedures

The proponent of this action research used the intervention material that is composed of different activities of the topic presented in the learner’s manual that were given by the Department of Education.

The experimental group used the intervention materials that involve activities and worksheet that used scaffold. It was constructed by the researcher, some were from the internet and modified by the researcher so that it used scaffolding strategy. Before the intervention the control group and experimental group were given 50 items test. Their score determined their level of performance.

Both the experimental and control group was given the same quizzes and long test. After finishing all the lessons and topics, they were given post-test that was computed to determine their academic progress.

Scores on the pre-test and post-test of grade five pupils will serve as the basis in determining the effectiveness of the SIM in increasing their performance level. The researcher was ascertained suggestions, improvements and recommendations to improve the quality of teaching Science.

### 2.7 Results and Discussions

The table shows that the weighted mean of 37.26 of the control group was higher than the mean of experimental group which is 29.14 during the pre-test while during the post-

test the mean of experimental group increases and became 60.02 which is greater than the mean of control group which is 43.54. The mean gain of the experimental group is very high compare to the mean of control group.

**Table 2.** T-test for Significance Differences

Group	Mean	SD	T-values		Interpretation	Decision
			Computed	Critical Value		
Control	21.77	5.50			$p < 0.05$ (df = 58)	Reject
Experimental	30.10	5.57	10.16	1.671	Significant	Ho

Based on the table presented above the t-ratio is 10.16 which is higher than the critical value of 1.671 which means that there is a significant difference between the mean of control and experimental group.

### 3. Conclusion

The null hypothesis that the intervention material is not effective in improving the pupils' competence is rejected because based on the result; the weighted mean shows that the mean of experimental group is higher compared to the control group. The mean gained of experimental group is higher than the mean gain of the control group. The computed t-ratio shows that there is a significant difference between the mean of two groups. Therefore, the intervention materials that used scaffolding technique are an effective way of improving pupils' competence in Science.

Research on scaffolding continues to uncover a variety of approaches that different agents can employ to support learners as they engage in complex intellectual practices. Traditional views of scaffolding that focus on human interventions to support learners now encompass an additional focus on SIM interventions that scaffold learners in similar ways. In this paper, the researcher has focused on scaffolding features for SIM that scaffold learners with science practices in classroom settings. SIM can actually play a dual role to connect the human and SIM aspects of scaffolding. Certainly the SIM is providing a direct scaffolding function for those pupils. However, the SIM is also indirectly supporting pupils by directly helping teachers strengthen their teaching practices to essentially become a more effective human scaffolding agent. An interesting research direction would be consider scaffolding in other contexts and content areas for both pupils and teachers to uncover similarities and differences in both the conceptual scaffolding approaches and the manner in which those approaches can be implemented in SIM.

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## Problem-Based Learning Module in the Conservation of Ecosystem

**Gary Z. Regala**

Division of City Schools, Manila

[garyregala@yahoo.com](mailto:garyregala@yahoo.com)

**Abstract.** Effective teaching method has been an increasing concern to improve the performance of the learners. As such, an action research about problem-based learning module in the conservation of ecosystem was used to assess the ability of the learners to analyze and solve the environmental issues and concerns of ecosystem. One sample quasi-experimental design was used among one hundred sixty-one (161) student participants from the Division of City Schools of Manila. The study revealed that students' engagement with the problem-based learning module enhances students' learning based on pretest mean score of 5.78 to post-test mean score of 7.09 with the p-value of  $< 0.001$  means that there is a significant difference between the pretest and post-test performance of the students. This agrees with the previous indication that the students did better in their post-test than in pretest. The results of the post-test scores were significantly higher than the pretest scores of the students with t-value of -29.04 and df of 160. This showed that PBL is an effective teaching and learning approach, particularly when it is evaluated for situational environmental issues. A proposed problem-based learning module was developed to strengthen the performance of the learners.

### 1 Introduction

Today's teaching method has been the increasing concern to improve the performance of the learners. The content of the curriculum needs to elaborate further to the extent that the learners must have the skills to incorporate the concepts learned to the current based situation of the environment. Environmental issues must be fully understood by the learners based on the contextualization of current environmental trends. As such, the researcher conducted action research about problem-based learning module in the conservation of ecosystem to improve learning outcomes. Problem-Based Learning Module (PBL) was used to assess the ability of the learners to analyze and solve the environmental issues and concerns of the ecosystem.

For this reason, the researcher contemplates a problem-based learning module in the conservation of ecosystem to improve learning outcomes of the learners. This specifically aimed to determine the effect of problem-based learning module on the performance of the learners.

This study focused to improve learning outcomes by using problem-based learning module in the conservation of ecosystem. Thus, help teachers make their classroom instruction more engaging for students through contextualization and developing real world connection, collaboration and teamwork in the classroom. It will help teachers think about new classroom instructions relevant to students' needs. Students can take

more responsibility for their own learning while teachers can focus on building critical skills appropriate for their classrooms.

## **2 Review of Related Literature**

Problem-Based Learning (PBL) is a pedagogical approach that allows students to learn while fetching actively with meaningful problems. (E.H.J. Yew, K. Goh, 2016) Students are given the opportunities to problem-solve in a collaborative setting, create mental models for learning, and form self-directed learning habits through practice and reflection. Hence, the underpinning philosophy of PBL is that learning can be considered a “constructive, self-directed, collaborative and contextual” activity. The principle of constructivism positions students as active knowledge seekers and co-creators who organize new relevant experiences into personal mental representations or schemata with the help of prior knowledge. This is further reinforced by social theories of learning that postulate the merits of social interaction in cognitive development. PBL can encourage the development of critical thinking skills, problem-solving abilities, and communication skills. It can also provide opportunities for working in groups, finding and evaluating research materials, and life-long learning (Duch et al, 2001).

In 1960's the PBL process was started by Barrows and Tamblyn at the medical school program at McMaster University in Hamilton . This was first introduced to used by dissatisfied students of the traditional medical education, who could not see the relevance to the vast amount of material kin the practice of medicine and clinically based medicine. The PBL curriculum was developed in order to stimulate learning by allowing students to see the relevance and application to future roles. It maintains a higher level of motivation towards learning, and shows the importance of responsible, professional attitudes with teamwork values. The motivation for learning drives interest because it allows for selection of problems that have real-world application.

The majority of studies on the effectiveness of PBL have focused on the field of medicine. Studying the effect of PBL in applied domains and professional education also offers new perspectives on its influence on student learning outcomes. The field of nursing education has devoted a substantial amount of research to exploring the effectiveness of PBL in healthcare training in order to prepare nursing professionals for a growing range of patient care services. A meta-analysis of studies related to the effectiveness of PBL in nursing education revealed that PBL has positive effects on student satisfaction with training, clinical education and skills development.

Researchers say that students like problem-based learning classes rather than the traditional classes. The increase in the percentage of attendance of students and their attitude towards this approach itself makes it very clear that they are self-motivated. (Vernon, D. T.; Blake, R. L., 1993).

## **3 Methodology**

The descriptive type of research in this study using one sample quasi-experimental design was used among one hundred sixty-one (161) student participants from the Division of City Schools of Manila during the Division Science and Environmental Camp 2018. The

pretest and post-test were administered, and results have been interpreted based on the effectiveness of problem-based learning module before and after the exposure.

In the analysis of data, descriptive statistics was used to describe the distribution of data. Inferential statistics was also used, specifically, paired samples *t* test to identify any significant difference in the pretest and post-test scores within the group.

Prior to the evaluation, the researcher conducted series of consultation from specialist in Science for the validity of problem-based learning module.

#### 4 Results and Discussion

The study revealed that students' engagement with the problem-based learning module enhances students' learning based on the pretest and post test score of students.

Table 1. The Mean Difference between the Pre-test and Post-test Scores of Students under Problem Based Learning Module

Group	N	Mean	Std. Deviation	Mean Difference
Pre-test	161	5.78	2.09	1.31
Post-test	161	7.09	2.27	

Based on table 1, the mean score value of the post test is 7.09 which is higher than the pre-test with the mean score 5.78 after being taught using problem-based learning module in the conservation of ecosystem. The mean difference of 1.31 which implies that teaching the students through a problem or situational instruction can improve students' achievement in Science. We can infer that the study revealed that students' engagement with the problem-based learning module enhances students' learning based can improve students' achievement and develop collaborative skills thru problem-based activities.

A pictorial representation of the students' pre-test and post-test scores is also shown in Figure 1.

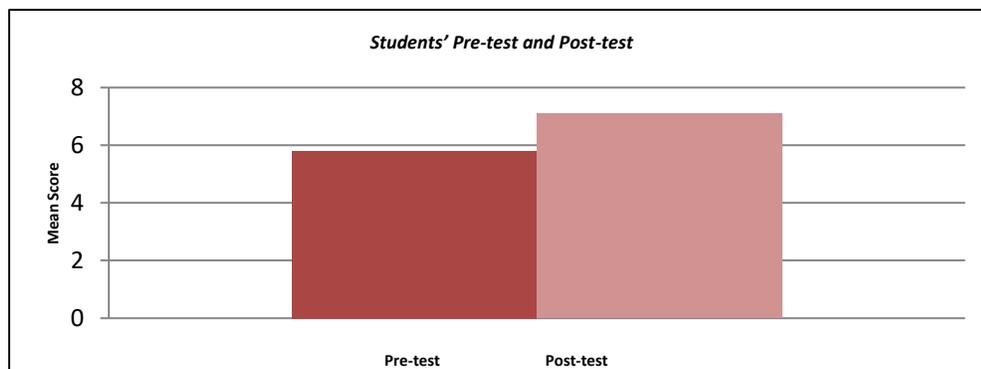


Figure 1: Histogram analysis of mean score between pre-test and post-test using problem-based learning

Figure 1 shows that the students' mean score on the Post Test have significantly increase with the Mean difference of 1.31.

The table 2 shows the comparison of pre-test and post-test scores of students under problem-based learning module.

**Table 2.** Paired sample *t* test Analysis of the Pre-Post of Students under Problem Based Learning Module

Variable	N	Mean	Std. Deviation	t-value	df	p-value
Pre-test	161	5.78	4.29	-29.04	160	<.001*
Post-test	161	7.09	4.56			

\* = significant at  $\alpha = 0.05$

The study revealed that students' engagement with the problem-based learning module enhances students' learning based on pre-test mean score of 5.78 to post-test mean score of 7.09 with the p-value of < 0.001 means that there is a significant difference between the pre-test and post test performance of the pupils. This agrees with the previous indication that the students did better in their post-test than in pre-test. The results of the post-test scores were significantly higher than the pre-test scores of the pupils with t-value of -29.04 and df of 160. This showed that PBL is an effective teaching and learning approach, particularly when it is evaluated for situational environmental issues.

## 5 Summary, Conclusions and Recommendations

### 5.1 Summary of Findings

The main concern of this study is to improve learning outcomes by using problem-based learning module in the conservation of ecosystem.

The significant findings of the study are as follows:

1. The performance of the learners before the exposure to the problem-based learning module is 5.78 mean score value and with the standard deviation of 2.09.
2. The performance of the learners before the exposure to the problem-based learning module is 7.09 mean score value and with the standard deviation of 2.27. The Mean difference of 1.31 which implies that teaching the students through a problem or situational instruction can improve students' achievement in Science.
3. The performance of the learners after the exposure to the problem-based learning module was 7.09 which were significantly higher than the pre-test with the mean score of 5.78 after being taught using problem-based learning module in the conservation of ecosystem. The results of the post-test scores were significantly higher than the pre-test scores of the pupils with t-value of -29.04 and df of 160. Since the *p-value* is 0.001

is less than 0.05, then reject the null hypothesis and there is a significant difference between the pre-test and post-test of the Students under Problem Based Learning Module.

## **5.2 Conclusions**

Based on the findings in this investigation, the following conclusions were drawn:

1. The studies showed that PBL is an effective teaching and learning approach, particularly when it is evaluated for situational environmental issues. The components of the PBL process influence students' learning that begins with problem analysis, followed by learner-centered activities and a subsequent reporting phase is important to predict students' qualitative learning.
2. The study revealed that student engagement with the problem-based learning module was sufficient to enhance students' learning gains over the regular approach and the problem-based activities made a greater mean difference to student learning process.
3. There is a strong indication that the performance of the students was increased after exposure to the problem-based learning module. There is a significant difference between the pre-test and post-test of the students that undergo intervention.
4. A proposed problem-based learning module was developed to strengthen the performance of the learners.

## **5.3 Recommendations**

Considering the findings and conclusions, the following strongly recommended:

1. There is a need to improve the performance of the learners using the problem-based learning module.
2. More rigorous experimental studies therefore need to be carried out to further uncover the mechanisms behind how PBL works.
3. The researcher highly recommends the adoption of problem-based learning module in the conservation of ecosystem to improve students' capability to understand and analyze environmental issues and concerns.

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## Electronic Strategic Intervention Materials (e-SIMs) in Chemistry for Grade 9 Students

Maejen Clovelle T. Ebojo<sup>1</sup>, Katya Amelia A. Valido, Juvelyn A. Raguini, Erika Joyce A. De Ramos, Esralyn P. Ignacio, Crisdane R. Alicante, & Joey-Nell T. Marzan

University of Northern Philippines, Ilocos Sur  
[maejenclovelle@gmail.com](mailto:maejenclovelle@gmail.com)<sup>1</sup>

**Abstract.** This study is anchored on the significant role of teachers in facilitating low performing students in meeting the necessary learning competencies as prescribed by the science curriculum. Thus, the conceptualization of electronic strategic intervention materials (e-SIMs) in chemistry for grade 9 students. Specifically, this study aimed to develop and validate e-SIMs through research and development methodology. It involved three phases namely planning phase, development phase, and validation phase. The planning phase involved conduct of achievement test which served as the basis in developing the e-SIMS. Strategic intervention materials were developed by the researchers and later on, put into its electronic form in collaboration with an IT specialist. In the validation phase, the e-SIMS were evaluated by a pool of experts in science education, and it was field-tested to grade 9 students. The e-SIMs were found to be valid and effective in improving students' performance in chemistry. Thus, it is recommended for use.

### 1 Introduction

#### 1.1 Background of the Study

Several reports have shown low performance in science among Filipino in the past years (Dacumos, 2016; Salviejo, Aranes & Espinosa A. 2014; Jalmasco, 2013). This issue on low performance continuously alarms stakeholders of education (Bichi, Hafiz & Abdullahi, 2017) and in response to these notable changes in the curriculum were brought in the implementation of the new curriculum.

On a specific note, the Department of Education as shown in the DepEd Order No. 39, s. 2012 promotes the use of interventions to address learning gaps. The purpose of strategic intervention material (SIM) is highly suggested to address the deteriorating students' academic performance in science. According to Dacumos (2016), SIM increases academic achievement by helping students to master least mastered competencies during regular classes. Thus it serves as a tool to re-educate students (Bunagan, 2012). SIM has found to be effective in improving students' performance on least mastered competencies most specially to slow learners (Ramos, 2016).

On the other hand, ICT has been recognized as a potential tool in the teaching and learning process (Copriady, 2014). Lorenzo (2016) stated that ICT is a milestone in the Philippine educational system due to the opportunities and benefits it could bring both to the teachers and students. Several studies have shown that students have better scores with ICT, and increase achievements with ICT (Delen & Bulut,2011).

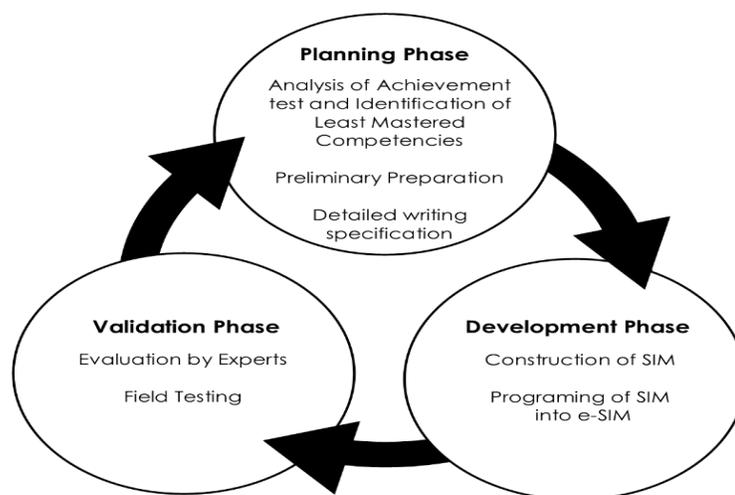
With these, the researchers were urged to investigate the performance of high school students and respond accordingly to arrive with solutions anchored on well-designed electronic strategic intervention material to ensure quality education.

**1.2 Objectives**

This study aimed to develop and validate electronic strategic intervention materials in chemistry (e-SIMs) for grade 9 students based on least mastered competencies. Specifically, it sought to answer the following questions:

1. What are the least mastered competencies of students in Grade 9 Chemistry particularly in carbon compounds?
2. What is the assessment of the group of evaluators on the electronic strategic intervention materials (e-SIMs) in Chemistry for Grade 9 students in terms of SIM characteristics and non – print characteristics?
3. What are the pretest performance and post-test performance of the students exposed to e-SIMs?
4. Is there a significant difference between the pretest performance and the post-test performance of the students exposed to e-SIMs?

**2 Methodology**



**Figure 1.** The Research and Development Methodology

This section presents the research design, locale, and population of the study, research instruments, and research procedure.

## **2.1 Research Design**

This study is employed to research and development methodology to arrive with e-SIMs in Chemistry for grade 9 students. It specifically used one group pretest-post-test design to determine the effectiveness of the e-SIMs in improving student's performance on least mastered competencies.

## **2.2 Locale and Population of the Study**

This study was conducted at Manzante National High School, Manzante, Magsingal, Ilocos Sur. Three groups of population were considered in the study. In the achievement test, the whole Grade 9 students of Manzante National High School served as the respondents. On the other hand, three experts in the field of Chemistry Education evaluated the e-SIMs in terms of SIM characteristics and non-print instructional material characteristics. The criteria used in selecting the evaluators include 1) holder of professional teacher license, 2) holder of master's degree in Chemistry teaching or related field, and 3) experience in high school teaching. Lastly, in the field-testing 10 selected randomly Grade 9 students of Manzante National High School who scored below the mastery level served as the student-respondents.

## **2.3 Research Instrument**

In gathering the data necessary for the study, a teacher-made test and validation checklists were used. The teacher-made test is a 20-item test which was subjected to content validity and reliability (KR 20= 0.85). These items were used in the achievement test and pretest/posttest. On the other hand, two prescribed checklists of the Department of Education were used to evaluate the characteristics of the e-SIMs. The first checklists evaluate the e-Sim in terms of SIM Characteristics which includes Guide card, Activity card, Assessment card, Enrichment card, and Reference card, while the other checklist was used to evaluate the Non – Print Instructional Material Characteristics in terms of Content Quality, Instructional Quality, Technical Quality, and Absence of Errors.

## **2.4 Procedure**

The following stages facilitated the researchers in the development and validation of e-SIMs:

### **Phase 1: Planning Phase**

This stage involved the conduct of achievement test. The result was statistically analyzed using mean to identify the least mastered competencies which then served as the basis in designing e-SIMs. After which intensive review of books and reading of additional

literature related to the identified least mastered competencies followed. Lastly, the identification of the process flow in the construction of e-SIMs was made.

### Phase 2: Development Phase

This stage involved designing of SIMs and the construction of e-SIMs. The researchers were facilitated by SIM objectives and SIM Characteristics. After the SIM was constructed, the IT member of the research team programmed the SIM to arrive with the e-SIMs cell phone application.

### Phase 3: Validation Phase

In the validation of the e-SIMs, experts assessed the e-SIMs in terms of strategic intervention material characteristics and non-print instructional characteristics. The result of the validation was analyzed using mean and Aiken's V. After which, it was followed by field testing. In the field testing, students took the pretest first followed by the use of the developed e-SIMs as intervention, and after their exposure to e-SIMs, a posttest was given. The result was statistically analyzed using frequency, mean, and t-test.

## 3 Results and Discussion

### 3.1 Student's Achievement in Chemistry

Table 1 presents a summary of the achievement test result. The table reveals that the overall level of performance of the students in Grade 9 Chemistry particularly in carbon compounds was at a "Fairly Satisfactory" level. Cantil (2018) also found out that students display least mastered competencies in science. This finding is also in consonance with the reports cited by Dacumos (2016), Espinosa (2014) and Jalmasco (2013).

The performance of the students in the two learning competencies under carbon compounds fall under "Fairly Satisfactory" level, which means to say that these competencies were least mastered and therefore an intervention program has to be implemented to address this. Thus, e-SIMs were developed as tools to improve students' performance especially to those who are performing low.

**Table 1.** Achievement Test Result

<b>Learning Competencies</b>	<b>Mean</b>	<b>Descriptive Rating</b>
A. Explain how the structure of the carbon atom affects the type of bonds it form.	3.37	Fairly Satisfactory
B. Recognize the general classes and uses of organic compounds, and	2.67	Fairly Satisfactory
C. As a whole?	6.04	Fairly Satisfactory

### 3.2 Result of the Validators' Evaluation on e-SIMs Characteristics

Table 2 and 3 show the assessment of the evaluators on e-SIMs. Table 3 shows that the developed e-SIMs present a very satisfactory rating in terms of SIM characteristics, while table 4 also shows that the developed e-SIMs display very satisfactory rating in terms of Non-Print Characteristics.

**Table 2.** A Result of Evaluation of the SIM Characteristics of e-SIMs

<b>SIM Characteristics</b>	<b>Mean</b>	<b>Descriptive Rating</b>	<b>Aiken's V</b>
Guide Card	5.00	Very Satisfactory	1.00
Activity Card	4.85	Very Satisfactory	0.96
Assessment Card	5.00	Very Satisfactory	1.00
Enrichment Card	4.92	Very Satisfactory	0.98
Reference Card	4.83	Very Satisfactory	0.96
Overall	4.92	Very Satisfactory	0.98

To further identify the extent of validity of the developed e-SIMs, Aiken's V for each category was computed. Aiken's V with 0.80 indicates good content validity of the measure (Kowsalya et al. 2012). The calculated values show that the e-SIMs are valid in terms of SIM characteristics and non-print characteristics as implied on the V-value of each category which is all higher than 0.80. It is also good to note that some of the categories have a V-value equal to 1.0 which means that the evaluators have selected the highest possible rating in these categories.

**Table 3.** A Result of Evaluation of the Non-Print Characteristics of e-SIMs

<b>Non-Print Characteristics</b>	<b>Mean</b>	<b>Descriptive Rating</b>	<b>Aiken's V</b>
Content Quality	3.97	Very Satisfactory	0.99
Instructional Quality	3.97	Very Satisfactory	0.99
Technical Quality	3.94	Very Satisfactory	0.98
Absence of Errors	3.83	Very Satisfactory	0.94
Overall	3.93	Very Satisfactory	0.97

### 3.3 Pretest and Post-test Performance of Students Exposed to e-SIMs

Table 4 reveals the majority of the students performed at "Fairly Satisfactory" level before their exposure to e-SIMs while after their exposure to e-SIMs all of them performed an outstanding level.

**Table 4.** Frequency Distribution of Pretest and Post-test Performance

Level	Pretest						Posttest					
	LC1		LC2		As a Whole		LC1		LC2		As a Whole	
	F	%	f	%	F	%	f	%	F	%	f	%
Outstanding	0	0	0	0	0	0	8	80	4	40	10	100
Very Satisfactory	0	0	0	0	0	0	2	20	6	60	0	0
Satisfactory	1	10	0	0	0	0	0	0	0	0	0	0
Fairly Satisfactory	6	60	3	30	8	80	0	0	0	0	0	0
Needs Improvement	3	30	7	70	2	20	0	0	0	0	0	0
<b>Total</b>	<b>10</b>	<b>100</b>	<b>10</b>	<b>100</b>	<b>10</b>	<b>100</b>	<b>10</b>	<b>100</b>	<b>10</b>	<b>100</b>	<b>10</b>	<b>100</b>

Table 5 further reveals that after their exposure to e-sim, the students performed at “Outstanding” level in terms of learning competency 1, learning competency 2 and as a whole. It is also good to note that as a whole, the students improved from “Fairly Satisfactory” to “Outstanding” using the developed e-SIMs. Cantil (2018) and Ramos (2016) also observed an increase in the performance of the students towards a perfect score after their exposure to SIM.

**Table 5.** Pretest and Post-test Result

Learning Competencies	Pretest		Posttest	
	Mean	DR	Mean	DR
A. Explain how the structure of the carbon atom affects the type of bonds it forms	3.1	Fairly Satisfactory	8.9	Outstanding
B. Recognize the general classes and uses of organic compounds	1.7	Needs Improvement	8.5	Outstanding
C. As a whole	4.8	Fairly Satisfactory	17.4	Outstanding

### 3.4 Test for Significant Difference Between the Pretest and Posttest Performance of Students Exposed to e-SIMs

Table 6 displays the result of a t-test. The effect of t-test successfully revealed a statistically significant difference between pre-test and post-test mean scores in learning competency 1 ( $p < 0.05$ ), learning competency 2 ( $p < 0.05$ ), and as a whole ( $p < 0.05$ ), thus the null hypothesis is rejected.

The difference in which the post-test mean scores is higher than the pretest mean scores are attributed to the effect of the intervention. This further implies that the developed e-SIMS was effective in improving students' performance in Grade 9 chemistry specifically of the two least mastered competencies under the content standard in carbon compounds. This study is further supported by the study of [Salviejo](#),

Aranes & Espinosa (2014) in which students got a significant increase in their score after their exposure to SIM. Also, Su & Cheng (2013), and Hao et al. (2019) showed that intervention programs with the aid of ICT particularly mobile application also showed that students got a significant increase in their score after their exposure to intervention programs using mobiles.

**Table 6.** t-test Result

Learning Competencies	Pretest	Posttest	t	Sig.	Decision
A. Explain how the structure of the carbon atom affects the type of bonds it forms	3.1	8.9	-13.12	.000	Reject H <sub>o</sub>
B. Recognize the general classes and uses of organic compounds	1.7	8.5	-23.40	.000	Reject H <sub>o</sub>
C. As a whole	4.8	17.4	-22.43	.000	Reject H <sub>o</sub>

#### 4 Conclusion and Recommendations

The researchers concluded that the developed intervention material based on least mastered competencies entitled Electronic Strategic Intervention Materials (e-SIMS) for Grade 9 students, were useful tools in enhancing the performance of the students on least mastered competencies. This result was shown by the significant increase in their performance from pretest to posttest and further supported by the assessment of the evaluators on the developed e-SIMs, which were statistically described valid.

Based on the findings and conclusions, it is recommended that 1) the developed e-SIMs be used by the teachers to address the need in developing least mastered competencies, 2) other least mastered competencies in chemistry be identified by teachers and that e-SIMs be developed in order to aid learning deficiencies and to bridge learning gaps in Chemistry, 3) a comparative study be conducted to differentiate the effect of e-SIMs and traditional Strategic Intervention Materials, 4) and a qualitative research be conducted to explore the experiences of students exposed to e-SIMs.

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# Computer Engineering Students Performance Using the Udemy and Khan Academy Videos in Learning Differential Equations

**Rafael J. Eusebio Jr.**

Universidad de Manila, Manila  
[rjusebiojr@pagibigfund.gov.ph](mailto:rjusebiojr@pagibigfund.gov.ph)

**Abstract.** This study aimed to compare and test if there is a significant difference between the performance of computer engineering students using the Udemy and Khan Academy videos in learning differential equations. The respondents were the selected computer engineering (COE) students enrolled in Universidad de Manila (UDM) for the school year 2017-2018. This study involved two groups – first group watched the Khan Academy videos while the other group watched the Udemy videos. To establish the comparability within the groups, the researcher conducted a pretest examination. Those whose score matched were considered as the respondents of the study. The researcher used experimental with static-group comparison design. Students from two sections took quizzes and midterm examination. After watching the videos, students were given a quiz every topic and after the midterm period, midterm examination was given. Results of tests were gathered to compare the mean scores. Independent sample t-test was used to test if there is a significant difference between the two means. Using Khan Academy and Udemy videos, performance of the students in quizzes about slope fields and Euler's method are in the average, while on separation of variables, exact equations and homogenous equations are low. There is a significant difference between the performance of students in the topics slope fields, Euler's method, separation of variables and the mid-term examination. Overall, when comparing the performance of computer engineering students of UDM in quizzes and midterm examination, result of study implies that Khan Academy video is more effective than Udemy video in teaching differential equations.

## 1 Introduction

### 1.1 Background of the Study

Teaching strategies define the teacher's ability to unlock the potential of his students. Different subjects and learning abilities entail diversity in teaching strategies. To teach is to strategize and this means that teachers must be sensitive to the different abilities of his students, so that students' interest and imagination would be triggered and thus supports learning and help students in developing knowledge, specifically to important subjects such as mathematics and science.

Students nowadays are described as 21<sup>st</sup> century learners and considered digital learners. This means that the utilization of information and communication technologies must be used to its maximum inside the classroom. This global trend creates a new

teaching strategy that goes beyond paper and pen. Students nowadays are visual and their interest and motivation to learn are stimulated by virtual animation, knowledge channel and other actual videos. They learn faster when they see and feel.

Based on the experience of the researcher in teaching mathematics subject, there are many students who perform poorly which sometimes caused them to fail in the subject. The researcher also observed that most of the teachers in UDM, teach their subjects in traditional way. Given that scenario, the researcher thought of a way to help the students become interested in mathematics. Since students nowadays are technology-driven and active in computer, the researcher thought of utilizing the UdeMy and Khan Academy instructional videos in their mathematics subjects especially in differential equations.

## **1.2 The Related Studies**

### **1.2.1 Khan Academy**

Khan Academy, a non-profit organization is founded in 2006. Now, it is one of the globe's most popular education website, and describes its mission as providing "a free world-class education for anyone, anywhere." Khan Academy offers more than 5,500 instructional videos – of which approximately 3,500 are about math – and they continue to be extremely popular. However, Khan Academy is more than a massive repository of teaching videos; it also offers more than 100,000 practice math problems that students can complete at their own pace. In 2013 alone, users worked on more than 700 million problems. Khan Academy has expanded its initial focus on math, economics, and science to include other subjects such as art history and entrepreneurship. Additionally, Khan Academy is now partnering with a diverse array of institutions including museums, universities, and think tanks.

On the other hand, Barman (2013) evaluates the effectiveness of the Khan Academy videos as a tool for teaching math in a low-resourced school. This project analyses the effectiveness of these videos for teaching in math to Grade 9 students at Menzi High School, a low-resourced school in the Umlazi township of Durban. For three weeks, students watched and learned math from the Khan Academy videos, which were displayed on a projector in the classroom. The videos chosen complemented their usual lessons in math and matched the school's educational curriculum, along with the South African education curriculum, so that students fulfilled the school's requirements. In the end, students were assessed with a short quiz after watching these videos to determine the effectiveness of these videos in teaching math. Student input on the Khan Academy videos was also taken by having students fill out a questionnaire. The results indicated that the Khan Academy videos were effective for teaching simpler math concepts to students but were not as effective for teaching more difficult math concepts. The results also conveyed that many students have a weak foundation in math, which might be influencing their ability to understand high level math concepts. Lastly, the results showed that although students believed that the Khan Academy videos have certain flaws, they also believed that the videos provided a valuable learning experience for them.

### 1.2.2 Udemy

There is a dearth of literature as to Udemy but for purposes of this study, the following information will most likely interest researchers for future reference.

Udemy was founded in 2010 with the aim of helping anyone build the life they imagine through online learning. Udemy is a global marketplace for learning and teaching online where more than 13 million students learn from an extensive library of 40,000 courses taught by expert instructors in 80 different languages. Whether learning for professional development or personal enrichment, students can master new skills through self-paced, on-demand courses, while instructors can share their knowledge with the world. For companies, Udemy for business offers subscription access to a curated collection of business-relevant courses as well as a central, simple platform to host and distribute proprietary content. Udemy is privately owned and headquartered in San Francisco with offices in Ireland and Turkey (Business Wire, 2016).

### 1.2.3 Teaching Using Educational Videos

Akir (2006) opined that the most exciting feature about technology enhanced education is the abundance of communication tools available. Learning is a communication process. Two-way communication is vital for learning to occur. When students have questions, instructors need to provide feedback and students need to discuss among themselves.

Mirvan (2013) asserted that employing video materials in a classroom can enhance students' motivation to learn since it can expose them to a wide variety of situations that can help them comprehend similar situations in real-life.

Zacal (2014), opined that modernization means advancement of technology. Since technology is now fast growing in any instance, it also affects student's behavior in their studies.

Hsin and Cigas (2013), used short videos to enhance student satisfaction and motivation for an online introductory course in computer science / mathematics and resulted to a significant higher percentage of involved students and increased their average grades.

## 1.3 Research Questions

Specifically, the study attempted to answer the following questions:

1.3.1 What is the performance in the quizzes of the students using the Udemy videos in the following topics: Slope Fields; Euler's Method; Separation of Variables; Exact Equations; and Homogenous Equations and in their midterm examination?

1.3.2 What is the performance in the quizzes of the students using the Khan Academy videos in the following topics: Slope Fields; Euler's Method; Separation of Variables; Exact Equations; and Homogenous Equations and in their midterm examination?

1.3.3 Is there a significant difference between the mean scores of the students using the Udemy and Khan Academy videos in terms of:

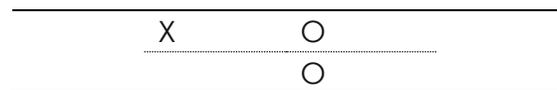
1.3.3.1 Quizzes on Slope Fields; Euler's Method; Separation of Variables; Exact Equations and Homogenous Equations?

1.3.3.2 Mid-term Examination

## 2 Methodology

### 2.2 Research Design

Experimental design with the Static-Group Comparison Design was used by the researcher. According to Fraenkel and Wallen (2009), in static-group comparison design, two already existing or intact groups are used. A diagram of this design is as follows:



**Figure 1.** Static-Group Comparison Design

The dashed line indicates that two groups being compared are already formed – that is, the subjects are not randomly assigned to two groups. X symbolizes the experimental treatment. The blank space in the design indicates that the “control” group does not receive the experimental treatment; it may receive a different treatment or no treatment at all. The two Os are placed exactly vertical to each other, indicating that the observation or measurements of two groups occurs at the same time.

### Respondents

The respondents of this study were the computer engineering students of the Universidad de Manila, 1<sup>st</sup> semester, SY 2017-2018. The researcher handled the subject differential equation of section COE31 and COE32. Using the toss coin method, the researcher was able to determine the group who would be exposed to Udemy (COE32) and the group who would be exposed to Khan Academy videos (COE31).

**Instruments**

The teacher-made quizzes and midterm examination were administered to all students in both groups after each lesson. The instruments were validated by the experts from the fields of engineering and all of them are faculty members.

**Data Analysis**

The arithmetic mean was used to measure the mean scores in the quizzes and mid-term examination of the students under the Udemy and Khan Academy videos. On the other hand, independent sample t-test was used to find out if there is a significant difference between the mean scores of the students under the Udemy and Khan Academy videos.

**3 Results and Discussion**

Table 1 below shows the comparison of the mean scores in quizzes and midterm examination of the respondents using the Udemy and Khan Academy videos. The mean score of the students on the topic slope fields with 10-items using the Udemy videos was 4.88 while in Khan Academy videos was 5.85. On the topic Euler's method, the mean score of the students with 10-items using the Udemy videos was 6.79 while in Khan Academy videos was 8.41. For separation of variables quiz with 25-items, students exposed to Udemy videos obtained a mean score of 5.85 while students exposed to Khan Academy videos obtained a mean score of 9.47. In exact equation quiz, students exposed to Udemy videos obtained a mean score of 8.24 while students exposed to Khan Academy videos obtained a mean score of 10.03. Likewise, in homogenous equations, students exposed to Udemy videos obtained a mean score of 8.06 while students exposed to Khan Academy videos obtained a mean score of 9.15. Lastly, in midterm examination, with 60-items, students exposed to Udemy videos obtained a mean score of 19.82 while students exposed to Khan Academy videos obtained a mean score of 24.26. Overall, mean score of students exposed to Khan Academy is higher than the mean scores obtained by the students exposed to Udemy, both in terms of quizzes and midterm examination.

**Table 1.** Mean Scores in Quizzes and Midterm Examination of the Respondents using the Udemy and Khan Academy Videos

Examination	Type of Program	Number of Items	Mean Scores
Quiz in Slope Fields	Udemy	10	4.88
	Khan Academy		5.85
Quiz in Euler's Method	Udemy	10	6.79
	Khan Academy		8.41
Quiz in Separation of Variables	Udemy	25	5.85
	Khan Academy		9.47
Quiz in Exact Equations	Udemy	25	8.24
	Khan Academy		10.03
	Udemy	25	8.06

Quiz in Homogenous Equations	Khan Academy		9.15
Mid-term Exam	Udemy	60	19.82
	Khan Academy		24.26

Table 2 below shows the significant difference between the mean scores of the students using the Udemy and Khan Academy videos. In slope fields, the weighted mean of the respondents who watched the Udemy videos was 4.88, while the weighted mean of the respondents who watched the Khan Academy videos was 5.85. The  $t$  – value was -3.161 with a  $p$  – value of 0.002, so the null hypothesis was rejected.

In Euler's method, the weighted mean of the respondents who watched the Udemy videos was 6.79 while the weighted mean of the respondents who watched the Khan Academy videos was 8.41. The  $t$  – value was -4.183 with a  $p$  – value of 0.000, so the null hypothesis was rejected. In Separation of variables, the weighted mean of the respondents who watched the Udemy videos was 5.85, while the weighted mean of the respondents who watched the Khan Academy videos was 9.47. The  $t$  – value is -8.012 with a  $p$  – value of 0.000, so the null hypothesis was rejected.

In Exact equations, the weighted mean of the respondents who watched the Udemy videos was 8.24 while the weighted mean of the respondents who watched the Khan Academy videos was 10.03. The  $t$  – vale of -1.512 with a  $p$  – value of 0.137, so the null hypothesis was accepted. In Homogenous equations, the weighted mean of the respondents who watched the Udemy videos was 8.06, while the weighted mean of the respondents who watched the Khan Academy videos 9.15. The  $t$  – value of -1.589 and  $p$  – value of 0.117, so the null hypothesis was accepted. In Mid-term examination, the weighted mean of the respondents who watched the Udemy videos was 19.82 while the weighted mean of the respondents who watched the Khan Academy videos 24.26. The  $t$  – value of -3.626 with a  $p$  – value of 0.001, so the null hypothesis was rejected.

**Table 2.** Test of Significance Between the Mean Scores of the Respondents in Quizzes and Midterm Examination using the Udemy and Khan Academy Videos

Examination	Type of Program	Mean	t-value	p-value	Decision	Remarks
Quiz in Slope Fields	Udemy	4.88	-3.161	0.002	Reject Ho	Significant
	Khan Academy	5.85				
Quiz in Euler's Method	Udemy	6.79	-4.183	0.000	Reject Ho	Significant
	Khan Academy	8.41				
Quiz in Separation of Variables	Udemy	5.85	-8.012	0.000	Reject Ho	Significant
	Khan Academy	9.47				
	Udemy	8.24	-1.512	0.137		

Quiz in Exact Equations	Khan Academy	10.03			Accept Ho	Not Significant
Quiz in Homogenous Equations	Udemy	8.06	-1.589	0.117	Accept Ho	Not Significant
	Khan Academy	9.15				
Mid-term Exam	Udemy	19.82	-3.626	0.001	Reject Ho	Significant
	Khan Academy	24.26				

#### 4 Conclusions

The mean scores of the students who watched the Udemy videos is 4.88 in slope fields, 6.79 in Euler’s method, 5.85 in separation of variables, 8.24 in exact equations, 8.06 in homogenous equations, and lastly, 19.82 in mid-term examinations. The mean scores of the students who watched the Khan Academy videos is 5.85 in slope fields, 8.41 in Euler’s method, 9.47 in separation of variables, 10.03 in exact equations, 9.15 in homogenous, and lastly, 24.26 in mid-term examinations.

There is a significant difference on the mean scores in the quizzes of slope fields, Euler’s method and separation of variables of the students using the Udemy and Khan Academy videos while there is no significant difference on the topics exact equations and homogenous equations. On the other hand, there is a significant difference on the mean scores in the midterm examination of the students using the Udemy and Khan Academy videos. Overall, when comparing the performances of the students in their quizzes and mid-term examination, results of the study implies that the Khan Academy video is more effective than Udemy video in teaching differential equations.

#### 5 Recommendations

Based from the findings and conclusions, the following were recommended:

Since, this is an experimental research, longer exposure of students in Udemy and Khan Academy videos is encouraged for them to be familiarized with the applications, to achieve a better level of performance. The College of Engineering and Technology of Universidad de Manila should expose students to different digital learning applications to enhance their performance. The Udemy and Khan Academy video presentation be thoroughly reviewed by engineering experts on how this can be integrated in the teaching and learning process. For future studies, the use of Udemy and Khan Academy videos be utilized for simpler math concepts to establish the difference when used in higher concepts.

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## SMART Management Plan for an Outcome-Based Research in the K to 12 Curriculum

**Mac Millan C. Tobeo**

Alupay National High School

[macmillantobeo@yahoo.com](mailto:macmillantobeo@yahoo.com)

**Abstract.** This action research envisions providing a research technical plan for our senior high school students based on the outcome-based education in the K to 12 curriculums. The author would assess the extent of integration of outcome-based education in research works of the academic track and Technical-Vocational-Livelihood, the offerings of Alupay National High School. Academic Tracks covered the assessment and integration of government programs in the school in Humanities and Social Sciences such as the WINS, YES-O programs, 4P's, CPP and other social-related matters; science investigatory projects and disaster-preparedness in Science, Technology, Engineering and Mathematics; feasibility study, business plan and assessing marketing strategies for new products in Accountancy and Business Management and creating a prototype and learning guides in electrical installation and maintenance in Technical-Vocational-Livelihood. This led to the creation of the author's SMART Management for Research (Management of Self, Money, Ability, Results, and Time). Moreover, the author devoted his time drafting a technical plan from the format of research for senior high school to programs and activities to improve the research capabilities of students leading to higher quality outcome-based research.

### 1 Introduction

Senior High School really faced series of changes from almost three consecutive school years in curriculum guides, schedule of classes, subject offerings, and quantity of teachers, buildings, equipment and offering of tracks. With this, research has been part of it, for the improvement of educational practice and integration of innovative strategies particularly in research. This should incorporate the outcome-based research that emphasizes the outcomes or goals of an educational system.

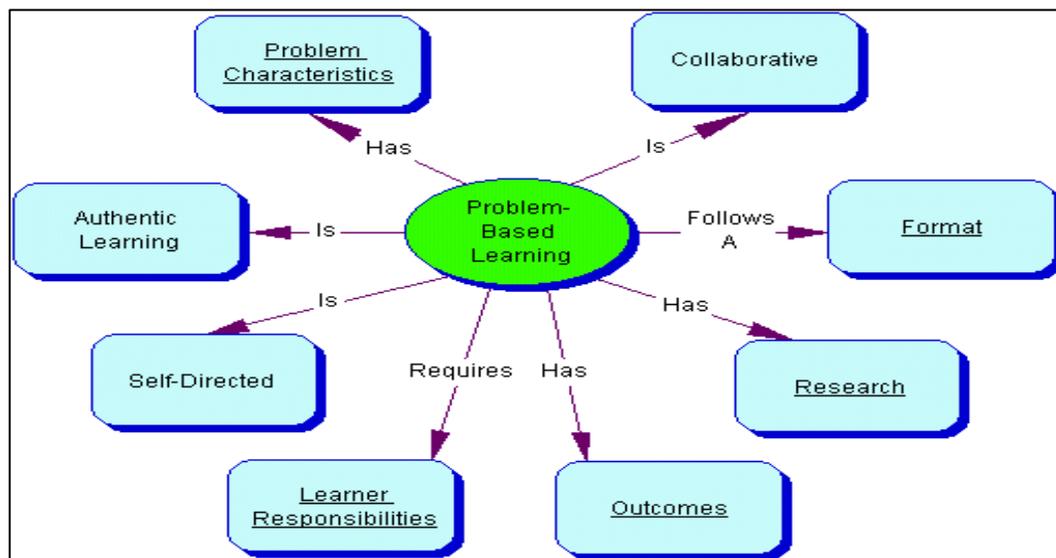
According to Roniel (2015), outcome-based research, therefore, is a new approach that brings the value of research towards a higher level. Research is not just for the sake of personal gain but for the sake of humanity. It is responsive to the needs of society. It does not stop at publications as the outcome of research but a much higher goal that can make life better for everyone.

This led the researcher to the formulation of the SMART (Self, Money, Ability, Results and Time) Management for the improvement of research works of the Senior High School students. It is not just to come up with a paper-based research but to come up with an outcome that would be helpful to others and to the community.

**1.1 Framework of the Study**

The framework begins with a problem for students to solve or learn more about. Problems are designed to be “ill-structured” and to imitate the complexity of real-life cases. The approach uses an inquiry model: students are presented with a problem and begin by organizing any previous knowledge on the subject, posing any additional questions, and identifying areas that needs more information. It is also a reason of designing the research technical plan or the SMART Management that provides frequent opportunities for students to learn, practice information, problem solving and facilitate repetition of information, seeking actions and behavior.

In this process, it replicates the commonly used systemic approach to resolving problems or meeting challenges that are encountered in real life. As problem-based learning is a student-centered process, it is the responsibility of the individual student to participate fully, not only for his or her own learning, but also to aid the learning of others in the group. But students also seek approval from their teachers and need guidance and role models for respect and trust. It is essential for teachers to be honest with students. Even though effective teacher avoid the ‘expert’ role, they can have a powerful impact on students (Institute of Progressive Education and Learning, 2019)



**Figure 1.** Concept Map of Problem-Based Learning and Outcome-Based Research

**1.2 Objectives of the Study**

The following are the objectives of the study:

1. Determine the extent of awareness of students on outcome-based research in the K to 12 curriculums.
2. Assess the extent of integration of outcome-based research in the following strand;
  - 2.1 Science, Technology, Engineering and mathematics;
  - 2.2 Accountancy, Business and Management;
  - 2.3 Humanities and Social Sciences;
  - 2.4 Technical-Vocational-Livelihood – Electrical Installation and Maintenance
3. Assess the research works of senior high school students applying the outcome-based approach.
4. Design a research technical plan integrating outcome-based research in senior high school.

**2 Methodology**

The descriptive method of research was used in this study to assess the integration of outcome-based research in Senior High School of Alupay National High School for the purpose of designing a research technical plan to enhance the research works of the students. As defined by Day (2001), descriptive research involves collection of data in order to answer questions concerning the current status of the subject of the study. For this purpose, a questionnaire was designed according to the specific questions stated in the study and was analyzed statistically with appropriate tools. The study involved the Grade 12 senior high school students as respondents of the study.

**3 Results and Discussion**

This part includes the presentation, analysis and interpretation of findings obtained from the data collected.

**Table 1.** Extent of Awareness of Students on Outcome-Based Education in the K to 12 Curriculum

ITEMS	W.M.	V.I.	RANK
1. making students demonstrate that they "know and are able to do" whatever the required outcomes are	4.29	GE	7
2. emphasize setting clear standards for observable, measurable outcomes	4.08	GE	9
3. measured outcomes rather than "inputs," such as how many hours students spend in class, or what textbooks are provided	4.21	GE	8

4. reflect the achievement of high order learning and mastery rather than the accumulation of course credits	4.06	GE	10
5. includes everything from mere recitation of fact to complex analysis and interpretation	4.32	GE	4
6. students are assessed depending on skills, absolute objectives, instead of reporting the students' relative achievements	4.37	GE	3
7. generally tracks and reports not just a single overall grade for a subject, but also give information about several specific outcomes within that subject	4.41	GE	2
8. teachers think about the individual needs of each student and give opportunities for each student to achieve at a variety of levels	4.51	VGE	1
9. requires that students demonstrate that they have learned the required skills and content	4.31	GE	5
10. designed from the bottom up, looking at the challenges, roles and projects, and embedding into the learning plans	4.30	GE	6
<b>COMPOSITE MEAN</b>	<b>4.29</b>	<b>GE</b>	

**Legend:**

- WM – Weighted Mean
- VGE – Very Great Extent
- VI – Verbal Interpretation
- GE – Great Extent

It can be inferred in the Table 1 that teachers think about the individual needs of each student and give opportunities for each student to achieve at a variety of levels in a very great extent in the Senior High School. It obtained a weighted mean of 4.51 and ranked first among the ten items. And reflecting the achievement of students on high order learning and mastery rather than the accumulation of course credits are observed at great extent. It is considered as least rated with a mean of 4.06 among the given items. The composite mean of 4.29 implies that outcome-based education was practiced of great extent in the K to 12 curriculums. As revealed on the study of Rhaffor, et.al (2017) students have great extent of awareness related to OBE implementation to ensure the attainment of learning outcomes.

**Table 2.** Extent of Integration of Outcome-Based Education in Research Works of Grade 12 Accountancy, Business and Management (ABM) Students

ITEMS	W.M.	V.I.	RANK
1. focus on the basic concepts of financial management, business management, corporate operations and all things that are accounted for	4.69	VGE	4.5
2. lead you to careers on management and accounting	4.69	VGE	4.5

3. locate, gather and organize information using appropriate technology and information systems	4.63	VGE	6
4. use relevant scientific, technological and mathematical knowledge and skills to explain or clarify idea	4.56	VGE	7.5
5. experience streamlining procedures and cutting costs as part of business development skills	4.31	GE	9.5
6. support the decision- making process based on a cost benefit analysis of the actual business or project viability	4.56	VGE	7.5
7. able to nurture and set goals through clear performance expectations aligned with accounting and business management	4.81	VGE	2
8. support the business planning stage and apply entrepreneurial skills	4.31	GE	9.5
9. apply creative thinking to come up with innovative solutions	4.88	VGE	1
10. understand the marketplace in which a business operates and of what makes a business successful	4.75	VGE	3
<b>COMPOSITE MEAN</b>	<b>4.62</b>	<b>VGE</b>	

**Legend:** WM – Weighted Mean  
 VGE – Very Great Extent  
 VI – Verbal Interpretation  
 GE – Great Extent

As revealed in Table 2 regarding the integration of OBE in research works of ABM students, this SMART Management develop their skills as they formulate new innovations to products and assess some of the business strategies that led them to well-developed entrepreneur and business enthusiast. This is observed in the composite mean of 4.62 as very great extent related to development of entrepreneurial skills and business management skills of the students.

**Table 3.** Extent of Integration of Outcome-Based Education in Research Works of Grade 12 Humanities and Social Sciences (HUMSS) Students

ITEMS	W.M.	V.I.	RANK
1. explore their identity as part of cultural diversity	4.33	GE	8.5
2. examine the significance of traditions and shared values within society	4.30	GE	10
3. learn each function socially, culturally, economically, and politically	4.53	VGE	4
4. be familiar with opportunities to explore different perceptions of people, places, ideas and events	4.67	VGE	3
5. develop the interrelationships within and between the natural environment, human communities, and economics	4.70	VGE	2

6. explore how people, ideas and events are connected over time	4.50	VGE	5.5
7. examine how individuals and groups have participated in and contributed to society past and present	4.37	GE	7
8. develop questions about events, developments, issues and/or phenomena	4.33	GE	8.5
9. ready to take on the world of socialization and talk to a lot of people	4.50	VGE	5.5
10. looking forward to becoming a teacher, a psychologist, a writer, policeman, a social worker, or a reporter someday	4.80	VGE	1
<b>COMPOSITE MEAN</b>	<b>4.50</b>	<b>VGE</b>	

**Legend:** WM – Weighted Mean  
 VGE – Very Great Extent  
 VI – Verbal Interpretation  
 GE – Great Extent

Similarly, with the composite mean of 4.50, HUMSS students are looking forward on applying their chosen careers related to their strand in very great extent as presented in Table 3. This is the reason of providing an outcome-based research related to the assessment of some of the government programs such as Child Protection Policy (CPP), WASH (Water, Sanitation and Health) in School, Inclusive Education, Solid Waste Management and some issues such as Gender Equity and Impacts of cyberbullying.

In addition to the growing numbers of outcome-based research applying the SMART management, STEM students apply their ideas on science investigatory projects on creating an alternative energy from recycled materials and document the bridge design of Rosario East District and even proposed a contingency plan for earthquake preparedness of the school. This is in consonance with the composite mean of 4.78 resulted in Table 4 that outcome-based research was applied in a very great extent. It is the aim of the study to apply their problem-solving skills and supports the next generation of scientists and innovators.

Academic track such as the Accountancy, Business and Management (ABM), Humanities and Social Sciences (HUMSS) and Science, Technology, Engineering and Mathematics (STEM) are now geared with an outcome-based research. It is supported with the study of Sarmiento and Orale (2016), that Senior High School Curriculum prepare students to enter into college/university or to work in the industry or be an entrepreneur.

**Table 4.** Extent of Integration of Outcome-Based Education in Research Works of Grade 12 Science, Technology, Engineering and Mathematics (STEM) Students

ITEMS	W.M.	V.I.	RANK
1. propel the forefront of an innovation-based research	4.70	VGE	8
2. support the next generation of scientists and innovators	4.50	VGE	10
3. bring together STEM disciplines and concepts through creative hands-on projects and experiments	4.80	VGE	5
4. supports knowledge gains in engineering and technology	4.80	VGE	5
5. elicit the relevant scientific or mathematical ideas	4.80	VGE	5
6. enhance the problem-solving skills	5.00	VGE	1
7. develop the students critical thinking skills	4.90	VGE	2.5
8. students learn to be flexible and easy to adapt to new situations	4.90	VGE	2.5
9. be able to make a decision based on scientific data	4.70	VGE	8
10. allow the students to come up with their own solutions based on their own thought and ideas	4.70	VGE	8
<b>COMPOSITE MEAN</b>	<b>4.78</b>	<b>VGE</b>	

**Legend:** WM – Weighted Mean  
 VGE – Very Great Extent  
 VI – Verbal Interpretation  
 GE – Great Extent

Lastly, with the only one strand of Technical-Vocational-Livelihood (TVL) track offered in the school, Electrical Installation and Maintenance as presented in Table 5.

**Table 5.** Extent of Integration of Outcome-Based Education in Research Works of Grade 12 TVL – Electrical Installation and Maintenance (TVL-EIM) Students

ITEMS	W.M.	V.I.	RANK
1. deals with good housekeeping and safety, maintain tools and equipment, and interpret technical drawing.	4.40	VGE	2.5
2. prepare construction materials and tools and observe procedures, specifications and manual of instruction	4.20	VGE	5.5
3. perform roughing-in activities for electrical installation	4.27	VGE	4
4. train the students in installing and maintaining electrical wiring, lighting, and related equipment and systems	4.20	VGE	5.5
5. provides technical knowledge and trouble-shooting skills	4.53	VGE	1
6. prepare students with entry level knowledge and manipulative skills for employment in the electrical industry	4.13	VGE	7
7. provides technical training to meet the demands of the electrical industry and the needs of the individual	4.07	VGE	8
8. students are prepared for jobs based upon manual or practical fields	4.00	VGE	9

9. students have the opportunity to work in their field while being educated in on-the-job training component	3.87	VGE	10
10. potential job options include field technicians and automotive electronic equipment installers or repairers, among others	4.40	VGE	2.5
<b>COMPOSITE MEAN</b>	<b>4.21</b>	<b>VGE</b>	

**Legend:** WM – Weighted Mean  
 VGE – Very Great Extent  
 VI – Verbal Interpretation  
 GE – Great Extent

It provides students technical knowledge and trouble-shooting skills in maintenance services for electrically controlled systems. With the composite mean of 4.21 of very great extent revealed that students do not pertain only in the paper-based approach but also provide wide range of application of their understanding in their strand such as providing prototype of electrical circuits, information-dissemination material for electrical tools and hazards and giving an orientation for incoming senior high school students about technical and vocational education.

With the composite mean of 4.37, it is revealed that the assessment of the outcome-based research of the Grade 12 students is in great extent as presented in Table 6. This assessment tool is also based on the criteria provided on the DepEd order No. 36, s. 2016 that categorized research as paper and innovations for awards and recognition.

**Table 6.** Assessment of the Outcome-Based Research of Senior High School

ITEMS	W.M.	V.I.	RANK
1. Students speak with a clear, strong voice and use correct pronunciation, maintain good eye contact and gestures showing confidence and dressed appropriately.	4.16	GE	10
2. Visual aids easily hold the audience's attention and well integrated into the presentation, big enough to read and easy to interpret and complete with correct citations, captions, the like.	4.41	GE	5
3. All team members are willing to address the topic of the questions and show knowledge in areas related to their chosen topic.	4.25	GE	9
4. Has a well-developed research proposal that conveys a perspective on the subject and poses relevant and tightly drawn questions about the topic.	4.40	GE	6
5. Ideas are logically grouped and sequenced within paragraphs and across parts of the paper and avoids plagiarism and organizes and displays information on charts, maps, and/or graphs.	4.48	GE	2

6. Engages the reader and develops reader interest by establishing context and sentences are varied in structure and length; errors are minor and infrequent.	4.28	GE	8
7. Originality or novelty of the product or service and/or usefulness to the school and/or larger community is considered.	4.32	GE	7
8. The product is cost-effectiveness, efficient, and/or environmentally safe	4.42	GE	4
9. Clarity of the product development process and the innovative features shown during presentation.	4.53	VGE	1
10. Service or product is research-based.	4.45	GE	3
<b>COMPOSITE MEAN</b>	<b>4.37</b>	<b>GE</b>	

**Legend:** WM – Weighted Mean  
 VGE – Very Great Extent  
 VI – Verbal Interpretation  
 GE – Great Extent

With this finding, SMART Management as researcher technical plan proved the application of outcome-based research of attaining learning outcomes. This improves the research paper, presentation and output of the Grade 12 students. Moreover, this management will not just realize to manage self, money, ability, results and time but the holistic development of the learners to take part in the community involvement and individual's development in research.

**4 Conclusions**

It revealed that application and integration of outcome-based research was in great extent with the delivery of SMART Management. It is a tool that helps the teacher to support and enhance the content of the curriculum guide provided by the Department of Education. This management starts from self that establish their research skills by establishing guidelines for research. It follows with the finance management, building interest through their abilities, and accomplishing better results based on different criterion and tasks. Lastly, is to value time management by setting every task into right order and time. With this, the researcher as research adviser and enthusiast are driven to share this management strategy and technical plan that led the Grade 12 students of Alupay National High School to finish the twenty-eight (28) outcome-based researches.

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## Custom-Fit Learning: Integration of Industry-based Instructional Materials in the Senior High School – Automotive Strand

**Dareen Louise M. Guisehan**

Quezon National High School, Panabo City, Davao del Norte  
dareenlouise.guisehan@deped.gov.ph

**Abstract.** The central objective of this study is to evaluate the crafted instructional materials for the automotive servicing students of Quezon National High School. It attempts to comprehensively evaluate the materials developed (e.g., English for Automotive Industry module and activities). A mixed methods approach was adopted involving 30 automotive senior high students. Findings reveal that students found the worktext and activities relevant in their chosen industry and increased their interest in learning English. Additionally, it was found out that there is a significant difference in the level of Automotive English proficiency before and after the implementation of the industry-based worktext. Accordingly, this study recommends that further evaluations should be done by curriculum designers and course evaluators to further validate the results of this study. Furthermore, this study postulates that senior high school offering TVL track should also craft industry-based instructional materials in language teaching to further increase the connection of the subject matter and industry.

### 1 Introduction

The Philippines is recognized globally as one of the largest English-speaking nations with majority of its population having at least some degree of fluency in the language (Cabigon, 2018). However, recent survey conducted by Hopkins International Partners in 2018 showed that the level of English proficiency of college graduates from the Philippines is lower than the target English proficiency of high school students in Thailand. With the rise of globalized industries, English is more than ever a necessity to be acquired as it is accorded the privilege to be the language of international communication. Its acquisition can guarantee the availability of opportunities to employment, travelling, higher education, and even better life (McKay, 2002).

With the country's efforts to be in sync'd with the education standards of the ASEAN community, its latest reforms include the additional 2-year-senior high school curriculum which envisions to prepare its graduates to the world of commerce, higher education, and work. However, in the current senior high school curriculum, especially in the Technical- Vocational and Livelihood Track, the offered English subjects are not specified for the language needs of each strand. Moreover, learners need more career-oriented English skills to meet industry requirements. Thus, teaching English in context is crucial and is equally vital for students who are about to enter the workforce and higher education

In the research locale, the TVL strand offered is automotive servicing. Consequently, it is expected to produce SHS graduates who are both competent in the industry and ready for higher education. To guarantee this vision, materials and activities,

especially on language learning are continuously contextualized and upgraded through needs analysis and crafting of industry-based modules. The automotive industry is characterized as highly global and technology-driven, and in the case of the Philippines, the industry is considered as a major player in the economy, revolutionizing job generation and export growth (Sugata, 2014). International cooperation also plays a vital role in automotive industry for there is virtually endless pool of component and service suppliers all over the world where English is the only language that can fulfill the means of international communication. With this, it is required that to become a competent automotive mechanic/technician, one must possess at least some degree of fluency in English for it is the industry's language in both oral and written communication.

Thus, to address the gap between the industry requirements and the current English language skills of the senior high school students, this two-phased study identified the most needed language skills in the industry through target situation analysis and needs analysis, and crafted an industry-based module for English, specifically catered to the needs of the senior high school students of Quezon High School.

### **1.1 Related Literature**

This study stems from the need to contextualize language teaching in TVL strands for the senior high school, specifically, the tenets of English for Specific Purposes. Smoak (2003) asserts that 'ESP is English instruction based on actual and immediate needs of learners who have to successfully perform real-life tasks unrelated to merely passing an English class or exam. ESP is needs based and task oriented'. To identify the specific language needs of the target industry, a needs analysis was conducted before the crafting of the industry-based language materials.

Needs analysis is considered to be the main driving factor in ESP curriculum development. In the domain of language program design, needs analysis refers to a number of means for identifying and validating the needs and establishes priorities among those. Brown defines it as a series of activities involved in gathering information that will serve as the basis for developing a curriculum that will meet the learning needs of particular group of learners. This will involve conducting a Target Situation Analysis which deals with what the language learners need to prepare to be able to use the language in the future, a Present Situation Analysis which deals the current proficiency of the learners in the target language, and a Context Analysis which refers to the environment in which the learning will take place.

For the main reason that English is the means of international communication, there is a strong need to at least teach senior high school students with some degree of fluency in the target language. To develop materials that contextualized and targeted to the industry needs, this study utilized the language needs analysis profile of the automotive industry conducted by the researcher in the previous study.

In the present study, the researcher utilized the target needs analysis in order to create materials that are industry-based to connect the students' interest in learning grammar lessons to the current industry practices. To be able to sew the design of this

research seamlessly, the ADDIE Model was utilized as the basis of the instructional design. ADDIE stands for Analysis, Design, Development, Implementation, and Evaluation.

With the use of the crafted worktext, the automotive senior school students undergone a short language course. To evaluate the effectiveness and to explore the learning experiences of the students, the course materials were evaluated in both formative and summative assessments.

As Richards (2001) posits that language course evaluation can also be formative or summative. Formative evaluation, on the one hand, is conducted 'to find out what is working well, and what is not, and what problems need to be addressed', with the purpose of improving and developing the delivery of the course. Summative evaluation, on the other hand, 'is concerned with determining the effectiveness of a program, its efficiency, and to some extent with its acceptability. It takes place after a program has been implemented'. According to Jordan (1997),

For these reasons, the current study opted for both qualitative and quantitative evaluations to create a much clearer view of what works best and what didn't work in the language course.

## **1.2 Research Questions**

This study attempted to comprehensively evaluate the industry-based instructional material crafted through mixed-methods approach. Specifically, this study sought to answer the following questions:

1. What is the level of students' English proficiency in the target industry?
2. Is there a significant difference between the English proficiency level of the students in the pre-test and post-test?
3. How do automotive servicing senior high school students describe their learning experiences using the industry-based instructional materials?

## **1.3 Scope and Limitation**

The researcher's purpose is to comprehensively evaluate the industry-based instructional materials crafted for the senior high school students of Quezon High School through mixed-methods approach. Additionally, this study is limited in terms of its scale and situation-unique conditions. The areas under discussion in this study are restricted to 30 automotive servicing students in the research locale, thus, the research findings may not be generalized to other populations in other locale for it is limited and this could be subjected to other interpretations.

## **2 Methods**

The mixed methods research design was utilized in this study to comprehensively evaluate the industry-based instructional materials crafted, specifically, a worktext that covers the language needs of the automotive servicing industry. This approach to

research is a procedure for collecting, analyzing, and mixing quantitative and qualitative data at some stage of the research process within a single study in order to understand a research problem more completely (Ivankova and Creswell, 2009). Richards (2001) advocates this approach in evaluating English for Specific Purposes, such as the current study, arguing that both quantitative and qualitative approaches to collecting information are needed because they serve different purposes and can be used to complement each other.

Thus, this research had both qualitative and quantitative components. The goal of the of the qualitative approach is to explore the learning experiences of the senior high school students using the industry-based instructional materials through semi-structured interviews, whereas the goal of the quantitative approach to analysis is to obtain the data needed to measure the level of proficiency in terms of specific English skills needed in the automotive industry.

## **2.1 Participants**

This study involved 30 automotive servicing senior high school students of Quezon High School. All 30 students went through the activities and assessments of the crafted industry-based material.

## **2.2 Data Collection**

Creation of the instructional materials. The industry-based instructional material utilized in this study is a worktext which stems from the results of the needs analysis of the automotive industry conducted by the researcher. The worktext is composed of 5 units of grammar lessons in the context of the automotive industry.

Implementation of the worktext. The industry-based worktext served only as supplemental materials in English for the senior high school students. The implementation spans for five consecutive weeks.

Retrieval, tabulation, and recording of the data in the master data sheet. For the quantitative component. After the participants had completed the questionnaire, the researcher retrieved, tabulated, and recorded the data in the master data sheet in preparation for the statistical treatment. For the interview, learners were asked about their reflections on their learning experiences.

## **2.3 Research Instruments**

For the qualitative component of the study, a researcher-made interview guide was made. The questions were validated by experts, namely: three Practical Research instructors. The questions explored the learning experiences of the learners during the implementation of the industry-based worktext. On the other hand, a 50-item pre-test and post-test questionnaire encompassing automotive English lessons was also utilized

for the quantitative component. The researcher-made automotive English questionnaire was pilot-tested after the experts' validation.

### 2.4 Data Analysis

For the quantitative part of the study, t-test was utilized to determine the significant difference between the pre-test and post-test scores in automotive English of the students. For the qualitative part, the researcher opted to the Collaizi's process for data analysis.

## 3 Results and Discussion

### 3.1 Level of Automotive English Proficiency

To evaluate the instructional materials crafted specifically for the automotive servicing students of senior high school, the researcher first sought to find out the level of automotive English proficiency of the students.

For a 50-item pre-test seeking the student's level of automotive English proficiency, the results show that the students' mean is very low with a mean of 11.86. This implies that the students' knowledge on industry-based English skills should be improved. Interestingly, students regarded English highly because they considered it as a necessity because of their aspirations to go abroad and get higher education.

### 3.2 Summative Evaluation of the Instructional Materials

To evaluate whether the instructional materials were effective in improving the learners level of proficiency in automotive English, a post-test was conducted to determine if there is an improvement.

**Table 1.** Mean Score of Students' Pre-test in Automotive English

	<b>Mean</b>	<b>p-value</b>
<b>Pre-test Score</b>	<b>11.86</b>	<b>0.0001</b>
<b>Post-test Score</b>	<b>39.67</b>	

By conventional criteria, the difference above is considered to be extremely significant. This suggests that the instructional materials crafted to improve the student's level of proficiency in automotive English is effective.

### 3.3 Learning Experiences of the Senior High School Students

This research presents the results of how the industry-based material was implemented in the senior high school of the research locale. The researcher came up with the following themes based on the students learning experiences during the implementation of the materials:

Apprehension in learning English. In the recent years, the Philippines has seen a decline in English proficiency among its college graduates. Because of this, job opportunities for Filipinos abroad that requires them to have at least some degree of English fluency have become elusive in the recent years. This may be linked to how English is taught in schools, as the participant had said:

“Lisod man gud ang grammar maam. Wa sad ko kasabot kung mag English na si maam. Ulaw sad mag English-english sa room.”

(The grammar is hard to understand. Also, I can't understand when the teacher is already speaking in English. I don't feel confident when I speak English inside the classroom)

The students' apprehension in learning English may stem from their inability to use English orally, their lack of basic skills in grammar, and their low level of confidence in using the language. As supported by another participant:

“Kataw-an man gud ko pag mamali ko og pronounce og mali sad ako grammar.”  
(Some will laugh at me if I got the word mispronounced and when my grammar is wrong.)

It can be concluded that the students' apprehension in learning English can be rooted from their own learning environment which can be threatening as it does not encourage the value of learning from mistakes.

In order to change the situation and giving the students opportunities to express their thoughts in English without anxiety, a class rule was established before the implementation of the worktext. In such rule, students are to speak in English always during the class, may it be formal or informal conversations without pointing out their mistakes severely. Instead, they keep notes on their most valuable conversation during the day and reflect on the content and how the sentences were structured. As another participant stated:

“Naa sad ko nakat-unan gamay. Okay lang gamay basta English. Lingaw man sad diay mag English-english bahalag mali. Unta di na mali-mali sunod kay paanaray ra man diay ni og storya.

I learned a little. It's okay to learn a little as long as it's English. It's fun to speak in English even if it's wrong (grammar). I hope it's not wrong next time (grammar) because it only needs getting to use it always. (P5)

Connecting grammar lessons to real-life contexts. In the current senior high school curriculum, there are no available language materials contextualized on each of the TVL strand. This is the gap that the present study wants to address.

The worktext consists of 5 units with grammar lessons in automotive English. Authentic materials and examples were used in creating the worktext. As emphasized by Nunan (1998), teaching grammar should not be in isolation, rather, it should be taught in context in order for the students to see the connection of the lessons to the real-world scenarios which in the case of this research is the automotive service industry.

As the participant stated:

“Mas dali nuon ni sya sabton ang English dri nga lesson kay naagian man gud namo sa automotive ang gi-basehan sa grammar.”

It's much easier to understand English in this lesson because we already discussed in the automotive (subject) the basis of the grammar lesson. (P5)

Additionally, participant 6 (P6) further supports the previous observations:

“Ganahan ko sa activities kay kabalo nko atong mga tools unsaon pag gamit, maka-focus nuon ko atong mga prepositions.”

I like the activities because I already knew how to use those tools, I can now focus on the prepositions (grammar lesson).

These statements validate the claims of Nunan (1998) about creating connections between grammar lessons and real-life contexts. With the help of these insights, the claim that the instructional materials increased the level of automotive English proficiency of the senior high school students is supported.

This gives a clearer picture as to how students are motivated to learn English grammar lessons if their interest is considered and that the lessons are taught in context.

#### **4 Conclusion**

The purpose of this study is to evaluate the industry-based materials crafted for the senior high school students of Quezon High School through qualitative and quantitative assessments. Based on the findings, this study concludes that:

1. Senior high school students have high regard in English as they wish to use it effectively for their future careers in higher education, commerce, and even going overseas.
2. Senior high school students found that the materials and activities in the crafted worktext, Automotive English for Senior High School, are relevant to their chosen industry, thus, increasing the students' motivation in learning English.
3. The industry-based instructional material, Automotive English for Senior High School, has significantly increased the level of automotive English proficiency of the senior high school students.

## 5 Recommendations

Based on the conclusions made, this present study recommends the following:

1. The worktext, *Automotive English for Senior High School*, should be used further in the automotive strand by improving its activities and assessments for the next group of automotive language learners.
2. Further evaluations should be done by curriculum designers and program evaluators to give expert insights on how to improve the worktext on its next edition.
3. Senior high school offering TVL strands should also conduct a needs analysis and target situation analysis focusing on language on their partner industries to increase students' interest on seeing the connection between the grammar lesson and its real-world applications.

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## Pragmatics of Prosody in Meranaw Conversations: A Grounded Theory Research

**Rohaida Maunting-Derogongan**

Mindanao State University, Marawi City

rohaymd@yahoo.com

**Abstract.** This study delves into the role of prosodic features in the construction of meaning in Meranaw conversations. For this purpose, Glaser and Strauss's (1967) Grounded Theory is employed. The study aims to examine Meranaw utterances using stress, rhythm and intonation as strategies to convey intended meaning, identify the attitudes, feelings, or emotions expressed through the use of the identified prosodic features, determine the context of situation that shape the use of the identified prosodic features, and analyse and discuss the basic concepts that can be deduced or formulated from the Meranaw speakers' use of the prosodic features under study. The data for this paper were collected from the recorded conversations of native Meranaw speakers in Poblacion Lumbatan, Lanao del Sur. To record and analyze the pitch contour of the utterances, the Praat Software was utilized as the visual technology support. The findings revealed that in Meranaw a change in stress, rhythm and intonation creates nuances. The use of prosodic features as strategy to convey meaning necessarily takes into account wider context. Lastly, this study reveals that Meranaw traits are expressed through the use of prosodic features in the Meranaw conversations under study.

### 1 Introduction

One of the most interesting discoveries about language use is that meaning does not reside in words (Austin, 1962). Meaning is shaped and negotiated as meaning represents an intent or purpose. One tries to figure out the speaker's intended meaning by interpreting the uttered words. Word is a unit of language consisting of sounds that function as a principal carrier of meaning.

Variation in prosody can influence the interpretation of linguistic phenomena in many languages. According to Hirschberg (2017) the type of location of prosody prominence and prosodic phrase boundaries, differences in pitch contours, and changes in intensity duration and speaking rate can serve to inform hearers about what the speaker wants to convey.

Some languages use prosodic features or supra-segmentals to distinguish meanings. Fernandez and Crains (2011) explained that prosodic features are the stress, rhythm and intonation in speech. The study of these features is known as prosody. Beatty, Orbello, Socorro and Ross (2003) posited that language use that exploits prosody is a skill which is necessary to ensure effective social communication.

The use of intonation, stress and rhythm convey pragmatic meaning. Finch (2000) defines pragmatics as the use of language in social contexts and the ways in which people produce and comprehend meanings through language.

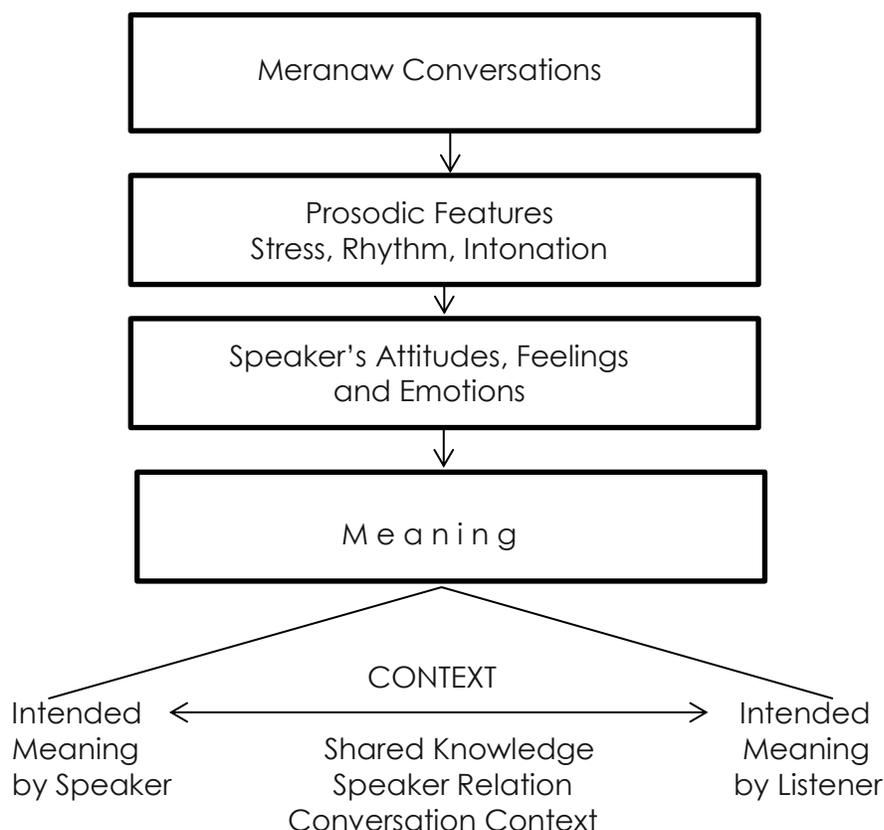
Prosody plays an important role in Meranaw communications. Lobel and Riwarung pointed out that Meranaw is one of the Danao languages spoken by people living in the island of Mindanao, particularly in Lanao del Sur and Lanao del Norte provinces. The complex phonologies hinder a complete analysis of outsiders' inquiry into the Meranaw language. This study is conducted to fill this gap.

**1.1 Theoretical Framework**

This study employed Grounded Theory by American sociologists Barney Glaser and Anselm Strauss. The Grounded Theory is a systematic qualitative research methodology in the social sciences emphasizing generation of theory from the data in the process of conducting research. It uses a systematic set of procedures to develop an inductively grounded theory about a phenomenon (Glaser & Strauss, 1967).

The objective of the study is to find out the role of prosodic features in the construction of meaning in Meranaw conversations. GT was employed to discover explanations that have yet to be articulated. Moreover, GT was employed to explain the patterns of behaviours of the Meranaw speakers through a systematic methodology involving the construction of theory.

**1.2 Conceptual Framework**



**Figure 1.** Schematic Diagram

As shown in Figure 1, the corpus of data observed to suit the description of pragmatics of prosody were subjected to analyses. With the Grounded theory as framework, the patterns that were discovered through conversation analysis were then considered to describe the role of prosodic features in the construction of meaning in Meranaw conversations.

### **1.3 Objectives of the Study**

This paper explores the pragmatics of prosody in Meranaw conversations to show how certain uses – manipulation, adjustment, or modification of stress, rhythm, and intonation – shape meaning.

Specifically, this study seeks to do the following:

1.3.1 Examine how the Meranaw speakers use the prosodic features such as stress, rhythm and intonation as strategies to convey meaning;

1.3.2 Identify the attitudes, feelings, or emotions expressed through the use of the identified prosodic features;

1.3.3 Determine and discuss the context of situations that shape the use of the identified prosodic features; and

1.3.4 Analyze and discuss the basic concepts that can be deduced or formulated from the Meranaw speakers' use of the prosodic features under study.

## **2 Review of Related Literature**

All the languages in the world sound so different because the way the languages use speech sounds to form patterns differ from language to language (Fromkin, Rodman & Hyams, 2011).

### **2.1 Prosodic Features**

Stress functions as the means of making a syllable prominent (Landefoged, 2010). It can change the meaning of a word or sentence (Concepcion, Dela Cruz & Enriquez, 1994) and there is considerable variation from language to language concerning the role of stress in identifying words or in interpreting sentences ( Hirst & Di Cristo, 1998 ).

Sentences is characterized by the recurrence of the stressed and unstressed syllables at regular intervals. They are rhythm stresses. Rhythm is a repeated pattern of words (Concepcion, Enriquez and Dela Cruz, 1994).

Wennerstrom (1994) studied intonational meaning in English discourse. The findings reveal that the use of intonation can convey linguistic and pragmatic meaning.

## **2.2 Attitudes, Feelings, or Emotions Expressed through the Use of the Identified Prosodic Features**

Intonation is not only central to conveying meaning but attitude as well. Learners of language must understand the function of intonation in conveying attitude and be able to recognize the difference between different intonation contours and the effects on meaning (Avery & Ehrlich 1992).

Why do many people conceal their true thoughts and feelings in non-verbal expressions particularly the use of prosodic features and cleverly crafted words and phrases? According to Brown and Levinson (1978) the main reason, perhaps, is politeness.

## **2.3 Context of Situations that Shape the Use of the Identified Prosodic Features**

Sternstrom (1994) explained that "exactly what the speaker means by saying something must be interpreted not only in relation to the immediate context referring to what the previous speaker just uttered, but also in relation to the wider context which includes the speech situation, the topics, the speakers and their relationship to each other and the knowledge they share about the world."

Halliday and Hasan (1985) define Context of Situation as the environment in which meanings are being exchanged which comprise the following "what is it that the participants are engaged in", "what types of speech role that they are taking on in the dialogue?" and "what it is that the participants are expecting the language to do for them in that situation?"

Dell Hymes (1967) coined the phrase 'communicative competence' to refer to the ability of interlocutors to convey and interpret messages, and to negotiate meaning interpersonally within a given context.

Brown and Levinson (1987) argue that in human communication, people tend to maintain one another's face continuously. Face refers to a speaker's sense of linguistic and social identity.

Austin (1962) presented a new picture of analysing meaning; meaning is described in a relation among linguistic conventions correlated with words/ sentences, the situation where the speaker actually says something to the hearer, the associated intentions of the speaker.

## **2.4 Historical Background of the Meranaw**

Meranaw is one of the Danao languages spoken by people living in the island of Mindanao, particularly in Lanao del Sur and Lanao del Norte provinces. It belongs to the Southern Philippine sub-branch of the Western Austronesian language family and is most closely related to the Ilanun language spoken in Sabah, Malaysia and Maguindanaon, spoken in Maguindanao, North Cotabato, South Cotabato, Sultan Kudarat and Zamboanga del Sur provinces (Disoma, 1999).

### **3 Research Methodology**

This study is a qualitative research design employing ethnography to report on its activities and values from the inside (Ottenheimer, 2009), participant Observation to gain insight into cultural practices and phenomena, the Grounded Theory to develop an inductively grounded theory about a phenomena research (Glaser & Strauss, 1967) and Praat software as the visual technology support to record and analyze the pitch contour of the utterances.

#### **3.1 Respondents of the Study**

The participant respondents are native speakers of Meranaw who have lived virtually their entire life in Poblacion Lumbatan Lanao del Sur. The respondents were adults between 30-55 years old and consist of female and male.

#### **3.2 Locale of the Study**

The field work is in Poblacion, Lumbatan Lanao del Sur. This study covered two settings; the public setting and domestic setting where the usual conversation takes place. Public setting refers to the workplace while domestic setting refers to the house and private domain.

#### **3.3 Data Gathering Procedure**

The researcher collected the data by recording naturally occurring speech or talk using an audio recorder. To form the sample or corpus the participants were brought together to converse and be recorded, at other times the conversations were already in progress. All recordings had three or more speakers, and, in most cases, they were doing nothing but conversing with one another. The relationships between conversants ranged from relatives to close friends and acquaintances. The gathering of data lasted for one month.

The participants were interviewed to provide data relevant to the research objectives. The interviews are supplemented with the researcher's field notes.

After the empirical data have been collected, the researcher begins the process of coding-categorizing the data to reflect the various issues represented. Since the purpose of this study is to examine the role of prosodic features in the construction of meaning in Meranaw conversations, prosodic feature forms and patterns that kept on surfacing from the corpus were subjected for analysis.

The Grounded Theory method uses three levels of coding: open coding, axial coding and selective coding.

In the open coding, the raw data, 267 utterances, are initially examined and compared to form categories of similar phenomena. Coding and categorization happened simultaneously. At this stage, the researcher wrote "notes to self" or memos, in further adherence to the GT methodology. The researcher wrote down everything as

reminders of the development and relationships of codes and categories. Glaser refers to memoing as the “core stage in the process of generating theory, the bedrock of theory generating” Glaser (1978). When data began to accumulate into categories, constant reflection on what was emerging was done.

After coding categories emerge, a coding paradigm is then developed to link the concepts together in theoretical model around a central category that hold everything together. Strauss and Corbin (1990) posited that axial coding is the procedure which reassembles the results of open coding by creating new relationships between concepts.

The final stage of coding is known as selective coding. This stage is reached when core categories have become saturated. The point of saturation is reached when no new data result from additional data collection. All the memos written by the researcher through processes of abstraction and reflection and the major categories that had emerged are compared and assessed for theoretical development.

The Conversation Analysis Approach was used to discover how Meranaw speakers understand and respond to one another in their turns at talk while awaiting their turn to talk in their intended meaning.

Politeness Theory was referred to and reviewed to find out why being polite depends on the social distance between the speaker and the hearer, the power of the hearer and the speaker and the risk of hurting the other person.

#### **4. Results**

The following abstractions are enfolded from the data which provide illustrations and explanations of the linguistic behaviour of the Meranaw particularly the relationship between prosodic features and meaning.

4.1 In Meranaw a change in stress, rhythm and intonation creates nuances.

4.2 The use of prosodic features as strategy to convey meaning must be in relation to the wider context such as shared knowledge, speaker relations and conversation context.

4.3 Modesty, respect, politeness, consciousness of social rank and status and fondness for music as a means of communication are the traits expressed through the use of prosodic features in the Meranaw conversation under study.

4.4 Based on the data, the following basic concepts were formulated:

4.4.1 Meranaws utilize prosodic features to add inflection and depth to statements and arguments to convey intended meaning and, at the same time, to maintain interpersonal harmony and safeguard one's maratabat.

4.4.2 The use of prosodic features allows the Meranaw speakers to convey a broad range of meaning in as few words as possible relying on context and cues aimed at the audience, in their speech patterns.

4.4.3 The use of prosodic features expresses an interplay and interrelationships of overlapping values and practices such as maratabat, modesty, respect, politeness, consciousness for social rank and status, fondness for music as a means of communication, and adherence to Islamic principles and teachings.

4.4.4 Meranaw is a high-context culture, and as such prefers more indirect and implicit communication and they find outlet for the expression of feelings and thoughts by manipulating stress, rhythm and intonation.

4.4.5 The strict observance of Islamic doctrines and deep-seated fidelity to cultures and entrenched traditions are interwoven in Meranaw conversations. The two - Islamic and Meranaw – converge, probably not always and absolutely seamlessly, but usually smoothly enough.

## 5. Conclusion

5.1 The way words are chunked into intonation phrases directs a listener's attention to the most salient points of a message. This implies that the use of stress, rhythm and pitch allows the Meranaw speakers to convey a broad range of meanings in as few words as possible relying on context and cues for the audience in their speech patterns.

5.2 Meranaw is a high context culture which prefers more indirect and implicit communication in which individuals may need to use interpretation and context to understand the intended meaning. This implies that shared knowledge among Meranaws is important when using the prosodic features as a strategy not only to help the speaker convey the intended meaning but also to let the hearer decipher the intended meaning.

5.3 Meranaw communication depends on whom they are talking to. This implies that the success of communication depends on the role or power relationship between the speaker and hearer to convey and interpret message and negotiate message interpersonally within a given context. Awareness of the other in a communication event – his/her rank status, age, relationship to the speaker (degree of familiarity and intimacy) – should be part of the communication competence of a person. An inappropriate tone (intonational pattern and stress), not to mention register or level of usage, may be an immediate 'turn off' to the other or worse, cause offense.

5.4 Different set of words is routinely used depending on the context of situation. This implies that Meranaws indirectly express their thoughts and feelings to save face and to avoid situations of conflict, where they may experience uncomfortable amounts of tension and unrest. There are face-threatening situations – for example making a risky

proposition, suggestion or a request, asking a favour of the other – in which the result or outcome is unpredictable. A refusal has a disastrous effect on the speaker. Thus, Meranaws use indirect means to communicate such intent (seeking favour, for example).

5.5 There is an interplay and interrelationships of overlapping values and practices in the conversations under study. Prosody plays a role in this, which results in adding information to the linguistic content and/or in its modification. This implies that Meranaws use prosodic features not only to convey the strictly linguistic content of sentences but also the expression of attitudes, feelings and thoughts of the speakers and listeners.

The aforementioned findings can be summarily stated that prosodic features play a significant role in the construction of meaning in Meranaw communication and at the same time regulate interpersonal relationship which establishes unity and solidarity between and among the Meranaws.

## **6. Recommendations**

6.1. A study can be conducted on the pragmatics of prosody in other Muslim communities to detect other patterns which will lead to deeper insights into Meranaw culture.

6.2 To ascertain the current state of knowledge about Meranaw orthography, further inquiry on this area is recommended as it is possible that some underlying contrasts may still be found.

6.3 A contrastive / comparative intergenerational study could be undertaken to investigate the strategies used by the young Meranaws to convey meaning.

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## **Multimodality: Stimulating an Ambiance of Fun and Effective Learning of Oral Communication**

**Arlyn B. Dawadias**  
**Valencia National High School, Bukidnon**  
[dawadiasarlyn@gmail.com](mailto:dawadiasarlyn@gmail.com)

**Abstract:** This study examined the use of multimodality in improving students' oral communication. Multimodality refers to the use of class blog (video recording) and podcast (audio recording) for students to monitor and improve their grammar, vocabulary and pronunciation in speaking. Using a quasi-experimental research design and purposive sampling, 20 Grade 11 ABM students of Valencia National High School, whose speaking level is B1 were the subjects of the study. Using descriptive statistics and ANOVA test complemented with interview and observation for triangulation, the effect of the use of multimodality on students' oral communication was examined. Results showed that students' mean of errors in grammar, vocabulary and pronunciation decreased after the use of multimodality. Moreover, it revealed that students found the lessons interesting, engaging, fun and appropriate for 21<sup>st</sup> century learners. Thus, the use of multimodality is effective in improving students' oral communication.

### **1 Introduction**

Proficiency in English oral communication is continuously high demand in the academic and business world (Cardona, 2015). For this reason, a number of English subjects are taught in the academe to address oral communication skills. Oral communication is a process of sharing and conveying messages or information from one person to another (O'Halloran, K.L. 2011, Allen et al., 2007). Communication cannot take place and is futile if the receiver does not understand the speaker's message. To make the oral communication successful, competency in language structures, lexicon and pronunciation are essential. Thus, the use of combined and integrated making-meaning resources in various modalities is essential to create meaning (Baldry & Thibault, 2006; Bateman, 2008; O'Halloran, 2011; Ventola et al., 2004; Cubillo & Garrido, 2010; Busa, 2010).

In the case of Valencia National High School, proficiency in speaking English is a problem which Grade 11 Senior High School students are facing. As the researcher observed when she handled Oral Communication subject for Grade 11 learners, competence in language structures, lexicon, and phonology are the reasons that hinder learners from speaking English especially in Oral Communication classes. In fact, the result of the students' Diagnostic Exam-Speaking Test during the first week of class revealed that their speaking level range from B1 to B2, which means that they have basic and limited command of the English spoken language. With this, the researcher felt the need to use various modes of communication that stimulate students' interest in learning oral communication. Thus, the researcher deems appropriate to improve oral communication by creating tasks which integrate several discourse modes, the use of multimodality.

Barron (2003) defined multimodality as an approach that views communication as the result of the integration of multiple expressive resources. These resources are in the forms of video and audio files on the internet. The main goal of multimodality is to use inexpensive, easily accessible and user-friendly technology, suitable to varied communicative situations that stimulate an ambiance of engrossing and effective learning of oral communication (Kress, 2010; Tapscott, 2008; Garcia, 2012; and Palomeque, 2012).

The purpose of this research is to examine the use of multimodality (blog and podcast) and to see how students integrate them to enhance the development of communicative competence in oral language. It sought to answer the following questions: 1. Is there a significant difference in the students' oral communication in terms of: a. grammar, b. vocabulary, and c. pronunciation, before and after the use of multimodality? 2. What are the learning experiences of students in the use of multimodality?

**2 Conceptual Framework**

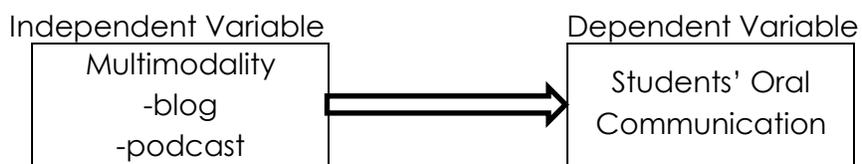
The use of multimodality in the classroom is an approach that emphasizes the two important skills of the 21<sup>st</sup> century learners, such as: oral communication skills and technology literacy.

Oral communication is the process of transmitting spoken information and ideas from one individual or group to another (Swarthout, 2017). With advances in technology, new forms of oral communication continue to develop, like video conferencing using Skype, Zoom and many more which allows callers to communicate over the internet (Schinkten 2015).

On the other hand, technology literacy is the ability to effectively use technology. It helps one to communicate, solve problems, and enhance life-long learning skills for future progress. It represents the aptitude to use media, such as the internet to access and interact with information. These two concepts became the foundation of using multimodality as an approach to stimulate an ambiance of engrossing and effective learning of oral communication in this study.

**2.1 Research Paradigm**

In a nutshell, figure 1 illustrates the interplay of the variables in this study.



**Figure 1.** Schematic diagram showing the interplay of the variables in the study

### **3 Methodology**

#### **3.1 Participants**

The participants of this study were 20 grade 11 senior high school students under ABM Strand of Valencia National High School, Valencia City. Ten were males and ten were females. Parents' permission was obtained before the conduct of the study along with the assurance that their child will not be identified nor demeaned in any way.

#### **3.2 Intervention**

The teaching intervention occurred daily for a period of 8 weeks. Prior to the intervention phase, the researcher created a class blog exclusively for the 20 respondents. The class blog was used to post audio and video recordings as lesson outputs. Then, each student created a podcast account. Blog and podcast were used as multimodal resources to enhance students' oral communication skills.

On the first week, students watched a video on How to Improve Your English-Speaking Skills (by yourself). It is a video tutorial on imitation technique. The technique presented was Easy-to-Hard Imitation where students imitated the speaker's delivery of the speech as to the tone, pronunciation and pitch.

On the second week, the students watched videos on Learning English with Mr. Duncan. The topics presented were as follows: introducing one self, 'small talk', talking about the weather and many more. The students were paired and they acted out each topic through a role play.

On the third week, mini video clips on Real English videos were presented. These video clips contained formulas used in real conversations, such as: What do you do? What are you doing? What does she do? and a lot more. These videos allow a controlled linguistic situation, with a transcription of what the speaker(s) say(s), and thus provide a type of listening activity that is easier than authentic.

On the fourth week, students watched a video on How to Practice Speaking English Alone - Learn English Fast. In this video, it shows simple ways to practice speaking English as it emphasizes that the best way to get better at speaking English is to speak English.

On the fifth week, students watched a video on One Simple Trick to Become Fluent in English – the JAM Technique. In this video, students learn how to become fluent and confident English speakers.

In the final part of each class, students had to prepare and present a short oral text with the same characteristics as the one watched in class. This meant using the same type of language and discourse strategies as those used in the model video. In the interactions like interviews, conversations and the like, the students had to work in pairs or groups. They then had to act out a real-life situation similar to those analysed in class.

All the activities were recorded and evaluated by both the researcher and the students for improvements. The final outputs were done via voice and video recordings and these were posted in the class blogs (video recording) and podcast (audio recording).

Lastly, after the 8-week intervention period, the researcher called again the attention of the 20 respondents and they were asked the same questions in the diagnostic test. Also, the same material and evaluation tool was used in the beginning of the study. Their answers were compared if there were changes on the choice of words (vocabulary) use, sentence structures (grammar) and correct utterance (pronunciation) after the use of multimodality (blog and podcast). Furthermore, the researcher interviewed the respondents on their learning experiences for the 8-week intervention phase. There may be other extraneous variables that may have affected the result which were beyond the parameters of this study.

### **3.3 Data sources and Analysis**

The materials used for this study were retrieved online. These videos created listening skills, showed the dynamics of communication, and exemplified the language occurring in all the different types of linguistic situations examined in class, like interviews, talk shows, news, and monologues presentations (Appendix A).

The following methods of data analysis guided the organization of data in the study. Pre and post tests were applied in order to assess the oral performance of the students at the beginning and at the end of the investigation. Each participant answered two (2) questions orally for the pretest and the same questions were given to the posttest. PET rubric was used to assess students' speaking level (Appendix B). Individual interview of the participants was conducted after the pretest in order to get information on how they felt upon answering the questions. Another interview was conducted at the end of the intervention period to develop a deeper understanding of the students' experiences of the techniques used.

To facilitate the interpretation of data, the following statistical tools were employed: For problem number 1, the researcher used descriptive statistics and ANOVA-test to determine the significant difference in the students' oral communication in terms of vocabulary, grammar and pronunciation before and after the use of multimodality. To answer problem 2, qualitative discussion of the researcher's interview was done.

## **4 Findings and Results**

At the close of this study, the difference of students' oral communication before and after the use of multimodality in terms of: vocabulary, grammar, and pronunciation are compared.

Table 1 presents the mean of errors of pre and post tests for grammar, vocabulary and pronunciation. The results show that the mean of errors in the post test in grammar, vocabulary and pronunciation decreased compared to the pretest. This implies that

after exposing the students to the use of multimodality, the students' oral communication improved.

**Table 1.** Mean scores of post and pre-test for the independent variables

Independent variables	Mean		Significance
	Pre-test	Post-test	
Grammar	14.1	12.4	0.000
Vocabulary	23.9	9.1	0.000
Pronunciation	12.4	4.7	0.000

It further shows that there is a significant difference in the students' oral communication before and after the intervention period. Looking at the foregoing table, though the mean of errors of the posttest in grammar, vocabulary and pronunciation decreased, it was revealed that vocabulary had the lowest mean of errors which means that after the 8-week intervention phase, the students' use of correct words in sentences is evident.

Moreover, pronunciation was lowered to 4.7 which means that with constant listening, talking, giving of feedback and monitoring students were able to correct their mispronounced words right away and communicating using the English language is becoming natural for them. Also, the researcher had observed that students were enjoying the activities especially the small talks. They tried to imitate the speakers' way of talking and they were in characters the whole time. It manifested that they had fun doing the activities and that the use of multimodality created interaction and produced meaning. Hence, the decreased of mean of errors of the post test scores in grammar, vocabulary and pronunciation indicates that the use of multimodality is effective in improving students' oral communication.

The learning experiences of the students in the use of multimodality were expressed during the researcher's interview of the students who got fewer and more errors during the post-test in vocabulary, grammar and pronunciation.

When the researcher asked the students, who got fewer errors, how they found their lessons using multimodality, according to them they found the activities interesting, understandable, engaging and fun. The use of podcast and blog made them review their presentations and monitor their progress in speaking. They could assess their flaws and weak points and improve them.

When the researcher asked about the effectiveness of multimodality in enhancing oral communication, someone shared that to have a vlog was her ultimate dream and that having a class blog seemed like a step closer to her dream. Since she loved what she's doing, so she was happy with her video and audio outputs and she felt the experiences were rewarding. Moreover, they felt it was effective in improving oral communication. They got fewer errors because they found the activities interesting and understandable. The use of blog and podcast were new to them and really appropriate

to the students of the new era. The answers of the students show that the use of multimodality is self-motivating and effective strategy in improving oral communication.

When the researcher asked the students who got more errors, how they found their lesson using multimodality according to them, as ABM students, they were not into speaking, so they were really not good in oral communication. Some of them reasoned that they encountered problems like low internet connection and phone's poor video and audio quality. However, according to them, the use of multimodality is interesting, simple, understandable, conversational and easy to do. It is appropriate for the 21<sup>st</sup> century learners - the digital natives. Also, as observed by the researcher, though today, the students were exposed to multimedia presentations, yet the use of multimodality such as class blog and podcast were new to them. Thus, the use of cyber tools for learning foreign languages does not only mean that teachers have a wide range of learning resources at their disposal, but it also involves the creation of new discourses and modes of communication in the teaching context.

## **5 Conclusion and Recommendations**

After the 8-week intervention period, the students' mean of errors in grammar, vocabulary and pronunciation decreased after the use of multimodality. The students found the use of multimodality stimulating, challenging and fun in any communicative situation. Thus, the following conclusions could be drawn: Firstly, there is a significant difference in the students' oral communication before and after the use of multimodality. Secondly, the use of multimodality is effective in improving students' oral communication. Lastly, it should be noted that these conclusions were drawn on the bases of the parameters set on this study. Certain limitations such as time constraints and proximity may have indirectly affected the conclusions drawn. In the same way, other factors and areas which were not investigated may also have affected the students' oral communication.

The following recommendations are laid out: Firstly, the school administrators should provide a stable internet connection within school premises so that the teachers can employ and utilize online apps in their teaching and learning process. Secondly, English teachers should conduct diagnostic test in speaking at the start of the semester in order to determine the students speaking level and make it a mission to enhance their speaking level at the end of the semester or school year. Thirdly, the 21<sup>st</sup> century teachers should be innovative in creating a 21<sup>st</sup> century classroom; a classroom where students experience technology at hand. Lastly, it is recommended that further studies of bigger scope and longer time with the use of other variables (not included in this study) could be done to validate further and enhance the results of the present study.

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**Appendices**

**Appendix A. Web-based lessons used in class**

Topic	Content
Real English	use of formulas used in real conversations <a href="http://Real-english.com/">Real-english.com/</a>
Learning English with Mr. Duncan	general topics such as: introducing yourself, 'small talk', talking about the weather <a href="http://www.youtube.com/user/duncaninchinga">http://www.youtube.com/user/duncaninchinga</a>
TalkEnglish.com	use of formulas used in real conversations <a href="http://real-english.com/">http://real-english.com/</a>
Learning English with Mr. Duncan	general topics such as: introducing yourself, 'small talk', talking about the weather <a href="http://www.youtube.com/user/duncaninchinga">http://www.youtube.com/user/duncaninchinga</a>
TalkEnglish.com	How To Practice Speaking English Alone - Learn English Fast <a href="https://www.youtube.com/watch?v=sYzR1_tMI7c">https://www.youtube.com/watch?v=sYzR1_tMI7c</a>
EngFluent	How to improve your English speaking skills (by yourself) <a href="https://www.youtube.com/watch?v=CAU2zx2Ri_M">https://www.youtube.com/watch?v=CAU2zx2Ri_M</a>
Learn EnglishLAB	Simple Trick to Become Fluent in English - the JAM Technique - How to Be a Confident Speaker <a href="https://www.youtube.com/watch?v=O0qT4cK-wtk">https://www.youtube.com/watch?v=O0qT4cK-wtk</a>

**Appendix B. PET Rubric**

Level	Student's Speaking Ability
<b>B1</b> ALTE 2 (PET) Limited but effective command of the spoken language	Able to handle communication in most familiar situations.
	Able to construct longer utterances but it is not able to use complex language except in well-rehearsed utterances.
	Has problem searching for language resources to express ideas and concepts resulting in pauses and hesitation.
	Pronunciation is generally intelligible, but L1 features may put a strain on the listener.
	Has some ability to compensate for communication difficulties using repair strategies but may require prompting and assistance by the interlocutor.

## Rule-Output-Correction at Output-Rule-Output Strategy sa Pagsulat ng Komposisyon

**Jerick T. Gonzales**

Naglaoa-an National High School-Senior High School, Ilocos Sur

[jerick.gonzales@deped.gov.ph](mailto:jerick.gonzales@deped.gov.ph)

**Abstract.** Ang pananaliksik na ito ay naglalayong masuri at mapaghambing ang kabisaan ng mga estratehiyang Rule-Output-Correction at Output-Rule-Output sa pagtuturo ng pagsulat ng komposisyon sa mga mag-aaral ng Grade 11 ng Naglaoa-an National High School Taong Panuruang 2018-2019. Ang mga komposisyong sinulat ng mga mag-aaral ang naging pangunahing pinagkuhanan ng datos. Ang mga komposisyon ay tinaya batay sa nilalaman, organisasyon at mekaniks. Ginamit ang rubrics at t-test bilang mga statistical tools. Natuklasan sa pag-aaral na parehong **proficient** ang antas ng kasanayan ng mga respondent nang sila ay sumailalim sa Rule-Output-Correction Strategy at Output-Rule-Output Strategy. Ganoon pa man, mas mataas ang iskor ng mga respondent na sumailalim sa Output-Rule-Output Strategy. Ito ay nangyari dahil nakatulong sa mga respondent ang pansarili at ginabayang pagwawasto ng kanilang mga komposisyon. Bukod dito, nakakaimpluwensiya rin ang istilo ng pagsulat, motibasyon, karanasan, kaalaman sa paksang susulatin at ang positibong saloobin ng mag-aaral sa kanilang kapwa at sa kanilang guro.

### 1 Introduksyon

#### 1.1 Rasyunal

Layunin ng pagtuturo ng wika na magkaroon ng komunikatibong kasanayan ang bawat mag-aaral. Upang makamit ang layuning ito, binibigyang-diin ng mga guro ng wika ang paglinang sa ng mga apat na makrong kasanayan- ang pakikinig, pagsasalita, pagbasa, at pagsulat. Ang pagpasok ng makabagong teknolohiya sa pagtuturo ang ilan sa mga dahilan kung bakit isinama ang panonood bilang isang kasanayan na ng mga mag-aaral ng ikadalawampu't isang siglo. Anupa't napakahalaga ang lahat ng mga kasanayang ito para sa pagpapaunlad sa intelektwal na pag-iisip ng mga mag-aaral.

Isa sa mga kasanayang kailangang malinang sa mga mag-aaral ay ang kasanayan nila sa pagsulat. Ang pagsulat ay isang kasanayang tumutukoy sa pisikal at mental na gawain ng isang tao. Ito ang nagsisilbing ekstensyon ng natamong wika at mga karanasan ng mga mag-aaral na natamo nila mula sa iba pang kasanayan (Peck at Buckingham, 1976; Ulit, 2009) . Ito ay proseso at produkto dahil may mga hakbang kailangang sundin upang makabuo ng isang mabisang pangungusap o talata o iba pang mga sulatin. Dahil dito, ito rin ang pinakamahirap iwasto sa lahat ng uri ng komunikasyon sapagkat hinihingi nito ang maingat na pagsiyasat at pagwawasto upang hindi mawala ang diwang gustong sabihin.

Sa kasalukuyang pinagtuturuan ng mananaliksik, bagamat nasa Grade 11 na ang mga mag-aaral, kailangan pa ring maituro ang tamang pagsulat ng komposisyon. Naobserbahang may kahinaan pa rin ang mga mag-aaral sa pagsulat ng komposisyon dahil sa limitadong kaalamang gramatikal at kawalan ng sapat na kaalaman sa paksang sinusulat. Kung kaya't sa pag-aaral na ito, ang mananaliksik ay nag-eksperimento ng dalawang estratehiya sa pagtuturo ng pagsulat ng komposisyon mula sa mga nabasang mga teorya at mga kaugnay na pag-aaral sa pagsulat.

Ang mga nabanggit na mga dahilan ay mga katibayang gumanyak sa mananaliksik upang magsagawa ng isang aksyong pananaliksik upang malinang ang kasanayan ng mga mag-aaral sa pagsulat ng komposisyon.

### **1.1. Pagpapahayag ng Suliranin**

Pangunahing layunin ng pananaliksik na ito na masuri at mapaghambing ang kabisaan ng *rule-output-correction strategy* at *output-rule-output strategy* sa pagtuturo ng pagsulat ng komposisyon ng mga mag-aaral ng Grade 11 ng Naglaoa-an National High School , Taong Panuruan 2018-2019.

Ito ay ginabayan ng mga sumusunod na katanungan:

1. Ano ang antas ng kasanayan ng mga respondent sa pagsulat ng mga komposisyon gamit ang *rule-output-correction strategy* at *output-rule-output strategy* ?
2. Mayroon bang pagkakaiba sa antas ng kasanayan ng mga respondent gamit ang *rule-output-correction strategy* at *output-rule-output strategy*?

### **1.2. Haypotesis**

Ang pananaliksik na ito ay nais patunayang walang significant na pagkakaiba sa antas ng kasanayan ng mga respondent na sumailalim sa *rule-output-correction strategy* at *output-rule-output strategy*.

### **1.3. Teoretikal na Balangkas**

Sina Villafuerte at Bernales (2007) ay naglahad ng tatlong teoryang may kaugnayan sa proseso ng pagsulat- Teoryang Romantiko, Kognitib at Sosyal. Ang Teoryang Romantiko ay nakapokus sa pagpapahayag ng manunulat sa paglalantad ng katotohanan. Ang Teoryang Kognitib naman ay nakapokus sa kaalaman ng manunulat sa paksa at hindi sa mga mambabasa. Layunin naman ng Teoryang Sosyal na maturuan ang mga mag-aaral sa pagsulat para sa iba't ibang uri ng mambabasa. Ang mga teoryang ito na binanggit sa libro ni Jocson et al (2005) ay tinawag ni Freeman (1987) na *socio-cognitive theory* ng pagsulat.

Sa pahayag ni Lalunio (1990) na binanggit sa libro ni Jocson et al, (2005), ang teoryang sosyo-kognitibo ay nagsasabi na ang pagsulat ay isang prosesong nangangailangan ng interaksyon at nakabatay sa karanasan ng bata at sa konteksto ng lipunang ginagalawan nito.

Ang pagsulat ay isang natatanging kakayahan (Arrogante at Garcia, 2004). Bilang isang natatanging kakayahan, hindi lamang kung ano na ang pumapasok sa isipan ay isusulat na kaagad. Ito ay dumadaan sa maraming proseso upang maging pino at maganda ang pagkakaayos at pagkakalahad ng mga ideya. Kaugnay nito, upang maging maayos ang pagkakalahad ng mga ideya, may mga pamantayang dapat isaalang-alang sa pagsulat (Casanova, 2001). Bukod diyan, ang isang makabuluhang sulatin ay nagtataglay ng mga iba't ibang elemento- nilalaman, organisasyon, mekaniks. Kailangang ito muna ang bigyang-pansin sapagkat ang mga ito ay pangunahing mga elementong kailangang taglayin ng isang komposisyon at iba pang uri ng mga sulatin (Rorabacher at Dunbar, 1982; binanggit sa libro ni Batnag et al., 2011).

Sa pagsusuring isinagawa ni Lagmay (2010) sa kakayahan sa pagsulat ng komposisyon ng mga mag-aaral sa unang taon ng Ilocos Sur Polytechnic College-College of Agriculture, natuklasang angkop na gamitin ang pinanutnabayang pagsulat dahil epektibo sa paglinang sa kakayahan sa pagsulat.

Sa pag-aaral ni Masjari (2010) tungkol sa *process oriented approach*, natuklasang ang nasabing pagdulog ay nakapagpapaunlad sa kakayahan ng mga mag-aaral sa pagsulat. Sa nasabing pananaliksik napatunayang ang *Process Oriented Approach* ay nakapagpapaunlad sa kakayahan ng mga mag-aaral. Ito rin ay nakapagpataas ng pagganyak at self-esteem ng mga mag-aaral.

## **2 Metodolohiya**

### **2.1 Disenyo ng Pananaliksik**

Ang pananaliksik na ito ay gumamit ng *experimental design* na *contrasted groups*. Sa pananaliksik na ito, ginamit sa isang grupo ang rule-output-correction strategy samantalang sa isang grupo naman ay output-rule-output strategy. Ang mga awtput ng mga respondent ay kinuha at pinaghambing.

### **2.2 Populasyon**

Ang populasyon ay binubuo ng mga mag-aaral ng Grade 11 ng Senior High School ng Naglaaa-an National High School Taong Panuruang 2018-2019. Ginamit ang total enumeration na kung saan ay kinuha ang lahat ng mga mag-aaral bilang mga respondent. Ang kabuuang bilang ng mga respondent ay limampu't tatlo (53).

### **2.3 Instrumento ng Pananaliksik**

Ang mga sinulat na komposisyon ang naging pangunahing datos upang masagot ang mga katanungan. Sinuri din ang nilalaman, organisasyon at mekaniks ng mga komposisyon ng mga respondent sa pamamagitan ng rubric. Ang rubric ay hinalaw mula sa rubric na ginamit ni Gonzales (2016).

**2.4 Paraan ng Pag-aaral**

Ang mga respondent mula sa isang seksyon ay gumamit ng estratehiyang *rule-output-correction*. Sa estratehiyang ito, itinuro muna ng gurong mananaliksik ang tuntuning panggramatika, wastong paggamit ng bantas, wastong gamit ng mga salita at pagbuo ng komposisyon. Sa sumunod na araw, pinapili ng mananaliksik ang mga respondent ng paksang kanilang susulatin. Pinasulat ang mga respondent ng isang komposisyon batay sa kanilang piniling paksa. Pagkatapos ng pagsulat, kinuha ng mananaliksik ang mga papel ng mga respondent upang masuri batay sa rubric na ginamit.

Sa kabilang grupo naman ay ipinagamit ang estratehiyang *output-rule-output* sa pagpapasulat ng komposisyon. Sa pagsasagawa ng estratehiyang ito, una ay pinapili ang mga respondent ng paksang kanilang susulatin. Matapos makapili, pinasulat ang mga respondent ng komposisyon. Sa sumunod na mga araw, tinalakay ng gurong mananaliksik ang mga tuntuning panggramatika sa Filipino, wastong pagbabaybay, pagbabantas at wastong paggamit ng mga salita. Pagkatapos, ipinabalik ang komposisyon sa mga respondent para sa pagwawasto. Matapos maiwasto ang kanilang komposisyon, kinuha muli ito ng mananaliksik para sa pagtataya.

Ang mga komposisyon ng mga respondent ay sumailalim sa pagtataya gamit ang rubric at pagsusuring istatistikal (mean at t-test). Pinaghambing ang nakuha ng mga respondent na gumamit ng unang estratehiya at pangalawang estratehiya.

**3 Resulta**

**Talahanayan 1.** Antas ng Kasanayan ng mga Respondent sa Pagsulat ng Komposisyon Gamit ang Rule-Output-Correction Strategy at Output-Rule-Output Strategy

Krayterya	Rule-Output-Correction Strategy		Output-Rule-Output Strategy	
	Mean	DR	Mean	DR
a. Nilalaman	3.81	Proficient	3.89	Proficient
b. Organisasyon	3.81	Proficient	3.83	Proficient
c. Mekaniks	3.45	Proficient	3.58	Proficient
<b>Kabuuan</b>	<b>3.69</b>	<b>Proficient</b>	<b>3.77</b>	<b>Proficient</b>

- Norm: 4.21 – 5.00    A    Advance
- 3.41- 4.20    P    Proficient
- 2.61-3.40    AP    Approaching Proficiency
- 1.81-2.60    D    Developing
- 1.00-1.80    B    Beginning

Makikita sa Talahanayan 1 ang antas ng kasanayan ng mga respondent sa paggamit ng *rule-output-correction strategy* at *output-rule-output strategy*.

Lumalabas na parehong **proficient** ang mga respondent na gumamit ng estratehiyang sa *rule-output –correction strategy* ( $\bar{x}$ =3.69) at *output-rule-output strategy* ( $\bar{x}$ =3.77). Ganoon pa man, higit na makikitang mas nakaaangat nang bahagya ang mga respondent na gumamit ng ikalawang estratehiya.

Ipinapakita sa talahanayan na mas **proficient** ang mga komposisyon ng mga respondent na gumamit ng *output-rule-output strategy* sa nilalaman ( $\bar{x}$ =3.89), organisasyon ( $\bar{x}$ =3.83) at mekaniks ( $\bar{x}$ =3.58). Sa pagsusuri sa mga komposisyon, natuklasan na nakabuo ang mga respondent ng tatlo o mahigit pang mga talata, may magkakaugnay na mga detalye, may lohikal o kronolohikal na pagkakasunod-sunod ng mga impormasyon at mga pangyayari, may kawili-wiling panimula, may mahusay na impresyon sa wakas ng sinulat na komposisyon at gumamit ng mga transitional devices. Bukod sa nabanggit, ang karanasan at kaalaman ng mga respondent sa paksang sinulat ay nakaimpluwensiya upang makabuo sila ng substansyal na nilalaman ng kanilang komposisyon. Natuklasan ding madaling naiwasto ng mga respondent ang kanilang mga komposisyon dahil sa mayroon na silangkaranasan sa pagbabantas, pagbabaybay at paggamit ng gramatika. Ganoon pa man, may kahinaan pa rin ang mga respondent pagdating sa kanilang mga sulat-kamay.

Sa kabilang banda, mapapansing proficient din ang mga respondent na gumamit sa estratehiyang *rule-ouput-correction* ayon sa nilalaman ( $\bar{x}$ = 3.81), organisasyon ( $\bar{x}$ =3.81) at mekaniks ( $\bar{x}$ = 3.45).

**Talahanayan 2.** Ang T-test ng Pagkakaiba ng Mean ng Nakuhang Iskor sa Rule-Output-Correction Strategy at Output-Rule-Output Strategy

Statistics	Rule-Output-Correction	Output-Rule-Output Strategy	Mean Difference	T-stat	T-critical	Desisyon
Mean	3.69	3.77	0.08	-1.258	2.006	<b>Fail to Reject Ho</b>

Degrees of freedom: 52

Level of Significance: 0.05

Ipinapakita sa talahanayan 2 na mas mataas ang mean ng mga respondent na gumamit ng Output-Rule-Output Strategy na pinatutunayan ng kabuuang mean score na 3.77kaysa Rule-Output-Correction Strategy na may mean score na 3.69. Ganoon pa man, ang nakuhang t-stat na -1.258 ay mas mababa kaysa sa t-critical na 2.006 na may level of significance na 0.05. Ibig sabihin nito ay finatanggap ang *null hypothesis* na nangangahulugang walang pagkakaiba sa antas ng kasanayan ng mga respondent sa pagsulat gamit ang dalawang estratehiya.

Ang resulta ng pag-aaral ay sinusuportahan ng natuklasan mula sa antas ng kasanayan ng mga respondent na gumamit ng una at ikalawang estratehiya. Parehong epektibo ang dalawang estratehiya upang maging **proficient** ang mga komposisyon ng mga respondent. Nakaimpluwensiya rin ang istilo, motibasyon, karanasan , kaalaman sa paksa at maayos na pakikitungo ng mga mag-aaral sa kanilang kapwa at guro nakasalalay ang kanilang kasanayan sa pagsulat.

#### 4 Kongklusyon

Sa pagsusuri ng mga datos na nalikom, ang mga sumusunod ay natuklasan sa pag-aaral:

4.1. Mabisa ang mga estratehiyang *rule-output-correction strategy* at *output-rule-output strategy* sa pagtuturo sa pagsulat ng komposisyon. Ganoon pa man, mas epektibo ang ikalawang estratehiya kaysa sa nauna bagamat parehong **proficient**. Natuklasang nakaimpluwensiya sa pagsulat ng komposisyon ang istilo, motibasyon, karanasan, kaalaman sa paksang susulatin at positibong saloobin ng respondent sa kanilang kapwa at sa kanilang guro.

4.2. Walang pagkakaiba ang antas ng kasanayan ng mga respondent na sumailalim sa mga estratehiyang *rule-output-correction strategy* at *output-rule-output strategy*.

#### 5 Rekomendasyon

Sa mga nabuong kongklusyon, ang mga sumusunod na tagubilin o rekomendasyon ay nabuo ng mananaliksik:

5.1. Gamitin ang *rule-output-correction strategy* at *output-rule-output strategy* sa pagtuturo ng pagsulat ng komposisyon. Para sa *rule-output-correction strategy*, ituro muna ang gramatika bago magpasulat. At para naman sa *output-rule-output strategy*, magpasulat ng muna sa mga mag-aaral at pagkatapos ay iwawasto sa pamamagitan ng pagtalakay sa mga tuntuning panggramatikal.

5.2 Sa pagsulat ng komposisyon o anumang sulatin, iminumungkahing isaalang-alang ang istilo, motibasyon, karanasan, kaalaman sa paksa at positibong saloobin ng mga mag-aaral sa kanilang mga kapwa at mga guro.

5.3 Ipagpatuloy ang pananaliksik sa mga estratehiya sa pagtuturo hindi lamang sa kasanayan sa pagsulat kundi pati rin sa iba pang mga makrong kasanayan.

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**APENDIKS**

**Rubric para sa Komposisyon**

<b>Krayterya</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
<b>NILALAMAN</b>					
<ul style="list-style-type: none"> <li>- Pagbuo ng 3 at/o mahigit pang mga talata at maayos na pangunahing ideya o paksa</li> <li>- Pagsulat ng 15 at/o mahigit pang magkakaugnay na mga detalye</li> <li>- May kronolohikal o lohikal na pagkakasunod-sunod ng mga pangyayari o impormasyon</li> <li>- Pagbuo ng kawili-wiling panimula ng komposisyon</li> <li>- Pagbuo ng wakas ng komposisyon nang may pangkalahatang impresyon</li> </ul>	Nakamit ang lahat ng mga krayterya na nailahad	apat sa mga krayterya ang nakamit	tatlo sa mga krayterya ang nakamit	dalawa sa mga krayterya ang nakamit	isa sa mga krayterya ang nakamit
<b>ORGANISASYON</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
<ul style="list-style-type: none"> <li>- May maayos na simula, katawan at wakas ang komposisyon</li> <li>- May mga ekspresyong transisyunal at mga pang-ugnay upang maging maayos ang daloy ng mga ideya.</li> <li>- May maayos na sumusuportang detalye sa bawat paksang pangungusap</li> <li>- May magkakaugnay na mga detalye sa paksang pangungusap</li> <li>- May pagpangkat-pangkat ng mga magkakaugnay na ideya at impormasyon.</li> </ul>	Nakamit ang lahat ng mga krayterya na nailahad	apat sa mga krayterya ang nakamit	tatlo sa mga krayterya ang nakamit	dalawa sa mga krayterya ang nakamit	isa sa mga krayterya ang nakamit
<b>MEKANIKS</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
<ul style="list-style-type: none"> <li>- May wastong palugit at indensyon</li> <li>- May wastong mga bantas</li> <li>- May wastong gramatika (uri ng pangungusap, at mga bahagi ng panalita)</li> <li>- Nakasusulat nang may kalinisan</li> <li>- Wasto ang baybay ng mga salita</li> </ul>	Nakamit ang lahat ng mga krayterya na nailahad	apat sa mga krayterya ang nakamit	tatlo sa mga krayterya ang nakamit	dalawa sa mga krayterya ang nakamit	isa sa mga krayterya ang nakamit

(halaw mula sa tesis ni Gonzales, 2016)

## Worksheets: Improving the Performance of BSED Mathematics Students in Calculus

**Sharon M. Galicha**

Romblon State University, Romblon  
sgalicha6@gmail.com

**Abstract.** The study of Calculus proves to be difficult to students who lack proficiency in algebra and other pre-calculus subjects. Teachers are expected to use interventions in their classrooms when their students encounter difficulties in learning. Having observed this problem in her class in Calculus, this researcher decided to conduct a study which involves the use of worksheets. These worksheets were designed to cover basic facts and exercises in Algebra and Trigonometry and also include practice exercises in some topics in Calculus. This study focused on the effect of using worksheets on the performance of students in calculus. To determine the effect of worksheets on the students' performance in Calculus, an experimental research using the single group pretest-posttest design was utilized in this study. It was conducted over a period of three weeks in the researcher's class in Calculus. The participants consisted of twenty-seven (27) Third Year BSED Math students enrolled at Romblon State University during the second semester of school year 2017-2018. The first activity was the administration of the pretest after which each of the six worksheets was administered to the students every meeting. At the end of the third week, the posttest was administered and grades were recorded. Results of the study showed that there is a significant difference between the pretest and posttest scores of the students in favor of the posttest [ $t_{26}=9.037$ ,  $p<0.05$ ]. The pretest mean score of 0.2963 which has increased as shown in the mean posttest score (2.1111) of the students implies that the use of recall and practice worksheets may have played a significant role in enhancing students' learning. Hence, the researcher recommends the further use of worksheets not only in calculus but also in other mathematics subjects. It is also recommended that the design of the worksheet be modified in order to sustain the students' interest.

### 1 Introduction

#### 1.1 Rationale/Framework

The study of Mathematics, unlike other subjects, is very dependent upon prior learning of its basics. McCallum, et al (2006) and Poncy et al. (2006) pointed out that more complex tasks or concepts can be performed by those students who can recall basic facts accurately and quickly. Frawley (2012) argued that students who are fluent with their facts are more equipped to solve math problems quickly and they don't exert a lot of efforts in working out complicated math exercises. Hence, it is a must for teachers to always include the activity of recalling math facts in their daily plan. In addition to this, instructional materials are considered as tools in motivating students to learn. The effective use of these instructional materials by the teacher is a key to enhance the

students' learning in any subject. It is likewise important for a teacher to choose the kind of instructional material that will help students understand concepts especially those in mathematics. This present study looked into how the traditional instructional material called worksheet would fit as a strategy on improving the students' performance in Calculus. Lee (2014) asserted that worksheets can be useful in improving academic achievement as supplements to textbooks. Besides providing opportunities for knowledge construction, worksheets may also contain well-designed questions that can draw students' interest when paired with proper teaching methods. The worksheets that were used in this study contain relevant math facts and review exercises in Algebra and Trigonometry while worksheets in Calculus contain exercises for exponential and trigonometric functions.

According to Stein et al. (2004), worksheets can be utilized by students as guide in solving a mathematics problem in the absence of the teacher. In other words, for students who prefer to work independently, the teacher can design the worksheets such that the demonstration of a procedure for solving a problem is included together with practice exercises in mathematics. Corpuz (2006) & Salandanan (2009) emphasized that the development of the student's self-learned skills and processes can be enhanced through independent study with directed instruction from the teacher. Stein et al. (2004) also added that the student's ability to follow a math procedure when combined with repeated practice in doing math exercises result to the enhancement of the student's higher order thinking and problem-solving skills.

Van de Walle (2006) stated that the use of flash cards is effective in helping students to achieve mastery of math facts. This idea was supported by Pool, et al (2013) and Strother (2010) who explained that flash cards can be shown to the students every meeting for recall purposes. This activity may be followed with a worksheet with 20 to 100 problems to solve, usually with time limits. Clements & Battista (1990) stated that this strategy is considered as an old fashion way of teaching math facts. Nevertheless, they added that some research revealed students become more fluent at a faster pace using flashcards and written practice daily than those using other methods.

In a study conducted by Tan and Chan (2007) on utilization of self-guided worksheets as a remediation support for academically weak students, anecdotal feedback from students' states that the self-guided worksheets motivated them to learn. It was also shown that there is a significant improvement in the students' performance in both post-test and prelim2 compared to their initial performance in prelim1. On the other hand, teacher-directed activities are particularly helpful to students who experience difficulties in learning math concepts. The largest predicted effect for a specific instructional practice was for drill and practice (Morgan et al., 2014). They suggested that first-grade teachers in the United States may increase their use of teacher-directed instruction if they are to raise the mathematics achievement of students with learning difficulties.

In contrast to drilling math facts, hands-on instruction gives more value to the development of mathematic concepts (Clements & Battista, 1990). Many teachers are using more student-centered approach in their teaching enabling students to construct

their own meaning of math problems (NCTM, 1991). Florence (2012) argues that mathematics manipulatives can help engage students for a longer period of time by helping them stay focused on particular tasks. Shaw (2002) suggests that many children see mathematics as a struggle so they give up on the task. She also suggests that the use of manipulatives can counter this.

McCallum, Poncy and Frawley stated that understanding of new concepts necessitates mastery of previously learned basic facts and skills. Stein et al., Van de Walle, Tan & Chan, and Morgan et al. agreed that drills and practice are effective in increasing students' fluency in mathematics. On the other hand, Clements and Battista, Florence and Shaw argued that the development of math concepts as well as longer engagement by the students in particular tasks are best achieved through student-centered activities. This study however looked into the effectiveness of using worksheet as a tool for students to revisit previously learned concepts and do a lot of practice in solving math problems.

## **1.2 Objectives**

This study aims to improve the performance in Calculus of BSED Math students in Romblon State University. It also seeks to determine the effect of using worksheets on the performance of students in Calculus.

## **2 Methodology**

In their study, Tan and Chan (2007) stated that the nature of an action research is one which is conducted by teachers for improvement of an ongoing teaching. Hence, the emphasis of this paper will be on the teaching strategy which will be tested as well as the findings and reflections. The teaching strategy under study is the use of recall and practice worksheets as an intervention in improving the performance of students in Calculus.

### **2.1 Participants**

This study was conducted over a period of five weeks in a class in Calculus. The participants consisted of Third Year BSED Math students enrolled at RSU-Main Campus during the second semester of school year 2017-2018. Instead of selecting the respondents based on the results of their midterm examination, it was decided that the entire class will participate in the study. Hence, the experimental method of research using the single group pretest-post-test design was utilized in order to measure the effect of worksheets on the performance of the students in Calculus.

### **2.2 Data Collection**

Eight (8) worksheets prepared by the researcher and validated by two mathematics teachers were administered to the students in sequence. Each worksheet was carefully designed so that they contain some concepts for recall and related exercises for drill purposes. The worksheets were subjected to analysis for improvement after they were

submitted by the students and checked by the teacher. The students had to complete two (2) worksheets every week for a period of four (4) weeks after which a post-test was administered, and their grades were recorded.

**2.3 Data Analysis**

Statistical data were interpreted using the mean, standard deviation, and the t-test.

**2.4 Ethical Considerations**

The participants of the study are already of legal age, so it is not necessary to seek their parents' permission. Instead, they were asked to fill up a consent form which indicates that they are willing to participate in the action research. They were also assured that data will be treated with utmost confidentiality and that their grades will not be affected by participating in the study.

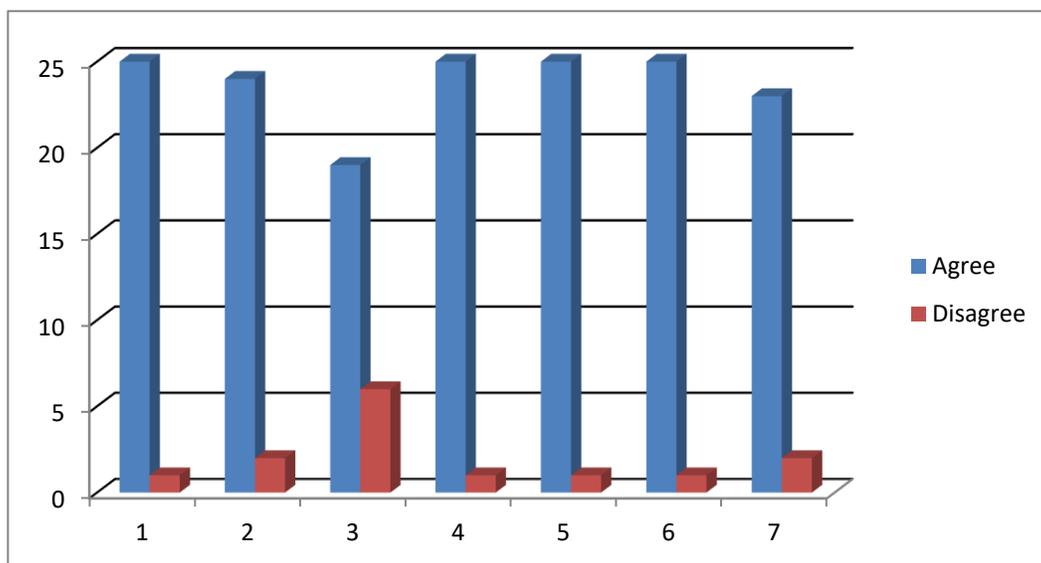
**3 Results and Discussion**

Table 1 presents the data resulting from the application of t-test that was used to determine if the difference between the pretest mean and the post-test mean is significant.

**Table 1.** Comparison of Pretest and Post-test Scores of the Students in Calculus

Test	N	Mean	Std Deviation	MD	t	Sig.(2-tailed)
Pre-test	27	0.2222	0.42366			
Post-test	27	2.1111	1.1547	1.8889	9.037	0.000

As shown in Table 1, there is a significant difference between the pretest and post-test scores of the students in favor of the post-test [ $t_{26}=9.037, p<0.05$ ]. It can also be seen that the students' mean score of 0.2222 in the pretest has increased to 2.1111 in the posttest. The mean difference, 1.8889, however indicated that the increase in the pretest score is just slight. The post-test mean did not even reach the average score which is 2.5.



Legend:

- 1- The worksheets make the topic more interesting.
- 2- The worksheets make the lesson easier to understand.
- 3- I am more comfortable doing the exercises in calculus if I do it using worksheets.
- 4- I get help from my classmates in solving the problems in the worksheets.
- 5- I prefer to have more questions in the worksheets which will lead me to the solution of the problem.
- 6- I like the review of past lessons in mathematics provided in the worksheets.
- 7- I enjoy the math practice in the worksheets.

**Figure 1.** Students' Feedback on the Use of Worksheets

Figure 1 presents the students' feedback on the use of worksheets as a learning material. Out of the 27 participants of the study, 25 students agreed that with the use of worksheets :1) They get help from their classmates in solving math problems; 2) They prefer to have more questions in the worksheets which will lead them to the solution of the problem; 3) They like the review of past lessons in mathematics provided in the worksheets; and 4) The worksheets make the topic more interesting. Twenty-four students agree that the worksheets make the lesson easier to understand. Only twenty-two agree that they enjoy the math practice in the worksheets. The comment that has the lowest frequency (19) is that which states that they are more comfortable in doing the exercises in calculus if they do them using worksheets.

### 5 Conclusion and Recommendations

The pretest mean score of 0.2222 which has increased as shown in the mean post-test score (2.1111) of the students is an indication that the use of recall and practice worksheets is effective in improving the students' performance in Calculus. The intervention has a significant effect on the performance of the students which can be seen in the computed value of  $t=9.037$ ,  $p<0.05$ . Problems on operations of exponential functions and trigonometric functions were given as separate exercises for the students

for the purpose of recalling concepts discussed in algebra and trigonometry. This strategy of inserting review facts and exercises helped the students to analyze whether or not the given function is integrable in its present form. The slight increase on the post-test scores could possibly be blamed on the attitudes of the students. Working as a group can cause some students to be dependent on their classmates. They are more conscious about getting high grades rather than learning.

However, anecdotal feedback from the students implies that the use of recall and practice worksheets has made the topic more interesting. Solving math problems as a group has probably reduced the anxiety they must have felt when they do the task by themselves. Those students who are really keen on achieving learning must have considered the availability of the review of past lessons a great help in solving the problems in the worksheet. They however expressed their desire for more questions that will serve as their guide to get to the right answer. With positive feedback from the students on the use of worksheets it is then necessary for teachers who are using the same intervention to improve the design of their worksheets regularly in order to sustain the students' interest in the subject.

Hence, based on findings and conclusions, the following are hereby recommended:

1. Use worksheets as learning materials instead of just relying on Power Point lectures and seat works.
2. Make an attempt to modify the contents of the worksheet. Instead of including recall of math facts, the students can be given worksheets containing questions that will serve as guide for them to arrive at the correct answer.
3. Conduct a follow-up study using either the same design of worksheet or a modified one.

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## Aplikasyung Android WattPad sa Asignaturang Filipino para sa Baitang Walong (8) Mag-aaral sa Ika-21 Siglong Pagkatuto

Ian M. Cristobal & Jonaline M. Closa

Kagawaran ng Edukasyon-Dibisiyon ng Oriental Mindoro

ian.cristobal@deped.gov.ph

**Abstrak.** Ang aplikasyung android wattpad sa asignaturang Filipino para sa baitang walong (8) mga mag-aaral ay isang inobasyon na kagamitan/stratehiya sa ika-21 siglong prosesong pagtuturo-pagkatuto. Humantong sa isang konsepto ang mga mananaliksik na gawing kapaki-pakinabang ang wattpad sa akademikong larangan lalo't higit sa pagtuturo ng asignaturang Filipino. Orihinal na mga katha na may kaugnayan sa mga paksa at kasanayang pampagkatuto na nararapat linangin sa mga mag-aaral ang binuo at nakainstall sa wattpad upang magbunga ng ika-21 siglong pagkatuto. Wattpad ang naging sanhi ng pagbaba ng akademikong pagganap, wattpad din ang magbubunga ng pagtaas nito. Ang kuwasi-eksperimental ang ginamit na disenyo ng pananaliksik. Ang paggamit ng pauna at panghuling pagtataya ang naghayag ng naging akademikong pagganap ng mga mag-aaral. May dalawang pangkat ng mag-aaral-respondente sa pag-aaral na ito, ang kontrolado (gumagamit ng wattpad) at eksperimental (hindi gumagamit ng wattpad). Pinagtibay ang naging resulta lapat ang T-Test bilang kagamitang pang-estadistika. Ang kinalabasan ng pag-aaral ay mayroong mahalagang pagkakaiba ang akademikong pagganap ng mga mag-aaral sa pauna at panghuling pagtataya. Ang kontrolado at gayundin ang eksperimental na pangkat bilang mag-aaral-respondente ng pag-aaral ay nakakuha nang mas mataas na iskor sa panghuling pagtataya na may deskripsyong mahusay. Nabuo ang kongklusyon na kahit gumagamit o hindi gumagamit ng wattpad subalit ginamit ang bagay na ito nang makabuluhan at kapaki-pakinabang ay magbubunga nang mahusay na pagkatuto. Ang nabuong aplikasyung android wattpad sa asignaturang Filipino para sa baitang walong (8) mag-aaral ay inaasahang magagamit at makatutulong higit sa mga guro at mag-aaral sa lahat ng antas ng edukasyon at magbubunga nang ika-21 siglong pagkatuto.

### 1 Konteksto at Rasyonale

Binigyang-kahulugan ng *American Dialect Society* (2011) ang aplikasyon ay isang uri ng *software program* para sa mga *mobile phone* o *computer operating system*. Maraming mga mag-aaral ang may lapit sa paggamit ng iba't ibang aplikasyon sa kanilang *smartphone* o *tablet* na madodownload sa libre o mababang halaga na magiging kapaki-pakinabang sa kanilang pag-aaral. Ang pagiging portable ng *smartphone* o *tablet* ay isang katangian na kahit saan ang isang tao naroroon ay maaaring makakonekta sa iba't ibang aplikasyon na ninanis niyang gamitin.

Ang Kautusang Panrehiyon Blg. 27, serye 2018 at Kautusang Pangkawaran ng Edukasyon Blg. 83, serye 2003 ay pumapatungkol sa paggamit ng cellphone sa loob ng silid-aralan. Batay sa kautusang mga nabanggit, mahigpit na ipinagbabawal ang paggamit ng cell[hone sapagkat lumabas na ito ay ginagamit ng mga mag-aaral sa

mga di-kaiga-igayang mga gawain na walang kaugnayan sa akademikong gawain. Mula ditto humingi ng pahintulot ang guro sa mga kinauukulan upang isagawa ang pag-aaral at nagsilbing matinding batayan niya ang pag-aaral nina Ruz, et. al.,(2014) *“Investigating the Use of Smartphones for Learning Purposes By Australian Dental Students”* at lumabas na mayroong halaga ang paggamit ng cellphone na nakainstall ang iba't ibang aplikasyon tulad ng diksyunaro, google, youtube at marami pang iba na magagamit sa pag-aaral ng mga mag-aaral.

Pinatutunayan ng K to 12 Filipino Kurikulum ng Kagawaran ng Edukasyon (2013), Kautusang Pangkagawaran ng Edukasyon Blg. 78, serye 2010, Kautusang Pangkagawaran ng Edukasyon Blg. 23, serye 2004, Kautusang Pangkagawaran ng Edukasyon Blg. 42, serye 2016 ay nagsilbing matinding sanligan ng mga mananaliksik upang isagawa ang kasalukuyang pag-aaral. Ang mga batayang legal na ito ay nagsasaad na ilapat ang teknolohiya sa prosesong pagtuturo-pagkatuto na umaakma sa mga mag-aaral sa kasalukuyan.

Ang kakulangan sa mga makabagong kagamitang-pampagtuturo na maaaring gumawa ang guro ng batid niyang mga makabagong kagamitang-pampagtuturo bago isagawa ang isang pagtuturo ay nangangailangan nang masusing pagpaplano at pananaliksik. Gayundin ang interes ng mag-aaral sa paggamit ng cellular phone bagaman ito'y ipinagbabawal ay naararapat na gawing kapaki-pakibanang o makabuluhan ang paggamit ng cellular phone sa oras ng klase. Iminumungkahi ng gurong-mananaliksik ang mainam na patnubay o pagsubaybay sa paggamit ng cellular phone sa oras ng klase.

Kung ang watsapp ang naging sanhi ng pagbaba ng akademikong pagganap ng mga mag-aaral, naniniwala ang mananaliksik na ito rin ang magiging solusyon sa suliraning kinakaharap ng kasalukuyang pananaliksik.

Ang inaasahang bunga ng pananaliksik ay isang aplikasyung android watsapp para sa baitang walong (8) mag-aaral na magbubunga ng ika-21 siglong pagkatuto.

### **1.1 Paglalahad ng Suliranin ng Pananaliksik**

Ang kasalukuyang pananaliksik ay naglalayong makalilikha ng isang aplikasyung android watsapp sa Filipino para sa Baitang Walo (8) tungo sa ika-21 siglong pagkatuto ng mga mag-aaral ng Doroteo S. Mendoza Sr. Memorial National High School panuruang taon 2019-2020.

Nilalayon ng pananaliksik na ito na matugunan ang sumusunod na katanungan:

1. Ano-ano ang akademikong pagganap ng mga mag-aaral sa paunang pagtataya sa paggamit ng watsapp sa asignaturang Filipino sang-ayon sa:
  - a. gumagamit ng watsapp
  - b. hindi gumagamit ng watsapp

2. Ano-ano ang akademikong pagganap ng mga mag-aaral sa panghuling pagtataya sa paggamit ng watsapp sa asignaturang Filipino sang-ayon sa:
  - a. gumagamit ng watsapp
  - b. hindi gumagamit ng watsapp
3. May mahalagang pagkakaiba ba ang akademikong pagganap ng mga gumagamit ng watsapp sang-ayon sa:
  - a. paunang pagtataya
  - b. panghuling pagtataya
4. May mahalagang pagkakaiba ba ang akademikong pagganap ng mga hindi gumagamit ng watsapp sang-ayon sa:
  - a. paunang pagtataya
  - b. panghuling pagtataya
5. May mahalagang pagkakaiba ba ang akademikong pagganap ng gumagamit ng watsapp bilang kontroladong pangkat at hindi gumagamit ng watsapp bilang eksperimental na pangkat?
6. Ano-ano ang suliraning kinaharap ng mananaliksik habang isinasagawa ang implementasyon ng aplikasyung android watsapp sa asignaturang Filipino para sa baitang walong (8) mga mag-aaral sa ika-21 siglong pagkatuto?

## **2 Pamamaraan ng Aksiyong-Pananaliksik**

Ang kasalukuyang pananaliksik ay isang Kuwasi-Eksperimental na uri ng pananaliksik na naglalayong matukoy ang kabisaan ng aplikasyung android watsapp sa Filipino bilang isang makabagong kagamitang-pampagkatuto ng mga mag-aaral sa Baitang Walo (8) ng Doroteo S. Mendoza Sr. Memorial National High School. Sasailalim ang mga mag-aaral na gumagamit ng watsapp sa kasalukuyang pag-aaral gayundin ang mga piling mag-aaral na hindi gumagamit ng watsapp bilang eksperimental na pangkat.

Bago isagawa ang kasalukuyang pananaliksik, humingi na pahintulot ang mananaliksik mga kinakaukulan lalo't higit sa administrasyon ng paaralan kung saan isinagawa ang pananaliksik.

Inilahad ng mananaliksik ang mabubuon panukalang-pananaliksik sa pandibisyong kongreso ng pananaliksik upang makalikom ng mas mainam na suhestiyon at rekomendasyon.

Sa pagsisimula ng aksiyong-pananaliksik na ito, nagsagawa ang mga mananaliksik ng isang panimulang pagsasarbey upang matiyak na ang paggamit ng watsapp ay naging sanhi ng pagbaba ng akademikong pagganap ng mga mag-aaral o bilang isang karagdagang inobasiyon na kagamitang-pampagtuturo.

Mula rito, pinili ang mga respondente ng pananaliksik batay sa katangian ng gumagamit at hindi gumagamit at sa naging resulta ng panimulang pagsasarbey.

Bago gamitin ang nabuong aplikasyung android wattpad sa akademikong larangan, nagbigay ng panimulang pagtataya ang mananaliksik. Ang panimulang pagtataya na ito ay pumapaloob sa iba't ibang aralin sa panitikan na nakaangkla ang bawat tanong sa badyet ng mga gawain at batay sa talahanayan ng ispesipikasyon.

Ang ginamit na ika-21 siglong kagamitang-pampagtuturo ay isang aplikasyung android wattpad. Bawat mag-aaral ay mayroong android phone na mayroong nakainstall na nasabing aplikasyon. Ginamit ang internet koneksiyon upang maka-access dito. Sa isasagawang pagtuturo ng gurong-mananaliksik, ang aplikasyung android wattpad ang ginamit na kasangkapan sa pagbabasa ng mga anyo ng panitikan mapaprosa o panulaan man ito, ang aplikasyung android wattpad group na nakalink sa facebook ang ginamit upang i-post ang mga isinagawang gawain, ang aplikasyung facebook-wattpad android e-worksheets naman ang ginamit sa pagsasagot sa mga inihandang gawain ng guro at tinawag na aplikasyung android wattpad classroom naman ang silid-aralan na ang mga mag-aaral na gumamit ng wattpad sa pagkatuto.

Dahil pinahintulutan ang paggamit ang android phones sa loob ng silid-aralan, mahigpit at mainam na implementasyon at pagsubaybay ang isinagawa. Ginamit ang mga android phones sa oras ng klase lamang at kinolekta ito matapos ang pagtuturuang naganap.

Matapos na maituro ang mga piling kasanayang pampagkatuto sa ikaapat na markahan, nagsagawa muli ng isang panghuling pagtataya. Tinukoy ang kabisaan ng wattpad batay sa akademikong pagganap ng mga mag-aaral. Nilapatan ng kagamitang pang-estadistika ang T-test upang pagtibayin at tukuyin kung may mahalagang pagkakaiba ang akademikong pagganap ng mga mag-aaral sa kontrolado at eksperimental na pangkat.

**3 Presentasyon at Interpretasyon ng mga Datos**

**Talahanayan 1.** Ano-ano ang akademikong pagganap ng mga mag-aaral sa paunang pagtataya sa paggamit ng wattpad sa asignaturang Filipino sang-ayon sa gumagamit at hindi gumagamit

Pangalan ng Mag-aaral	Gumagamit (kontrolado)	Hindi Gumagamit (eksperimental)
M1	3	2
M2	2	4
M3	4	4
M4	3	2
M5	5	5
M6	5	6
M7	4	3
M8	7	5
M9	5	5
M10	2	3
<b>Mean</b>	<b>4</b>	<b>3.9</b>

**Talahanayan 2.** Ano-ano ang akdemikong pagganap ng mga mag-aaral sa panghuling pagtataya sa paggamit ng watsapp sa asignaturang Filipino sang-ayon sa gumagamit at hindi gumagamit.

Pangalan ng Mag-aaral	Gumagamit (kontrolado)	Hindi Gumagamit (eksperimental)
M1	8	8
M2	8	7
M3	8	8
M4	7	7
M5	7	7
M6	7	6
M7	8	5
M8	8	8
M9	7	6
M10	8	7
Mean	<b>7.6</b>	<b>6.9</b>

**Talahanayan 3.** May mahalagang pagkakaiba ba ang akademikong pagganap ng mga gumagamit ng watsapp sang-ayon sa paunang pagtataya at pahuling pagtataya?

Paunang Pagtataya	Panghuling Pagtataya
<b>3</b>	8
<b>2</b>	8
<b>4</b>	8
<b>3</b>	7
<b>5</b>	7
<b>5</b>	7
<b>4</b>	8
<b>7</b>	8
<b>5</b>	7
<b>2</b>	8

Paglalatap ng T-Test para sa hindi magkatulad na variances

	T-Value		T-Critical
	-6.91		2.20

Ipinapahayag na mayroong pagkakaiba ang pauna at panghuling pagtataya ng mga mag-aaral-responenteng gumagamit ng watsapp bilang kontroladong pangkat.

**Talahanayan 4.** May mahalagang pagkakaiba ba ang akademikong pagganap ng mga hindi gumagamit ng wamppad sang-ayon sa pauna at panghuling pagtataya?

Paunang Pagtataya	Panghuling Pagtataya
2	8
4	7
4	8
2	7
5	7
6	6
3	5
5	8
5	6
3	7

Paglalatapat ng T-Test para sa hindi magkatulad na variances

	T-Value		T-Critical
	-5.60		2.12

Ipinapahayag na mayroong pagkakaiba ang pauna at panghuling pagtataya ng mga mag-aaral-responenteng hindi gumagamit ng wamppad bilang kontroladong pangkat.

**Talahanayan 5.** May mahalagang pagkakaiba ba ang akademikong pagganap ng mga gumagamit ng wamppad bilang kontroladong pangkat at hindi gumagamit ng wamppad bilang eksperimental na pangkat?

Panghuling Pagtataya	Panghuling Pagtataya
8	8
8	7
8	8
7	7
7	7
7	6
8	5
8	8
7	6
8	7

Paglalatapat ng T-Test para sa hindi magkatulad na variances

	T-Value		T-Critical
	1.98		2.14

Ipinapahayag na walang pagkakaiba ang akademikong pagganap sa panghuling pagtataya ng mga mag-aaral-respondenteng gumagamit ng wamppad bilang kontroladong pangkat at hindi gumagamit ng wamppad bilang eksperimental na pangkat.

#### **4 Kinalabasan, Kongklusyon at Rekomendasyon**

##### **4.1 Kinalabasan**

Batay sa isinagawang pag-aaral lumabas na:

1. Para sa mga gumagamit ng wamppad, ang mean ng paunang pagtataya ay 4.0 at ang panghuling pagtataya naman ay 7.6. Ipinahahayag nito na mas mataas ang iskor na nakuha ng mga mag-aaral-respondente sa panghuling pagtataya.
2. Para sa hindi gumagamit ng wamppad, ang mean ng paunang pagtataya ay 3.9 at ang panghuling pagtataya naman ay 6.9. Ipinapahayag nito na mas mataas ang iskor na nakuha ng mga mag-aaral-respondente sa panghuling pagtataya.
3. Para sa gumagamit at hindi gumagamit ng wamppad sa panghuling pagtataya, hindi nagkakarayo ang iskors ng mga mag-aaral-respondente sa 7 at 8.
4. Sa paggamit ng wamppad sa asignaturang Filipino, mapapansin na nagiging aktibo sila sa pagsagot sa kasunduan, mas naipahahayag ang sariling kasagutan sa mas malinaw na paraan, may panahon para makapagsaliksik at masigasig sa pag-aaral dahil naiiwasan ang pagliliban sa klase.

##### **4.2 Kongklusyon**

Batay sa kinalabasan ng pag-aaral, ang mga mananaliksik ay humantong sa sumusunod na kongklusyon:

1. Mayroong mahalagang pagkakaiba ang akademikong pagganap ng mga gumagamit ng wamppad sa pauna at panghuling pagtataya.
2. Mayroong mahalagang pagkakaiba ang akademikong pagganap ng mga hindi gumagamit ng wamppad sa pauna at panghuling pagtataya.
3. Walang mahalagang pagkakaiba ang akademikong pagganap ng mga gumagamit at hindi gumagamit ng wamppad sa panghuling pagtataya.
4. May halaga ang paggamit ng nabuong aplikasyong android wamppad para sa baitang walong (8) mag-aaral sa ika-21 siglong pagkatuto.

### 4.3 Rekomendasyon

Mula sa nabuong kongklusyon ng pag-aaral at mga hakbang na isagawa ng pananaliksik, ang mga mananaliksik ay humantong sa sumusunod na rekomendasyon:

1. Gamitin ang nabuong aplikasyung android watsapp sa asignaturang Filipino para sa baitang walong (8) mag-aaral na gumagamit at hindi gumagamit ng whatsapp bilang isang makabagong kagamitang-pampagtuturo o estratehiya sa ika-21 siglong prosesong pagtuturo-pagkatuto.
2. Hinihikayat na dagdagan pa ang bilang mga mag-aaral-respondente ng pag-aaral. Maaaring isagawa na magkahiwalay ng silid-aralan ang mga mag-aaral na gumagamit at hindi gumagamit ng whatsapp.
3. Dahil ang panimulang pananaliksik ay maituturing na *classroom-based* na pananaliksik, hinihikayat na isagawa ito sa mas malawak na saklaw katulad ng pandibisyon subalit siguraduhin na dadaan sa mga eksperto sa nasabing asignatura ang mga instrumentong gagamitin upang mabalideyt.
4. Inirerekomenda na pumili ng mga paksa sa asignaturang Filipino 8 na maaaring lapatan o gawan ng sariling komposisyon na mayroon naming kaugnayan sa naturang paksa kung saan mas mapadadali ang pag-unawa ng mga mag-aaral na magbubunga ng ika-21 siglong pagkatuto.

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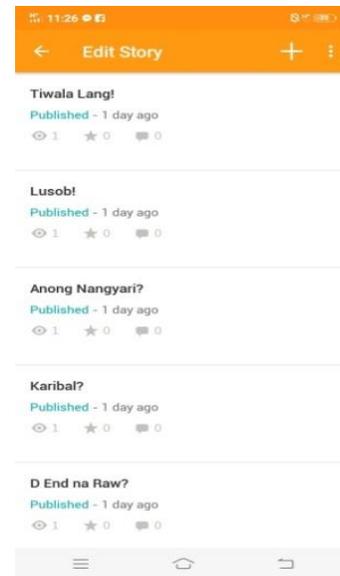
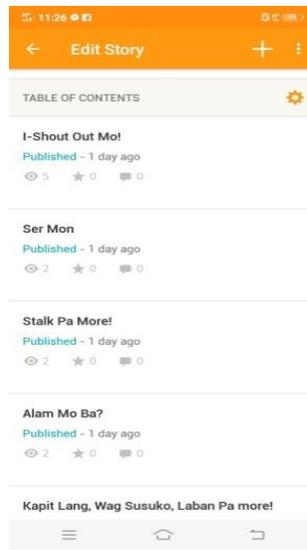
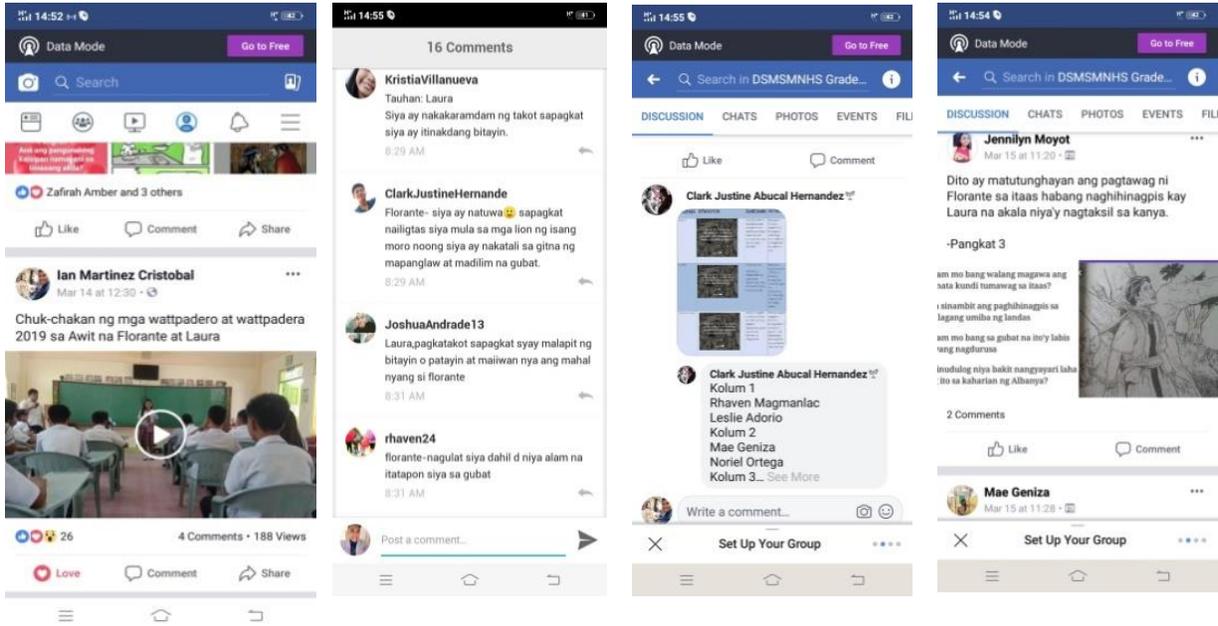
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Apendiks

Apendiks A  
Sample ng mga Gawain sa Facebook-WattPad Group



## Life Dynamics as a behavioral program for student leaders of Jose Rizal University

**Jonathan W. Chiong, Jayces C. Catipunan-Francisco**

Jose Rizal University, Mandaluyong  
jonathan.chiong@jru.edu

**Abstract.** Student behavior in today's times is focused on strengths management. Life Dynamics begins by identifying the individual's basic orientation to life, or personal style. Based on this foundation of self-knowledge, powerful strategies enable individuals and groups to work more effectively together, be more influential when dealing with key people, and achieve better results in teams. Student leaders of Jose Rizal University are encouraged to maximize their potentials by encouraging use of underused strengths. Student leaders of Jose Rizal University are given a series of context specific surveys with topics ranging from leadership to individual styles. The surveys measure behavioral style preferences that may change in different environments, so it is essential to establish context. As the student leaders manage student activities, student organizations and team members, they become aware of their preferences in managing their strengths as they begin to implement the developmental strategies that will have an immediate impact on productivity. In coordination with the Student Development Office and the Community Development Office, Life Dynamics resulted to learning activities that are carefully sequenced as student leaders build confidence in acquiring relevant skills, perspectives, and insights in a study conducted among the student leaders across colleges and departments of Jose Rizal University for school year 2018-2019. ASCEND program stemming yields to enormous productivity improvements that can be realized using common language to communicate with people in the style that they wish to be communicated to, thus, enhancing productivity among student leaders of Jose Rizal University.

### 1 Introduction

Language and communication skills that translate to behavior are one of the elements of standard skills that are critical among college students. The university's role in producing graduates in a variety of fields to fulfill the industry needs does not only focus on academic achievement, but also on generic skills or "soft skills" required for them to compete in the global market. Furthermore, employers now place great importance on generic skills and personality in choosing their future employees.

Mastery of technical skills alone is no longer adequate for employees in the highly competitive marketplace (Lazarus, 2013) of the 21st century. The need for individual soft skills has taken on heightened importance (Seetha, 2014). The most valuable employees in the organization have a mix of both hard and soft skill competence (Griffith & Hoppner, 2013).

Life Dynamics is a method that helps individuals, teams, and organizations improve communication skills, productivity, and results by working more effectively

together. This organizational development tool support people to value and manage their strengths and those of others in order to achieve greater satisfaction and better outcomes, take advantage of people's strengths to create high performing organizations that deliver results, and create an exchange between people where they celebrate their differences so that they all feel comfortable and do well together. It begins by identifying the individual's basic orientation to life, or behavioral style. Based on this foundation of self-knowledge, it offers powerful strategies that enable individuals and groups to be more productive in their work and more influential when dealing with key people. People behave using the four basic styles, which are based on the four basic ways of how humans interact: GIVING, TAKING, HOLDING, and DEALING, in two conditions, FAVORABLE, when things are going well and; UNFAVORABLE, when things are in stress and conflict and six strategies for making CHANGE – ways to deal with other people effectively and address the things that get in the way of being effective.

Student leaders of Jose Rizal University are given life dynamics surveys, a self-reporting assessment that provides participants specific feedback for personal and professional development that stemmed from language and communication skills and competence that will give the graduating students a clear concept of their strengths.

Jose Rizal University established in 1919 is one of the premier universities in the Philippines. The vision of the university is to be a market leader in the use of technology for innovation in teaching and learning to produce graduates of social importance. Its aim is to develop its students to become useful and responsible citizens through the effective transfer of relevant knowledge and desirable values.

The aim of this paper is to provide a view on the use and application of Life Dynamics that resulted to ASCEND as behavioral program, for student leaders of Jose Rizal University to develop soft skills to enhance behavior.

## **2 Literature Review**

Language and communication skills, leadership skills are powerful instruments for university graduates to succeed in the professional world. An individual's technical skills are no longer sufficient as the demand for soft skills is increasing (Robles, 2012). Demand for individuals who have skills such as the ability to communicate effectively is on the rise with the individuals poised for success in the highly competitive marketplace (Lazarus, 2013).

Communication skills are listed by numerous executives as prime requisites for obtaining and retaining employment (Hartman & LeMay, 2004). Davis and Brantley (2003) concurred that the ability to communicate is essential for success in career growth and personal relationships. Lehman and Du Frene (2008) asserted that regardless of the field, communication skills are important to all twenty-first century job applicants.

Jose Rizal University, in coordination with the Student Development Office, uses Life Dynamics as a tool for develop soft skills. Part of its program is the Go Green Campaign that encourages student leaders to ensure that behavioral programs are implemented in the university campus as part of student activities. Student leaders are

encouraged to serve the university and the community to obtain and achieve continuity in student activities and student development programs of Jose Rizal University.

Using the Life Dynamics Framework of Dr. Stuart Atkins (2014) shown on Figure 1, students are encouraged to assess their individual styles to develop a framework of values, using them to support the campus sustainability programs of the university. This framework as language and communication and leadership tool supports communication preferences and styles, developmental strategies will be implemented that result to immediate impact on productivity. The four orientations include GIVING, TAKING, HOLDING, and DEALING.



Figure 1. Life Dynamics Framework

In a 360° perspective that creates a positive environment for values clarification and strengths management, feedback is centered on the strengths the students see in themselves and reinforced by how others view their strengths in relationships to them; includes observed strengths and strengths to use more and less of. This tool helps the students in mapping their plans and goals to understand how to work more effectively on their own, or with teams, in implementing behavioral programs and student development activities. The strengths feedback chart is used as shown in Figure 2.

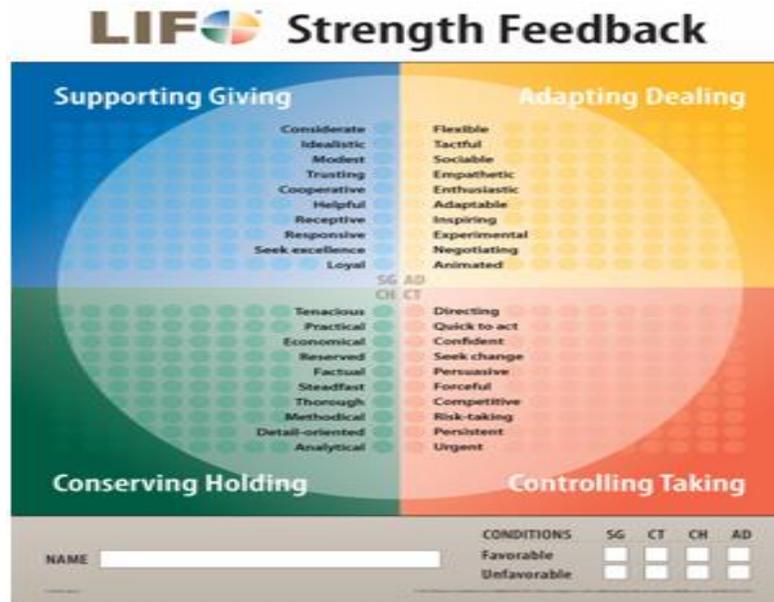


Figure 2. Life Dynamics Feedback Chart

The Life Dynamics Program can be applied in training, coaching, consulting, and organizational development. Applications include: Appreciating diversity, better relationships, building on and utilizing strengths, effective leadership behavior, improved performance, increased resilience, increasing morale at all levels in organizations, job and career satisfaction, organizational effectiveness and culture, teamwork and collaboration, and social responsibility.

The world is full of innovation. Simply defined as the application of new ideas, innovation is often the driving force in government, business, technology, and education. People are often praised for their innovation, held in high regard for the new ideas that lead to organization paradigm, and asked to share this shift in thinking with their colleagues. With so much value placed on innovation, it is important to understand the primary factors that promote and obstruct innovation. There are two basic forces that influence innovation. Restraining forces have a negative effect on innovation and include bias, excessive obsession, and preoccupation. These forces limit new ideas and prohibit successful organization paradigm shift. The positive forces (Takayama 1982) that influence innovation are known as driving forces. Embracing change, taking risks, and embracing other cultures are all examples of driving forces. It is important to note that the restraining forces are all influenced by our self-constraining straps or taga. In the past, when an attempt was made at translating taga from Japanese to English (Tsukasa, 1982), finding a word that would match the original meaning of the Japanese expression became a point of discussion. Thinking hoops, thought straps, or limitations in one's thinking, were all considered as possible translations for the term. It was highly debated whether these terms would actually succeed in accurately conveying the meaning of the concept or not. Many professionals held the opinion that it would be better to introduce this concept by using the original Japanese word taga (箍)—which would join other borrowed Japanese words such as: Fujiyama, tempura, or kaizen. Simply put, tagas

are self-limiting parameters that prohibit innovation. Japanese companies wanted to proclaim their elimination of taga, and wanted to express how they have come to use innovation by facing their challenges, failures, and successes.

### **3 Methodology**

This study integrates the use of Life Dynamics, Taga Innovation in the application and implementation of the programs for student leaders to further other programs in behavior management. The researchers used mixed methods, qualitative and quantitative methods, participant observation, in-depth interviews, and focus groups-discussion. A qualitative research design is concerned with establishing answers to the whys and hows of the phenomenon in question. The strength of qualitative research is its ability to provide complex textual descriptions of how people experience a given research issue. It provides information about the "human" side of an issue – that is, the often contradictory behaviors, beliefs, opinions, emotions, and relationships of individuals. (Denzin, 2000). The underlying reason for carrying out any qualitative research is to gain a richly detailed understanding of a particular topic, issue, or meaning based on first-hand experience. The Life Dynamics survey is also being used. It is a self-reporting assessment that takes approximately 15 minutes to complete. There are no right or wrong answers and the results provide participants specific feedback for personal and professional development. For contextual and situational aspects, there are a series of context specific surveys with topics ranging from language and communication styles to leadership styles. The surveys measure behavioral style preferences, which may change in different environments, so it is essential to establish context. The survey is a contextual assessment of behavioral styles, in other words, "what you do", as opposed to a static review of your personality type, "who you are," translating action and productivity skills to develop and enhance behavior.

### **4 Findings and Discussion**

Life Dynamics resulted to ASCEND as behavioral program for student leaders to develop soft skills. This is an integration of education, innovation, and leadership. ASCEND trains university students to do active community participation. For instance, if their student and professional organizations face a particular social problem, they can use their skills to research the causes and possible solutions of the problem, work with others by listening and collaborating on developing a solution, and then present their views and solutions as citizens to their members.

A-Achieving Excellent English for the Professional Environment - This course combines specialized classes in International Business English communication skills and concepts with general English language skills. This course is designed to give students the English skills they need to work effectively in today's global marketplace. English skills and vocabulary are developed through exercises, case studies, role plays and research on business and social topics.

S-Self Awareness for Behavior Management- This course will provide learners with the knowledge and skills to self-reflect, understand emotional intelligence and the

various learning styles. As well as outlining the various personality types, and theories surrounding emotional intelligence, this section will provide you with all the resources, diagrams and descriptions of some of the most important models regarding self-awareness, such as Maslow's Hierarchy of Needs, the Johari Window, Force Field Analysis, Life Orientations.

C-Communicative Competence for Professional Purposes and Intercultural Sensitivity- It is common knowledge that in today's increasingly globalized world problems of intercultural understanding and communication are becoming more and more important. Living in a multicultural world and interacting with people from different cultural backgrounds is not easy if you have not developed "intercultural sensitivity," a specific feature that shows the ability of students to see and understand cultural differences, and "intercultural competence", the ability to think and act in an inter-culturally appropriate way. The course is devoted to communication between different cultures and includes the study of two aspects of intercultural communication – theory and practice.

E-Enhancing people's economic capacity and people's coping strategies for reducing disaster risk- This course is intended to provide fundamental understanding of different aspects of Disaster Management. It will expose the students to the concept and functions of Disaster Management and to build competencies of students to be ready for disaster management professionals. It would also provide basic knowledge, skills pertaining to Planning, Organizing and Decision-making process for Disaster Risk Reduction. This also includes strengthening people's economic capacity, enhancing people's coping strategies, firming up social and organizational support structures, accessibility of health and medical services, and advocacy and positive influence.

N-Nature of communication, principles and functions for values clarification- This course guides the students to examine their beliefs, attitudes and values behind decisions and actions including whether behavior matches stated beliefs, evaluating consequences of choices and developing a process that will enable the development of personalized value.

D-Discipline of communication for leadership and soft skills for campus and social sustainability. This course is designed for participants to work collaboratively to build an empirical model of effective leadership based upon their own observations and personal experience, as well as professional research findings on the discipline of communication. The empirical model on campus sustainability consists of an operational definition of leadership; identification of the essential qualities and characteristics of leadership; and specific skills necessary for students to realize their unique potential as leaders in campus sustainability and social and community sustainability.

Student leaders of Jose Rizal University all have undergone ASCEND for them to be holistic community leaders. Upon graduation, they serve their respective communities as manifested in behavior management Alumni of the university also serve Jose Rizal University in various campus student development programs that revolve the university's Go Green Campaign. The primary purpose of ASCEND is to develop individuals

holistically for them to serve their communities with their innate sense of service and purpose.

## 5 Conclusion

ASCEND resulted to the human element factor of all students. Student leaders of Jose Rizal University acquire and develop soft-skills for strengths and behavior management. True to the university core values, being responsible, courteous, considerate, and living in utmost integrity, ASCEND develops accountability, self-regard, responsibility, openness, and role-fit of purpose and service. In the midst of technology and globalization, the clarification of values among students is what the Jose Rizal University implements among its students. The human element is what we need to have a firm grasp on behavior management. The elements of awareness from life dynamics have developed to a series of psychometric instruments for ASCEND. Each element measures one aspect of a person or relationship. Together, these instruments comprise the backbone of ASCEND.

The purpose of all of the elements of awareness is to provide information for expanding self-awareness first hand. Increased self-awareness improves understanding of why people behave in the way that they do, how they interact, and the relation between behavior and consequences in the personal and professional environment. The result is greater effectiveness as students, leaders, managers or team members.

Using ASCEND as a behavioral program for student leaders of Jose Rizal University further translates values clarification in the contextual and situational human elements in developing soft skills bringing forth execution culture and actionable ways for behavior management.

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## **TalkHANGG (Talk with Heads of Agencies Needed for Good Governance): An Inter-Agency Campaign Regulating Entry of Learners to Computer Shops**

**Mary Joan J. Cajella, William C. Agomana, Maurita M. Donasco,  
Dinah Zoraida B. Zamora, Margarita B. Enerio, Leah Lyn A. Lingatong**  
[maryjoanjcajella@gmail.com](mailto:maryjoanjcajella@gmail.com)

**Abstract.** This paper intends to determine the outcome of the intensive awareness campaign for the learners of Cagayan de Oro National High School, to their daily attendance and academic performance. City Ordinance Section 38, Article IV #10536-2007, regulating entry of students to computer shops and café's during class hours through TALKHANGG: ( Talk with Heads of Agencies Needed for Good Governance) An Inter- Agency Campaign Regulating Entry of Students to Computer Shops. This initiative was introduced by City Welfare and Development, approved and supported by the Barangay Council of Nazareth with the active collaboration of Police Station 9 , School Heads from public institutions (elementary ,junior, senior) under Barangay Nazareth, Barangay Child Protection Chair and Barangay Nazareth youth leaders. The basis of this campaign is the alarming result of the Barangay through their records. The presence of the students is evident during the barangay inspection, moreover; the disturbing result for 2017-2018 where 10% failure rate was noted. TALKHANG is a surprise inspection of all computer shops that surround the barangay Nazareth. Conferences were scheduled on the proper mechanism of this operation taking into consideration the child protection policy. On the part of the school, the Talkhangers of Cagayan de Oro National High School had taken an initiative to do its part in the massive campaign by securing and giving guidance to its own learners particularly the Grade-8. Furthermore, this idea gave a positive feedback to the students and the community as a whole, everyone is now conscious of the ordinance. The Talkhangers (research team) considered this initiative to be a good venue for research and innovation in order to regulate students from going to computer shops during class hours and should be found inside the classrooms. It is therefore recommended that the implementation of TalkHANGG should be consistent and strengthen school's procedure in processing the children hooked in computer addiction to improve academic performance.

### **1 Introduction**

In this fast-paced world, life has been moving so wild because of modern technology which gives entertainment to all types of people in diverse ages, rich or poor are hooked in gadgets and in the net world ignoring the danger it may cause. "Computer games as started in 1972 with Pang, a computer tennis game, and then developed in hardware and software system. Improvement of quality and variety of games increasingly spread it in society especially adolescence. It is believed that computer games and watching TV provides opportunities for visual learning. Especially because these games are more active compared to watching TV they are considered more effective since these are second entertainment next to TV. However, negative effects on physical and mental health, which are much higher than the positive effects of games such as increasing the

coordination of eyes and hands. As Klein and Keepers mentioned in their research reports in 1990, students who prefer computer games to other entertainment have more behavioural problems. (Isfaha- Eshrat Zamani, PHD et. Al)

Furthermore, computer games, cyber sex , cyber relationship, internet gambling and information overload are the causes why students are being addicted to computer. These are the most common things that they do when they are in front of a computer (Deverensky & Gupta, 2004). These causes can affect the academic performance of the students resulted to high rate of failure and drop- out rate of the students. The nearby computer shops trigger the students to be easily hooked in computer use. That's why the researchers believe that computer addiction is the primary cause why most of the first year students at Mapua Institute of Technology are poor in their academic performances.( Philline Kate Vera C. Palaña et al.)

A lot of discussions had been brought out on how to solve this issue, the local government had passed ordinances on the distance of computer shops to school, presence of children during class hours and reinforced by DepEd Order #86 series of 2010 dated June 18, 2010. School authorities and DepEd should help in implementing policies concerning internet cafes for the good outcomes of this regulation. The sanctions for internet cafes that violate policies shall be subject to the following penalties, a. A fine of 1,000 for 1st Offense, b. A fine of 2,000 for 2ndOffense, c. A fine of 2,500 for 3rd Offense and for the students, a. 1st offense: reprimand/guidance counselling, b. 2nd offense: parents needed, c. 3rd offense: suspension depends on the gravity of the offense and shall be conformed with the DepEd ruling (DepEd-86, Series of 2010). (Borro Jr)

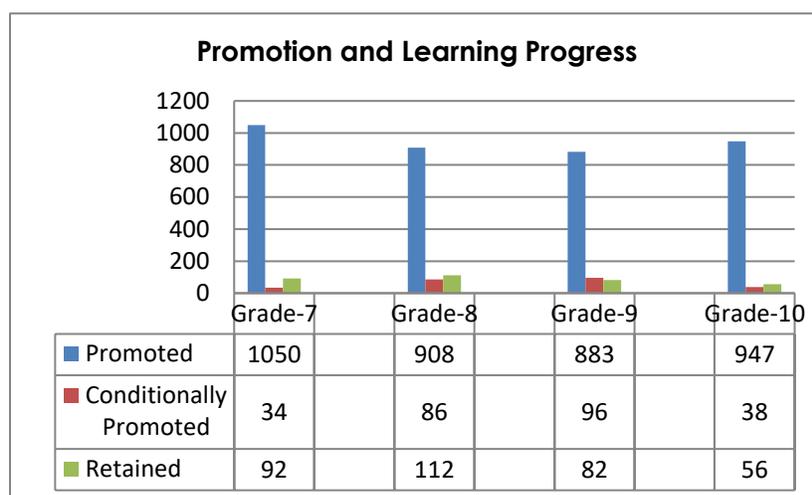
Cagayan de Oro de Oro Junior High School had been commended for outstanding performance both curricular and non-curricular, local to International level of recognition. It has existed for 53 years delivering the best education for learners according to the standards set by DepEd. For several years now, the school had made variety of innovations, interventions, researches yet 100% of promotion rate had not been achieved, a big twist of what is called to be a performing school. Continuous improvement is a great challenged faced by the school administration and teachers. One of the perennial causes of high failure and drop –out rate is the computer addiction among students. The school though offered a lot of innovations to improve academic performance, still the problem remains. But this does not stop the school for improving its services. The problem of computer addiction among learners is not a concern of the school alone but also of the whole community from parents, computer shop owners and the local government unit. It is everybody's concern.

## **2 Methodology**

This action research employs Continuous Improvement Action Research which involves three stages. Stage 1 ASSESS, Stage 2 ANALYZE, Stage 3 ACT. To test the validity and reliability, the researchers used triangulation, survey questionnaires, Voice of the Costumers (VOC), Focus Group Discussion (FGD) and classroom observations.

**2.1 ASSES Stage.**

With the present scenario, Cagayan de Oro Junior High School is situated in Barangay Nazareth Cagayan de Oro City is surrounded by internet hubs or computer shops. The performance indicator shown where 9.47 % failure rate was noted. The indication of this study, therefore, came primarily from the noted upsetting result of the promotion rate and records of Barangay who were rescued during surprise inspection. With the mentioned concern, the Talkahanggers target to address the problem by using TALKHANGG strategy initiated by the barangay council and reinforced by the school's Talkhanggers to the students of Cagayan de Oro National High School learners to help them become aware of the ordinance and avoid going to computer shops during class hours and eventually improve academic performance.



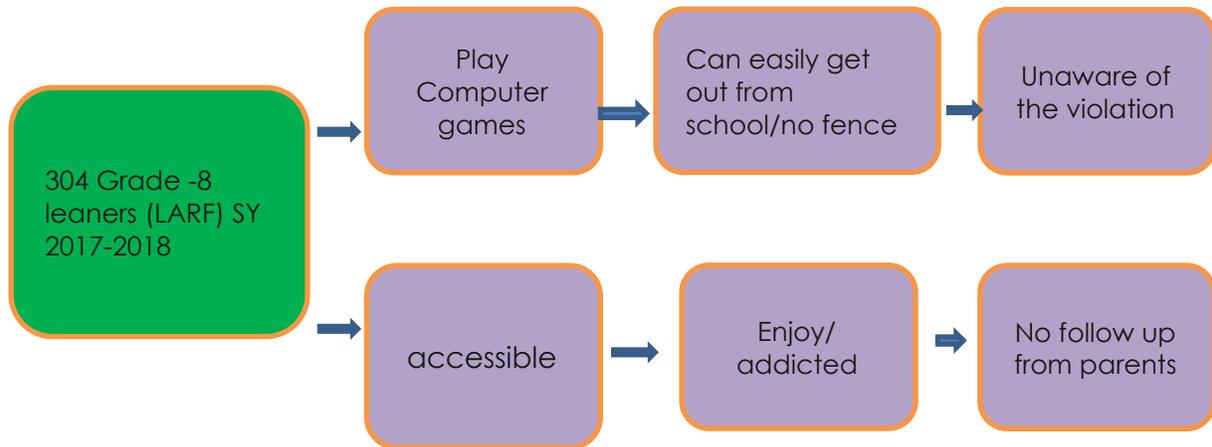
**Figure 1.** Promotion and Learning Progress SY 2017-2018

Figure 1 shows the promotion and learning progress of the learners from Grade-7-10 for SY 2017-2018. Among the four grade levels, Grade 8 had the highest number of failure rate, followed by Grade 10 ,9 and 7.

Based on the above results, the researchers identified the target customers who are the learners from Grade 8 level where 9.47% were retained the lowest among the four grade levels. FGD, survey and barangay and police records were gathered. Parent's consent, school's approval was done.

**2.2 Analyze Stage**

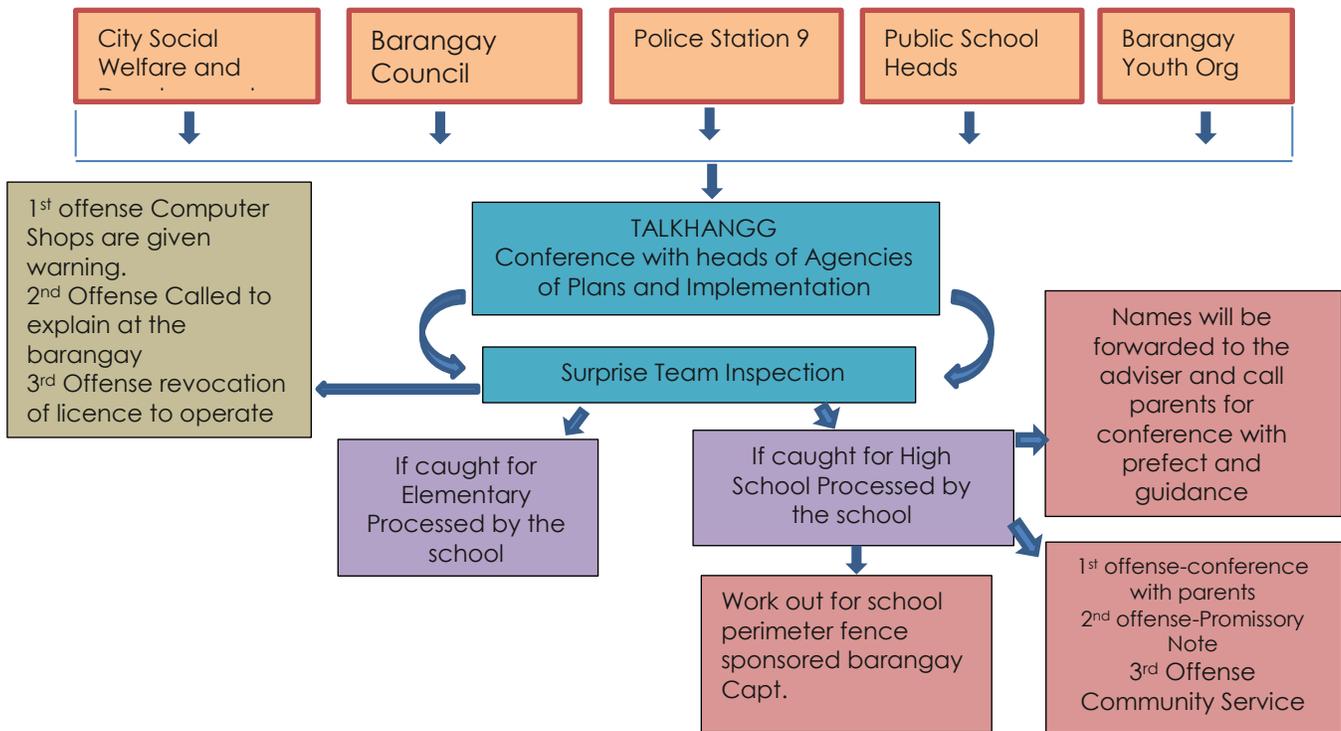
After a thorough discussion, VOC and FGD, and the declining result of the promotion progress the research team dig into the depths of the problem by using WHY-WHY diagram to analyse the root cause. The researchers found out that lack of awareness regarding the city ordinance on computer shop entry and its consequences and violation, lack of parents' concern, school's mechanism of student's attendance are the main causes of problem.



**Figure 2.** WHY-WHY DIAGRAM

The Why - Why diagram shows that 340 Grade 8 students were considered LARF (Learners at Risk of Failing) for SY 2017-2018 due to computer addiction. Students cut classes since there is no perimeter fence in the school, they are free to go out easily without being noticed. Furthermore, students who were involved are unaware of the city ordinance regarding allowable time they can enter the computer shops. Parents were also unmindful of their children reporting to school even though adviser reminding them of their children's attendance and misbehaviour.

**2.3 ACT Stage**



**Figure 3.** Generating Solution: TALKHANG

TALKHANGG as a collaborative strategy among City Social Welfare Development of Cagayan de Oro City, Barangay Nazareth in Cagayan de Oro City through the leadership of Barangay Captain Josephine Rodriguez had initiated an inter-agency campaign on regulation on entry of students to computer shops during class hours. This initiative is in partnership with Macasandig Police Station 9, Barangay Child Protection Chairman Lydia Tubella PhD., Youth Leader Dennis Motivo, Education Committee Chair Councilor Bernadette S. Murphy, South Central School Administrator and Cagayan de Oro National High School headed by the school principal, William C. Agomana. The campaign on regulation on student's entry to computer shop during class hours is of great help to the whole Nazareth Community and more specifically to students of Cagayan de Oro Junior High School.

The researcher who is also part of the campaign designed TALKHANG (Talk with Heads of Agencies on the Needed good Governance) as a positive strategy to inform the computer shop owner on their limits as to the entry of students during class hours. The strategy is anchored on the SBM Principle on strengthening the partnership with local communities as well as local government unit to invest time, money, effort, in making the school a better place to learn.

After a series of conferences with different heads of agencies, planning and implementation follows. The next process was a surprise random inspection by the team to all computer shops surrounding barangay Nazareth. The computer shop owners' attention is called and interviewed regarding the ordinance, and their permit for operation. If minors are caught, they all will be interviewed and be given orientation and counselling by the concern group. If Elementary Students are caught, they will be turned over directly to the head assigned that day. The head of the school gets data and submit it to the advisers and call parents for a conference and makes promissory note if offenses are done the 3<sup>rd</sup> time, parents will be called again and students shall render community service with the supervision by the City Social Welfare and Development Office.

The school had dig into the other factor why students likes going out from the school, during the School Governing Council's meeting the officers and all prefects of discipline were interviewed regarding the main concern. They reiterated that the school has no fence that is why it is easy for the students to in and out of the school campus. Their suggestion was to build a temporary perimeter fence. With the suggestion given by the body the school governing council had planned on an activity for a Cause " ZUMBA for A Cause" which was participated by barangay officials, barangay health workers, students , parents and school officials. The fundraising activity lasted for a week and it garnered Twenty-Six Thousand Pesos and it was turned over to Mr. Rowel Caga-anan school disbursing officer. The school has put up a temporary perimeter fence. While barangay Captain closed some computer shops who do not adhere to the ordinance and call parents for conference.

**3 Results and Discussions**

After a series of surprise inspection with the team, talkhangers checked on the students' level of awareness regarding the awareness campaign. Results are shown below.

**Table 1.** Survey Result Among Grade -8 Learners Sy 2018-2019

	<b>Yes</b>	<b>No</b>
Nasayod ka ba sa ordinansa na nagregulate sa mga estudyante sa pag -anha sa computer shop sa panahon sa klase?	42%	58%
Nakatabang ba ang maong ordinansa sa imong pag eskwela?	63%	37%
Sa imong pagkasayod sa ordinansa gaanha ka pa ba sa panahon sa klase?	37%	63%

Table 1 shows the result of the survey conducted among 106 students of Grade-8 for SY 2018-2019. There are 12 sections among the regular class under Basic Education Curriculum. We identified 2 sections that have an irregular attendance noted by the advisers, when the survey was conducted. The results are discussed below.

The survey shows that there are at least 58 % of the students who are not aware of the city ordinance regulating them from going to computer shops during class hours meaning almost half of the respondents needs to be informed of the said ordinance. The school may lack effort to inform the whole academic community regarding the ordinance. Intensive school based information campaign is necessary. There are at least 63% believe that going to computer shops are helpful for their studies while only 37% find it unhelpful.

Parents have no control on their children going on internet shops during school hours. Computer shop owners were also interviewed on the strict implementation of the said ordinance. They said that ordinance was good but it affects their business operation because they can't accommodate minor costumers during weekdays. That at times many are still inside the computer shops for the reasons that the students forced to get inside the shop to play while others are making research.

There are also shops that do not allow the students because they are mindful of the law and are afraid to be called by the barangay for not following the Barangay ordinance.

Barangay council, through Barangay Kagawad Jocelyn Rodriguez, and Youth Leader Dennis Mativo also commented that some Computer shop owners are not mindful of the ordinance because in the latest inspection, still the problems continues, the presence of minors are evident inside the shop. During the conference with Kag. Jocelyn Rodriguez the former Barangay Chair she reiterated that there are still presence of students and minors during their lasts inspection and computer shop owners are letting

them in. She made mentioned that they will call the attention and warn the computer shop owners that if this will happen gain their licence to operate will be revoked.

For the part of the school, the School Governing Council had initiated the temporary fencing of the school campus using the fund raised during "ZUMBA for a Cause" it was also helpful because it gives order to those students who are getting in and out of the school but because of limited resources and manpower it's not all the time guarded since there are still who scape from class and go to computer shops but some of them are just dropping by after class since classes are held from 6:30 – 3:30 for Grade 9-10 and 7:00-4:00 for Grade 7-8 daily.

#### **4 Conclusion**

There is really a need for consistency and sustainability of the program and everyone must have to do its part in making the project a success after all this will benefit not only the school but the whole community particularly of Barangay Nazareth a worth emulating project which is sanction from the City Social Welfare and Development. Collaboration among stakeholders are indeed necessary to address specific concerns.

#### **5 Recommendation**

TalkHANGG as a positive reinforcement is highly recommended had been rolled out to other school particularly to Indahag National High School because it was believe to be effective and found out to be helpful for the learners, schools, family and community as well.

#### **6 Reflection**

A quote states, "It takes a village to education a child". Collaboration ifs the key word for success. There might be some students who are not aware and are still going to shops despite warnings. The researchers and implementers of this project are already proud of the success gained but the challenge of going after the those are still ignoring the city ordinance despite warnings among computer shop owners and students is so huge that the TALKHANGGERS will endure in the project and make all this possible. This case had been going ever since and that is the typical attitude of some Filipinos that we are afraid of the laws promulgated and implemented not until iron hand has been thrown to us. Political will is necessary but it has to adhere to child protection policy as well.

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## History within History: Tracing the Development of the History Program in the University of Santo Tomas (1951-2017)

**Archie B. Resos**

University of Santo Tomas, Faculty of Arts and Letters, Manila

[abresos@ust.edu.ph](mailto:abresos@ust.edu.ph)

**Abstract:** History is the transcript of the relentless surge of events and the sequential and meaningful record of human activities. It seeks to understand the past in order to relate to the present providing insight for charting the future. As an empirical science, it hones students the rigorous method and procedure of scientific investigation while on the other hand, as a human science, it provides the students the understanding of the intricate interplay of consciousness and historicity. Any integrated narrative or description of past events or facts written in the spirit of critical inquiry for the whole truth is history. It is both timely and timeless to assess the development of history program in the University of Santo Tomas. It is timely because UST has a Graduate and Undergraduate program in history while it is timeless because UST is a primary contributor in the history of education in the Philippines.

### 1. Introduction

History is the transcript of the relentless surge of events and the sequential and meaningful record of human activities. (Leedy, 1974) It seeks to understand the past in order to relate to the present providing insight for charting the future. As an empirical science, it hones students the rigorous method and procedure of scientific investigation while on the other hand, as a human science, it provides the students the understanding of the intricate interplay of consciousness and historicity. Any integrated narrative or description of past events or facts written in the spirit of critical inquiry for the whole truth is history. (Jha, 2014) It is both timely and timeless to assess the development of history program in the University of Santo Tomas. It is timely because UST has a Graduate and Undergraduate program in history while it is timeless because UST is a primary contributor in the history of education in the Philippines being the oldest university in Asia.

The University of Santo Tomas was established by Manila Archbishop Miguel de Benavidez on April 28, 1611. It has been granting doctorate and master's degrees since the 1600s. It was in 1938 when the UST Graduate School was established. In 1951, the Doctor of Philosophy and Master of Arts in History was offered. On the other hand, the Bachelor of Arts in History (AB History), which is the undergraduate program in history under the Faculty of Arts and Letters was created only in June, 2011. (A. de Viana, personal communication, August 1, 2015) This study traces the development of the history program both in the graduate and the undergraduate program of the University of Santo Tomas which has been at the historical forefront of education being the oldest university in Asia and the Philippines. Likewise, an overview of its curriculum and research contributions will also be highlighted in this paper including the setbacks encountered and what lessons can be learned from these experiences?

## 1.1 Theoretical Framework

The Expanded Activity Theory of Yrjö Engeström uses the whole work activity as the unit of analysis, where the activity is broken into the analytical components of subject, tool and object, where the subject is the person being studied, (people responsible for the creation of the UST history department) the object is the intended activity, (vision and mission of the creation of UST History Department) and the tool is the mediating device by which the action is executed. (planning and financing of the creation of the UST History Department.) (Hashim, 2007)

## 2 University of Santo Tomas Graduate School: Birthplace of The History Program

It was in 1619 when Pope Paul V granted the faculty to confer degrees to all Dominican colleges in the New World including the Colegio de Santo Tomas which had been founded on April 28, 1611 by the Superiors of the Dominican Province of the Holy Rosary. In 1629, Pope Urban VIII issued a Papal Document renewing the authority of Santo Tomas to confer degrees. (UST Graduate School: About Us. Retrieved from <http://graduateschool.ust.edu.ph/about-us/>, 2016) It was on November 20, 1645 that Pope Innocent X uplifted the status of the Colegio to that of a University granting both civil and ecclesiastical faculties.

In 1785, King Charles III of Spain granted the University the title of Royal. In the twentieth (20th) century, the University operated under the laws of the state that exercised jurisdiction over the civil faculties. In 1902, Pope Leo XIII awarded the title of Pontifical while in 1947, Pope Pius awarded the title the Catholic University of the Philippines.

It was in 1938 when the UST Graduate School was established. The first Dean of the University of Santo Tomas Graduate School was Reverend Father Silvestre Sancho, O.P. who was also the Rector Magnificus in the same year.

All the Graduate courses offered before 8 December, 1941 had their respective certificates of government recognition. (UST Graduate School: About Us. Retrieved from <http://graduateschool.ust.edu.ph/about-us/>, 2016) The Doctor of Philosophy and Master of Arts in History was offered in 1951 through the academic leadership of Dean Rev. Fr. Eugenio Jordan O.P. of the UST Graduate School who was Acting Rector in 1941–1944, Rector Magnificus, 1944–1948 and Dean of the UST Graduate School from 1946 to 1951.

From 1951 to the present the UST Graduate School produced 58 scholarly dissertations and thesis. This excludes the doctoral dissertations and master's thesis in Social Science, Higher Religious Education and Education that also traverses in the field of institutional and ecclesiastical history. These include following: PhD in History (23 Dissertations: Diplomatic History – 4; Institutional History 2; Archival – 6; Local History – 3; Oral History 2; Ecclesiastical History – 4; Social History – 2) The breakdown for Master of Arts in History thesis and its specialized fields includes: (35 Master's Thesis: Diplomatic History – 1; Institutional History – 6; Archival – 2; Local History – 6; Oral History – 3; Ecclesiastical History -2; Social History – 3; Military History -10; Ethnic History -2) On the other hand, the Bachelor

of Arts in History produced 19 undergraduate thesis with the following field of specialization as follows: Diplomatic History – 2; Institutional History – 5; Oral History – 6; Social History – 2; Military History 3; and Political History – 1)

### **3 Curriculum Program of the Ust Graduate School Doctorate and Master's Degree In History**

#### **3.1 Ph.D. in History Program**

Currently the curriculum program of the UST PhD in History would require: three (3) Philosophy Courses equivalent to nine (9) units namely: Philosophy of St. Thomas Aquinas, Philosophy of Values, and Philosophy of Human Person. These include the following: (University of Santo Tomas, Graduate School Ph.D. and M.A. in History Prospectus, 2013)

**PHL 821 – Philosophy of St. Thomas Aquinas** – An expository course of the essential philosophical teachings of the Angelic Doctor, St Thomas Aquinas.

**PHL 822 – Philosophy of Human Person** – An analytical study of contemporary Christian critique and synthesis of modern and contemporary philosophies of man.

**PHL 823 – Philosophy of Values** – A survey exposition of the moral philosophies with reflective critique in the light of contemporary Catholic moral thought.

There are six (6) noncredit units of foreign language courses. The University of Santo Tomas Graduate School offers Spanish, French or Japanese language for this requirement. Specialization courses for the Ph.D. in History has a requirement of 10 subjects (30 units). This include the following: (University of Santo Tomas, Graduate School Ph.D. and M.A. in History Prospectus, 2012)

#### **3.2 Core Courses**

**Theories and Approaches in History** – this covers the leading epistemological theories that had significant impact on the way contemporary historians study the past.

**Practice of History and Historical Writing** – this introduces various research techniques that could be used in constructing a credible narrative.

#### **3.3 Specialization Course**

**Seminar of Pre-16<sup>th</sup> Century Philippines** –the period referred to as Philippine Prehistory covering the earliest identified human habitation before the arrival of the Spaniards in the country.

**Seminar of the 16<sup>th</sup> to 18<sup>th</sup> Century Philippines** – the 16<sup>th</sup> century marks the beginning of the historical period in a sense that there are now written records about the Philippines. This singular event which has a tremendous

consequence for the Philippines and what became the Filipino nation was the beginnings of Spanish colonization and the Christianization.

**Seminar on 19<sup>th</sup> Century Philippines** – start of Nationalism and Revolution were the 19<sup>th</sup> century was a very significant period in Philippine history resulting in the breaking down of Spanish monopolistic policies leading to economic and administrative reforms.

**Seminar on Philippine-American War (1899-1902)** – This course focuses on military strategies that two protagonists employed to ensure victory from the start of the Philippine-American War and establishment of civil government.

**Seminar on Philippine Commonwealth** – The course will cover the 10 year transition period that would ultimately end in the recognition of Philippine independence in 1946.

**Seminar of the Second World War and Japanese Occupation** – deals with the outbreak of the Second World War (in December 1941) and the resulting Japanese Occupation of the Philippines (1942-1945).

**Seminar on Contemporary (Post-War) Philippines (1946-present)** – course covers the period from the end of World War II (1946) to the recent contemporary times in the Philippines.

**Seminar on Local and Oral History** – The course emphasizes the study of history beyond the centers of authority and population in the Philippines and will view these histories in comparative and integrative methodologies so they can be situated in the context of national history.

**Seminar of the Ethnic Histories of the Philippines** – a major highlight of the course is the evaluation of their similarities and differences/distinctiveness that contributed to the multifaceted identity of the Philippines and the Filipinos.

**Seminar on the History of Social Movements in the Philippines** – The course will look at the history of social movements in the Philippines prior to the nineteenth century and end up to the present.

**Seminar on Moro History** – the course is a multi-disciplinary approach to a better understanding of Muslims in the Philippines.

**Seminar on Selected Topics in Philippine History** – This course focuses on topics in Philippine History that are not included in the thematic and area courses

**Seminar on Comparative Revolution in Southeast Asia** – the course begins with a survey of European overseas expansion/colonialism in Southeast Asia, culminating in the heyday of imperialism in the 19<sup>th</sup> century.

**Seminar on Contemporary Asia** – This course will look at contemporary developments in the areas where the Philippines will play the most meaningful part – Southeast Asia through ASEAN; East Asia, especially with China and Japan.

**Seminar on Contemporary American History** – The period to be covered in this course will be from the end of the Civil War and the rise of the United States as a world superpower.

**Seminar on Contemporary European History** – the course will cover the period from the middle of the 19<sup>th</sup> century and will discuss such developments as the impact of Industrial Revolution, the expansion of Europe beyond its continental borders.

The required courses to be taken in the Ph.D. in History would also include 6 units of cognate subjects or any course which has a direct bearing on one's dissertation which could be in the field of social science or humanities. There are terminal requirements of Written Comprehensive Examination, Dissertation Writing I (Research Proposal) which is 6 units, Dissertation Writing II for Research Colloquium and Publication in any reputable international or local journal/proceedings (3 units), and Dissertation III (3 units) which is final defense.

### 3.4 Master of Arts in History Program

The Master of Arts in History generally, has the total number of academic units required: Prerequisites courses (6 units) includes the following: (University of Santo Tomas, Graduate School Ph.D. and M.A. in History Prospectus, 2007)

**St. Thomas and Critical Thinking** – it is a course on Aristotelian and Symbolic Logic that focuses on the fundamental laws of thought.

**Research Methodology** – a competency-oriented course which emphasizes both the theoretical and practical aspects of designing a research.

An M.A. in History also has nine (6) units of core courses including the following: (UST Graduate School: Degree Requirements. Retrieved from <http://graduateschool.ust.edu.ph/degree-requirements/>, 2016)

**Philippine Historiography 1** – the course will expose the students to primary historical data and other sources of historical information pertinent from the period from 1521 to 1898.

**Philippine Historiography 2** – the course will survey the historical literature for the period from 1898 to the contemporary period.

Fifteen (15) units of specialization will be selected from the following courses: (University of Santo Tomas, Graduate School Ph.D. and M.A. in History Prospectus AY 2014)

**The Philippines (1521- 1896)** – this course covers the history of the Philippines from the time of the arrival of Magellan in 1521 until the outbreak of the revolution against Spanish rule.

**The Philippine Revolution (1896-1902)** –the course will study in more depth this important period in Philippine history, specifically looking at how the Philippine revolution against Spain was played out.

**The Philippines (1902-1946)** – the course examines the major developments during the American colonial period.

**Post-war Philippines (1946-present)** – This course will look at the developments taken by modern Philippine society from the post-war period to the present.

**Selected Topics in Philippine History** – this course focuses on topics in Philippine history that are not included in the thematic or area courses.

In addition to the prerequisite, core courses and specialization, the M.A. in History program also requires students to finish Cognate (3 units); Thesis Writing I-Thesis Proposal (3 units); Thesis Writing II-Research Colloquium (3 units); and Thesis III-Thesis Oral Defense (3 units).

#### **4 Curriculum Program of The UST Faculty Of Arts and Letters, Bachelor of Arts in History**

Since the foundation of the University of Santo Tomas in 1611 the liberal arts and philosophy had been incorporated as part of its main thrust in teaching. It was in 1896 that the Faculty of Philosophy and Letters was established. The College of Liberal Arts was created in 1926. It was only in 1964 that the two colleges were merged to form the Faculty of Arts and Letters. (University of Santo Tomas, Faculty of Arts and Letters Prospectus, 1997). The main courses offered at that time were only the Bachelor of Arts, Bachelor of Literature and Bachelor of Philosophy. In the 1970s the Faculty of Arts and Letters began to open degrees in Behavioral Science (which evolved from the previous LiA-Com – Liberal Arts and Commerce) Communication Arts, Economics, Journalism, Literature, Philosophy, Political Science, Sociology, and Translation (which was later phased out.) (University of Santo Tomas, Faculty of Arts and Letters Prospectus 1999) Later in 1994 Legal Management was created as an alternative preparatory course for those intending to take up law. (UST Faculty of Arts and Letters, Undergraduate Program. Retrieved from <http://www.ust.edu.ph/index.php/undergraduate-programs/78-faculty-of-arts-and-letters.html>, 2016)

In 2002, the Faculty of Arts and Letters began opening a double-degree program, the AB-BSE major in Social Science. (University of Santo Tomas, Faculty of Arts and Letters Prospectus, 2005) In June 2011, the Faculty started offering and Bachelor of Arts in English Language Studies and Bachelor of Arts in History.

The UST Faculty of Arts and Letters Bachelor of Arts in History was the brainchild of the UST History Department Chair Dr. Augusto de Viana. Through the support of Dean Michael Anthony Vasco, PhD, the program was opened in the 1<sup>st</sup> Semester of AY 2011-2012. Initially 34 students enrolled in the pioneer batch of 2011 and 19 graduated in 2015.

Currently the Bachelor of Arts in History has 174 units comprising of the following courses: 81 units of General Education Courses, Major Courses 78 units, Theology Courses 15 units. The mandated general courses include: (Commission on Higher Education Memorandum Order No. 16 Series of 2010. Retrieved from <http://www.ched.gov.ph/wp-content/uploads/2013/07/CMO-No.16-s2010.pdf>, 2016)

**Philippine History** – a General Education (GE) course intended to provide freshmen with basic information on the history of the Philippines from prehistoric times to contemporary period.

**Life and Works of Rizal** – intended to provide freshmen students with the basic information on the life and works of Rizal.

The A.B. History program of the University of Santo Tomas Faculty of Arts and Letters also offers the basic courses: (University of Santo Tomas, Faculty of Arts and Letters History Program Prospectus, 2011)

**Philosophy of History** – the course will discuss the philosophical and theoretical foundations of the discipline of history.

**Historical Methodology** – the course will discuss historical methodology as a tool for research.

**Introduction to the Writing and Study of History** – the course will focus on the meaning and relevance of history and the important role that historians play in the society

**Survey of Western Civilization** – The course is a survey of the history of Western Civilization, beginning with its Graeco-Roman to the rise of nation states.

**Survey of Asian Civilization** – the course is a survey of civilization which originated and flourished in various parts of Asia.

The UST AB History program includes required courses. This is to ensure the firm intellectual foundation of its students. These courses include:

**Modern and Contemporary Europe** – the course covers the period from Industrial Revolution to the major developments of Contemporary Europe.

**Island Southeast Asia** – the course is a survey of the histories of the countries that comprise Island Southeast Asia (Brunei, Indonesia, Malaysia, Philippines and Singapore.)

**Mainland Southeast Asia** – the course is a survey of the histories of the countries that comprise Mainland Southeast Asia (Myanmar, Thailand, Laos, Cambodia and Vietnam)

**Modern East Asia** – the course will provide an overview of the modern histories of China, Japan and Korea.

**History of the United States** – the course will provide an overview of American history with its early beginnings to the rise of the United States as a world power.

**Islamic History as a Global History** –the course is intended to provide a general knowledge of the history of Islam.

**Pre-16<sup>th</sup> Century Philippines** – the course will look at the formation of indigenous communities in the Philippines from pre-historic times prior to the coming of the Spaniards.

**Economic History of the Philippines** – the course is a survey of the development of Philippine economy from prehistoric times to contemporary period.

**Cultural History of the Philippines** – the course will look at the artistic and cultural tradition of the Philippines.

**Diplomatic History of the Philippines** – the course focuses on the diplomatic relations of the Philippines from 1946 to the present.

**Social History of the Philippines-** the course will look at the Philippine society from its early beginnings as recorded, with particular attention to the social structure as it interacted and related to foreign forces coming from Spanish and American colonial rule.

**Nationalism and Revolution-** the course discusses the concept of nationalism as it is developed in the 19<sup>th</sup> century including their response to Spanish colonization.

**Ethnic Histories-** the course is a study of the many cultural communities that comprise the totality of the Filipino nation.

## 5 Conclusion

History is a very important discipline and it is crucial in the development of other disciplines. All professions and even religions are linked to history. History is not only the record of man's development, it provides him with the overall perspective of life and the reason for his existence and present condition. Through history, man's past illuminates his present through the knowledge passed throughout his existence. It tells him what he is. History is also the beacon to his future. It provides the groundwork for man's action beyond the present.

The University of Santo Tomas has a proud history of producing some of the country's eminent historians. Worthy of mention are Gregorio Zaide, Antonio Molina, William Henry Scott, Fidel Villaroel and Florentino Hornedo. Their works have influenced Philippine historiography and were read by legions of students. The opening of the UST Graduate School Doctorate and Master's program in history in 1951 contributed immensely in the development of archival, documentary and oral history research. With the opening of the Bachelor's degree in history in 2011, the continuity in the study of history from the baccalaureate until the graduate degrees has been established. All of these would propel the University of Santo Tomas at the forefront of Catholic education in Asia and the entire Philippines. With students and alumni carrying the teachings and philosophy of St. Thomas Aquinas in the light of analyzing historical events. Indeed, it is milestone where there is history within history in the Development of the History Program of the University of Santo Tomas.

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Vasco, M.C. (2017, December 11) Personal interview.

# Knowing the Art Capital: Understanding the Appreciation of Art through Poblacion Ibaba and Poblacion Itaas of Angono Rizal

**Lara Marinnete G. Landayan**

University of the Philippines Diliman, Quezon City, NCR  
lglandayan@up.edu.ph

**Abstract.** Being the Art Capital of the Philippines, Angono forged an identity reliant on the creativity not only of the artists in the region but also its residents. The research aimed to understand the sense of place of the residents of población Ibaba and población Itaas towards Angono through a series of qualitative interviews. In these interviews, the factors affecting their art appreciation, as well as their perception of tourism, placemaking, and sense of community were formed. Content analysis revealed that while there is strong sense of place and emotional meaning, Angono is facing issues of cultural othering and lack of spaces for emerging artists.

## 1 Introduction

Angono Rizal, the Art Capital of the Philippines, only has few artists known beyond their community because of the lack of space for others to showcase their works. The lack of art spaces for emerging artists begged the question what is an Art Capital? Based on previous fieldworks of the UP Diliman Geography Field School on Angono Rizal, barangay Población Itaas, the barangay known as the home of the national artist Carlos “Botong” Francisco and Población Ibaba, the home of Lucio San Pedro, the national artist for music, are the places where art is most present, and nowhere else. The lack of art spaces implies neither recognition for public art nor urban transformation of landscapes that cater growth of artistic freedom and creative economy – both necessities for an inclusive community. Exploring this, the research aims (1) to understand the appreciation of art among people from barangay Población Ibaba and Población Itaas of Angono Rizal, (2) to elaborate the perception of the participants among Población Ibaba and Población Itaas of Angono as an art capital, (3) to contribute to synthesizing of knowledge about cultural capital and creative economy of Angono.

### 1.1 Scope, Limitations, and Assumptions

The paper assumed the manufactured material environment in the community cultured a sense of community during placemaking and in development of public art. Although the research explored art appreciation of the residents and how it affected their perception of the landscape, the research did not tackle art spaces outside barangay Poblacion Ibaba and barangay Poblacion Itaas.

Although most of the residents downplayed their ability to be able to perform any of the seven dominant forms of art (e.g. visual arts, film, architecture, performance art, literature, sculpturing, music), they remained well informed about applications of art, especially on their municipality festivals. Therefore, most of the narratives for the study have been derived from their appreciation of festivals. The research will tackle only the

seven forms of art mentioned by the key informants of the research because there has not been proper research about the non-dominant forms of art in Angono (i.e. vandalism street art).

## 1.2 Review of Related Literature

Art having numerous forms are commonly clustered by dominant society into seven main groups: visual art, music, literature, architecture, performance, sculpting, and film. Although art is linked with culture Carroll (2004) in his work *Art and Human Nature* said that art remained unexplained by cultural diffusion because art did not sprout from one region and spread, but instead sprung from different parts of the world simultaneously and grew outward. Carroll (2004) hypothesized from the random appearances of art that humans have an innate sense to understanding art as it became a tool to describe life. Together with other practical skills, art evolved with development. Art became a way for people to express themselves and became the social realities of artists and audiences (De Marrais and Robb, 2013).

De Marrais and Robb (2013) saw that art called for participation, appreciation, and reinvention of the landscape. Pollock and Paddison (2014) believed art empowered through reclaiming areas to become spaces for public art— they agree with De Marrais and Robb (2013) that cities of activity filled with public art created more relevant experiences and investment. Toraldo (2017) built upon Pollock and Paddison's (2014) note and added that the attractiveness is built upon the small spontaneous moments that happen both in the celebrations and everyday mundane life which takes place in the manufactured city. De Marrais and Robb (2013) believed that investing art spaces into cities are a cultural capital which promoted inclusivity, resilience, and tourism. Kingsbury (2015) believed in appreciation of art in culture through assessment of it according to its value on people and how the circumstances it allowed promoted tourism and self-expression, belonging. Participation of the community on public art is important to reassert their political identity in the development process of their area and to foster their sense of place. Inclusive participation on art is from the assumption that public art is multicultural and dynamic. Cudney (2014) considered festivals as an example of this community reassertion on public art and placemaking. Everyone participated in artful placemaking because it does not require formal education. In art appreciation Trondle and Tschecher (2016) believed that art is from one's way of life: a mingling of the interpersonal and self-reflection processes regardless the formal education on art. Trondle and Tschecher (2016) encouraged an interactive, and accessible form of art. When the local Aboriginal community in Australia is given a chance to map their area like how Gibson (2010), they felt empowered with the tools to describe and define their spaces. Allowing participation in public art institutionalizes the belonging to a community. The vacant spaces in the Angono could become "a symbolic space of familiarity, comfort, security, and emotional attachment" (Antonsich, 2010).

Placemaking is a process in human geography dealing with feelings associated with occupied spaces. Throsby (1984) studied the connection of art and placemaking through forms of arts, local demand, tourist expenditure, urban growth patterns, and municipal policy. Gibson (2010) emphasized the societal strain when the creative

expression of the members of the community are hindered in placemaking. Mejares (2012) said without government intervention no one was shelling out financial resources for art improvement. The government therefore must intervene with multidisciplinary approaches to community empowerment towards art appreciation. The government could decentralize the process of making art spaces. They could also support artists by providing capital and space. In the Philippines, the lack of support for artists is shown by the lack of space for them to show their art. Sacco and Serge (2009) hypothesized that the hesitation of the government to invest in art may be because investing in art is like a “black box” where causal relationships between the audience and the artists are unperceivable. Since Angono utilized art tourism, a special type of tourism (Estiva and Tuazon, 2012), there is a need to unpack the “black box”. Hartley (2018) noted that Angono was (1) home to high profile artistic activity, (2) home to proud residents of the identity they exhibit to the world; especially during the Gigantes festival. The Gigantes festival is a symbolic festival flaunting their Agrarian roots and was a subversive material to ridicule their landlords. According to the residents however, the Angono Gigantes festival is now used to honor influential families in Angono. The last factor contributing to Angono's cultural significance according to Hartley (2018) is its environment that seemed to attract established and emerging artists.

### **1.3 Gaps in the Study**

Although Estiva and Tuazon (2012) see no urgent need for Angono to improve the organic growth of the art community in Angono, Hartley (2018) called for concrete ways to establish space. There were claims that the art in its heritage and age do not reflect anymore the culture of the municipality since the flock migration that now accounted for more than half of the Angono population. In this study, understanding the art appreciation of all the societal subgroups, even the ones who have migrated needed to be exposed in order to understand what can be done to improve art spaces.

## **2 Method and Study Area**

### **2.1 Participants**

The participants are residents of Población Ibaba and Población Itaas of Angono Rizal and were selected based on their time availability the morning to late afternoon of the last November 9-19, 2018. In the thirty (30) participants, eighteen (18) participants live in Poblacion Ibaba, and the twelve (12) other residents live in Poblacion Itaas. Seven out of the twelve participants (7/12, 58%) of Poblacion Itaas are male, and eight out of eighteen participants in Poblacion Ibaba are male (8/18, 44%). Overall the number of female and male respondents are equal but there were more male participants from Poblacion Itaas and more female participants in Poblacion Ibaba. Majority of the participants (18/30, 60%) for the study are on the age group 25-50 years old, while the remaining twelve (12, 40%) participants are the elderly.

## 2.2 Study Area

Angono is a municipality located in Rizal, a province from the administrative Region IV-A CALABARZON per signed Executive Order No. 103. The municipality of Angono, Rizal was separated from Binangonan through Executive Order No. 158 and remained a 1st municipality income class with an annual income of 182,716,722 pesos from the local taxes of their ten barangays. Two of which, Poblacion Ibaba (PB Ibaba) and Poblacion Itaas (PB Itaas) being the area of this study. Angono is known for its religiosity, its festivals, and its exotic delicacies like fried ducks. Historically, the municipality of Angono was primarily a hunter-gatherer society but later resorted to settling in the area, resorting to logging, fishing in "Wawa", and promoting Angono as a tourist spot.

Poblacion Itaas, one of the areas included in this study, is the upper part of Dona Aurora street and closer to the Municipality. Currently barangay Poblacion Itaas is under the care of Barangay Captain Loloy Sulit. The barangay prides itself as being the home of the national artist Carlos "Botong" Francisco and his grandson Carlos "Totong" Francisco. Topographically, Poblacion Itaas has relatively higher elevation and is known to seldomly encounter flooding unlike than Poblacion Ibaba. They are also known for the murals among house walls that were recreations of the masterpieces of Botong Francisco from the past. Poblacion Ibaba is the other barangay of the study is located on the lower part of Dona Aurora street, and is known to be beside Poblacion Itaas. Poblacion Ibaba is under the care of barangay captain Marianito Vitor and secretary Villaluz. There is a lack of murals in Poblacion Ibaba compared to Poblacion Itaas but Poblacion Ibaba is home to the San. Clemente Parish, a Catholic church where most of the events during the Gigantes festival were held. It is also important to mention that Poblacion Ibaba is the home of national artist for music Lucio San Pedro.

## 2.3 Tools and Data Treatment Procedures

The researcher used an interview questionnaire. The content of the interview questionnaire includes prompts related to topics like their likeliness to refer to old artists, their exposure to art, their perception of themselves as residents of Angono, familial relations with either national artists in Angono, awareness of the government intervention of Angono, tourists' perception, willingness to be interviewed, and their opinion about the change of the festival throughout their stay in Angono. Their interviews were recorded after they gave permission. The researcher also carried a field notebook where she wrote journal entries every time she went on field. She also has a field ID with Sir Laca's signature as proof that the researcher is on official business and is a legitimate student of University of the Philippines Diliman Department of Geography. The researcher got the keywords and the general thought per interview and used content analysis to list down the recurring concepts. After the recurring concept, the researcher made an ordinal scale of factors like art exposure, awareness of government measures, etc. Ethical considerations include anonymity of all participants in the research and all their photos and recorded interviews are with permission.

## 3 Results and Discussion

Regarding their belongingness in their residence in either barangays that are part of the study, nineteen among thirty (24/30, 80%) respondents claimed before their interview that

there are “not true residents of Angono and therefore could not answer perfectly the questions” and admitted that this could affect their perception of art. This almost coincides with the 70% -30% migrants and real residents’ estimation participants give when they blame the lack of appreciation and luster of festivals on “not true residents” of Angono. Moreover, 18 among these 24 participants who claimed that they were “not true residents of Angono” have lived in Angono for more than 20 years. This perception can be a warning sign of cultural othering or exclusion of people from dominant society for irrational reasons. Othering is a start of discrimination and might cause lack of representation of art in the landscape. The research explored art appreciation of residents of Poblacion Ibaba and Poblacion Itaas: participants interviewed know they have seen art and have not regarded it as beyond simply giving it a glance. They can elaborate on the words of Carlos Francisco or Lucio San Pedro and mostly textbook knowledge, but if asked about their own artistic pursuits, it is often noted that they do neither have the resources, the time, nor the “family talent” to do so. There were six recurring themes in the art appreciation of Poblacion Ibaba and Poblacion Itaas residents. First and the strongest factor seen throughout the interviews is the internal and external migration of people towards Angono during urbanization. Participants in the interview have implied a dichotomy between “true” and “not true” residents of the art capital of the Philippines. The second factor to be considered are the power relations between (1) low profile and high-profile artists as quoted by Hartley (2018), (2) emerging artists lacking connection to national artists thus lacking an audience, and (3) artists having difficulty showing their unique art style outside conventional style. These power relations could be solved by government intervention to improve opportunities for these artists. The fourth factor has something to do with the institutionalized system addressing art in Angono. It is believed that there is a lack of office directly addressed to art. Hartley (2018) believed that if Angono wanted the branding of art capital of the Philippines then it must show it by institutionalizing offices targeting specific creative populations. The tourism office is already loaded with tasks and cannot further tackle on work and the incoming cultural heritage office is too vague to address art. Art is not only present in the past artworks but also in the emerging ones. Most residents only cite the national artists and do not give credit to the emergence of new ones therefore the need to reinvent art to include current struggle of artists. It must not be the case that artists are restricted to predetermined muralist expressions of the national artist.

Mostly it is believed that consumption of art is mostly concentrated among the affluent population. After the interaction with the participants, it seemed that this claim was not supported. Appreciation of the festival was open to economically marginalized and even differently abled people. However, it is noticed that the displayed art during festivals came from influential high-profile artists. The amount of art spaces getting allotted to them in commercial spaces like malls or during festival is telling of their influence in Angono versus the emerging marginalized artists. The basic concept of political geography brings about claims that the bigger space allotted to a party, the more powerful or influential they are in that society— therefore art in the area is more than a collection of cultural processes, it also involves political underpinnings. Starting artists, especially low-income ones need to know someone influential for their artwork to receive a big break (Zong 2016, Hartley, 2018). There were some attempts to provide artists some space, this was the Artists village project in 1992 but it was postponed due to

a lack of funding therefore leading to the lack of space preventing artists from being integrated into the social urban fabric (Hartley, 2018). Further interviews with the participants revealed that appreciation of art does not vary among the rich and the marginalized and there are many factors affecting the way participants in Población Ibaba and Población Itaas perceive Angono as an Art Capital.

Although in general, residents in Angono do not feel the intensity of being in the Art capital of the Philippines consistently. Their appreciation of being the art capital, although present, is time-specific.

*“Masaya kapag festivals pero pag tapos na wala na ulit.”* From one of the participants

Art is connected to culture and therefore is also another way to reinvent places and to illicit social change in society. Angono has the potential to be an art district and a comfortable home for artists, tourists, and locals. Through humanistic research, perception of the residents about Angono was discovered and there is realization that Angono tends to isolate its individuals. It is also noted that emerging artists have a hard time making a reputation in the area because of the irrational affliction for the past painting that do not anymore reflect social reality by itself. Therefore, there is a call not to waste such rich art capital. It is important to remember that the past paintings can be reference but not a confinement for new artists. Each artistic individual has an identity different from his influence and such should be present for his participation in urban development be present. Realization of this shall encourage more participation of people needed which is needed for effective urban planning or artistic spaces.

#### **4 Action Plan**

Appreciation of art in Angono has become a political problem because in the municipality office alone, the people in the Tourism office are having a hard time gathering sponsors and managing art and tourism simultaneously. The way old seasoned artists vs new artists also affect the appreciation of Angono and its landscape: how come it seemed easy to make murals of Botong Francisco's paintings but there are yet to be murals celebrating artworks of emerging artists? It is therefore time for artists trying to break free from confines of the celebrated realism and its effect on their social growth as a municipality. Encouraging emerging and nonconventional artists also solved the lack of lack of participation of individuals in Angono because their involvement in any artistic endeavor gives empowerment. As a key informant in my research said, art should be a way of seeing not an objective skill selected for a few. Moreover, festivals should unite not only residents and tourists but residents and residents alike.

Considering unity of the people in a cultural region, it is undeniable that art appreciation in Angono has become a spatial problem. Since the Artist Village that Hartley (2018) brought out in his paper, there is still the undying call to use space in more practical ways. Either make more spaces for public art or give space to starting artists anything that shows support to artists that are tangible helps address the “black box” impression of financial investing on culturale conomies. Check once again the paper and ensure that the instructions are carefully followed.

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## **Sabay-Kaon sa Buntag: Panacea to Students' Tardiness, Absences, Inactiveness and Lack of Focus (TABINLACK)**

**Nympha P. Rodriguez, Fe S. Guzman, Dindo W. Cuevas,  
& Minerva R. Conag**

Pedro "Oloy" N. Roa Sr. High School, Misamis Oriental  
[nympha.rodriquez@deped.gov.ph](mailto:nympha.rodriquez@deped.gov.ph)

**Abstract.** Parents have a crucial role of improving the Philippine Education and school's job was to reach to them. Several studies have proven the importance of parent involvement in increasing students' academic achievements. The study titled "Sabay-kaon sa Buntag: Panacea to Students' TABINLACK" is anchored on Revised Guidelines Governing Parents-Teachers Associations and Guidelines of Implementation of Breakfast Feeding Program (BFP). With the hope of resolving problems on tardiness, absences, inactiveness, and lack of focus (TABINLACK), the study was employed. This study used qualitative method of research and descriptive statistics to validate the impact of the intervention strategy. With the support of the Home Room Parent-Teachers Association (HRPTA), the intervention was dutifully implemented without sacrificing any instructional time and was found effective to change students' behavior that in turn improved academic outcomes. Science proficiency level per quarter has shown an increasing pattern of 55.09 %, 59.28 %, 65.68% and 77.20%. To validate the claim, students' grade point average in all subjects was compared. The study suggests implementation of the intervention strategy called "Sabay-Kaon sa Buntag" to all year levels and to schools having the shifting of class schedules to address problems on tardiness, absences, inactiveness, and lack of focus (TABINLACK) in class.

### **1 Introduction**

The study is anchored on D.O 54, s.2009 also known as the Revised Guidelines Governing Parents- Teachers Associations and D.O 80, s.2011 the Guidelines of the Implementation of the Breakfast Feeding Program (BFP). Breakfast is often described as the most important meal of the day for it provides energy needed for the activities that lies ahead. A large and growing body of scientific evidence supports the claim that breakfast really is a very important meal since it makes a large contribution to daily micronutrient intake (Frantzen et al., 2013).

In a class of fifty-six Grade 7-Hyacinth students, it was observed in the first quarter that, thirteen (23%) were often tardy, absent, inactive, and having lack of focus in the first period subject -Science. Also, forty-three (75%) of them affirmed that they skipped eating breakfast. The teacher inferred that skipping breakfast could be the reason of students' tardiness, absences, inactiveness and lack of focus (TABINLACK) in the Science class and to the succeeding classes that impact significantly their academic outcomes. Thirteen students were below the 80% grade point average during the first quarter assessment that emboldened the adviser to employ an action research titled "Sabay-

Kaon sa Buntag": A Panacea to Students' Tardiness, Absences, and Lack of Focus (TABINLACK).

"Sabay-Kaon sa Buntag" means eating breakfast together was a modified breakfast feeding initiative that allowed students to eat their packed meal in school and benefit the food served by the Home Room Parents-Teachers Association. The food served was able to nourished students for them to sustain the tasks that lie ahead. Also, with this intervention, parents were given an opportunity to visit school and help implement the process.

With the ardent support of the Home Room Parents Teachers Association, the intervention strategy was dutifully implemented without sacrificing any instructional time because it was the parents who do the implementation process and was proven effective on impacting changes on students' behavior resulting to an astounding increase of students' academic outcomes in Science and in all subject areas as well.

The main objective of this action research is to resolve perennial issues on students' tardiness, absences, inactiveness and lack of focus (TABINLACK) in the class. Teacher-made questionnaire, focus group discussions, self-made questionnaires and informal interviews were the tools used in the study to answer the research problems and to validate the efficacy of the intervention strategy.

### **1.1 Research Questions**

This research study was guided by the following research questions;

1. How the intervention strategy called "Sabay-Kaon Sa Buntag" enhanced the Science Proficiency level of the grade 7 Hyacinth class?
2. How effective is the "Sabay Kaon sa Buntag" in increasing the students' grade point average across subject areas?
3. How the "Sabay-Kaon sa Buntag" implementation satisfies students?

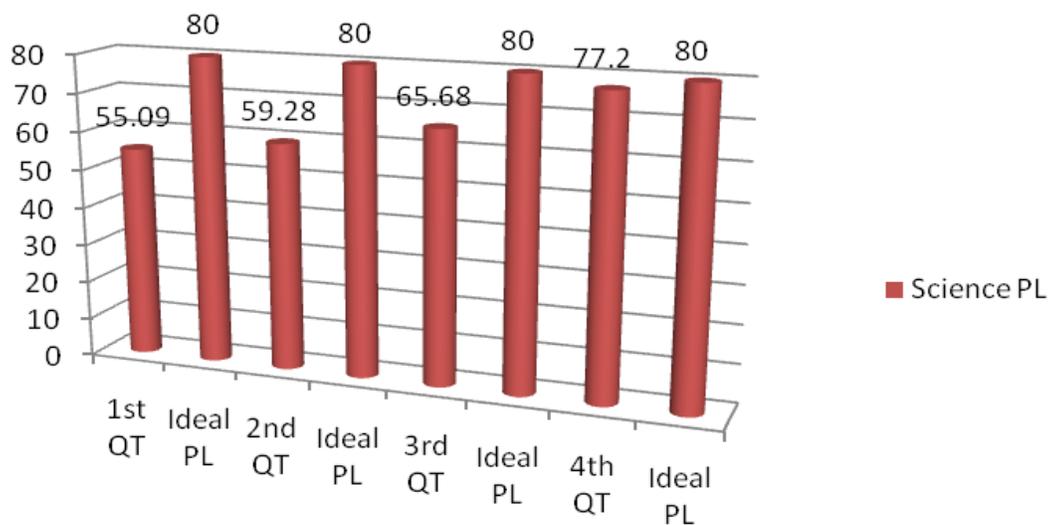
### **2 Methodology**

The study has used qualitative method of research. Focus group discussions, self-made questionnaires, observation and informal interviews were employed in the research process to validate the effect of the intervention strategy.

### **3 Research Findings**

The collected data were sorted, tallied, and recorded out from the instruments used in the study. The findings were analyzed, interpreted, and presented sequentially by problem for thorough understanding of the data.

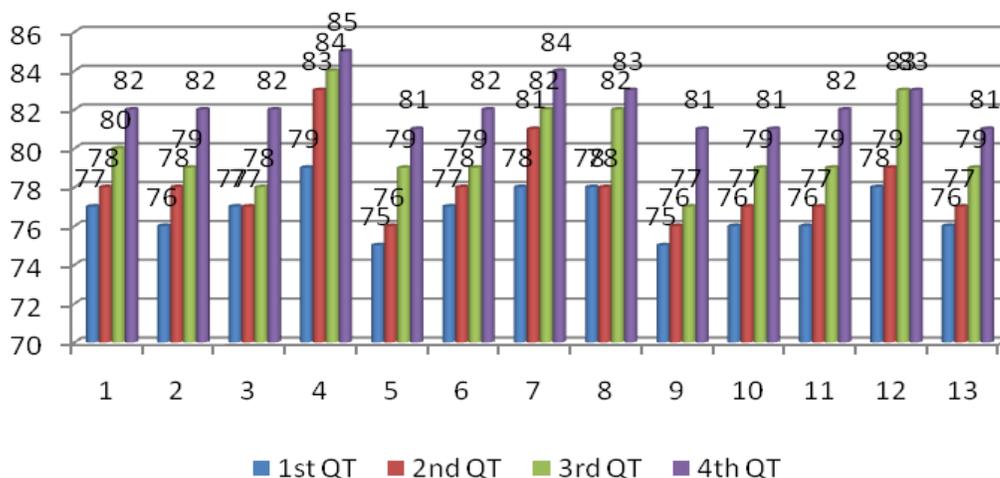
**3.1** How the intervention strategy called "Sabay-Kaon sa Buntag" enhanced the Science Proficiency level of the Grade 7 Hyacinth?



**Figure 1.** Grade 7 Hyacinth's Science Proficiency Level

Figure 1 shows the Science Proficiency level of the grade 7 Hyacinth. Result reveals an increasing pattern of the class' Science proficiency level. The researcher inferred that provision of the necessary energy from food have given the students ample energy needed for science activities. The nutrition in food enhanced cognition and the vitamins and minerals in food increases mental concentration needed in performing science activities (Frisvold, 2016). Indeed, parental involvement to intervention or school programs like these could increase students' academic achievements (Desforjes, 2003).

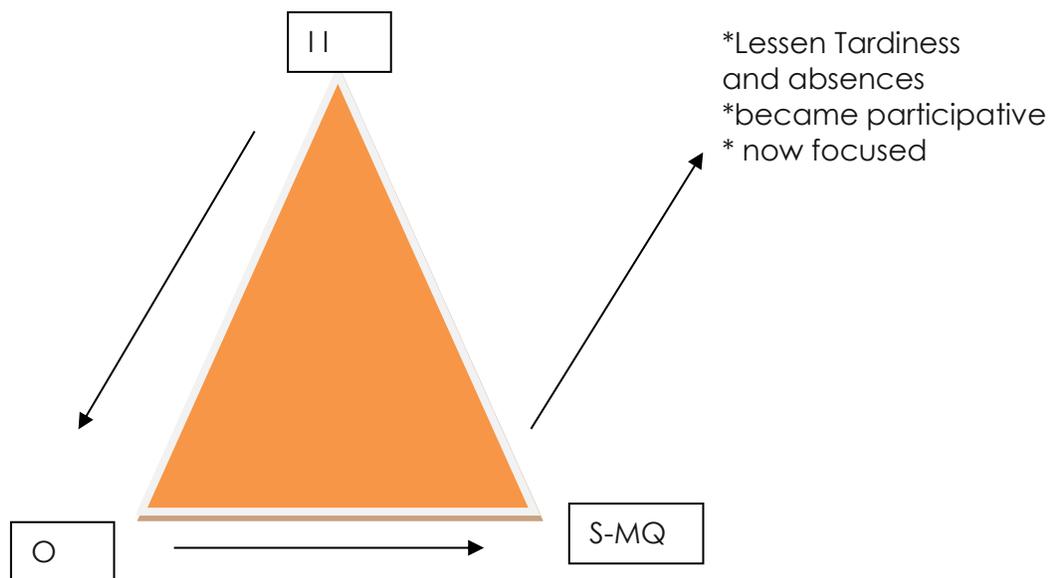
**3.2** How effective is the “Sabay Kaon sa Buntag” in increasing the students' grade point average across subject areas?



**Figure 2.** Select-Students quarterly grade by quarte

Figure 2 depicts the student-participants' grade point average by quarter. Results show an increasing pattern of students' grade point average per quarter during the implementation. This shows the positive impact of the intervention strategy in changing students' behavior that manifest change on absences, tardiness, inactiveness and lack of focus (TABINLACK) in the class

**3.3** How the “Sabay-Kaon sa Buntag” implementation satisfies students?



**Figure 3.** Impact of sabay-kaon sa buntag

Figure 3 above demonstrates the impact of the intervention on students' behavior. A lot of research could prove that school-assisted breakfast program satisfies student expectation (Fresvold, 2016). With the help and support of the Home Room Parents-Teachers Association, the intervention strategy called “Sabay-Kaon sa Buntag” was able to better students' behavior (TABINLACK) that impact positive results on academic outcomes.

The ardent support of the Home Room Parents-Teachers Association (HRPTA) has motivated the students to refrain from incurring tardiness, absences and the food served has provided them nourishment to be active and focused within the day's activity. The intervention was able to satisfy the students that in turn has created an astounding impact on their academic outcomes. The researchers found out that the intervention was effective of addressing perennial problems on students' tardiness, absences, inactiveness and lack of focus in class. The claim was validated by the conducted interviews, observation and survey questionnaires.

**4 Conclusion**

The study titled “Sabay-Kaon sa Buntag: A Panacea to Students' Tardiness, Absences, Inactiveness and Lack of Focus (TABINLACK)” has helped the students changed behavior that impact positively on academic outcomes. The dutiful implementation of the

intervention strategy was made possible because of the parents' ardent commitment and collaborative power on lessening students' tardiness, absences, inactiveness and lack of focus (TABINLACK) in the class. The intervention has motivated students to change behavior because they were satisfied of the implementation. The foods that were served during the implementation were able to provide energy that enhanced students' cognition and the mineral and vitamins in food have increased their mental concentration therefore enhancing academic outcomes.

With these observations, the researchers could attest that the intervention has positive effects on lessening tardiness, absences, inactiveness, and lack of focus (TABINLACK) in the class. Thus, recommendations are hereby made: The "Sabay-Kaon sa Buntag" should be implemented to all sections in the Grade 7 level and to all schools affected by the shifting of class schedules due to classroom shortage. Teachers should have mobilized the Home Room Parents Teachers Association to support the intervention in order to help students classified as the "least, lost and last in the classroom not to drop from their classes. Moreover, Sabay-Kaon sa Buntag should be practiced and replicated to create a more valid and reliable results.

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## Teachers Commitment and Job Satisfaction

**Myleen P. Acebes**

COC-PHINMA Cagayan de Oro City, Misamis Oriental

[myleen.pagaran@gmail.com](mailto:myleen.pagaran@gmail.com)

**Abstract.** Teachers play the most influential position in social and economic development of the learners. They must devote themselves for work, with providing knowledge, skill and attitude to cope with the demands. The caliber of the teachers, their commitment, satisfaction and enthusiasm are important factors for the education system to serve its purpose. This study primarily sought the teacher's commitment and job satisfaction among elementary teachers in Balingasag North District of Misamis Oriental. It utilizes descriptive research design. Purposive sampling procedure was employed in the selection of the respondents. From the findings of the study, it can be concluded that job satisfaction and commitment were statistically significant to their personal profile such as age, gender, marital status, position, family income, and attitude towards teaching. Concerning the effect of job satisfaction, the study recommended that schools should ensure that school environment is favorable for teachers to guarantee their motivation and satisfaction with their jobs. Leaders of the school must put into considerations that Teachers' commitment and job satisfaction is a vital phenomenon for their teachers and their learners.

### 1 Introduction

Education is one of the most important aspects in nation building. Its basic purpose is to produce potential workers, which can surmount developmental challenges of a certain country. Teachers are expected to work hard to bring out the best in their students. To make this possible, the teaching force must be committed and satisfied in the organization they belong. Teachers who have high level of job satisfaction commit their time, energy and efforts to work which result in high productivity (WR Scott, 2014).

The caliber of the teachers, their commitment, satisfaction and enthusiasm are important factors for the education system to serve its purpose. Therefore, commitment and satisfaction among teaching personnel with the teaching job should be accentuated. It means that the teachers must be happy, devoted and committed, so that they can help bring out the best qualities of their schools, the students, parents, and the society may benefit from their services (Christopher, 2016).

Research into teachers' commitment and job satisfaction is thus significant in order to retain teachers in the educational profession and to encourage increased teacher productivity. Moreover, it is important to find out the factors that account for teacher job satisfaction based on personal, organizational, work environment and work itself, and the level of teachers' commitment considering the following variables; normative, continuance, and affective. When these factors are known, then it will be possible for school administrators and other educational stakeholders to adjust the school environment accordingly to foster satisfaction amongst teachers.

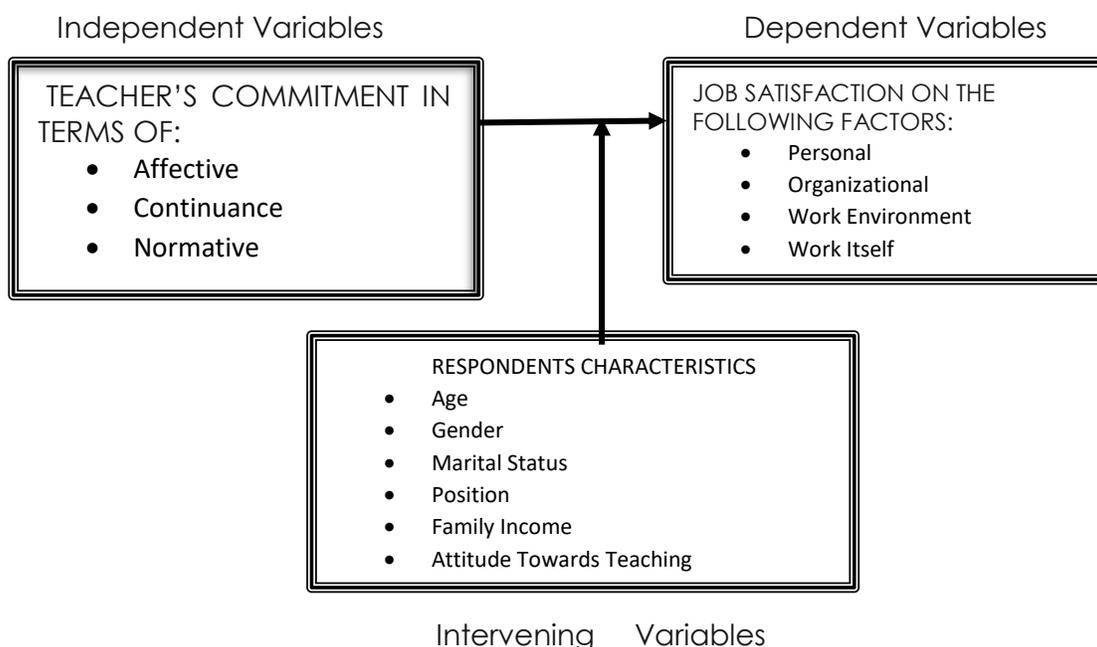
Furthermore, the commitment and productiveness of teachers depend on their motivation, morale and job satisfaction. This indicates that teachers' commitment and job satisfaction is a vital phenomenon for teachers, their managers and their learners.

### **1.1 Theoretical and Conceptual Framework**

This study was anchored on the theory of Maslow's Hierarchy of Needs. Maslow (1954), stated that a person has five fundamental needs: physiological, security, social, esteem, and self-actualization. The physiological needs include pay, food, shelter and clothing, good and comfortable work conditions etc, whereas the security needs include, for example, the need for safety, fair treatment, protection against threats, and job security.

According to Maslow, people arrange their needs in order of significance. Once individuals have satisfied one need in the hierarchy, it ceases to motivate their behavior, and they are motivated by the need at the next level up the pyramid. Thus, we are not driven by all the needs at the same time and only one need will dominate our personality. Which one it will be depends on which of the others have been satisfied. For example, a financially incapacitated teacher feels no urge to satisfy the higher need for esteem. They are inattentive with satisfying the physiological need for food, not with obtaining approval and esteem from other people. It is only when people have adequate food and shelter and when the rest of the lower needs are satisfied that they are motivated by needs that rank higher in the hierarchy (Schultz & Schultz, 2013; Maslow, 1954).

This theory provides several approaches to understand job satisfaction and job related motivation which mirror the commitment of the teachers toward teaching. In the present study the researcher applied this aforementioned theory for exploring teachers' commitment and job satisfaction in Balingasag North District. Education is a dynamic field that continuously changes and expands. It requires a lot of effort and hard work for the teachers to be abreast with the latest trend of teaching and learning. To this end, teachers need to be committed, and satisfied in their job in order to be productive in the field. Hence, educational administrators, professional developers and policy makers need understanding about factors that affect teachers' commitment and job satisfaction and influence the realization of the change that they are looking for. The concept of this study is to identify the level of Teachers' Commitment and Job Satisfaction among teachers to evaluate the cognitive and behavioral aspect of the teachers to achieve maximum performance level of the public elementary school of Balingasag North District, Division of Misamis Oriental. The independent variables considered in this study are the teachers' commitment in terms of Affective, Continuance, and Normative. Dependent variables are the factors affecting job satisfaction; Personal, Organizational, Work Environment, and Work Itself. Age, Marital Status, Position, Gender, Family Income, and Attitude towards Teaching are the moderating variables. The diagram in Figure 1 illustrates the profiles of the teachers that have connection to their commitment and job satisfaction.



**Figure 1.** A Schema Showing the Interrelationship of Variables

### 1.2 Statement of the Problem

This study attempts to determine Teachers' Job Satisfactions and Commitment to evaluate the cognitive and behavioral aspect of the teachers to achieve maximum performance level of teachers in Balingasag North District, Division of Misamis Oriental during the school year 2017-2018. Specifically, this study sought to answer the following questions:

- 1.2.1. What are the characteristics of the respondents in terms of age, marital status, position, gender, family monthly income, and attitude towards teaching?
- 1.2.2. What is the respondents' level of Job Satisfaction based on the following factors: Personal, Organizational, Work environment, and Work itself?
- 1.2.3. What is the respondents' level of commitment considering each of the following variables: Normative, Continuance, Affective?
- 1.2.4 Is there a significant relationship between Teacher's Job Satisfaction and their Commitment when grouped according to Age, Gender, Family Monthly Income, Marital Status, Position, and Attitude towards Teaching?

### 1.3 Hypotheses

Problems 1, 2, and 3 are hypothesis-free. However, for problem 4, the following null hypotheses were tested at 0.05 level of significance.

Ho 1: There is no significant relationship in Job Satisfaction and Commitment when grouped according to age, gender, family income, marital status, position, and attitude towards teaching.

### 2 Methodology

This study used of the descriptive research. It deals with the relationship of the variables that have universal validity. Essentially, it discussed the interplay of the independent, dependent and intervening variables in the study. Survey questionnaires for Commitment were borrowed and modified from Meyer (2002) and Job Satisfaction from Paul Spector. They were used and distributed to the 209 elementary teachers of Balingasag North District, Balingasag Misamis Oriental. Data were gathered and results were tabulated and interpreted. After the interpretation, the results were explained by the underlying concepts that can relate to each piece of information.

The data from the survey questionnaire was processed and analyzed using the Statistical Package for Social Sciences (SPSS). Frequency, percentages, standard deviation was used to present the data. These were used to show the characteristics of the respondents in terms of age, marital status, position, gender, family income, type of school graduated from, and attitude towards teaching. Pearson Product Moment Correlation was used to test the relationship of job satisfaction and their commitment acquired when grouped according to their personal profile. Prior to the collection of data, the researcher secured permission to conduct the study from the Office of the Superintendent.

### 3 Findings

**Table1.** Profile of respondents

<b>Respondents</b>	<b>Age Range</b>	<b>Gender</b>	<b>Marital Status</b>	<b>Position</b>	<b>Family Income</b>	<b>Attitude Towards Teaching</b>
1	(56 or 27%)	(46 or 22%)	(67 or 32%)	(124 or 59%)	(147 or 70%)	Mean 3.25
2	(98 or 47%)	(163 or 78%)	(136 or 65%)	(46 or 22%)	(40 or 19%)	SD 0.81
3	(38 or 18%)		(6 or 3%)	(29 or 14%)	(16 or 8%)	Desc. Good
4	(56 or 27%)			(10 or 5%)	(6 or 3%)	

**Legend:**

<b>Age:</b>	1: 20-28	2: 29-37	3: 38-46	4: 47-55
<b>Gender:</b>	1: Male	2: Female		
<b>Marital Status:</b>	1: Single	2: Married	3: Widower	
<b>Position:</b>	1: T- I	2: T- II	3: T- III	4: MT
<b>Family Monthly Income:</b>	1: ₱20,000-₱25,000		2: ₱26,000-₱31,000	
	3: ₱32,000 - 43,000		4: ₱44,000 – 50,000	

Majority of the teachers belong to the age bracket of 29 years old to 37 years old, female, married, teacher 1 and have “Good” attitude towards tea

**Table 2.** Distribution of respondents' level in terms of Job Satisfaction

<b>Job Satisfaction</b>	<b>Personal Factors</b>	<b>Organizational Factors</b>	<b>Work Environment Factors</b>	<b>Work Itself Factors</b>
<b>Mean Rating</b>	3.04	2.97	3.13	3.02
<b>SD</b>	0.80	0.81	0.80	0.80
<b>Description</b>	Good	Good	Good	Good

**Legend:** Poor: 1.00-1.75 Fair: 1.76-2.51  
 Good: 2.52-3.27 Very Good: 3.28-4.00

Teachers' collective result for Job satisfaction is “Good”. As to their factor: Personal is “Good”; Organizational is “Good”; environmental is “Good”; and “Good” for Work Itself. Teachers are job satisfied.

**Table 3.** Distribution of respondents' level in terms of Teachers' Commitment

<b>Teachers' Commitment</b>	<b>Normative</b>	<b>Continuance</b>	<b>Affective</b>
Mean Rating	3.25	2.95	3.15
SD	0.81	0.82	0.81
Description	Good	Good	Good

**Legend:** Poor: 1.00-1.75 Fair: 1.76-2.51  
 Good: 2.52-3.27 Very Good: 3.28-4.00

Teachers' collective result for commitment is “Good” which can be accounted for their “Good” in Normative, Continuance, and Affective. Teachers are committed.

**Table 3.** Test of Significant Relationship between the Respondents' Job Satisfaction and Commitment when group according to Age, Gender, Marital Status, Position, Family Income, and Attitude towards Teaching

Variables	Correlation Coefficient	Level of Significance (p)	Interpretation
Age	.405	.000	Significant
Gender	.355	.000	Significant
Marital Status	.321	.000	Significant
Position	.292	.000	Significant
Family Income	.387	.000	Significant
Attitude towards Teaching	.542	.000	Significant

The test of significant relationship of the Respondents Job Satisfaction and their Commitment when group according to age, gender, family income, marital status, position, and attitude towards teaching are all statistically significant. This means that the null hypothesis was rejected because the p-values were greater than the level set at 0.05.

It is indeed true that attitude towards teaching significantly affects job satisfaction and commitment. Our behavior at work often depends on how we feel about being there. Therefore, making sense of how people behave depends on understanding their work attitudes. "At work, two particular job attitudes have the greatest potential to influence how we behave. These are job satisfaction and organizational commitment" Strauss (2015). The data obtained further implies that the significant positive correlation is between work values and job attitude (including job involvement and organizational commitment). A mediated effect was shown in work attitude and job involvement toward work value and job performance Liaw (2012).

Age significantly affects job satisfaction and commitment. Majority of the teacher respondents belong to the age bracket of 29 to 37 years old. This indicates that majority of them are already not new to the organization hence, this explain why they have high correlation coefficient at 0.01 level. Some job surveys indicate that older workers are more satisfied with their jobs than younger workers. The higher job satisfaction among older employees may be due to the perks that come with maintaining a long career, including higher salaries, better benefits and success in the workplace Burks (2017). This implies that the higher the age of the employee the more it is committed and job satisfied.

Family Income Statistically significant were observed between job satisfaction and commitment to the income of the family. On average, decreasing levels of job satisfaction were correlated with decreasing family income. Nevertheless, it cannot be concluded that a higher income brings more job satisfaction and commitment or, turning the statement around, that a higher level of job satisfaction produces a higher income. Indeed, this implies that the feeling of job satisfaction and commitment is all in the attitude. Majority of the respondents' family income belongs to 20,000 to 25,000 thus,

the respondents rated this significantly correlated to their job satisfaction and commitment.

In recent years there has been a substantial rise in the number of women entering the work force. One consequence of this trend is that it has generated considerable interest in the relationship of gender, commitment and job satisfaction. The results indicated that gender does significantly affect the job satisfaction and commitment of the teachers directly. "Female academics at higher ranks namely, senior lecturers, readers and professors, were more satisfied with their jobs than male academics of comparable ranks" Titus (2015). The implication of this finding is that job satisfaction and commitment varies in accordance to gender.

Marital Status significantly correlates with job satisfaction and commitment among teacher respondents at 0.01 level. Some economists attribute this wage differential to differences in job productivity between married and single workers. "The analysis of the effects of marital status shows that married officers achieved better performance than single officers" Browman (2014). This implies that married respondents are more satisfied and committed than the single respondents. Moreover, this might be because of responsibility. Married respondents take seriously their job for the reason that they have responsibilities to deal with and Commitment follows.

### **3.1 Conclusion**

From the findings of the study, it can be concluded that job satisfaction and commitment were statistically significant to their personal profile such as age, gender, marital status, position, family income, and attitude towards teaching.

Job Satisfaction and Commitment are the most important resources of teaching organizations. The sustained profitability of an organization depends on its workforce, job satisfaction and organizational commitment. Employees' job satisfaction enhances their motivation, performance and reduces absenteeism and turnover Smith (2015). Job satisfaction is an employee's attitude about his or her job and the organization in which he/she performs the job. Just as much as employee's job satisfaction is correlated with received salaries, benefits, recognition, promotion, co-workers and management support, working conditions, type of work, job security, leadership style of managers, and demographic characteristics such as age, gender, family income, marital status, position attitude towards teaching.

Organizational commitment on the other hand shows the psychological attachment of an employee to the organization. According to Meyer (2002) there are three types of organizational commitment: Affective, Continuance and Normative Commitment. Affective commitment in the study shows a very strong result which relates to an employee's emotional attachment to the organization and its goals. Continuance commitment shows a firm cognitive attachment between the teachers' organization because of the costs associated with leaving the organization. Finally, in the normative commitment showed substantial typical feelings of obligation to remain with an organization.

### 3.2 Recommendation

Concerning the effect of job satisfaction, the study recommended that schools should ensure that school environment is favorable for teachers to guarantee their motivation and satisfaction with their jobs. This can be achieved by ensuring that there are reasonable teaching and learning resources.

The study also recommended that teachers must be compensated well to motivate them in their job. This can be achieved through offering incentives to teachers and rewarding teachers. This will motivate them to improve on curriculum delivery. "Project Praise" needs to be implemented fully.

On teacher training, the study recommended that teachers will attend in-service training to upgrade their skills. By attending trainings, teachers will develop confidence in teaching their subjects and become motivated.

The study finally recommended that the school management will ensure that the school environment should be favorable. This can be done by ensuring high standards of discipline among students and ensuring that school rules and regulations are followed to.

The future researchers may use the result of this study as their reference and to replicate the study too larger number of respondents and consider other variables such as family background, school type, birth order, and reading habits.

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# Vocabulary Notebook for Teaching and Learning Technical Vocabulary

**Gefilloyd L. De Castro**

Zamboanga State College of Marine Sciences and Technology

[aqohsidyep812@gmail.com](mailto:aqohsidyep812@gmail.com)

**Abstract.** While teaching specialized/technical (henceforth technical) vocabulary is pivotal for learners to be effective in the target situation, it is one of the most challenging tasks English for Specific Purposes (ESP) practitioners must surpass. The present study sought to determine (1) the effectiveness of vocabulary notebook in the development of students' technical vocabulary in the target context, and (2) the students' perceptions of the vocabulary notebook as a potential teaching and learning tool. A mixed method was employed. A total of 188 third year college students participated in this study. This study identified positive outcomes both from the scores and experience of the students, which imply that the vocabulary notebook was generally effective, particularly for technical vocabulary acquisition and retention. This study posits that the use vocabulary notebook for technical vocabulary acquisition makes the teaching and learning of the language meaningful and relevant to the target context. The study suggests methodological process for implementing vocabulary notebook in language teaching.

## 1 Introduction

Language is unquestionably the most important tool to communicate. However, it is so vast that it is impossible for a person to learn all words or vocabulary in a certain language, especially for speakers or L2 learners whose target language learning is not their first language. In today's globalization, English has become a medium of communication for international trades and businesses. In the same vein, technical vocabulary plays a pivotal role in the everyday tasks of a workplace. This implies that adequate general and technical vocabulary is fundamental in comprehending written and spoken languages. Consequently, the increasing interest in teaching technical vocabulary emerged, especially among English for Specific Purposes (ESP) practitioners. The ESP is an approach to teaching English language in which the content and method are based on the learner's reason and needs for learning the language. It revolves around the question, 'What the learner has to know in order to function effectively in the target situation.' It is based on understanding the process of language learning and language use. The growth of ESP was brought about by a combination of three essential factors, including the expansion of demand for English to suit in particular needs and developments in the fields of linguistics and educational psychology (Hutchinson & Waters, 1987; Dudley-Evans, 1998).

In the ESP approach, teaching technical vocabulary is one of the most challenging tasks ESP practitioners must surpass. Several approaches in vocabulary teaching and learning focus on the acquisition of General English (GE) words. Although the teaching of technical vocabulary and General English varies in content and approach, some principles, or even the approach itself, in the teaching of GE may also be employed in the technical vocabulary teaching.

## **1.2 Vocabulary notebook**

Schmitt and Schmitt (1995) provided theoretical underpinnings and practical suggestions for implementing vocabulary notebooks (see also Baddeley, 1990). Eleven principles were derived from language memory and language research which are needed to consider when designing a vocabulary notebook or program. They also suggested practical principles that foster independent vocabulary study when using vocabulary notebook. These include writing word pairs or L2-L1 translation and then enrich them; recycling new words; independent learning; expanding rehearsal where the important words, which needed most attention, are placed at the front of the notebook; a personal word store such as notebook where the teacher occasionally checks it; and selecting words which refers to the type and number of words to be studied in a week.

McCrostie (2007) examined vocabulary notebooks among 124 first year English major students at a Japanese university. The study revealed that students draw the words for their notebooks from textbooks. The students favour certain parts of speech and have difficulty identifying words with high frequency. The students also view all words they do not know as equally important. This was elaborated further by the author.

Dubiner (2017) found positive outcomes in target vocabulary acquisition and retention using vocabulary notebook among the 13 third year students in an English teaching program at a teachers' college in Israel. The study posits that the implementation of vocabulary notebooks in teaching the following key factors in vocabulary development: learner motivation, involvement with materials, noticing, and subsequent attention to lexical items. While vocabulary notebook is considered as a useful tool, dangers have also been an inevitable event that may take place along the learning process (see McCrostie, 2007).

## **1.3 Maritime vocabulary**

According to Demydenko (2012), Maritime English (ME) is composed of several contrasting subsystems or languages. These are General English, General ME, ME for navigation, ME for marine engineering, ME for ship's documentation, ME for radio communication, Standard Marine Communication Phrases (SMCP), IMO conventions,

regulations, recommendations and manuals, ME semiotic systems, and ME for visual aids. It was noted that General English is the foundation in ME training.

In the teaching of maritime vocabulary, Romanova (nd) emphasized that Maritime English (ME) teachers must accomplish the task of meeting the requirements of the International Convention on Standards of Training, Certification and Watchkeeping. Reasons for the difficulties in learning maritime vocabulary were identified: 1) lack of awareness of the maritime vocabulary used in their native language, 2) a large amount of vocabulary required for learning over a short period of time, and 3) insufficient knowledge of General English. It was concluded that the most effective ways of learning maritime vocabulary is by using explicit teaching of vocabulary. Activities must correspond to the professional needs and the language proficiency level of the learners. These, accordingly, could provide basis for the occurrence of incidental learning.

## **2 The Study**

This study is the outcome of an action research in language teaching and learning, and classroom practice in ESP context among maritime students. The approach was adopted from Dubiner's (2017) strategy on using notebook for vocabulary acquisition and learning and integrated the approaches in the ESP context. The study sought to determine: 1) the effectiveness of vocabulary notebook in the development of students' maritime vocabulary, and 2) the students' perceptions on the vocabulary notebook as potential teaching and learning tool.

## **3 Methods**

### **3.1 Research Design**

This study utilized quantitative and qualitative methods in determining the effectiveness of vocabulary notebook in the students' maritime vocabulary development, and the students' perception on the notebook as a potential tool.

### **3.2 Participants**

A total of 188 third year maritime students enrolled in English program participated in this study. None of the participants is a native speaker of English. However, all participants have basic English language background, since the language is part of the curriculum in elementary, secondary and tertiary levels.

### **3.3 Data Collection Procedure**

The students were required to keep a vocabulary notebook with them all the time as part of the components of the grading system. They were instructed to record new maritime vocabulary items they encountered in reading, lectures, classroom discussion, etc. They were asked to provide the definition, the context where the words are used, and a sample sentence. Each student was required to record only 3-5 words per week for 18 weeks (from November-March).

The students were initially assessed after every two weeks, i.e. a total of 6-10 words were expected of them in every assessment. In the initial assessments, they were asked to write down the words they familiarized, to provide the definition, context, and a sample sentence.

A comprehensive assessment was administered to the students before the end of the semester. All notebooks were collected in which a total of 54-90 new words were expected. Without their knowledge, only 25 words from their notebooks were randomly selected for their final assessment. A sample questionnaire form is presented below:

**Instructions:** The following words in the table were taken from your vocabulary notebook. Write the meaning or definition of the word in column 1, and a sample sentence in column 3. If you cannot recall the meaning or definition, check column 2.

Maritime Words	Meaning/Definition	I don't remember	Sample Sentence
1. air draft/ air drought			
2. berth			
3. knot			

The second part of the final assessment is an evaluation of the method. The students were asked to give their reflection to provide an evaluation whether the vocabulary notebook is effective, and whether they consider it as a potential teaching and learning tool.

The questionnaire form with the score was returned to students. For ethical consideration, the students were asked to voluntarily contribute the result of their comprehensive assessment test for research purpose only. They were assured that the data shall be treated with utmost confidentiality, that no information from their individual questionnaire shall be disclosed, and that their identity shall not be revealed. They were clarified that the information collected may not directly benefit them, but shall provide general benefits.

### 3.4 Data analysis

For the research question number 1, the scores of the students on the following components were computed using mean and standard deviation. The mean score was computed for the number of words remembered, defined, and used in the sentence.

The adjectival rating in table 1 below was used to interpret the overall average/mean score of the students for the vocabulary gain and sample sentence:

**Table 1.** Adjectival Ratings

Mean Score	Interpretation
Below 5	Poor
6-11	Fair
12-17	Satisfactory
18-22	Very Satisfactory
23-25	Outstanding

For the research question number 2, the explicit responses of the students on whether the vocabulary notebook is effective and is potential as teaching and learning tool was counted. Content analysis was also used to analyze their responses.

**4 Results and Discussion**

**4.1 The effectiveness of vocabulary notebook**

The comprehensive self-assessment administered to the students before the end of semester shows that the use of vocabulary notebook for technical vocabulary acquisition is generally effective, specifically in ESP context. As seen in Table 2, all students showed a very satisfactory performance in the two major components of the assessment. Overall, this means that the students could define or explain newly acquired maritime words ( $m=20.0$ ), and use them in a sentence ( $m=19.6$ ). This, in the same way with Dubiner (2017), testifies a noteworthy result of the vocabulary notebook as a tool to promote vocabulary learning in the ESP context.

It can be argued that the number of words used for the comprehensive assessment is relatively low. As Nation (1993, p.36) advised, 'choose a sample that is large enough to allow an estimate of vocabulary size that can be given with a reasonable degree of confidence'. However, Gyllstad, Vilkaite and Schmitt (2015) argued that 'large enough' sample depends on or is decided by the test designers and there are no hard-and-fast rules for how many items are enough. Considering that words are highly technical, it is with prudent decision that the said number of words was chosen for culmination. Another reasonable decision was that the words were randomly selected.

Further, it shows that an average of 5 words could not be remembered by the students. Either they had vaguely recalled or entirely forgot them. The technical hitches in the process of familiarizing maritime words, and the number of recorded words needed to be reviewed may be a dilemma for some, considering that the learners are non-native

English speakers. Nonetheless, it can be considered that there was a big difference between the words the learners remembered and vaguely recalled or completely forgotten.

**Table 2.** Average Score

	Number of words that were not remembered	Number of words that were defined	Interpretation	Number of words that were used in the sentence	Interpretation
Mean Score	5.0	20.0	Very Satisfactory	19.6	Very Satisfactory
SD	5.1	5.1		5.5	

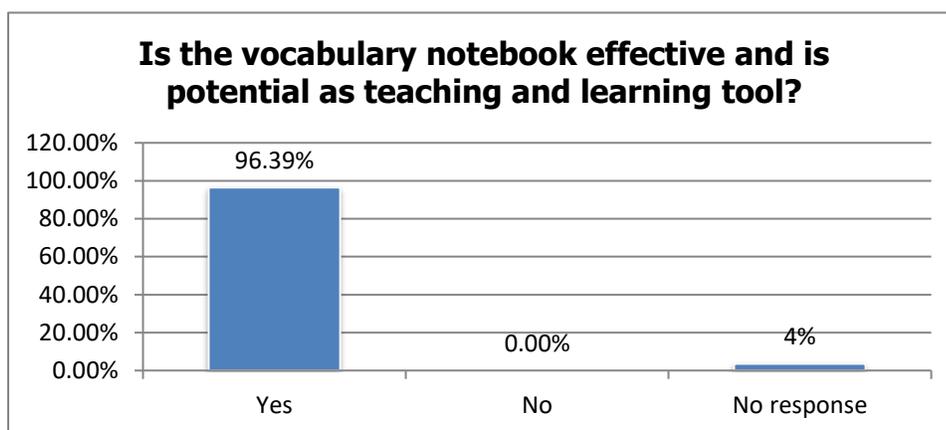
**4.2 Students’ perceptions on the vocabulary notebook as potential teaching and learning tool**

While it is evident that the use of vocabulary notebook is effective, students’ feedback must be recognized impartially. Favourably, the notable finding above was validated by the responses of the learners. As seen in Figure 1, the majority (96%) of them said that the vocabulary notebook was effective for learning maritime words, and had considered it as potential teaching and learning tool. Employing this strategy in the class was generally a great idea, essentially helpful, timely, relevant and beneficial for the target context, since the students will be having their on-the-job training or apprenticeship in few months. For instance, the students said in their narrative feedback: *‘The vocabulary notebook was a great help for us future seafarers. I have learned many new maritime words.’* and *‘I learned different terms which I know I would benefit from when I’ll be on board a vessel.’* The finding of Dubiner (2017) that increased vocabulary retention made students give enthusiastic testimonies is also evident in this study. The following participants said: *‘It was a great idea!’* and *‘The vocabulary notebook is enjoy!’* Surprisingly, none of them said that the approach is ineffective. None also expressed negativities. However, there were very few (4%) who had not responded. Either they refused to respond or ran out of time during the culmination.

In a similar vein, the technicalities of the maritime vocabulary and the keeping of the vocabulary notebook itself was a challenging part without consequent frustration. One participant said: *‘It’s a great challenge to familiarize maritime vocabulary, but it’s worth it.’* This challenge was actually anticipated prior to the implementation of vocabulary notebook. As such, only 3-5 words were required of them to familiarize every week. It is also for that reason why preliminary assessments were given after every two weeks. Although learners need to learn vast number of (maritime) words as research

suggested (e.g. Nation, 2006; Schmitt & Schmitt, 1995), as I said earlier, quality is preferred over quantity. Learning large number of words is likely to be impossible in one semester.

Based from the overall findings, this study affirms the effectiveness of vocabulary notebook as tool for learning and acquiring vocabulary in general and in particular (i.e. in ESP context). The findings do not, in any way, suggest neglect of General English. Learners' knowledge of technical vocabulary, in whatever context, can easily be intersected with GE. After all, as put forth by Kremmel and Schmitt (2016), knowing a word should entail the ability to use it in real language communication in one or more of the four skills. The true success of using vocabulary notebook finally lies on how the words are recalled and applied real-world scenario. The positive outcome of this study may be considered as a portion of the learners' entire success.



**Figure 1.** Students' Responses

In this study, the use of vocabulary notebook allows the learners to learn words from various perspectives. It also fosters learner-centeredness and learner autonomy, i.e. learners who can play the kind of active role in their own learning could be said to be autonomous (Nunan, 2003). Schmitt and Schmitt (1995) refer this to learner independence where learners can find information for some forms of enrichment. They also suggested that the students should be taught to learn words from different perspectives, encourage them to choose learning activities which are best for them, and foster independent vocabulary study. The vocabulary notebook is believed to be subsumed under these principles.

In the course of this study, the students know what was expected of them. Setting goals is quiet personal and is dependent on the learner's ability and self-motivation; however, learners were encouraged to achieve the best, if not perfect, which is basically what they need. As Pichugova, Stepura and Pravosudov (2016, p. 2) put forth that 'autonomous learning means that learners have to set their own goals according to their needs.' The approach to teaching and learning the language in this study was actually based on learners need; thus, ESP in nature. As Hutchinson and Waters (1987, p. 53) said that what distinguishes ESP form General English (GE) is not the existence of a need but rather an awareness of the need. Although learners were at liberty to decide what specific maritime vocabulary items to learn and how to learn them, they were supported

through scheduled consultations and suggested necessary references to refer to. Pichugova et al. (2016) suggested that support refers to the multiple resources and contexts the learner can make use of when necessary.

Nonetheless, there is no such thing as perfect approach. There can be underlying issues which can be emerged and argued about in adopting this vocabulary notebook approach. For instance, the teacher does not know whether the words included in the notebooks are genuinely new because practically, students' mind cannot be read. This cannot even be validated by merely asking the learners. This argument can be combatted with the principle of recycling words for higher retention. This means that if the student recorded technical/maritime words that are known yet, then by recalling and applying them in specific context, these words are subsumed under 'recycling'. As Baddeley (1990) put forth that that recalling and recycling of words are factors to vocabulary retention.

While flaws in the process of implementing the approach are inevitable, overall this study shows positive outcomes. What makes this study, particularly this apropos strategy employed, very meaningful and relevant is that the students are learning the meaning of the words in the context of maritime. After all, the goal of learning the target language is to effectively communicate in the target situation, and to accurately comprehend maritime lexicons.

## **5 Conclusion and Recommendation**

In this study, it can be concluded that the vocabulary notebook is generally effective in the development of students' technical vocabulary in the target context. It is also perceived to be a potential teaching and learning tool. This study posits that using vocabulary notebook for technical vocabulary acquisition makes the teaching and learning of the language meaningful and relevant to the target situation. The findings can be of noteworthy contribution to the pool of knowledge in language teaching. This study suggests several pedagogical implications for both General English and ESP practitioners. This study also suggests methodological process for implementing vocabulary notebook in language teaching.

While this study shows positive outcome, several arguments can also be emerged. For example, the depth of knowledge in maritime vocabulary or how well the learners understood those words is beyond the line of inquiry of this study. Hence, the findings cannot be generalized. It is, therefore, recommended to conduct further studies wider in scope and in ESP context.

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