FULL ISSUE: Volume 6, Issue 1, s. 2020

ASEAN Multidisciplinary Research Journal

e-ISSN: 2672-2453

p-ISSN: 2672-2445

Published by the Philippine Association of Research Practitioners, Educators, and Statistical Software Users (PARESSU), Inc (CN2019001170) through the OFFICE OF THE DIRECTOR FOR JOURNAL MANAGEMENT (ODJM)

www.paressu.org/online/mrj
ASEAN-MRJ December 2020 Issue
Published online (Full Issue): **January 5, 2020**

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Contact: 0977-756-2735
e-ISSN 2672-2453
p-ISSN 2672-2445

Foreword

Moving forward comes with a reflection on making a difference based on lessons learned from the past. The dizzying array of 2020 has illuminated the challenges in the advancement of knowledge and evidence in the fourth industrial revolution. Given the reality in education, a hallmark on quality assurance entails the researchers, faculty, and educational revolutionists to evaluate curriculum and ameliorate pedagogy. As a year-end issue, the ASEAN Multidisciplinary Research Journal responds to overcoming the pedagogical perplexities and ecological disequilibrium through scientific evidence of the psychology of learning and environmental evolution.

Accepted articles for Volume No. 6 Issue No. 1 offer mixed ingredients of designs from multidisciplinary perspectives and different sectors of the educational and medical citizenry. This issue is composed of seven articles that shed light on the existing challenges on educational approaches, social technology, and plant science. In their study titled "Implementation of Outcome-Based Education to STEM Strand in Pangasinan State University (PSU)," Zarate and his colleagues revealed a high level of implementation of the Outcomes-Based Education (OBE) approach in Science, Technology, Mathematics and Engineering (STEM). However, their study concluded that a difference exists between teachers' and students' perceptions of OBE implementation. Consequently, the authors recommend the collaboration of teachers and students to strengthen the implementation of the OBE curriculum.

Another approach was used by Inaldo, who determined the effectiveness of the Contextual Framing Approach in enhancing the performance and attitude of students in Biology. Using a single-blind experimental design, findings revealed that the students in the control and the experimental groups did not differ in their post-test performance. However, both groups developed a highly favorable attitude after their exposure to the conventional and contextual approach, respectively. The author recommends a case analysis of the factors that may affect student performance relative to the exposure to Contextual Framing approach. On a similar note, a One Group Pretest-Posttest design study of Tanghal from Nueva Ecija University of Science and Technology aimed to determine the effect of Integer Game Card in increasing performance of 196 respondents (89 male and 107 female) Grade 7 students in operations of integers. The play-based approach of Integer Game Card Battle improved student performance in integer operations and should be integrated into the curriculum to further mastery of integers among the students. Rivera also conducted experimental research to test the efficiency of a Strategic Instructional

Module utilized in Organic Chemistry. The results indicate that the module facilitated the comprehension of the students in Organic Chemistry. It also found out that male students gained higher scores than female students. Guinto and Bautista's research utilized a qualitative approach and laboratory method analysis. They analyzed the phytochemical constituents of the Black Mulberry Tree. Based on the plant analysis, the constituents of a mulberry tree have promising medicinal value. The said tree also consists of phytochemical constituents that can be utilized for insect-repellent and anti-microbial solutions. However, such hazardous constituents are also detrimental to human health. Hence, a need exists to isolate and perform a proximate analysis on the tannins and saponins constituents of the Black Mulberry Tree.

Resueño, a researcher from Nueva Ecija University of Science and Technology, identified the gender differences in lexical features. Taken from the official Facebook Page of the College of Education of the said University, data revealed that more women utilize different formations than men. The author recommends investigating the morphological structure of newly coined words and other language innovation in social media.

Concerning the pandemic, Nolasco of Goodsam Medical Center in Cabanatuan City described the epidemiological distributions of COVID-19 cases in the Philippines public health crisis in the country. His result provided the dismal reality of the spread of the virus as a continuing threat to public health.

The articles in this issue are advancing scientific evidence amidst challenging educational, environmental, and public health crises. The authors provide a glimpse of hope through science-based actions and scientific analyses to contribute to overcoming the evolving challenges in the face of the fourth industrial revolution. From here on, we move forward with another year of scientific milestones. Congratulations to the authors for their contributions to this year-end issue!

CATHY MAE D. TOQUERO
Mindanao State University
Incoming Director for Publications
Fiscal Year 2021, PARESSU, Inc

Message to Readers

Despite this pandemic, I hope that you are all physically and mentally fit. We all know that having perseverance during these difficult times is good, but do not forget to wear your smile and to count your blessings. With this blessed organization, I am thankful to be a part of those minds behind this who are willing to help and train future researchers. As one of the fruits of leadership, intellect, and hard work, it is an honor to showcase this issue that serves as one of the achievements of PARESSU, Inc.

To the readers, honestly, I was once a nobody, a typical student, but because of research through those people who helped me to be the better version of myself especially Kuya Jun. I was able to hit one piece of the domino that started to change my life one step at a time. I realized that it is not only a subject for us to complete, but also a way to show our ideas, capabilities and love for other people. It does not matter if it is a complex study or not as long as it positively impacts society. It is not too late; everything has its limitations but we do not need to delimit ourselves in soaring greater heights. Research is now a part of me, and I want this to impart with you. Research can provide solutions in this world full of uncertainties. I hope that you will learn more than before and always wear your smile. Thank you and God bless.

ADRIAN R. MANAOIS
Outgoing JUREP President
Incumbent Corporate Secretary
PARESSU, Inc

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Implementation of Outcome-Based Education to STEM Strand in Pangasinan State University

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Abstract- *Outcome-Based Education (OBE) has become an integral part in teaching Science, Technology, Mathematics and Engineering (STEM) strand in the Philippines. It is a paradigm shift in the education system that's changing the way students learn, teachers think and schools measure excellence and success. The research aimed to find out the significant difference between the perception of students and teachers in the level of implementation of Outcome-Based Education of Pangasinan State University-Integrated Laboratory Schools (PSU-ILS)-High School Department in Bayambang Campus during the 1st Semester of A.Y. 2019 - 2020. Also, the research sought to answer the extent of the manifestation of the following behaviors by the STEM students after their exposure to OBE. The descriptive method of research, frequency count and T-test for significant differences were used in the study. Reliability was analyzed using IBM SPSS version 25. The findings of the study echoed that the level of implementation of Outcome-Based Education (OBE) approach as perceived by Science, Technology, Engineering and Mathematics Students is highly implemented with a composite mean of 3.73. Also, the extent to which effort to implement OBE has influenced certain educational practices in the school is perceived by teachers' as moderately implemented with the composite mean of 2.83. Lastly, there is a significant difference in students' and teachers' perception in the area of the school's mission statement that reflects a commitment to enable all students to be successful with the computed significance of 0.042 which is lower than 0.05 level of significance. In addition, a significant difference in students' and teachers' perception in the staff's commitment to the written mission statement with the computed significance of 0.046 which is lower than 0.05 level of significance. Finally, anchoring on the findings, conclusions and recommendations of the study, the administration, principal and teachers are encouraged work collaboratively to further improve the implementation of Outcome-Based Education.*

Keywords- *Outcome-Based Education, descriptive survey method and frequency count*

INTRODUCTION

Senior High School (SHS) is two years of specialized upper secondary education; students may choose a specialization based on aptitude, interests, and school capacity. The choice of career track will define the content of the subjects a student will take in Grades 11 and 12. SHS subjects fall under either the Core Subjects or Specialized/ Applied Subjects. Each student in Senior High School can choose among three tracks: Academic; Technical-Vocational-Livelihood; and Sports and Arts. The Academic track includes three strands: Accountancy, Business, Management (ABM); Humanities and Social Sciences (HUMSS); and Science, Technology, Engineering, Mathematics (STEM). This is under the Republic Act 10533 otherwise known as the Enhanced Basic Education Act of 2013 mandates the Department of Education to create another level of the basic education composed of two years (Republic Act 10533, 2013).

The K-12 program basically added two more academic school years to the then-existing 10-year pre-university format of secondary education institutions. In SHS, students will go through a core curriculum and subjects under a track of their choice. These two additional years will equip learners with skills that will better prepare them for the future, whether it be: Employment; Entrepreneurship; Skills Development (further Tech-Voc training); and Higher Education (College) (The K to 12 Basic Education Program, n. d.). Science, Technology, Engineering, and Mathematics are intertwining disciplines when applied in the real world. With goals of achieving educational equity, the K-12 program aims to equip students with the much-needed skills to gain employment even without a college degree (Yu, 2018). Since its approval last 2013, the K to 12 system has changed the way high school students are educated and trained but more importantly how they are rigorously prepared for employment.

In Department of Education, (OBE) has been an integral part in teaching STEM. Outcome-based education (OBE) is an educational theory that bases each part of an educational system around goals (outcomes). By the end of the educational experience, each student should have achieved the goal. There is no single specified style of teaching or assessment in OBE; instead, classes, opportunities, and assessments should all help students achieve the specified outcomes (Spady, 1994). The role of the faculty adapts into instructor, trainer, facilitator, and/or mentor based on the outcomes targeted. Outcome-based methods have been adopted in education systems around the world, at multiple levels.

The difference of the STEM curriculum with the other strands and tracks is the focus on advanced concepts and topics. Under the track, a student can become a pilot, an architect, an astrophysicist, a biologist, a chemist, an engineer, a dentist, a nutritionist, a nurse, a doctor, and a lot more. Those who are also interested in Marine Engineering should take this track. STEM education in school is important to spark an interest in pursuing a STEM career in students. STEM education is critical to help the performance of the students in our country in the area of Science and Mathematics. If STEM education is not improved, the Philippines will continue to fall in world ranking with math and science scores (Dela Cruz, J.S. 2017).

For education stalwart Dr. William Spady, outcome-based education (OBE) is a paradigm shift in the education system that's changing the way students learn, teachers think and schools measure excellence and success (Transforming PHL Education, 2017). In addition, OBE is more concerned with how successful one is in achieving what needs to be accomplished in terms of skills and strategies. In OBE, real outcomes extend far beyond the paper-and-pencil test.

It is the objective of the study to determine the level of implementation of Outcome-Based Education (OBE) approach as perceived by Science, Technology, Engineering and Mathematics Students. Also, the study aims to discover the extent to which effort to implement OBE has influenced certain educational practices in school as perceived by the teachers. Finally, it is the goal of the study to analyze if there is a significant difference between the perception of students and teachers in the level of implementation of Outcome-

Based Education (OBE) approach to STEM education.

It is in this context that a study of the level of implementation of Outcome-Based Education to STEM Strand in Pangasinan State University is conceived.

Scope and Delimitations

The main focus of this research is the use of Outcome-Based Education Approach to STEM Strand and determine its level of implementation in terms of students' performance. It will identify the advantages of the Outcome Based Education approach and its impact in teaching STEM Strand based on the perception of teachers and students. The scope of this research is delimited to Senior High School STEM Strand Students in order to address the broad profile of intelligences operating within each learner in Pangasinan State University Integrated Schools – High School in Bayambang Campus. It does not cover other High Schools. The study will be conducted during the Second Semester of A.Y. 2019 - 2020 at Pangasinan State University Integrated Schools – High School in Bayambang Campus.

METHODOLOGY

Research Design

This study was a Quantitative research which was based on the measurement of quantity or amount. The design of this research used non-experimental design. This study used a descriptive method of research and a methodological approach where data from different disciplines can be integrated. The quantitative data were gathered using a survey questionnaire. There will be two samples, the students and teachers of STEM strand. The data collected from these two samples will be compared to determine the implementation of Outcome-Based Education (OBE) according to the perception of students and teachers in the STEM Strand. In addition, to determine whether there is a significant difference in the perception of students and teachers in the level of implementation of Outcome-Based Education (OBE) approach to STEM Education.

Subjects of the Study

Population was generally the objects of the research while sample is a part of the population that would be investigated. Population was all of the things that would be observed which were relevant with the questions or problems that was asked, while sample was totally (not all) of the things that would be observed which were relevant with the question the question that asked, based on this statement, population referred to the whole targets of the research that were observed by the researcher. The population of this study were the students and teachers of STEM Strand. It consisted of Grade 11 and Grade 12 students. Under Grade 11 students there twenty-six (26) males and forty-seven (47) females. While for the Grade 12 students, there are sixteen (16) males and twenty-four (24) females. The total population of the STEM Strand students is one hundred thirteen (113). Also, the STEM Strand teachers teaching Science and Math are also involved as separate respondents. The total number of teachers teaching Science and Math in STEM Strand is four (4).

The researchers decided to utilize total enumeration of the population since this will serve as a baseline data to administration and principal of said school on evaluating the implementation of Outcome-Based Education approach to STEM strand.

Data Gathering Instrument

In any educational research, instrument for collecting data is important part. The accuracy of the result of research is mostly dependent on how accurate the use of instrument.

Based on the research problems, the researchers used two types of survey questionnaires as an instrument. In this study, one questionnaire will be used to measure the level of implementation of Outcome-Based Education (OBE) based on the perception of STEM strand students. And the other is for the implementation of OBE as perceived by the STEM strand teachers. The questions will be rated using 5-point Likert scale (5: Very Highly Implemented to 1: Least Implemented). The

data were analyzed using IBM SPSS version 25. And the questionnaire was prepared in English.

Data Gathering Procedure

The researchers requested all the Grade 11 and 12 STEM strand students and teachers of Pangasinan State University-Integrated Laboratory Schools (PSU-ILS) High School Department in Bayambang Campus to answer the survey questionnaires considering the venue and their availability. Also, the researchers read the questions one-by-one and explaining each item as needed to ensure accuracy of the respondents' answers.

A letter addressed to the school principal was given to get the exact number of students from Grade 11 and 12 STEM strand students. In addition, a letter of permission addressed to the school principal and advisers to carry out the study were submitted for answering the survey questionnaire. The availability of the respondents was noted, and their schedules were taken into consideration before administering the questionnaire.

The respondents were fully informed about regarding the objectives of the study, while they were assured that their answers were treated with confidentiality and used for academic purposes and only for the purpose of the particular research. Except from the above, the participants were not harmed nor abused, both physically and psychologically, during the conduct of the research. In contrast, the researchers attempted to create and maintain a climate of comfort.

Statistical Treatment

To interpret the data effectively, the researchers will employ the following statistical treatment. The Percentage, Weighted Mean and T-Test are tools used to interpret data.

FINDINGS AND DISCUSSIONS

Table 1 presents the summary of responses on Outcome-Based Education practices and standards of Pangasinan State University – Integrated Schools – High School STEM Students.

Table 1
SUMMARY RESPONSES ON OBE PRACTICES AND STANDARDS OF PSU-IS-HS STEM STUDENTS

Indicators	Mean	Descriptive Equivalent
A collectively endorsed mission statement	3.91	Highly Implemented
Clearly defined, publicly derived exit outcomes	3.55	Highly Implemented
A tightly articulated curriculum framework of program, course and unit outcomes	3.71	Highly Implemented
A system of instructional decision making and delivery	3.74	Highly Implemented
A criterion-bases consistently applied system of assessment, performance standards, student credentialing, and reporting	3.75	Highly Implemented
Composite	3.73	Highly Implemented

As gleaned from the table above, on the average, STEM Students perceived the implementation of Outcome-Based Education practices and standards as highly implemented with a composite mean of 3.73. Analysis of data reveals that the school in this study was successful at developing written mission statement that reflect a commitment to the success of all students. Examination of the summary shows that PSU – IS - HS more likely has clearly defined, publicly derived exit outcomes as well as tightly articulated curriculum framework of program, course and unit outcomes both having descriptive equivalent of highly implemented. In the same way, the STEM students perceived that the system of instructional decision making,

delivery and promotion on the student's ability to demonstrate all unit, course/ grade level and program outcomes are highly implemented. Hence, the finding of the study echoed the statement of Eslapor, M.F (2017) that outcome-based education (OBE) approach claims it is very much after on how students can demonstrate their knowledge and skills. The logic there is how the schools could assess student outcomes as required by industries. The OBE approach is said to be on track to changing the educational system from inputs based to outputs based. A significant part of the OBE process involves determining appropriate and measurable outcomes.

On the other hand, table 2 presents the summary of responses on outcome-based education practices and standards of Pangasinan State University – Integrated Schools – High School STEM Teachers. It is worth mentioning that the STEM teachers perceived OBE to be highly implemented with a cumulative mean of 3.91.

Table 2
SUMMARY RESPONSES ON OBE PRACTICES AND STANDARDS OF PSU-IS-HS STEM TEACHERS

Indicators	Mean	Descriptive Equivalent
A collectively endorsed mission statement	4.83	Very Highly Implemented
Clearly defined, publicly derived exit outcomes	4.00	Highly Implemented
A tightly articulated curriculum framework of program, course and unit outcomes	3.93	Highly Implemented
A system of instructional decision making and delivery	4.13	Highly Implemented
A criterion-bases consistently applied system of assessment, performance standards, student credentialing, and reporting	4.00	Highly Implemented
A system of instructional organization and delivery	3.88	Highly Implemented
A system which recognizes the power of organizational culture on student and staff development and stablishes a climate that enables all students and staffs to perform at high quality levels	3.83	Highly Implemented
An ongoing system of program improvement	3.75	Highly Implemented
A data base of course and unit outcomes for all students and other key indicators of school effectiveness that is used and updated regularly to improve the conditions and practices that affect students and staff success	3.89	Highly Implemented
Extent to which effort to implement OBE has influenced certain educational practices in the school	2.83	Moderately Implemented
Composite	3.91	Highly Implemented

As reflected from the table, the teachers strongly agreed that the school is successful at implementing outcome-based education with collectively endorsed mission statement having the highest mean of 4.83 and is interpreted as very highly implemented. Likewise, the teacher-respondents all strongly agreed that other areas and components of outcome-based education ate highly implemented in the school paving way for students to benefit from well-developed exit outcomes, multiple opportunities to master important objectives and successful demonstration of appropriate

exit outcomes. The teachers perceived that students are given more real life situations and are expected to improve by continuing to work beyond the normal grading system. Also, it is evident from the above result that, the school strives to promote high performance of all staff leading to successful and high learning experience of all STEM strand students. This is well supported by the composite mean of 3.91 interpreted as highly implemented.

As to the extent to which effort to implement OBE has influenced certain educational practices in the school is perceived by teachers' as moderately implemented with the composite mean of 2.83. This means that the utilization of exit outcomes and course/grade level outcomes, students' opportunity to master important objectives and classroom assessment are all moderately implemented.

Meanwhile, Table 3 presents the summary of the perception of students and teachers in the level of implementation of Outcome-Based Education (OBE) to STEM education.

Table 3
Summary of the perception of students and teachers in the level of implementation of Outcome-Based Education (OBE) to STEM education

Indicators	Mean	diff	t-value	Sig.
The school has a written mission statement.	4.1416 4.7500	-.60841	-2.276	.087
The school has a written mission statement that reflects a commitment to enable all students to be successful.	3.9558 4.7500	-.79425	-2.979	.042
The staff in my school is committed to the written mission statement.	3.6018 4.5000	-.89823	-2.955	.046
The school has developed clearly defined exit outcomes.	3.4956 4.0000	-.50442	-1.214	.306
The school has developed clearly defined exit outcomes with input from the public.	3.5398 4.0000	-.46018	-1.103	.344
The school utilizes exit outcomes that students must demonstrate or requires that an intervention plan will be developed before they can advance.	3.5752 4.0000	-.42478	-1.019	.378
The school has developed program outcomes.	3.7788 4.0000	-.22124	-.530	.630
The school has developed program outcomes for each discipline area.	3.6106 4.2500	-.63938	-2.417	.077
The school has developed program outcomes that support the exit outcomes.	3.4513 3.7500	-.29867	-.615	.580
In my school, teachers base grade level promotion on the	3.7168 4.2500	-.53319	-2.004	.118

student's ability to demonstrate the appropriate outcomes.				
The school has a vision of how our school should look and operate.	4.1062 4.2500	-.14381	-.539	.619
The school's OBE steering committee oversees the implementation of OBE.	3.5664 3.7500	-.18363	-.378	.729
The school reviews course/grade level and unit outcomes to assure relevancy.	3.6637 4.0000	-.33628	-.806	.475
The school systematically reviews curriculum to assure that it supports our outcomes.	3.5752 4.2500	-.67478	-2.510	.066
The school uses a monitoring system that documents student's demonstration of outcomes.	3.5575 4.2500	-.69248	-2.553	.061
Students demonstrate more awareness of what is expected of them.	3.7345 4.0000	-.26549	-.635	.567
Students are interested and motivated to achieve the outcomes.	4.0265 4.2500	-.22345	-.842	.449
Students demonstrate more responsibility for their own learning.	3.9646 4.2500	-.28540	-1.078	.345
Students score higher on standardized tests.	3.4513 3.5000	-.04867	-.096	.929
Students have improved their grades.	3.6372 3.7500	-.11283	-.232	.831
Students are able to apply knowledge better.	3.8673 4.2500	-.38274	-1.451	.226
Students are more focused on specific curriculum goals.	3.6991 4.0000	-.30088	-.721	.519
Higher expectations for ALL teachers and ALL Students are set forth.	3.9558 4.2500	-.29425	-1.079	.338
They became more successful as a student and as a teacher.	3.6549 3.7500	-.09513	-.356	.740

Noticeably in Table 3, there is a significant difference in students' and teachers' perception in the area of the school's mission statement that reflects a commitment to enable all students to be successful with the computed significance of 0.042 which is lower than 0.05 level of significance. In addition, a significant difference in students' and teachers' perception in the staff's commitment to the written mission statement with the computed significance of 0.046 which is lower than 0.05 level of significance.

It can be drawn from these findings that the students' perception does not match teachers' perception about the commitment of the school in its mission statement and how it contributes to the success of the students.

However, there is no significant difference in the perception of students' and teacher's in all other indicators. Areas such as the school has written statement, well-developed clearly defined exit outcomes and developed program outcomes that support the exit outcomes. Also, teachers base grade level promotion on the student's ability to demonstrate the appropriate outcomes and the school's OBE steering committee oversees the implementation of OBE. As a result, students demonstrate more awareness of what is expected of them and motivated to achieve the outcomes. The students demonstrate more responsibility for their own learning and have improved their grades. Moreover, students are able to apply knowledge better and students are more focused on specific curriculum goals.

Conclusion

Based on the findings of the study the following conclusions were drawn:

1. The level of implementation of Outcome-Based Education (OBE) approach as perceived by Science, Technology, Engineering and Mathematics Students is highly implemented with a composite mean of 3.73.
2. the extent to which effort to implement OBE has influenced certain educational practices in the school is perceived by teachers' as moderately implemented with the composite mean of 2.83.
3. there is a significant difference in students' and teachers' perception in the area of the school's mission statement that reflects a commitment to enable all students to be successful with the computed significance of 0.042 which is lower than 0.05 level of significance. In addition, a significant difference in students' and teachers' perception in the staff's commitment to the written mission statement with the computed significance of 0.046 which is lower than 0.05 level of significance.

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Phytochemical Analysis of Black Mulberry Tree (*Morus nigra*)

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Abstract *– This study aimed to determine the phytochemical constituents of the different parts of Morus nigra such as the leaves, bark, roots, and fruits. It made use of the Qualitative Method Design and Laboratory Method Analysis. The samples were collected and prepared in Alcala, Pangasinan. Plant samples were brought to the University of the Philippines at Diliman, Quezon City for identification and authentication. Plant materials were submitted to the Industrial Technology Development*

In terms of phytochemical analysis, the roots and bark is abundant in triterpenes and lacks flavonoids. The bark is also abundant in saponins. The leaves has abundant sterols and the fruits are rich in flavonoids. The beneficial phytochemical constituents are the sterols that are abundant in the leaves of Black Mulberry Tree; flavonoids that are abundant in the fruits and alkaloids that are found in traces in all the parts of Black Mulberry Tree. The hazardous phytochemical constituent are the tannins and saponins which were found in traces and moderate amounts in all of the parts of Black Mulberry Tree. The bark and roots of the tree could be used to create insect-repellent and anti-microbial solutions because of abundance of triterpenes. The leaves can be used as anti-cancer and immunity booster since it has a lot of sterols. Flavonoids in fruits could be used as anti-oxidant and heart disease preventer. However, abundant amount of saponins in the bark of the tree can cause destructive consequences in the body. It is hereby recommended that Black Mulberry Tree be cultivated and be propagated on a larger scale because of its medicinal value. The phytochemical constituents must be isolated and proximate analysis must be performed.

Keywords *– Black Mulberry, Herbal, Medicinal Uses, Phytochemical Analysis*

INTRODUCTION

All individuals have the right to health. This right means that everyone has the right to obtain the highest attainable standard of physical and mental health, which includes access to all medical services and high-quality medicines. However, the Philippines as a member of the third world economy is having difficulties in providing all these. The people are resorting to other means such as herbal medicines available. Also, there is limited research-based information on herbal medicines in the country.

Plants are excellent sources of food, chemicals, and herbal medicines. Many important drugs have been directly or indirectly derived from them [1]. The medicinal plants are useful for curing of various human diseases because of the presence of phytochemical constituents. Phytochemicals are naturally occurring in the medicinal plants, leaves, vegetables, and roots that have defense mechanism and protect from various diseases. One of the well-known medicinal plant is the Black Mulberry Tree.

In the Philippines, the Black Mulberry Tree (*Morus nigra*) leaves are harvested when the plant reaches six months and harvests take place every three months. Japan and China can only grow leaves of Black Mulberry Tree (*Morus nigra*) every six months because these countries experience long winters [2]. The *Morus nigra* is commonly grown to produce leaves which are usually fed to silkworms for the manufacture of silk threads. Silkworm Farming in La Union and Negros Occidental in the Philippines had been a great source of income to the community. However, the cutting of hectares of planted *Morus nigra* over the last ten years slumped the production of Silkworm.

It is necessary to know the probable uses of the Black Mulberry Tree (*Morus nigra*) from its roots, its branches, its leaves, and its fruits. The determination, therefore, of phytochemical constituents of Black Mulberry (*Morus nigra)* would be of great help to utilize programs and products that would enhance the use of Mulberry. It could also increase its marketability, thus, creating job opportunities to our locals. This study was conducted primarily to describe the Black Mulberry Tree that is grown in Pangasinan, Philippines; to identify the phytochemical constituents present on this tree; and, to describe the medicinal purposes of the phytochemical constituents of *Morus nigra*.

The parts of the Black Mulberry Tree (*Morus nigra)* samples were taken from San Nicolas, Alcala, Pangasinan. The preparation of samples for analysis were done in Canarvacanan, Alcala, Pangasinan. The samples were limited only in the Black Mulberry Tree since the White and Red Mulberry Trees are not propagated in the Philippines.

The physical description of the Black Mulberry Tree (*Morus nigra)* is performed in the University of the Philippines, Diliman, Quezon City. The phytochemical analysis of present phytochemical constituents was done by Industrial Technology Development Institute in Bicutan, Taguig. There were no isolation and purification of the plant constituents in this study.

OBJECTIVES OF THE STUDY

This research sought to determine the physical characteristics of the Black Mulberry Tree (*Morus nigra)* in terms of color, height, habitat, propagation, size, and shape. It also sought to determine the amount of phytochemicals that could be found in the different parts of Black Mulberry Tree (*Morus nigra)* and their medicinal purposes.

MATERIALS AND METHODS

This study described the characteristics of Black Mulberry Tree (Morus nigra) and determined the present phytochemicals in its four different parts. The presence of phytochemicals was measured qualitatively and were analyzed and described using Laboratory Method Analysis. The samples of the study were subjected to extraction and were subjected to different laboratory tests to identify the phytochemicals present. The medicinal uses of the phytochemicals found were discussed about pharmaceutical and medicinal findings.

Collection of Samples

The researcher secured the plant samples of Black Mulberry Tree from San Nicolas, Alcala, Pangasinan. The samples were the parts of Black Mulberry Tree such as roots, branches, leaves and fruits.

Preparation of Samples

The samples were washed two times with tap water and a final rinse using distilled water. It was then placed in a confined room in the researcher's residence in Canarvacanan, Alcala, Pangasinan.

The samples were carefully placed inside plastic containers. Some of the fresh samples were submitted to the University of the Philippines in Diliman, Quezon City for taxonomical classification and physical description.

The samples were air dried for three weeks. They were weighed, sealed and labeled. The researcher brought the dried samples to the Industrial Technology Development Institute for phytochemical analysis. The scientists and laboratory experts in Industrial Technology Development Institute at Bicutan performed the phytochemical analysis on leaves, roots, branches, and fruits of the Black Mulberry Tree.

Phytochemical Analysis

1. Tests for Alkaloids

Materials: Hydrochloric Acid
Mayer's / Wagner's Reagent

A 4.0 g sample of dried roots, leaves, branches, and fruits were weighted with methanol. The aqueous solution of the acid-soluble portion of the methanol fractions were extracted with 1 % HCl and 2 drops of Mayer's or Wagner's reagent which were added to the filtered acid extract. A cream coloured precipitate was observed in the case of Mayer's reagent while a reddish-brown precipitate was observed in the case of Wagner's test.

2. Tests for Steroids and Triterpenes

Liebermann- Burchard Test

Materials: Acetic Acid Anhydride
Concentrated Hydro Sulfuric Acid

A small amount of alcoholic extract was dissolved in acetic acid anhydride. The soluble portion was decanted and 1-2 drops of concentrated sulfuric acid was added. A green color, either immediately or slowly turned into red and blue tones. A pink to red color is indicative of triterpenoids while a blue color is indicative of steroids.

3. Test for Flavonoids

Materials: 10% Hydrochloric Acid
Magnesium Turnings

One (1) ml of alcoholic extract or a small amount of dried alcoholic extract was treated at 1 ml 10% HCl and magnesium turnings. Formation of red color is observed as there are flavonoids.

4. Test for Saponins

Materials: Distilled Water
Test Tube

The formation of persistent foams during plant extraction or during the concentration of plant extract is a reliable evidence that saponins are present. Indeed, if large quantities of saponins occur in a plant, it was difficult to successfully concentrate aqueous alcoholic extracts even when using a rotary evaporator. A simple test for saponins is therefore, to shake up an aqueous alcoholic plant extract in a test tube.

5. Test for Tannins

Materials: Ferric Chloride
Distilled Water

The alcoholic extract was extracted with hot water and the aqueous extract was filtered. Two (2) drops of ferric chloride test solution is added. An indication is a dark colored precipitate which may either be black, dark blue, blue black-green or blue green.

6. Test for Glycosides

Materials: Fehling's Solution
10% Hydrochloric Acid
Ferric Chloride
Sodium Carbonate
Filter Paper
Distilled Water
Test Tubes

The alcoholic extract was dissolved in hot water and filtered. The filtrate was used for the test. A 2 ml sample was placed in two test tubes. To sample 1, 1 cc of dilute HCl was added. To sample 2, nothing was added. Then the two test tubes were placed in a boiling water bath for 5 minutes. The test tubes were cooled. The samples were both neutralized with anhydrous sodium carbonate until no more effervescence was produced. Then Fehling's Solution was added which was prepared by mixing 3 ml of Fehling's A with 3 ml of Fehling's B. One (1) ml of this Fehling's solution was used. The two test tubes were heated in a water bath for 2 minutes. A brick red precipitate was observed. An increase in the amount of brick red precipitate in the hydrolyzed sample (the sample to which the dilute acid is added) as compared to the other sample indicated the presence of glycosides.

Fehling's Solution A was prepared by putting 34.64 g of Copper Sulfate in a flask and mixed with 500 ml distilled water.

Fehling's Solution B was a mixture of 50 g of sodium hydroxide and 173 g of potassium sodium tartrate and 500 ml of distilled water.

Further, the data was recorded by the scientists and laboratory experts from Industrial Technology Development Institute. The researcher secured a copy of the taxonomical phytochemical analysis results.

RESULTS AND DISCUSSION

The data-findings were presented and analyzed according to the phytochemical analysis of the different parts of Black Mulberry Tree (*Morus nigra*) namely, leaves, bark, roots, and fruits.

Physical Characteristics of the Black Mulberry Tree

Morus nigra, Black Mulberry, is a slow-growing, deciduous tree. The species is known to have escaped from cultivation in Denmark and Austria, is weedy in Spain, southeastern Australian bush land, and South Africa, and has been reported as invasive in southern Brazil. Invasive traits include its longevity, rapid growth rate, tolerance for droughts, infertile and rocky soil, and resistance to cold, easy seed dispersal by biotic vectors attracted to its sweet, edible fruits, and repeated introductions for cultivation around the world. Considering current evidence, risk of introduction for this species is medium to high, although further research is needed.

Table 1. Physical Characteristics of Black Mulberry Tree *(Morus nigra)*

Physical Attribute	Physical Characteristics
Color	Bark- scaly brown or dark brown Leaves- yellow-green and green Roots- brownish to yellowish or white Fruits- green, red, dark blue or black
Height	6-9 meters
Habitat	Warm- temperate regions
Propagation	Stem cuttings and pollination
Size and shape	Leaves- 7-12.5 cm long, one or more lobes Fruits- 1.3-2.5 cm long

Table 1 shows the physical characteristics of the Black Mulberry Tree in terms of color, height, habitat, propagation, and size and shape.

Color

The bark of the Black Mulberry Tree (*Morus nigra*) has a scaly brown to dark brown color. The leaves are yellow green when young and turns to be green as it matures. The roots are brown-yellowish and sometimes white. The fruits when young are colored green and will turn into red as it ripens and dark-blue or black when fully ripe.

Height

Morus nigra is a dioecious tree and grows up to 6-9 m in height, slender but with

numerous branches; it tends to be a bush if not trained when young.

Habitat

Morus nigra thrives in warm-temperate regions with long, hot summers. It can tolerate drought, infertile soils, and cold temperatures down to -10°C but does not do well in hot tropical zones with humid summers and grows best at lower altitudes when sheltered from wind and in coastal areas. It prefers warm, well-drained soil such as deep loams and in cultivation it is recommended to avoid planting the species in shallow, chalk, or gravelly soils.

Propagation

Some mulberries both requires male and female trees to produce fruit. Trees will sometimes change sex and do not bear much fruit for the first 15 years. High temperatures, strong light and long days favor maleness in mulberries, with their opposites, as well as high humidity, favoring the production of female flowers. The species is wind pollinated, and some cultivars will set fruit without any pollination, for example in California, USA. The self-fertile trees commonly produce two crops a year. *Morus nigra* occurs in coastal and warm, arid places, and is cultivated in agricultural and garden settings. It has also been reported to escape from cultivation. In addition to its use as a crop, roadside, and home garden species, *Morus nigra* has also been used in agroforestry as a windbreak, live fence, and shelter/shade tree. In the Philippines, the Black Mulberry Tree (*Morus nigra*) can bear fruit six times a year and can start bearing fruit eight months after planting. It can easily be propagated by cuttings and pollination.

Size and Shape

The tree has scaly bark and is usually kept pruned to a smaller, open, spreading shape. It can produce quite a dense and shady canopy. Leaves are rough on upper surfaces and pubescent underneath, 7-12.5 cm long, often producing leaves of several different shapes, with 1 or more lobes, multilobed leaves often appearing on the same branches as lobeless ones; abnormally shaped leaves usually produced from stem shoots or sucker growths, and frequently by very vigorous young branches. Flowers held on short, green, pendulous, nondescript catkins that appear in the axils of the current season's growth and on spurs on older wood. The flowers appear in 1.3 cm scaly clusters, female flowers ripening quickly into 1.3-2.5 cm blackberry-shaped edible fruits [3].

Phytochemical Analysis of the Black Mulberry Tree

Table 2 shows the results of the qualitative amounts of phytochemical constituents present in the different parts of Black Mulberry Tree.

About 200 grams of beige small pieces plant material in a plastic container marked as Mulberry (*Morus nigra*) Roots; About 200 grams of brown small pieces plant material in a plastic container marked as Mulberry *(Morus nigra)* Bark; About 100 grams dried ground green plant material in a plastic container marked as Mulberry *(Morus nigra)* Leaves; About 100 grams dried black plant material in a plastic container marked as Mulberry (*Morus nigra*) Fruit were submitted to Industrial Technology Development Institute at Bicutan, Taguig for phytochemical analysis.

Table 2. Phytochemical Analysis of Black Mulberry Tree *(Morus nigra)*

Phytochemical Constituents	**Leaves**	**Bark**	**Roots**	**Fruits**
Sterols	(+++)	(+)	(+)	(++)
Triterpenes	(+)	(+++)	(+++)	(+)
Flavonoids	(++)	(-)	(-)	(+++)
Alkaloids	(+)	(+)	(+)	(+)
Saponins	(++)	(+++)	(++)	(++)
Glycosides	(+)	(+)	(++)	(+)
Tannins	(++)	(++)	(++)	(+)

Legend:

(+)	Traces
(++)	Moderate
(+++)	Abundant
(-)	Absence of constituent

Sterols

An abundant amount of this constituent can be found in the leaves and moderate amount is attributed to the fruits. The bark and roots have traces of sterols in it.

Triterpenes

The leaves and fruits of Black Mulberry Tree (*Morus nigra)* have traces of triterpenes. The bark and roots have abundant amount of this phytochemical.

Flavonoids

Abundant amount of Flavonoids are found in the fruits and moderate on the leaves of Black Mulberry Tree (*Morus nigra)*. The roots and bark of the said tree has no flavonoids present. Flavonoids are pigments found in the leaves, petals, and fruits of higher plants.

Alkaloids

All of the four parts on the Black Mulberry Tree (*Morus nigra)* has only traces of Alkaloids found. This phytochemical is a bitter organic base in plants that usually contains nitrogen and oxygen.

Saponins

This phytochemical that is characterized by soapy lather has moderate amount found in the leaves, roots and bark while an abundant amount of this constituent is found in the bark.

Glycosides

This sugar like phytochemical constituent was found in all of the parts of the Black Mulberry Tree (*Morus nigra)* has traces of Glycosides except for the roots who have moderate amounts.

Tannins

All of the parts of the Black Mulberry Tree (*Morus nigra*) has moderate amount except for the fruits which has only traces of Tannins.

Medicinal Purposes of the Black Mulberry Tree

Sterols

The leaves and fruits of the Black Mulberry Tree has relatively abundant amount of sterols that play certain roles in the development of reproductive tract in humans and in the production and control of our reproductive hormones such as progesterone and testosterone [4].

Sterols also play a very important role in strengthening the body's immune system, thereby increasing the number of specialized cells (T-cells) which fight off bacteria and viruses in our defenses against infections. It can effect a response to diseases like breast, colon and prostate cancer, arthritis, hepatitis and HIV. On the other hand, bark and roots have only minimal potentials because there are only traces of sterols in it.

Triterpenes

The leaves and fruits have very little wax coatings which can serve as protective functions in repelling insects and microbial attacks.

A study from *Artocarpus Altilis,* a common Indian Tree also demonstrated an insecticidal and hypertensive activities of the plant because of triterpenes present. Pure triterpenes were also found to be very effective in the treatment of wound healing defects. It was also found out that the extracts of triterpenes from two species of *Maprounea Africana* act as anti-HIV agents.

Flavonoids

Since the fruits and leaves has considerable amount of flavonoids, they do have the potential to treat capillary bleeding and fragility because they strengthened capillary walls in which Vitamin C could not [5].

They have diuretic properties and have the potential to treat common colds. The flavonoids present in these plants are like carotenoids only that carotenoids are oil soluble while flavonoids are water soluble. They function as antioxidants that is protecting us from aging and cancer. Flavonoids in foods can also protect us from heart disease

Alkaloids

Alkaloids have the potential to be used or processed into an herbal drug as analgesic, narcotics, stimulants, miotics, mydriatics, antimalarial, and antispasmodics and in the

treatment of mental disorders, hypertension and tumors. The Black Mulberry Tree (*Morus nigra)* will only have a low potential since there are only traces of alkaloids in it.

Saponins

Saponins have detrimental effect on one's health because it can cause sneezing and can irritate the mucuous membrane. They can also destroy red blood corpuscles by hemolysis or the liberation of hemoglobin. Saponins have a bitter taste and reduce the food intake of livestock animals. Saponins were employed as fish toxicants [6].

Glycosides

Glycosides showed significant antioxidant activity, anticancer and antitumor activity, hepato-protective activity, anti-inflammatory activity, anti-diabetes activity, antiviral activity, antibacterial and antifungal activity, and other biological effects.

Tannins

Tannins is beneficial in the treatment of burns because it can precipitate the protein of the exposed tissue and will provide an antiseptic protective coat thus preventing external infection. It is also very useful in the vegetable tanning industry since it can precipitate the protein. But prolonged utilization of tannin rich plant such as the drinking of ordinary tea is hazardous due to its carcinogenic potential. All the tannins are relatively resistant to digestion and fermentation thus decreased ability of the animal to consume the plant and act as astringents thus shrinking and contracting structural proteins in the skin, mucosa and the gastrointestinal tract.

CONCLUSIONS AND RECOMMENDATIONS

Based on these findings, the researcher concludes the following in this study:

1. The *Morus nigra* is a dioecious tree and grows up to 6-9 m in height, classifying it as a medium sized tree. It thrives in warm-temperate regions with long, hot summers. Leaves are rough on upper surfaces and pubescent underneath, 7-12.5 cm long, often producing leaves of several different shapes, with 1 or more lobes. The flowers appear in 1.3 cm scaly clusters, female flowers ripening quickly into 1.3-2.5 cm blackberry-shaped edible fruits. Black Mulberry Tree (*Morus nigra*) can bear fruit six times a year and can start bearing fruit eight months after planting. It can easily be propagated by cuttings and pollination.
2. In terms of phytochemical analysis, the roots and bark are abundant in triterpenes and lacks flavonoids. The bark is also abundant in saponins that causes destructive consequences to the body. The leaves have abundant sterols and the fruits are rich in flavonoids.
3. The beneficial phytochemical constituents are the sterols that are abundant in the leaves of Black Mulberry Tree *(Morus nigra*); flavonoids that are abundant in the fruits and alkaloids that are found in traces in all of the parts of Black Mulberry Tree (*Morus nigra*). The hazardous phytochemical constituent is the tannins which were found in traces and moderate amounts in all of the parts of Black Mulberry Tree (*Morus nigra*).Saponins, a hazardous phytochemical is found in moderate amounts in all the parts of Black Mulberry Tree (*Morus nigra*) except for the bark which contains abundant amount of this constituent.

Based on these conclusions, the following recommendations are provided in this study:

1. As to the phytochemical constituents, all of the parts of the Black Mulberry Tree (*Morus nigra*) has beneficial constituents that could be isolated for further testing.
2. The relatively abundant amount of saponins and tannins in the different parts of *Morus nigra* could be isolated and should not be used for human consumption.
3. Proximate Analysis on moisture, crude fat, crude protein and crude fiber content must be done to determine if the dried samples were all fit to be processed as dried herbal drugs.
4. Black Mulberry Tree (*Morus nigra*) to be cultivated and to be propagated on a larger scale because of its medicinal value.

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Conversational Topic in FB Posts: Highlighting Gender Preferences on Lexical Features

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Abstract *– Crystal (2005) believed that language has no independent existence apart from the people who use it. He stressed that language changes because of the end-users. Hence, this study tried to identify the gender differences in relation to language choice and linguistic features from the official Facebook page of the College of Education, NEUST. All of the posts of the faculty and students from the page from June-October, First Semester, S.Y.2018-2019 were collected. This employed Baustista's (1997) description of word formation - compounding, acronyming, clipping and innovation. The formation processes revealed that more women university students often use different word processes than male. There was only one word formed under compounding, 48 in acronyming (16 by male and 32 by female); 48 in clipping (22 by males and 26 by females) and 88 in innovations (21 by male and 67 by women). The results apparently revealed that women are fond of using the different word formations than men. It was then recommended to use the power of Social Media Network (SMN) as springboard of language classroom discussion because of the diversity of word formation offered among learners. Since all of the respondents are future educators, it is also recommended that their professors must establish the demarcation about the usage of the linguistic innovation in and outside the classroom, i.e., formal and informal context. Other researchers may dwell on other linguistic aspects of language innovation such as the morphological structure of the newly coined word, blending, functional shifting and other language innovations*.

Keywords *– acronyming, clipping, compounding, innovation, word formation*

INTRODUCTION

Have you ever observed how men and women speak? Do you think they have different speaking styles? Have you observed the language they often use? Language, according to Crystal (2005), has no independent existence apart from the people who use it. He stresses that language, indeed, changes because of the people who use it. One of the very first linguists who claims that gender indeed influences how speakers converse is Robin Lakoff (1975). His claim included that women tended to use language differently from men. In her 1975 book, *Language and Women's Place*, Lakoff (1975) claimed that women's speech forms tended to express uncertainty, politeness, respect, insecurity and emotionality. For example, women were said to prefer the use of empty adjectives like '*adorable*' and '*divine*', to avoid the swear words men typically used, replacing them with euphemisms like '*goodness*' or *'oh dear'*, and to end statements with tag questions to play down the certainty of their opinions or observations.

As a matter of fact, gender has been a social variable in quantitative studies of language variation as early as 1960s and most of the findings revealed that women tend to use more standard or "prestige" language features and men use more vernacular language features. This supports the result of Women Movement in 1970s that women tend to use more supportive or cooperative speaking styles while men are more into competitive styles. This resulted to myriads of interpretations, not solely to the language per se, but the speakers as well. Even *Holmes (1995) and Mills (2003)* found out that women‟s and men‟s language use has also been interpreted in relation to politeness theory, where women are seen as more linguistically polite than men.

Moreover, *Coates (1993)* outlines the historical range of approaches to gendered speech in her book Women, Men and Language. She contrasts the four approaches known as the *deficit, dominance, difference,* and *dynamic approaches*. *Deficit* is an approach attributed to *Jespersen (1922)* that defines male language as the standard, and women's language as deficient. This approach created a dichotomy between women's language and men's language. *Dominance,* on the other hand, is an approach whereby the female sex is seen as the subordinate group whose difference in style of speech results from male supremacy and also possibly an effect of patriarchy. This results in a primarily male-centered language. Scholars such as Dale Spender and Don Zimmerman and Candace West support this view. *Difference* is an approach of equality, differentiating men and women as belonging to different 'sub-cultures' as they have been socialised to do so since childhood. Deborah Tannen (1990) is a major advocate of this position. Tannen (1990) compares gender differences in language to cultural differences. Comparing conversational goals, she argues that men tend to use a "report style", aiming to communicate factual information, whereas women more often use a "rapport style", which is more concerned with building and maintaining relationships. The "*dynamic*" or "*social constructionist*" approach is, as Coates (2011) describes, the most current approach to language and gender. Instead of speech falling into a natural gendered category, the dynamic nature and multiple factors of an interaction help a socially appropriate gendered construct. As such, West and Zimmerman (2013) describe these constructs as "doing gender" instead of the speech itself necessarily being classified in a particular category. This is to say that these social constructs, while affiliated with particular genders, can be utilized by speakers as they see fit.

On the other hand, the communication revolution since the birth of the Internet and Social Media Networks (SMNs) had greatly changed the linguistic landscape. Kaplan and Haenlein (2010) define social media as a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of user generated content, which come in different forms including internet forums, weblogs, social bogs, micro blogging, wikis, podcasts, pictures, video, and rating among others that are used for interactions by billions of Internet users or what they termed as "netizens" around the globe. This advancement in technology and communication prompted academic researchers to explore its impact on language learning and language acquisition.

Indeed, one of the most notable effects of social media is evident in language and communication system such as usage of a great number of neologisms, strange words and almost unidentifiable linguistic expressions, which are more likely to obfuscate people than help them in getting their message across.

Moreover, Sim and Pop (2014) conducted an experimental study investigating the impact of SMN on vocabulary acquisition of English as foreign language (EFL) students in Romania. The relevance of gender to linguistic analysis was first noted in the early 20th century when descriptive linguists observed differences in female and male vocabularies and patterns of speaking in non-European languages. Thus, the study attempted to identify the differences of men and women in relation to their language choice and linguistic features.

OBJECTIVES OF THE STUDY

The study attempted to identify the differences of men and women in relation to their language choice and linguistic features.

Specifically, the study sought answer to the given question:

1. Identify the language preferences of men and women in relation to their language choice and linguistic features in terms of:
    a. compounding;
    b. acronyming;
    c. clipping; and
    d. innovation.

MATERIALS AND METHODS

Methods

The study used the descriptive method of research on students' posts on the College of Education's official Facebook page from June October, First Semester, S.Y. 2018-2019 which were also utilized and used in identifying the language preferences of men and women university students. The school was chosen for being the most populated state university in the locale.

To solidify the feasibility of the study, the researcher visited the University Management Information System Office from the General Tinio Campus to check and ask for the veritable roster of Official Facebook Pages of the different colleges in the University. The researcher also asked the Dean of the College of Education, the Technical Assistant to the Dean of the College of Education, the Teacher Education Student Council President and the Adviser about the official Facebook page of the College of Education since they initiated the creation of the said page. Afterwhich, the researcher collected all of the posts of the students from the College of Education official Facebook page, COED News and Fora, from June-October, First Semester, S.Y. 2018- 2019.

The study employed Baustista's (1997) description of word formation or creation such as compounding, acronyming, clipping and innovation. From Baustista's (1997) original study, functional shifting, nominal expansions, coinage, affixing and echoing were included. However, the latter ones were not included in the study because they are not applicable to the recent study.

The posts were then used in analyzing, evaluating, and identifying the language preferences of men and women in relation to their language choice and linguistic features in terms of compounding, acronyming, clipping, and functional shifting.

Materials

The COED News and Fora, the official Facebook page of the College of Education, includes all of the announcements, greetings, messages, broadcasts, and pronouncements of all of the faculty members of the College of Education, clubs and organizations and all of the students in the College. For the purpose of the study, the researcher only used all of the posts from June-October, First Semester, S.Y. 2018- 2019. However, the researcher only got and used the posts of the students in analyzing, evaluating, and identifying the language preferences of men and women in relation to their language choice and linguistic features in terms of compounding, acronyming, clipping, and functional shifting. The Facebook page posts were used in this study because they can supply data needed for descriptive survey which could measure the language preferences of men and women in relation to their language choice and linguistic features.

RESULTS AND DISCUSSION

1. Language preferences of men and women in relation to their language choice and linguistic features

This part of the study presents the language preferences of men and women in relation to their language choice and linguistic features.

Compounding

Table 1 presents the post of the College of Education student which uses Compounding. It was found out that students of the College of Education are not accustomed to use this lexical innovation in their Facebook post, hence, only one word fell in this category.

Table 1
Compound Word Coined

Compound word	Student (man or woman)
Zai-zoned	Woman

The newly coined compound word signals that it is a woman who coined the lexeme because of the creativity of the creation. The word originated from the newly coined word of the 2018, seenzoned, which is also used by the millenials in their Facebook posts. When respondents were asked, it was found out that only women use the term because they confessed that it is very feminine to use the said newly coined word.

This supports the idea of Carib Indians of the Lesser Antilles (West Indies), whose language was documented by Rochefort in 1665 and was quoted by Jespersen (1922). He said that "the men have a great many expressions peculiar to them, which the women understand but never pronounce themselves. On the other hand, the women have words and phrases which the men never use, or they would be laughed to scorn. Thus, it happens that in their conversations it often seems as if the women had another language than the men." (1922: 237).

It is interesting, if Rochefort is to be believed, that the reason men avoided certain "feminine" words and phrases was to avoid ridicule, since this was not cited as a motivating factor for women. Such rigid boundaries surrounding masculinity can still be seen, including in Western cultures.

Acronyming

Acronyms are formed by taking the initial letters of the words in a title or phrase and use them as new words. Table 2 presents the lexical innovation through acronyming used by the men and women university students.

Table 2
Acronyming by men and women students

Acronyming by men	Acronyming words by women	
BEED	ACTS	otw
BSIE	asap	atm
CMBT	AVR	GAEC
COE	COED	COG
DepEd	CPTE	cr
gf	GenSci	GT
MAPEH	id	FS
lol	INC	LCD
MIS	NEUST	pm
MOA	NSTP	ppt
PAEC	NEUST LHS	pw
PAG-ASA	PDRRMC	PT
PC	SETLE	sm
PS	TESC	UCC
PTA	TLE	ty
SWAK	UD	USG

It revealed that there are indeed differences among the usage of acronyming among men and women. Men tend to use the more formal way of acronyming, i.e. most of the samples are the standard acronyms while women are still conversational.

This supports the study of Tannen (1990) who compares gender differences in language to cultural differences. She argues that men tend to use a "report style", aiming to communicate factual information, whereas women more often use a "rapport style", which is more concerned with building and maintaining relationships.

It also revealed the idea of "sex-exclusive" which refers to the use of language which occurs rarely and contrast with the much more common (and frequently studied) "sex-preferential" uses. These refer to differential tendencies, that is, ways in which women and men tend to talk differently from each other in a given context.

Clipping

Clipping refers to the process whereby a lexeme (simple or complex) is shortened, while still retaining the same meaning and still a member of the same class (Bauer, 1983). According to Berg (2011), there are four types of clipping: fore-clipping, back-clipping, mid-clipping, and combination of fore- and back clipping.

Table 3 presents the lexical innovation which uses clipping.

Table 3

Clipping

Clipping used by men		Clipping used by women	
		„raulo	acct.
„nak	„yung	ala	be
audi	bro	cab	choreo
dept.	educ	confed	congratz
fest	hal.	div	Eng.
info	irreg	esp.	Fil
lab	lab high	„ge	„la
lit	Phil	„lam	repre
pre	prof	req	sched
quad	Sat	Sept.	subj
sem	tol	Thurs	til
univ	wag	tom	Wed
		„yoko	yun

The result shows that more women are fund of using clipping when they converse. Most of the words of the men mirror their disposition in the society. The use of "*tol*" and "*pre*" simply implies that even it is the official Facebook page of the College of Education, they could not take their identity away as male, as if they always address their peers.

This supports the idea of "speech community" which uses linguistic social practices. It has been defined as an aggregate of people who come together around mutual engagement in an endeavour, which also include the jargon they use, the ways of doing things, ways of talking, beliefs, values, power relations – in short, practices – emerge in the course of this mutual endeavour. Community of Practice is also defined simultaneously by its membership and by the practice in which that membership engages (Eckert and McConnell-Ginet, 1998: 490).

Innovation

This category may also use analogy and clipping but the result stands out because of the creative effect of the word structure. Moreover, it refers to the creation of the new way to spell the words out.

Table 4 presents the innovative way used by men and women university students in their Facebook posts.

Table 4
Innovation

Innovation used by men	Innovation used by women	
	„un	akuh
	aq	areng
	awts	awtsu
	beks	besh
	bessy	bgo
	bkt	char
	charot	che
akis	chos	cm8
alryt	cnu	cpag
aq	cya	dto
bes	ganern	ganian
bessi	gud	guyses
brad	guyz	hanes
cge	hnd	Idhol
cguro	jip	kc
dre	Khuya	klasmeyt
kmi	koyah	kyeme
maesters	labyu	lamma
orayt	lezz	magash
pakner	mggng	nd
paps	ninja moves	
seeyah	nio	nlng
slmt	nxt	okays
tayis	Okhei	okie
yas	oryt	paandarz
yayz	pde	pes
Yeah	pls	prend
yup	pressy	q
	sb	siempre
	skn	soklop
	wat	wiz
	yea	yep
	yonoh	yown
	zana	zno

The result obviously shows the choice of words of men and women in their Facebook posts. It is found out that women mostly use innovation when they converse in Web 2.0.

This supports the study of Tannen (1990) who compares gender differences in language to cultural differences. She argues that men tend to use a "report style", aiming to communicate factual information, whereas women more often use a "rapport style", which is more concerned with building and maintaining relationships. It is very apparent that women tend to use and create more words than men, it is because they tend establish rapport among their interlocutors.

CONCLUSIONS AND RECOMMENDATIONS

Based on these findings, the researcher concludes the following in this study:

1. The products of linguistic innovations revealed that most women tend to utilize the processes than men.
2. It is also found out that women tend to be more creative and establish rapport among their interlocutors than men.
3. Based on the findings, it is tempting to conclude that Facebook posts or social media networks are productive means in manufacturing new words or new ways of word formation or in setting a new language fashion.
4. Finally, result of this study strengthens the claims of previous researches (e.g. Al-Sa‟di & Hamdan, 2005; Berg, 2011) and the long-standing assumption that SMN is an effective tool for fast, easy, and concise communication.

Based on these conclusions, the following recommendations are provided in this study:

5. Social media network (SMN) may be used as springboard of Language classroom discussion because of the diversity of word formation offered among learners.
6. Other researchers may dwell on other linguistic aspects of language innovation such as the morphological structure of the newly coined words.
7. Since all of the respondents are future educators, it is also recommended that their professors must establish the demarcation about the usage of the linguistic innovation. Since the threads of conversations among Web 2.0 are open to everyone, students need to know when do they need to utilize the processes. They shall have the idea on when and where to use the language innovations.

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Contextual Framing Approach and Student's Performance and Attitude in Biology

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Abstract *– Transfer-of-learning is one of the most important educational phenomena. To understand how to teach students how to learn, we have to understand something. This paper determines the effects of contextual framing approach and students' performance and attitude in Biology. Two comparable classes of Grade 10 students were the subjects of the study. One group was exposed to conventional teaching approach and the other to contextual framing approach. The single-blind experimental method of research was utilized. The findings reveal that the performances of the students exposed to different approaches were not comparable as shown by the students' post-test performance exposed to contextual approach which is higher than the students' post-test performance exposed to conventional approach. However, the performance of students exposed to the conventional approach and contextual approach has no significant difference. Moreover, the students in the control and experimental group developed a highly favourable attitude after their exposure to the conventional and contextual approach. The performance and attitude of the students has significant relationship after their exposure to two different approaches. The following recommendations are offered: the contextual framing approach could be used as part of the teaching-learning process; the contextual framing approach can be integrated in the curriculum of the pre-service students; a case study should be investigated, on the factors affecting improvement of performances of students exposed to contextual framing approach; and the use of contextual framing approach should be further experimented in other disciplines, for a wider range of topics and for a longer period of time.*

Keywords *– Attitude, Contextual framing approach, Conventional approach, Posttest performance, Pretest performance*

INTRODUCTION

Biology is one of the courses that explain natural events (Gercek & Ozcan, 2015). However, in literature there are studies claiming that the association level of students between daily life events and biology subjects is very low. Contextual framing approach is described as the starting point for the development of scientific ideas in science teaching. In this approach real-life contexts are used to introduce concepts.

Achieving understanding of nature is one of the aims of science. Transfer-of-learning, or the application of something that has been learned in one context to another context, is one of the most important educational phenomena. Without it, what students learn in school and elsewhere would have little effect on the rest of their lives.

It's safe to say that most teachers have an intuition about the importance of contextual framing approach in the classroom. It is important that teachers should strive to provide real world examples for their students. There's something about a richly contextualized example that seems to help student interest and performance more than if it were delivered without real world details. If the contextual framing of a problem helps bolster student understanding, then the presence of the context may actually affect student performance on assessments as well (Fout, 2009).

There is an international trend in science education towards context-based approaches. Teaching concepts in relationship to real-world contexts is expected to make science education more meaningful, relevant and motivating for students (Gilbert, 2006 cited by Weiringa, Janssen & Driel, 2012).

Although influencing everyday life more and more, natural sciences and mathematics still belong to the least popular subjects in school (Sjoberg & Schreiner, 2010). As often discussed, the inherent complexity of scientific topics as well as low relevance felt by students might be two of the main reasons for this issue. Accordingly, several approaches were developed over the past two decades to make scientific topics more understandable, interesting and relevant for students. A very popular and widely implemented attempt in this regard is the contextual framing approach. Despite being a quite heterogeneous field, different approaches of contextual framing approach are unified by the core idea of putting scientific concepts, models or topics in some kind of frame connecting science to everyday life, societal issues, or technological innovations (Podschuweit & Bernholt, 2018).

Compared to traditional programs, student's understanding of scientific concepts obtained from context-based programs is at least as good, while the interest, motivation and attitude towards science is usually improved (Vos, 2014).

Leaners become authors who share their knowledge, making them more likely to contribute what they know. When a contextual framing is in effect, leaners learn under the assumption that they will be expected to transfer what they have learned to other.

OBJECTIVES OF THE STUDY

Generally, this study, an excerpt, aimed to determine the effects of Contextual Framing Approach and Students' Performance and Attitude in Biology.

Specifically, this excerpt of a study, aimed to answer the following specific questions:

1. What is the performance of students in biology exposed to

a. conventional approach, and

b. contextual framing approach?

2. Is there a significant difference in the performance of students exposed to the two different approaches?
3. What is the attitude of the students toward biology after their exposure to the two different approaches?
4. Is there a significant relationship between the performance of the students and their attitude towards biology after their exposure to the two different approaches?

MATERIALS AND METHODS

Methods

The single–blind experimental method of research was used in this study to determine the effects of the two approaches in the performance of the students in Grade 10 Biology. This design involves two groups of students, the experimental and the control group (Angeles, 2013 cited by De Guzman, 2015).

The pre-test – post-test control group design was employed. The students in the experimental group were exposed to contextual framing approach, while the students in the control group were exposed to conventional approach.

Materials

The instrument used to measure the effect of the two teaching approaches on the performance of students is a researcher-made test question. It was a 50–item multiple choice type and was based from the table of specifications. The test was submitted for content validation in order to ensure that the final version of the test would be useful and functional. The criteria set by Meimban (2005) as cited by Carungay (2015) were used to validate the pre-test/post-test in Biology.

Meanwhile, the Biology Attitude Questionnaire of Russell and Hollander (2011) were used to assess the attitude of the students towards Biology after their exposure to their respective approaches. It comprises a 14-item scale/statement with 5-point loading ranging from Strongly Agree (A), Agree (B), Undecided (C), Disagree (D), to Strongly Disagree (E).

To maximize the speed and to ensure reliability of all necessary computations, statistical treatment of data was done using the Statistical Packages for the Social Sciences (SPSS).

The pre-test and post-test performance of the students exposed to the two different approaches were determined using mean, standard deviation, coefficient of variation, and skewness and kurtosis. The Wilcoxon W was used to test for the significance of the difference in the pre-test and post-test performance of the students within each teaching approach. The significance of the difference between the performances of the students exposed to the two different approaches was tested through the t-test for the independent sample means.

The Spearman Rho test of relationship was used to determine whether there is a significant relationship between the performance of the students and their attitude after their exposure to conventional and contextual framing approach.

RESULTS AND DISCUSSION

Performance of Students Exposed to the Two Different Approaches

Tables 1A and 1B shows the summary of the performance of students exposed to contextual framing and conventional approach.

Table 1A. Descriptive Measures of the Pre-test Scores of Grade 10 Students in Biology

Approaches	Performances	F	%	$\bar{x}$	s	Cv	Skewness			Kurtosis		
							Sk	Se	D	Ku	Se	D
Contextual Framing	Poor (11 - 20)	3	9.7	25.29	3.70	14.63	-.985	.421	NND	1.03	.821	ND
	Average (21 - 30)	28	90.3									
	Total	31	100.0									
Conventional	Poor (11 - 20)	6	20.0	25.10	4.55	18.13	-1.27	.427	NND	.290	.833	ND
	Average (21 - 30)	24	80.0									
	Total	30	100.0									

Table 1A presents the distribution of the pre-test scores of the students in contextual framing approach and conventional approach. Mostly of the students exposed to contextual framing approach scores 21 – 30 with a frequency of 28 or 90.3%. Likewise, majority of the students exposed to conventional approach scores 21 – 30 as supported by the frequency 24 or 80%.

The table also shows the computed coefficient of variation (cv) of the scores of the students exposed to conventional and contextual framing approach. The students exposed to conventional approach have higher coefficients of variation (18.13) than the students exposed to contextual framing approach (14.63). This implies that the distribution of the scores of the students exposed to conventional approach is more scatter about the mean than the students exposed to contextual framing approach.

The table presents also the skewness and kurtosis of the distribution of scores on both conventional and contextual framing approach groups. The computed skewness of each group is negative. The negative skewness index is tailing – off to the left which illustrates that the scores are mostly distributed above the mean value. The computed skewness of the scores of the students are not fall within the interval (-2Se) – (2Se). This means that the distribution of the scores of each group approximately not normally distributed in terms asymmetry. However, the computed kurtosis for each group is positive, indicates that the distribution of the scores of each group have longer tail than the normally distributed data. The computed kurtosis of the scores of each student are

not fall within the interval (-2Se) – (2Se). This means that the distribution of the scores of each group approximately normally distributed in terms of peakedness. Since, each group are not normally distributed in terms of skewness this means that the distribution of the scores is not normal.

Table 1B. Descriptive Measures of the Posttest Scores of Grade 10 Students in Biology

Table 1B shows the distribution of the post-test scores of the students exposed to conventional and contextual framing approach. Majority of the students exposed to contextual framing approach scores 21 – 30 or 31 – 40 as supported by the frequency of 11 or 35.5%. While, students exposed to conventional approach majority of them scores 21 – 30 with a frequency of 13 or 43.15%. It also fascinating to note that, there were no students exposed to contextual framing approach scores less than 21. Moreover, students exposed to contextual framing approach have a higher number of students' scores 41 – 50 than the students exposed to conventional approach.

The table also shows that coefficient of variation (cv) of the scores of the students exposed conventional and contextual framing approach. The students exposed to conventional approach have higher coefficients of variation (23.41) than the students exposed to contextual framing approach (22.48). This implies that the distribution of the scores of the students exposed to conventional approach is more scatter about the mean than the students exposed to contextual framing approach.

Approaches	Performances	F	%	$\bar{x}$	s	cv	Skewness			Kurtosis		
							Sk	Se	D	Ku	Se	D
Contextual Framing	Average (21 - 30)	11	35.5	34.87	7.84	22.48	-.229	.421	ND	-1.16	.82	NND
	Satisfactory (31-40)	11	35.5									
	Very Satisfactory (41 - 50)	9	29.0									
	Total	31	100.0									
Conventional	Poor (11-20)	1	3.3	33.10	7.75	23.41	-.199	.427	ND	-1.26	.833	NND
	Average (21 - 30)	11	36.7									
	Satisfactory (31-40)	13	43.3									
	Very Satisfactory (41 - 50)	5	16.7									
	Total	30	100.0									

Performance	Approaches	Mean Rank	Wilcoxon W	p-value	Description
Pre-test	Contextual Framing	30.02	930.500	0.658	Not Significant
	Conventional	32.02			
Post-test	Contextual Framing	33.03	867.000	0.363	Not Significant
	Conventional	28.90			

The table presents also the computed skewness and kurtosis of the distribution of scores of the experimental and control group. The computed skewness of each group is negative. The negative skewness index is tailing – off to the left which illustrates that the scores are mostly distributed above the mean value. The computed skewness of each group is fall within the interval (-2Se) – (2Se). This means that the distribution of the scores of each group is normally distributed in terms of asymmetry. Likewise, the computed kurtosis for each group is negative, indicates that the distribution of the scores of each group have a smaller tail than the normally distributed data. The computed kurtosis of the scores of each group are not fall within the interval (-2Se) – (2Se). This implies that the behaviour of the distribution of the scores of each group is wider than the normal curve in terms of peakedness. This means that distribution of the scores of each group is approximately not normally distributed.

This finding agrees with some studies regarding the performances of the students exposed to the two different approaches. The study revealed that the performance of the students is slightly inclined after the change.

Difference in The Performance of Students Exposed to The Two Different Approaches

Table 2 presents the summary of the results regarding the test of comparison between the two groups.

Table 2. t-Test between the Performance of the Students Exposed to the Two Different Approaches

The data reveals that the computed W – value of the pre-test scores is 930.50 with p-value of 0.658. Since the computed value is higher than the expected 0.05 value, the null hypothesis is accepted. This implies that there is no significant difference between the scores of the students exposed to conventional and contextual framing approach. This means that two groups are comparable with each other in terms of their pre-test performance.

Table 2 also shows the computed W – value of the post-test scores which is 867.00 with p-value of 0.363 higher than the alpha level 0.05. With this, it is apparent that the null hypothesis stating that there is no significant difference in the post-test performance of the students is accepted. This means that the post-test performance of the students exposed to conventional and contextual framing approach are the same from each other.

The finding agrees with some studies that there is no significant difference between the scores of the students exposed to two different approaches. This implies that contextual framing does not impact performance.

Attitude of the Students After their Exposure to the Two Different Approaches

Table 3 shows the summary of the attitudes of the students after their exposure to the two different approaches.

Table 3. Attitude of the Students After their Exposure to the Two Different Approaches

Statements	Contextual Framing Approach		Conventional Approach	
	Mean	Description	Mean	Description
1. Biology is very interesting to me.	4.3548	VHF	4.1000	HF
2. I like biology, and it doesn't scare me to have to take it.	3.6452	HF	3.9000	HF
3. I am not always under a terrible strain in a biology class.	3.8065	HF	3.6667	HF
4. Biology is fascinating and fun.	4.1290	HF	3.9667	HF
5. Biology makes me feel secure, and at the same time it is stimulating.	3.9677	HF	3.8333	HF
6. Biology makes me feel comfortable, easy, and patient.	3.9355	HF	4.0667	HF
7. In general, I have a good feeling toward biology.	4.0645	HF	3.9333	HF
8. When I hear the word biology, I have a feeling of liking it.	4.2903	HF	3.8000	HF
9. I approach biology without a feeling of hesitation.	3.8387	HF	3.5333	HF
10. I really like biology.	3.8065	HF	3.7000	HF
11. I have always enjoyed studying biology in school.	3.9677	HF	3.7333	HF
12. It doesn't make me nervous to even think about doing a biology experiment.	3.5161	HF	3.4000	F
13. I feel at ease in biology and like it very much.	4.0000	HF	3.7000	HF
14. I feel a definite positive reaction to biology; it's enjoyable.	4.2258	HF	4.0000	HF
Over – All	**3.9677**	**HF**	**3.8095**	**HF**

It can be gleaned from the table 3 that majority of the students expresses positive attitude toward Biology after their exposure to the two different approaches. They rated themselves to have "agreeable" attitude as it is indicated by the overall mean of 3.9677 for contextual framing approach and 3.8095 for conventional approach.

Students' attitude exposed to contextual framing approach shows more highly favourable response than those in the conventional group. One reason for this is that the used of contextual framing approach is effective in the formation of students' favourable attitude towards Biology because it engages their attention and interest.

The finding agrees with some studies that contextual framing approach increases the motivation and attitude of the students. This implies that students' attitude exposed to contextual framing approach shows more highly favourable response than those in the conventional group.

Relationship Between the Performance of the Students and Their Attitude After Their Exposure to the Two Different Approaches

Table 4 shows the relationship between the performance of the students and their attitude after their exposure to the two different approaches.

Table 4. Spearman Rho test of Relationship between Attitude and Performance of the Students after Exposure to the two Different Approaches

Approaches		Attitude		
		Correlation Coefficient	Sig. (2-tailed)	Description
Performance	Contextual Framing	0.556**	0.001	MHPC
	Conventional	0.506**	0.004	MHPC

**. Correlation is significant at the 0.01 level (2-tailed).
MHPC = Moderately High Positive Correlation

Table 4 indicates a Spearman Rho values for contextual framing and conventional teaching group of 0.556 and 0.506 with a significance of 0.001 and 0.004 respectively, which are obviously less than the alpha level of 0.05. With this, it is apparent that the null hypothesis stating that there is no significant relationship between the post-test performance and Attitude in Biology of each group of students is rejected. Since, the computed Spearman Rho value between post-test performance and Attitude in Biology of each group are 0.556 and 0.506, indicates that post-test performance and Attitude in Biology are directly proportional with each other. Moreover, the strength of relationship between the indicated variables from each group of students is Moderately High Positive Correlation. Therefore, the students with higher attitude towards the subjects tend to have a higher performance.

One reason for this is that students engage actively because they like the subject, it becomes more enjoyable and interesting for them.

The finding agrees with some studies that there is significant relationship between the performance of the students and their attitude after their exposure to the two different approaches. This implies that the students with higher attitude tend to have a higher performance.

CONCLUSIONS AND RECOMMENDATIONS

Based on these findings, the researcher concludes the following in this study:

1. The performances of the students exposed to conventional approach and contextual framing approach were not comparable as shown by the students' post-test performance exposed to contextual framing approach which is higher than the students' post-test performance exposed to conventional approach.
2. The performance of students exposed to the conventional approach and contextual framing approach has no significant difference.
3. The students in the control and experimental group developed a highly favourable attitude after their exposure to the conventional and contextual framing approach.
4. The performance and attitude of the students has significant relationship after their exposure to the conventional and contextual framing approach. The students with higher attitude tend to have a higher performance.

Based on these conclusions, the following recommendations are provided in this study:

1. The contextual framing approach could be used as part of the teaching – learning process.
2. The contextual framing approach can be integrated in the curriculum of the pre-service students.
3. A case study should be investigated, on the factors affecting improvement of performances of students exposed to contextual framing approach.
4. The use of contextual framing approach should be further experimented in other disciplines, for a wider range of topics and for a longer period of time.

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Utilization of Strategic Instructional Module to Facilitate Comprehension in Organic Chemistry: An Experiment

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Abstract – This study aimed to test the efficiency of developed and evaluated module in facilitating learning in organic Chemistry. Using experimental method of research, 33 males and 27 females from Grade 9 students were grouped into control and experimental group. Both groups were pre-tested. The control group was subjected to usual lecture discussion while the experimental group used the Strategic Instructional Module. The results of the pre-test showed that there was no significance difference in the performance of both groups. *All the respondents of both groups had low academic performance on the topic Organic Chemistry.* Post-test revealed that both groups improved their scores, however, there was a significant difference in the scores of the control and experimental group that use module approach. Experimental group obtained higher scores than control group. This indicates that the utilization of the Strategic Instructional Module can help to facilitate learning and comprehension in Organic Chemistry. Across the gender, the study found out that male students have higher score than female. Based on the results of the study, the researcher recommends the necessity to use more modern means to teach students the "Science" domain such as module strategy.

Keywords – *facilitate, Organic Chemistry, Strategic Instructional Module, utilization*

INTRODUCTION

Effective learning and teaching in any subject at any institution are dependent on the instructional strategies used. This is the major factor responsible for the level of performance in any subject by the students. Using appropriate teaching methods, learning difficulties can be solved to the great extent.

Upon implementation of k to 12 Program, Organic Chemistry became one of the component subjects in Science 9. But unlike other components in Science 9, most of the students have no prior understanding about Organic compounds. It is also considered as one of the least learned concepts every year.

Organic Chemistry is relevant to every student because this lesson encompasses every aspect of human life. In fact, most of the body matrix of all living organism are composed of organic compounds. In addition, several careers also apply an understanding of Organic chemistry such as doctors, veterinarians, dentists, pharmacologists, chemical engineers, and chemists. With all of these, Chemistry students really need to understand its diversity, chemical properties, reaction and uses.

The use of instructional material such module can be a vehicle of instruction. According Abdu-Raheem (2016) as cited by Urbano (2020), instructional materials are essential and significant tools needed for teaching and learning of school subjects to promote teachers' efficiency and improve students' performance. The use of teacher made module in teaching has a goal of helping each student to think for himself and allowing the individuality to each learner. In the study conducted by Alelaimat and Ghoneem (2012), researchers have developed an educational material relevant to carry out modules strategy for teaching scientific concepts in the science textbook for primary seventh grade. Their study aimed at revealing the effect of educational modules strategy in comparison with the conventional approach.

Based upon the study's results, the researcher recommends the necessity to use more modern means to teach students such as teacher made module.

The study Mahajan (2008) was designed to find out the instructional strategies in Organic Chemistry. Based on his findings, the students' response reveals that more than one method of teaching gives students a better knowledge of the course content. Students like to receive handouts or lecture material to follow the content easily.

With this, the researcher developed a strategic instructional module as alternative teaching strategy to help Science teachers and students in improving their learning concept in Organic Chemistry. With the use of this Strategic Instructional Module, it is expected that this will facilitate comprehension in Organic Chemistry and will increase the achievement rate of Grade 9 students in Science 9.

OBJECTIVES OF THE STUDY

Generally, this study aimed test the efficiency of developed and evaluated module in facilitating learning in Organic Chemistry.

Specifically, this study aimed to answer the following specific questions:

1.How may the achievements of the students in pre-test and post test before and after the application of Strategic Instructional Module be compared?

2. Is there a significant difference in the achievements of students in the following:
   - 2.1 Pre-test of control and experimental groups before the application of Strategic Instructional Module,
   - 2.2 Pre-test and post test scores of experimental group who used the Strategic Instructional Module,
   - 2.3 Post test scores of control and experimental groups?
3. Is there a significant difference in the

achievements of male and female students after exposure to Strategic Instructional Module?

MATERIALS AND METHOD

This study employed experimental methods of research to determine the effectiveness of the module.

The Strategic Instructional Module was developed based on the prior reviews of textbooks used in Chemistry, the Learning Competencies for Science 9 and on the results on the consultation with experienced Chemistry teachers from Division of Cabanatuan. The activities presented in the module were modified and simplified to help each student to think for himself and allowing the individuality to each learner.

The student's respondents were all Grade 9 from Cesar E. Vergara Memorial High School during the school year 2016-2017 consisting of 33 females and 27 males. Control group consisted of 18 male respondent and 12 female respondents while experimental group consisted of 15 male and 15 female respondents.

The pre-test and post-test result of control and experimental group served as the basis for evaluating the effectiveness of the module. Interview among experimental group were also gathered and recorded.

To statistically analyze the data, percentage and frequency counts were used. T-test was also used to determine the significant difference of assessment results before and after the application of Strategic Instructional Module.

RESULTS AND DISCUSSION

This part of the study presents the analysis and interpretation of the data gathered from students achievement in their obtained scores from pos-test and pretest.

Table 1. Summary of Scores Before and After the Application of Strategic Instructional Module

	CONTROL GROUP				EXPERIMENTAL GROUP			
	PRETEST		POSTTEST		PRETEST		POSTTEST	
	F	%	F	%	F	%	F	%
0-10	1	3.3			9	30		
11-20	29	96.7	4	13.3	20	66.7	2	6.7
21-30			25	83.3	1	3.3	19	63.3
31-40			1	3.3			9	30
Total	30	100	30	100	30	100	30	100

Table 1 shows the scores of the control and experimental group in their pre-test and post-test. Based on the data, 29 respondents or 96.7% of the control group got scores of 11-20 points and 20 respondents or 66.7% of the experimental group got the same score. Only one or 3.3% of the respondents in experimental group got scores between 21-30 points.

For the post test result, data also shows that four students or 13.3% of the control group remain in the score bracket of 11-20 points while in the experimental group two students or only 6.7% got the same score. Data revealed that after using the module, there are 25 students or 83.3% of the control group got score of 21-30 points and 19 students or 63.3% of the experimental group got the same score. There is only one student or 3.3% of the control got score of 31-40 points. The experimental group on the other hand, 9 students or 30% of the respondents got scores between 31-40 points.

Data revealed that respondents from both experimental and control groups have the same prior knowledge in Organic Chemistry. However, the post test result shows that there are more high scores in the experimental group.

Table 2. Difference in the Pre-test Scores of Students Before the Application of

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PRE-TEST	Equal variances assumed	6.73	0.012	0.673	58	0.504	0.63333	0.94112	-1.25	2.51719
	Equal variances not assumed			0.673	46.47	0.504	0.63333	0.94112	-1.26	2.5272

Table 2 shows that at 95% confidence interval of the difference, the standard error difference was only 0.9411. The mean difference was 0.6333 which is not significant to the calculated t value (t=.673). This means that both groups have the same prior knowledge in organic compound. Furthermore, the pre- test result explained the need for instructional material that will facilitate comprehension in Organic Chemistry and thereby improve their scores in post-test. Based on the data gathered, there is no significant difference in the pre-test scores of control and experimental groups.

The efficacy of using module as teaching strategy supported the idea of Phyllis (2011) that instructional materials possess some inherent advantages that make them unique in teaching.

Table 3. Difference in the Pre-test and Post Test Scores of Experimental Group

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	T	Df	Sig. (2-tailed)
Pair 1	PRETEST - POSTTEST	-15.866	4.65	0.849	-17.6	-14.12	-18.68**	29	.000

**t is significant at the 0.01 level (2-tailed)

Table 3 shows that at 95% confidence interval of difference, the standard error difference was 0.849. Upon using the Strategic

After exposure to Strategic Instructional Module, the obtained mean score of experimental group was -15.866 and the calculated t value was -18.68 which was significant at the probability level of 0.01.The results of the post-test among experimental group reveals that instructional material such as module can motivate students' interest in dealing with the subject and thereby improve students' achievement and results in the change of students' attitude towards Chemistry. This result strengthens the findings of Ali and Ghazi (2010) in his study about the effectiveness of the modular instruction in Biology in the University of Pakistan. Based on his findings, modular teaching is more effective as teaching learning process for Biology as compared to traditional teaching method because in modular teaching, the students are provided the opportunities of learning at their own pace, according to their ability level and needs.

Based on the computed mean, there is significant difference in the pre-test and post test score of experimental groups.

Table 4. Difference in the Post test Scores of Control and Experimental Group

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
POSTTEST	Equal variances assumed	3.055	0.086	-4.439**	58	0	-4.733	1.066	-6.867	-2.598
	Equal variances not assumed			-4.439**	51.3	0	-4.733	1.066	-6.873	-2.592

**t is significant at the 0.01 level (2-tailed)

The mean difference in the post test of experimental and control groups is shown in Table 4. At 95 % Confidence Interval of the difference, the mean difference was -4.733 in favor of experimental group. The obtained t value (-4.439**) is significant at 0.01 probability level. This indicates that there is significant difference in the scores of students in control and experimental groups. Students in experimental group have higher scores than control group. The results of their improved summative test in the third grading period also support and validate the findings that the use of the instructional module can facilitate comprehension in Organic Chemistry. Based on the result of their summative test, 18 students or 53% of the control group had improved in their summative test while 26 students or 86% of the experimental group had

increase the result of their summative test.

Although both group had improved their performance in the post test, the experimental group had more significant gain compared to the control group. This manifested that the use of Strategic Instructional Module is an effective way of facilitating comprehension and increasing the achievement of students.

These results strengthen the claim of Alelaimat and Ghoneem (2012) in their study *"The Effect of Educational Modules Strategy on the Direct and Postponed Study's Achievement of Seventh Primary Grade Students in Science, in Comparison with the Conventional Approach"*. The study's results revealed that students in the experimental group are superior to students in the control group in both types of achievement.

The researcher also conducted some interviews to students about the module to validate the findings of the research.

Majority of the students said :

> ***"Nakakaenjoy pong basahin dahil madali pong intindihin. Excited po kaming sagutan at iperform ang ibat- ibang activities ng bawat lesson."***
>
> ***("We really enjoyed reading the module for it is easy to understand. We are also excited to answer and perform the different activities for each lesson.")***

Some students also claimed:

> ***("Nakakatuwa po yung mga graphics, madali pong basahin at madali po yung mga activities***
>
> ***"The graphics and the writing style of the module are fun that makes it enjoyable to read. The activities can be easily understood.")***

The researcher observed that the used of Strategic Instructional Module is effective however, it did not achieve the 100% student's improvement due to some problems met. Still, there are students remained in the low bracket of scores despite of using the instructional module. The major problems are students' absenteeism and students with special needs like those with poor comprehension or the so-called frustrated reader.

Table 5. Difference in the Achievements of Students After Exposure to Strategic Instructional Module Across Gender

	Respondents	N	Mean	F	Sig(2-tailed)
SCORES	Male	15	30.2667	2.173*	0.038
	Female	15	26.6667		

*F is significant at the 0.05 level

Table shows that the mean score of the male students was 30.2667 and the obtained mean score from the female students was 26.667. The computed F-value of 2.173 was significant at the 0.05 probability level. This means that the gender is a factor in describing the knowledge and achievements of respondents in Organic Chemistry. Based on the given data, the Strategic Instructional module is more effective in male respondents than female respondents. There is considerable evidence pointing to the fact that boys and girls differ in their cognitive abilities. Male respondents among experimental and control group are increasingly stimulated by the graphic and texts of the module. Therefore, there is significant difference in the achievements of male and female students after exposure to SIM.

These results supported the study of Chioma and Uzoamaka (2015) at University of Nigeria. In their study *"A SWOT (Strength, Weaknesses, Opportunities and Threats) Analysis of Male and Female Students' Performance in Chemistry: A Comparative Study",* it was concluded that boys perform better than girls in Chemistry in urban rural and coeducational schools.

The results also proved the study of Omwirhiren (2015). Attention should be adequately paid to the female folds by advising

teachers of Chemistry to effectively employ the use of discussion method in a way that it will help improve female student's performance in Chemistry. This is because the results of the study have shown a significant difference in their mean achievement scores in favor of males.

CONCLUSIONS AND RECOMMENDATIONS

Based on these findings, the researcher concludes the following in this study:

1. The use of instructional module is an effective way of facilitating comprehension and increasing the achievement of students. However, this will not achieve the 100% students' improvement due to some problems met like students' absenteeism and with special needs like those with poor comprehension or considered as frustrated reader.
2. In Organic Chemistry, the prior knowledge of the respondents both in experimental and control groups are the same.
3. The students who used Strategic Instructional Module can perform better than students who were solely exposed to lecture and discussion method.
4. In Organic Chemistry, male students of experimental and control groups can perform better than female as shown by their higher scores.

Based on these conclusions, the following recommendations are provided in this study:

8. Science teachers should adopt the developed and validated Strategic Instructional Module since it helps to facilitate comprehension the basic concept in organic compounds.
9. It was found on this research that students have improved after using the instructional module. It is recommended that students can utilize the Strategic Instructional Module, conduct the activities and gain knowledge in Organic Chemistry by themselves or with a little assistance from the teacher.
10. Science teachers should develop an instructional module that will encourage both gender and therefore increase the achievement of male and female students .

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IGC: A Play-based Approach to Improve Concept and Operations on Integers

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Abstract *– This study aimed to determine the impact of Integer Game Card in increasing the performance of Grade 7 students in operations of integers. The research used the One Group Pretest-Posttest design. There were five Grade 7 sections with a total of 196 respondents (89 male and 107 female) who participated in the study. The data obtained were processed through Strata using the following statistical techniques: mean, weighted mean and dependent t-test. Results revealed that the students increased their performance in operations on integers through the use of game card called Integer Game Card Battle. It also implies that the game card has a significant impact in the performance of students in operations on integers. The study recommends that the Integer Game Card Battle should be implemented in Grade 7 students regularly until they master operations on integers especially how to determine the appropriate sign of the integers. Encourage Elementary Grade 6 Math Teacher to use Integer Game Card Battle in developing the skills of their pupils in the four fundamental operations on integers.*

Keywords – *Concepts, Integer, Integer Game Card, Operations and Performance*

INTRODUCTION

Mathematics is always required to be taken up in basic education and even in Higher Education. Many students would wish that Mathematics subject is an optional subject to be taken up or totally eliminated the subject in the Curriculum. This subject serves as hindrance in many students in completing their academic requirements and to graduate on time.

The subject of integers plays a vital part of the middle school mathematics curriculum as it symbolizes a move from concrete to abstract thinking (Lamb and Thanheiser, 2006). There are several methods or models invented to help assist students in learning and understanding the ideas or concept behind calculations involving integers. To name a few, money, number line, balloons and weights, and two-colour tiles (Cemen, 1993).

Many of the published studies, literature and experiences inside the classroom agree that many students have difficulty and struggle in the concept and principle of integers. Our country today is facing the low achievement or performance in the field of Mathematics. Lapid (2007) stated that the high school ability to manipulate and solve verbal problems is weak. One of the factors is low retention of the students in the past lessons particularly in integers. Integers serve as the pre-requisite to learn other concepts in Mathematics.

According to Cruz (2008) cited the report on Science, Mathematics, and Educational Panel on Congressional Commission on Science, Mathematics and Engineering (COMSTE) showed that the level of competitiveness of Filipino High School students in Mathematics was trimmed down from 47 in 2001 to 77 in 2007 out of 112 participating countries. The result served as an eye opener for every educator that Philippines is one of the countries having a poor performance in Mathematics.

The result of the performance showed low performance of students in Mathematics. Furthermore, the result of National Achievement Test (NAT) is also lower compared to the expected result. The Researcher observed how the students can solve complicated problem in Algebra, Trigonometry, Geometry and even in Calculus if the students are still struggling in the field of integers.

According to Novak and Gowin (2014), all classroom activities should be organized and implemented in such a way to guide students toward individual inventive learning, instead of rote learning. Therefore, it is important to use educational strategies that will enable the correct structuring of concepts so that meaningful learning can take place. The use of different approaches and teaching methods both broadens the contents of courses and enables students to overcome their prejudices thereby motivating them toward perceived difficult courses.

OBJECTIVES OF THE STUDY

This study determines the impact of Integer Game Card (IGC) to the performance of grade 7 in Mathematics performance on integers.

Specifically, it attempts to answer the following questions:

1. How may the academic performance in integers of the respondents be described?
2. Is there any significant effect the integer game card battles to the Mathematics performance on integers of the respondents?

MATERIALS AND METHODS

Methods

The study aims to find out the effectiveness of IGC as an instructional game material to improve the performance of Grade 7 students on operations in integers of Marciano Del Rosario National High School.

The experimental method and descriptive method of research is used. The result in window cards is the main tool in gathering data.

Experimental method is used to assign participants to an experimental treatment group and a control or comparison group (www.serve.org,20080).

Descriptive Research is the purposive process of gathering, classifying, analyzing and tabulating data about prevailing conditions, practices and cause and effect relationship and then making accurate interpretation about such data with the aid of statistical method. (J.F. Calderon 1993)

In addition, Jelineck (2007) defines descriptive method to describe a certain phenomenon. It is directed towards ascertaining the prevailing conditions and seeks to answer real facts with regards to the existence of a

phenomenon or condition. While experimental research, Joseph Luzzi, Ph.D. (2003) the investigator manipulates conditions for the purpose of determining their effect on behavior. Subjects should be unaware of their membership in an experimental group so that don't act differently (Hawthorne Effect). In the simplest experimental design, investigators administer a placebo to control group and a treatment to the experimental group. Experimental design vary in terms of subjects' assignments to different groups, whether subjects were pre-tested, whether different treatments were administered to different groups, and the number of variables being investigated.

The study utilized a total of 50% of the total population of Grade 7 students or 5 out of 10 sections from Marciano Del Rosario National High School in Cabanatuan City, during the second grading period, school year 2016-2017. Fifty (50) percent from the curriculum level are drawn by systematic random sampling where five even number sections from the list of sections is the respondent.

Materials

In gathering the data for this study, the researcher employs the I-Card as a tool to determine the improvement of the students from Pre-test to Post-test and the test is answered properly and honestly by the respondents.

A letter of request to conduct the study was sent to the Office of the School Division Superintendent of the Division of Cabanatuan City, Department of Education through the Principal of Marciano del Rosario Memorial National High School.

The researchers personally explained and discussed how to administer I-Card test and procedure of IGC. The researchers also implemented game card one week to the identified respondents. The said intervention was done once a week for one month. When the result of I-Card in Pre-test and Post-test were collected, the researchers tallied and analyzed.

The data of the study used descriptive analysis and statistical tools like mean/average, weighted means, percentages, and frequencies to describe the performance of Grade 7 students in integers.

T-test is used to test for the significant impact of Integer Game Card (IGC) to the performance in operation on integers.

$$t = \frac{(\overline{X}_1 - \overline{X}_2)}{\sqrt{\sigma_p^2\left[\frac{1}{N_1} + \frac{1}{N_2}\right]}}$$

Analysis was conducted using Statistical Package for Social Sciences (SPSS). The level of significance was set at 0.05 of significance.

RESULTS AND DISCUSSION

Ayinde (2014), assessed the impact of Instructional Object Based Game (IOBG) on the mathematics performance of the students. The study revealed that the use of IOBG had significant effect in the performance of the students. His finding supported Balbuena et.al; finding (2014) they found out that using gameplay such as card game in teaching instructional method had a significant effect in facilitating students learning of grade 7.

Similarly, Rubin et.al (2014), found that the activity-based teaching such as target integer, integer chips, Damath and online gaming had a significant effect on student performance in integers. In additon, Malvecino and Ventayen (2020), stated that some of the Mathematics teachers were utilized game apps in the teaching process of the subject. The most highly used are the Sudoku and Math riddles and puzzles.

However, Ferguso (2014), revealed that the Digital Game-Based Learning (DGBL) had no significant impact in the academic achieve in mathematics. Bragg (2012), supported the study of Ferguso. His study showed that games and activities did not help student to understand the concept in mathematics. He explained that the game and activity should be appropriate to mathematical concept before employing the games.

Researches revealed that online gaming had a positive impact in the academic performance in mathematics. Mavrotheris (2012), found that the online gaming had a significant effect as an instructional tool to teach mathematics concept.

Similarly, Kebritch (2008), examined the effect of computer games on mathematics achievement and student motivation and found out that computer games had a significant effect on mathematics achievement of the students.

Level of Performance of Control and Experimental Group Before the Use of Integer Game Card (IGC)

The table shows the mean score of each section, control and experimental group, before the use of integer game card. It also shows the weighted mean of 48.29 for control group and 49.13 for experimental group, it was revealed that the average score of the respondents are lower than the half of the 100-item test.

Table 1. Description on the Level of Performance of Control and Experimental Group before the use of IGC

Level of Performance of Control and Experimental Group After the Use of Integer Game Card (IGC)

The table shows the mean score of each section, control group and experimental group, after the used of integer game card. It also shows the weighted mean of 50.88 for control group and 60.12 for experimental group, it revealed that the average score of the student respondents are now greater than the half of the 100-item test.

Table 2. Description on the Level of Performance of Control and Experimental Group after the use of IGC

	Control	**Experimental**
SECTION	**MEAN**	**MEAN**
7-Maayos	44.32	47.78
7-Matatag	45.03	52.85
7-Mabait	46.06	58.75
7-STE	73.12	82.53
7-Matulungin	45.87	58.70
Weighted Mean	**50.88**	**60.12**

Comparison on the Level of Performance of Control and Experimental Group Before and After the Use of Integer Game Card (IGC)

The table 3 and table 4 show that the mean during pretest for control and experimental group has no significant difference since the probability (0.300) is greater than 0.05. It also shows that the mean during the posttest for control and experimental group has a significant difference since the probability (0.006) is less than 0.05. The study revealed that the t-value (5.33) in posttest is higher than the critical value of 2.13 with the probability of 0.006.

Table 3. Comparison of the mean value on the Level of Performance of Control and Experimental Group before and after the use of IGC

	Control	**Experimental**
SECTION	**MEAN**	**MEAN**
7-Maayos	40.12	38.95
7-Matatag	40.34	42.48
7-Mabait	47.12	49.50
7-STE	69.12	68.69
7-Matulungin	44.76	46.02
Weighted Mean	**48.29**	**49.13**

	MEAN	
	Control	**Experimental**
Pretest	48.29	49.13
Posttest	50.88	60.12

Table 4. Comparison of the t-value on the Level of Performance of Control and Experimental Group before and after the use of IGC

	t-value	**Probability**	**Decision**
Pretest	1.19	0.300	Accept
Posttest	5.33	0.006	Reject

The null hypothesis “Game card has no significant impact in the Mathematics performance in integers of Grade 7 student respondents” was rejected. It also implies that the game card is effective to improve the performance of the students in operations on integers.

The result was supported by the study of Rubin RJ. Et al (2014), they found out that the activity base teaching like games such as target integer, chips Damath and online game number cruncher had a significant effect in the performance of the students in operations on integers.

CONCLUSIONS AND RECOMMENDATIONS

Based on the result of the study, the following conclusions were drawn:

4. Majority of the student respondents increase their performance on operation in Mathematics. The mean score of the experimental respondents 49.13 before implementing the IGC was increased to 60.12 after implementing the IGC;
5. The study revealed that the integer game card had a significant impact in the performance of grade 7 students in operations on integers.;

Based on these conclusions, the following recommendations are provided in this study:

11. Teachers, administrators and parents should find ways in improving the performance of students in operations of integer. Several studies revealed the influence of factors such as low family income, study habits, etc. to the performance of students in school. Furthermore, patience and new techniques in teaching can help them to appreciate the beauty of mathematics and learn efficiently and effectively.
12. Similar studies are recommended using other subject areas and add more respondents from the different schools in Cabanatuan City to determine how effectives the tools in improving the academic performance of the students.

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Epidemiology of Covid-19 in the Philippines

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Abstract *– On 7 March 2020, the Philippines announced the local transmission of COVID-19. I described the characteristics and epidemiological time-to-event distributions for laboratory-confirmed cases in the Philippines recorded as of 29 December 2020. The average age of 472,298 cases was 38.15 years, with 45.3% being female and 44.3% living in the National Capital Region. The age group of 30-39 years old has the highest number of total confirmed cases with the total of 111,384. The age group of 90-99 has the lowest record of confirmed cases with the total of 745. The total active cases as of 29 December 2020 is 22,746 (4.8%), 9,124 (1.94%) died, and 438,780 (93%) are total number of recovered patients. Asymptomatic patients were 2,361 (10.4%) out of 22,746 active cases; 142 (0.62%) patients were pregnant. The average age of dead patients was 62.21 years, and the average age of recovered patients was 37.52 years. The average time between confirmation of Sars-Cov2 and recovery was 11.99 days.*

Keywords *– COVID-19; epidemiology; low- and middle-income country; Philippines; surveillance*

INTRODUCTION

On 12 March 2020, the World Health Organization (WHO) declared Coronavirus Disease 2019 (COVID-19) a global pandemic. Current and published epidemiological studies on COVID-19 have oriented to a large extent on China and other high-income countries such as South Korea, Japan, Italy, Spain, and the USA. Further research into the distribution and burden of COVID-19 in low- and middle-income countries (LMICs) will provide insight into its low-resource disease epidemiology, as the dynamics of transmission rely not only on population characteristics, but also on the capacity of the health system (e.g., access to testing) and the ability to enforce mitigation measures (e.g., community-level quarantine, social distancing). On 7 March 2020, the Philippines reported local transmission of COVID-19 and imposed enhanced community quarantines (ECQ) on half the population of the country from 20 March to 30 April. ECQ included very stringent social and physical distancing steps at the community level, such as halting public transport, banning intra-country travel, and limiting people to their homes, except for vital activities such as food and health care. I am explaining in this paper the epidemiological profile of the 472,298 confirmed cases of COVID-19 in the Philippines as of 28 December 2020.

METHODOLOGY

Methods Summary of the surveillance structure of the Philippines COVID-19 The Philippines is an archipelago of three groups of islands and 17 regions, divided into 81 provinces covering 146 cities and 1488 municipalities. Surveillance of COVID-19 is decentralized to local government units (LGUs), i.e., states, counties, and towns, as most of the delivery of healthcare services. At all administrative levels, epidemiology, and surveillance units (ESUs) exist, namely federal ESUs (RESUs), provincial ESUs (PESUs), and city/municipality ESUs (CESUs/MESUs). Units collect data and report to higher-level units for their jurisdictions: CESUs/MESUs cascade regular reports to the PESUs that cascade those to regional ESUs and then send to the DOH-Epidemiology Bureau (EB). The provincial government does not supervise 15 cities and one municipality in the National Capital Region (NCR), as well as 37 highly urbanized cities and autonomous component cities, and reports directly to the RESUs. DOH-EB is the main national security agency for COVID-19. It collects information on confirmed and reported cases nationally and provides all LGUs with advice and assistance. DOH-EB is the main national security agency for COVID-19. It collects information on confirmed and reported cases nationally and provides all LGUs with advice and assistance. DOH-EB operates an information system patterned after influenza-like disease (ILI)/severe acute respiratory infection (SARI) surveillance for COVID-19 cases. Using case investigation forms (CIF), which report patient characteristics, epidemiological links and select clinical details, reported cases are profiled.

CASE DEFINITION, CASE DETECTION AND LABORATORY TESTING

COVID-19 cases are classified as patients with positive real-time reverse transcription polymerase chain reaction (RT-PCR) performed by DOH approved laboratories and the Tropical Medicine Research Institute (RITM). The RITM is the National Emerging and Re-emerging Diseases Reference Laboratory and it is the public health authority that accredits COVID-19 testing laboratories. The DOH restricts testing to suspicious and likely cases beginning on 9 April 2020. (1) SARI requiring hospitalization with no other aetiology that fully explains clinical presentation; (2) ILI requiring hospitalization with no other aetiology that fully explains clinical presentation AND residence or travel to a region with documented local transmission 14 days prior to symptoms OR exposure to confirmed or probable cases within 2 days prior to symptoms OR exposure to confirmed or probable cases; and (3) high-risk populations of fever, cough, shortness of breath and other respiratory symptoms, including those 60 years of age and older, comorbidity patients, women at high risk of pregnancy and health staff. Suspicious cases (1) referred for RT-PCR examination, (2) with inconclusive RT-PCR findings from a DOH-accredited laboratory, or (3)

with a positive RT-PCR result from a non-RITM accredited laboratory are likely cases. There were six versions of case descriptions of COVID-19 as of 29 April, and research has extended to include 17 sub-national laboratories (see Supplementary Appendix). Via many avenues, possible cases are identified. The DOH Quarantine Office recognizes individuals with symptoms such as fever, shortness of breath and respiratory issues at ports of entry and refers them to health facilities, LGU health offices or sentinel disease monitoring units (DRUs). Official case descriptions are also used by health professionals to determine possible COVID-19 cases among patients consulted or hospitalized in their facilities. For identified confirmed, suspicious, and probable COVID-19 cases, LGUs, ESUs and DRUs then perform case investigations and contact tracing. Due to active COVID-19, death was described as death and confirmed by the DOH-EB as dead. To verify whether the cause of death was linked to COVID-19, an internal team of medical experts at DOH-EB reviews death certificate data, if available, or data transmitted by the health facility or ESUs via the information system. Recovery was described as COVID-19 cases identified as DOH-EB recovered based on symptom resolution, including hospital discharge for those admitted or home quarantine termination for those not admitted, and at least one negative RT-PCR test. As part of the DOH's open data access 'DataDrop' project, updated daily at https://ncovtracker.doh, all data is available.

STATISTICAL ANALYSIS

I analysed descriptive statistics of cases, deaths and recoveries by socio-demographics, average age of dead and recovered patients, as well as the average time between confirmation and recovery and the time between confirmation and death, respectively. Histograms and graphic figures were constructed using the data from the DOH.

Table 1.
Characteristics of COVID-19 cases in the Philippines as of 29 December 2020

	All Cases	**Died**	**Mild**	**Recovered**	**Severe**	**Critical**
Age Group						
0-9	*17,048*	*111*	*683*	*16,210*	*14*	*30*
10-19	*26,166*	*71*	*1,085*	*24,982*	*11*	*17*
20-29	*123,223*	*233*	*4,530*	*118,357*	*45*	*58*
30-39	*111,384*	*452*	*4,101*	*106,704*	*58*	*69*
40-49	*75,822*	*836*	*2,799*	*71,952*	*103*	*132*
50-59	*57,681*	*1,734*	*2,263*	*53,294*	*152*	*238*
60-69	*35,188*	*2,496*	*1,645*	*30,488*	*169*	*390*
70-79	*15,566*	*2,049*	*773*	*12,351*	*125*	*268*
80-89	*5,334*	*965*	*274*	*3,905*	*44*	*146*
90-99	*745*	*171*	*32*	*513*	*8*	*21*

Table 2.
The comparative breakdown on the effects of COVID-19 on different age groups and sex.

	Total	**Male**	**Female**
Age and Sex			
0-9	*17,048*	*9,289*	*5,959*
10-19	*26,166*	*13,484*	*12,682*
20-29	*123,223*	*64,620*	*58,603*
30-39	*111,384*	*62,551*	*48,833*
40-49	*75,822*	*43,589*	*32,233*
50-59	*57,681*	*30,963*	*26,718*
60-69	*35,188*	*18,035*	*17,153*
70-79	*15,566*	*7,483*	*8,083*
80-89	*5,334*	*2,160*	*3,174*
90-99	*745*	*274*	*471*

RESULTS

Among the 472, 298 COVID-19 cases detected in the Philippines as of 29 December 2020, 45.3% were female and 44.3% lived in the NCR. Among these, 9,124 (1.94%) died and 438,780 (93%) recovered. These are patients who were confirmed to have COVID-19 via RT-PCR of specimens collected from the nose or throat. Recovered patients are those who have no or minimal symptoms and have either tested negative when a repeat RT-PCR of nasal or throat swabs was performed or completed a 14-day quarantine period. Average age for all cases, deaths and recoveries was 38.15 years, 62.21 years, and 37.52 years. There were 111,384 (23.6%) cases and 452 deaths among those aged 30–39 years. There were total of 730 severe patients. These patients have a pulse oximetry reading (SpO2) of less than 90% on room air and have more than 30 breaths per minute. These patients generally require oxygen support and hospitalization. A record of 1,369 were account to as critical patients. These are confirmed COVID-19 patients whose symptoms are so severe that they require a mechanical ventilator, medicines to maintain their blood pressure, have evidence of damage in multiple organs (liver, kidneys, heart, lungs, etc.), or require admission to the intensive care unit (ICU). There were also 18,187 total number of mild patients. These are patients with confirmed COVID-19 obvious signs and symptoms. However, these patients have an oxygen saturation of 90% and above on room air measured by pulse oximetry (SpO2), have less than 30 breaths per minute, and do not require oxygen supplementation (oxygen masks, nasal cannula). Those who died were more likely to be older, male, had trouble breathing, and had comorbidities, except for asthma, compared to all those who recovered. Meanwhile, there were 142 total number of confirmed cases who are pregnant. The average time between the confirmation and recovery was 11.99 days. The average time between confirmation and death was 11.63 days. Post humous cases were 5,282 (1.12%). This is the number of reported cases after the death of a patient.

Figure 1

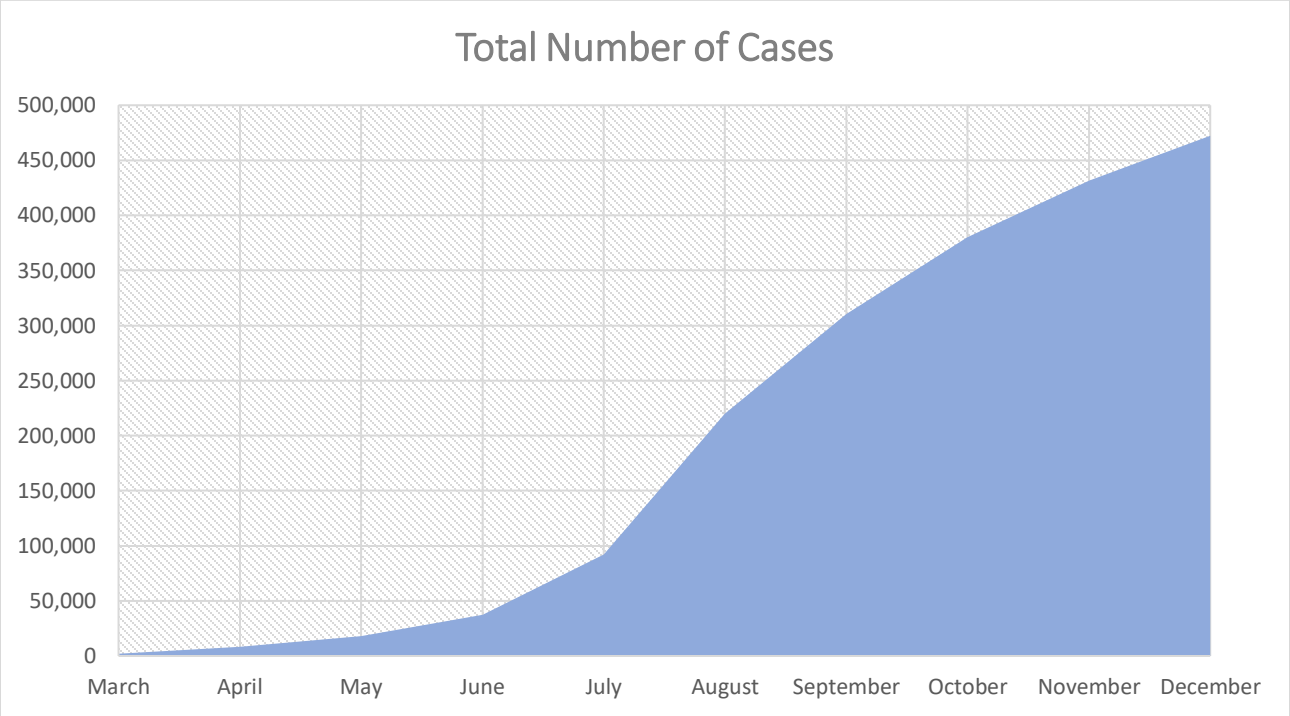


Figure 2

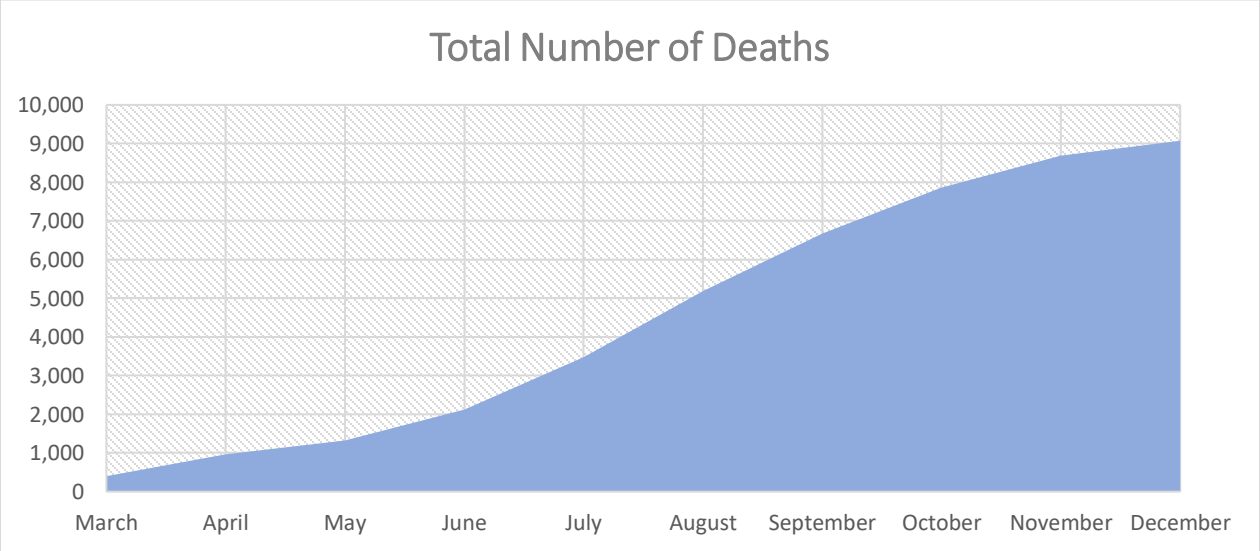


Figure 3

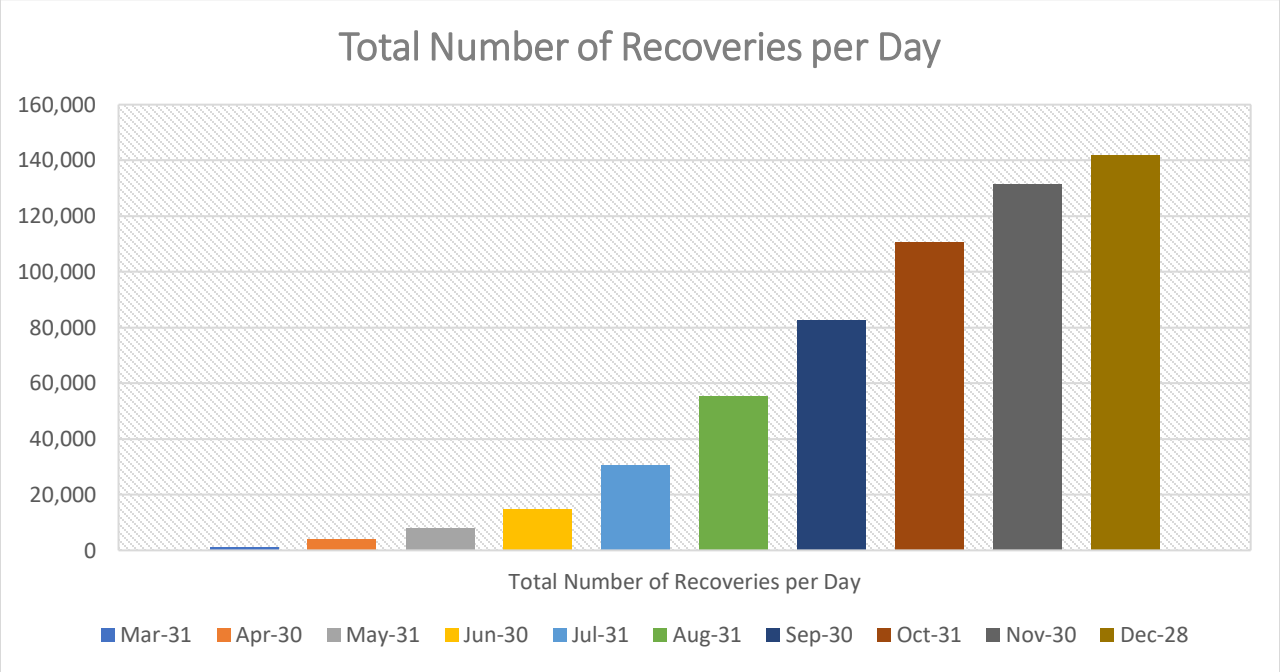


Figure 4

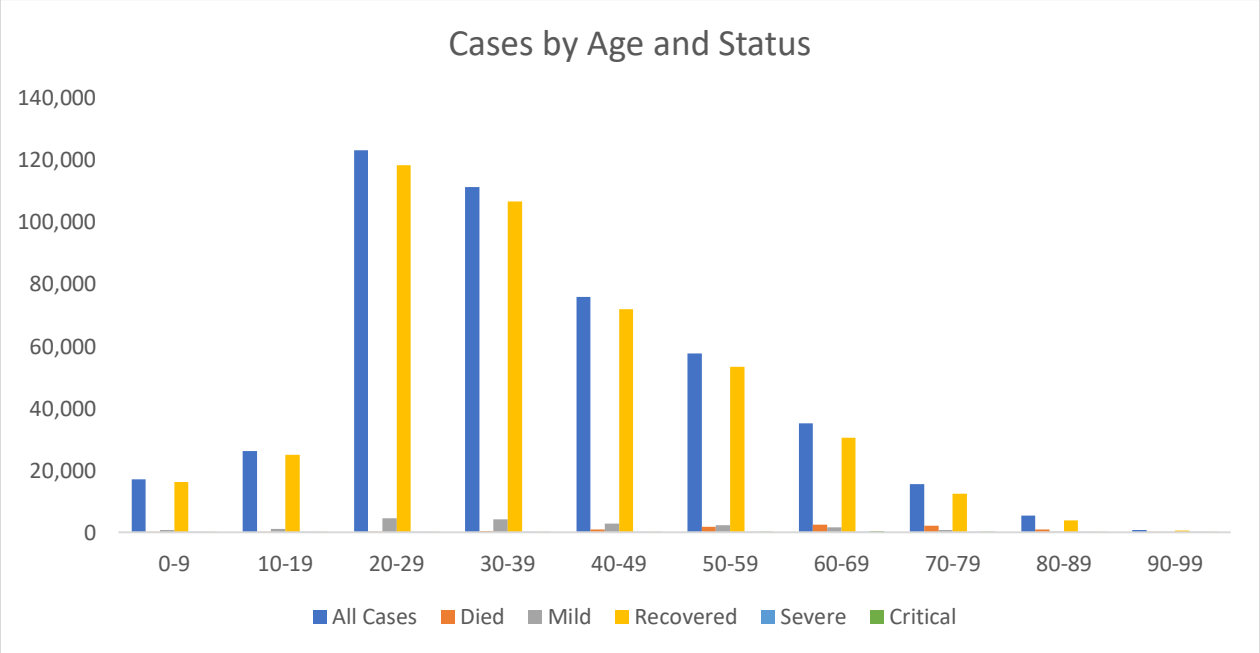
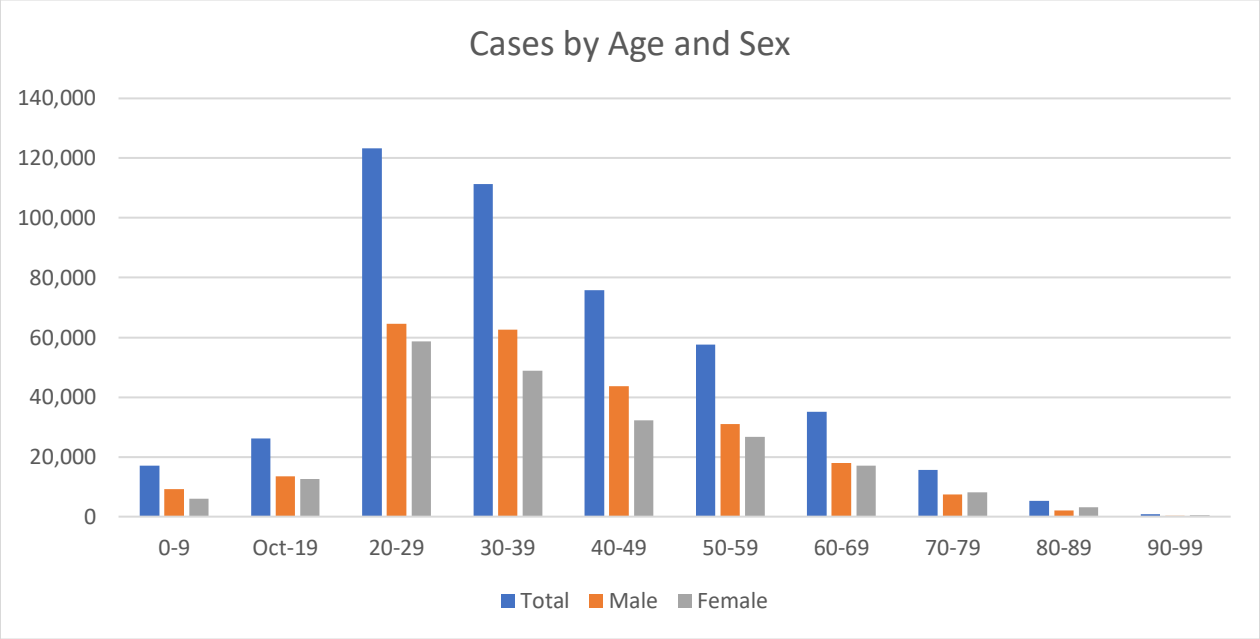


Figure 5



Discussion

This overview of the confirmed recorded cases since March 2020 of the COVID-19 outbreak in the Philippines provides a unique perspective on the transmission of COVID-19 in a health system with limitations in surveillance, testing and service delivery. Such information may aid modelling or data analyses efforts for outbreak response in the Philippines and countries with similar health system constraints as studies of the pandemic outside of high-income countries and in LMICs have been limited. Our results support findings that COVID-19 disproportionately burdens young adults and adult age groups, respectively. The age groups of 20-29/30-39 years old were the group of people that is currently working, or they frequently went out of their house to go to their work. There is a corresponding risk of going outside each person's home. Outbreak epicentres in the Philippines were urban centres, such as NCR and Cebu City, where NCR alone accounted for more than two-thirds of all cases. NCR is the fifth most densely populated metropolis in the world. The first few cases were likely imported into these urban centres, as approximately one-tenth of the population are migrant workers, and 8 million tourists visit annually.

The cases are progressively increasing since Mach 2020. I have found out that despite the quarantine and health protocols being mandated, the number of people being infected was not decreasing. We can assume for the following months that the number of cases will be higher. This is also affected by some parameters like the laboratory facilities, the waiting time between the RT-PCR Test Procedure and the respected laboratory results. On the other hand, I have found out that the number of people being recovered was also increases. This may be due to the change of classifications and descriptions of a patient labelled as recovered as per WHO. Recovered patients are patients who were confirmed to have COVID-19 via RT-PCR of specimens collected from the nose or throat. Recovered patients are those who have no or minimal symptoms and have either tested negative when a repeat RT-PCR of nasal or throat swabs was performed or completed a 14-day quarantine period.

The total number of deaths was also increasing. The average age of dead patients was 62.21 years. My results support the findings that COVID-19 burdens older age groups. This is also affected by some health variables because elderly patients have a decrease immune system, and they

are prone to such respiratory and other communicable or non-communicable diseases.

In the Philippines, surveillance delays were prominent due to the limited healthcare system capacity which affects the timeliness of decisions to suppress the outbreak. For example, on 7 March, the DOH officially reported local transmission upon public announcement of the sixth case [39, 40], but our findings suggest that the exponential growth period likely began more than 3 weeks earlier. Delays also affect rapid isolation of suspected cases. To reduce health-seeking behavioural delays, the National Health Insurance Program, of which all Filipinos are members under the newly passed Universal Health Care Law, has made laboratory testing free, and covers most of the community isolation and hospitalisation costs since mid-April. To reduce diagnostic delays, the Philippines has slowly expanded laboratory capacity from just one laboratory in February. More isolation facilities, such as stadiums, hotels, and schools, have been set-up for mild cases to save limited hospital resources for severe and critical cases. Information systems are being strengthened to allow synchronised reporting of cases at all ESU levels in real time.

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FULL ISSUE: Volume 6, Issue 1, s. 2020

ASEAN Multidisciplinary Research Journal

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