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FOREWORD

I am pleased to put into the hands of readers Volume-5; Issue-11: Nov, 2019 of **"International Journal of Advanced Engineering, Management and Science (IJAEMS) (ISSN: 2354-1311)" ,** an international journal which publishes peer reviewed quality research papers on a wide variety of topics related to Science, Technology, Management and Humanities. Looking to the keen interest shown by the authors and readers, the editorial board has decided to release print issue also, but this decision the journal issue will be available in various library also in print and online version. This will motivate authors for quick publication of their research papers. Even with these changes our objective remains the same, that is, to encourage young researchers and academicians to think innovatively and share their research findings with others for the betterment of mankind. This journal has DOI (Digital Object Identifier) also, this will improve citation of research papers.

I thank all the authors of the research papers for contributing their scholarly articles. Despite many challenges, the entire editorial board has worked tirelessly and helped me to bring out this issue of the journal well in time. They all deserve my heartfelt thanks.

Finally, I hope the readers will make good use of this valuable research material and continue to contribute their research finding for publication in this journal. Constructive comments and suggestions from our readers are welcome for further improvement of the quality and usefulness of the journal.

With warm regards.

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Sustainability of the Installed Battery-less PV Panel Systems at Two Government Institutions in Pampanga

Edgardo M. Santos, Noel T. Florencondia

***Abstract*— One of the most prominent energy alternatives available today is the solar energy. Innovation has made this more affordable and reachable to the public both in the resident and commercial areas. Solar energy was harnessed in two buildings from two different organizations through the installation of photovoltaic (PV) solar panels in the two locales. However, these solar panel systems needed to be assessed empirically. Also, during the initial operation, several technical problems led the researcher to use the result of the assessment procedures as basis for a proposed operation, maintenance, and troubleshooting manual for the users. Engineering management intervened in the study through the tools which were helpful in organizing the activities done in the course of the research. The PV solar panels were assessed in a quantitative approach. The energy and cost generated after the installation of the systems were compared to the energy and cost prior to the installation through the analysis of percentage difference and t-test. The efficiency and return on investment (ROI) of the PV solar panels were also assessed. The contents of the manual was based on the survey checklist distributed among the four (4) respondents from the locales and the interview checklist conducted by the researcher on the installer of the panel systems. In summary, no significant difference was observed between the energy and cost generated before and after the installation of the PV solar panels using t-test. But the percentage difference assessment reflected a significant difference in the energy and cost generated before and after the installation. Specifically, there was a positive decrease in the energy cost of the electricity generation in the two locales. Furthermore, the return on investment of the PV systems were discovered to be less than the expected life span which means that the projected payback could be harvested within the utilization of the PV solar panels. Lastly, a manual was made at the end of the study addressing the common issues and problems encountered by the users and how to troubleshoot them and operate the system properly. This manual was made for the sole purposeof maximizing the utilization of the solar PV panels and promoting sustainability.*

***Keywords*— Engineering management, solar, photovoltaic panels, efficiency, manual, sustainability.**

I. INTRODUCTION

Electricity is considered to be one of the vital needs in aintaining the progress of a continuously improving society. It facilitates the technology innovations of the current generation. It also establishes the wide range of products and services that improve not only the quality of life but also the economic status of a nation [1].

The updated Philippine Energy Plan (PEP) 2012-2030 conducted a nationwide roadmap of the total final energy consumption (TFEC). Based from the roadmap, the country's total final energy consumption (TFEC) is expected to increase at an average rate of 4.2 percent annually, from 29.8 million tons of oil equivalent (MTOE) in 2015 to 54.9 MTOE in 2030.

Disregarding fluctuation of oil prices in the world market, PEP stated that demand for petroleum products will increase by an average of 3.9 percent per year from 2015 to 2030. Diesel and gasoline will continue to be the most widely-used petroleum products, with the average shares of 50.5 percent and 28.4 percent in the total oil demand, respectively.

Coming after petroleum, electricity is projected to be the second most-consumed fuel after oil and is expected to contribute an average of 22.1 percent share to the final energy demand throughout the planning period and is projected to grow by an average of 5.7 percent annually. Its utilization in the transport sector is seen to expand by ten (10) times its 2015 level of 8 thousand tons of oil equivalent (kTOE) to 80 kTOE in 2030.

Still inferring from PEP, the country's total primary oil supply is projected to grow by 3.4 percent per year on

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average in the business-as-usual scenario, from 17.7 MTOE in 2015 to 29.1 MTOE in 2030.

Considering the continuously increasing rate demand and the decreasing rate of supply of petroleum based from the data, scarcity is not an impossible assumption by the year 2030.

Solar energy which is one of the previously mentioned, however, is considered to be one of the most effective alternatives to fossil fuels and other sources of electricity. It is a renewable resource that will not run out any time sooner than any other resource. Although some of its disadvantages are the lack of sunlight in cold places and the presence of too much heat in arid desserts, the efficiency of photovoltaic panels are continuously being improved through hybridization [2]. Solar and photovoltaic panels are being produced to generate solar energy in an increasing level.

Solar energy is the unique renewable (i.e., neglecting entropy creation by the Sun) resource in the world, where hydro and wind constitute secondary forms of the same source. From this perspective, it could be very convenient to directly convert solar energy into electricity by using the highest possible efficient physical process. Solar energy conversion techniques can involve thermal, electromagnetic or a combination of both forms of energy that attain our planet. The conversion of solar radiation into electricity has been extensively studied [3].

In particular, photovoltaic (PV) cells allow the energy transported by electromagnetic waves (i.e., photons) to be directly converted into electricity. The mechanisms that allow this energy conversion to take place are based on photon-electron interactions that occur in PN junctions formed by appropriately doped semiconductor materials (Mono-crystalline and polycrystalline silicon cells currently found in the market). A photovoltaic panel, or array, is composed of several unitary cells connected in series and/or in parallel. Depending on the available surface area exposed to the Sun, PV panels can be employed in small- and large-scale applications as auxiliary electric generators in buildings and stand-alone power plants. Nowadays, this type of solar energy conversion is expanding very rapidly, consequently, predicting the performance of PV panel which is essential for design engineers. Even though the most important electrical characteristics of PV panels are usually provided by manufacturers, in general, they are determined under Standard Test Conditions (STC).

The PV panel operating temperature is dependent upon many factors: solar radiation, ambient temperature, wind speed and direction, panel material composition, and mounting structure. For a typical commercial PV panel, a proportion of the solar radiation is converted into electricity, typically 13-20%, and the remainder is converted into heat [4]. One of the main obstacles that faces the operation of photovoltaic panels (PV) is overheating due to excessive solar radiation and high ambient temperatures. Overheating reduces the efficiency of the panels dramatically [5]. Due to this setback, hybrid Photovoltaic/Thermal (PV/T) solar system was made and is one of the most popular methods for cooling the photovoltaic panels nowadays [6]. In areas with limited sunlight, however, the lack of solar energy could also affect the efficiency of the PV panels. A study was conducted in Hong Kong regarding the analysis of local weather data patterns which showed that solar power and wind power can compensate well for one another, and can provide a good utilization factor for renewable energy applications, thus another hybrid solar panel [7]. Solar cells change the received solar energy into electricity, thus they have received attention as clean energy devices which do not release hazardous pollutants into the environment. The efficiency of the photovoltaic (PV) systems has been increased, while their production cost reduced which contributed to the expansion of PV systems globally [8]. Forced convection also plays a major role in determining the thermal response of the PV panel and a diverse range of values for the forced coefficient is available [9]. These equations were developed from fundamental heat transfer theory [10], wind tunnel measurements [11], and field measurements [12].

he 6th Environment Action Programme (EAP) is a decision of the European Parliament and the European Council adopted on 22 July 2002. It sets out the framework for environmental policy-making in the European Union (EU) for the period 2002–2012 and outlines the actions that need to be taken to achieve them. The 6th EAP identifies four priority areas: climate change, nature and biodiversity, environment and health, and natural resources and waste.

Solar panels, like any other electronic component existing today, operates within a limited life span. Although they are already considered as electronic waste, inactive solar panels are being subjected to recycling nowadays. Panels must be taken down and collected before recycling can take place. V.M. Fthenakis and P.D. Moskowitz – at the Brookhaven National Laboratory, National Photovoltaics Environmental Research Center in the USA – proposed three collection models in The Value and Feasibility of Proactive Recycling, available on the BNL website.

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Specifically, this study aimed to describe the PV system, energy consumption and efficiency of the system installed in the two government institutions in Pampanga. It is also aimed to determine the Return on Investment (ROI) for the said PV System.

II. METHODOLOGY

The study utilized a descriptive type of research. It focused on the empirical inquiry regarding the energy consumption of the building before and after the installation of the solar PV panels. Specifically, it sought to describe the energy profile of the building two buildings. These historical data were used to describe the generated cost and generated energy of the electrical lines installed in the building before the installation of solar PV panels.

Quantitative approach to research was then deployed in assessing and determining if there is a significant difference between the generated energy and cost before and after the installation of the solar PV panels.

According to Creswell, quantitative approach is one in which the investigation primarily uses measurable data claim for developing knowledge (i.e., cause and effect thinking, reduction to specific variables and hypotheses and question, use of measurement and observation, and the test of theories). It employs research techniques such as experiment and survey and collect data on predetermined instrument that yield statistical data to be interpreted and analyzed later on.

Then, descriptive inquiries regarding the problems being encountered with the operability of the solar PV panels were answered and were used as basis for a proposed manual for the solar PV panels.

III. RESULTS AND DISCUSSION

Table 1: Energy Consumption Profile of Institution A for the Year 2017-2019

kWhr Billing for the Year 2017 to October 2018			
Month /Year 2017	kWhr w/o PV	Month /Year 2018	kWhr w/PV
January	10540	January	11420
February	9520	February	9540
March	9600	March	9600
April	10160	April	8880
May	11640	May	10080
June	10420	June	9700
July	11640	July	9120
August	10080	August	9080
September	9420	September	9200
October	9500	October	11260
November	9880		
December	5420		
Total	117820		97880
Average	9818.33		9788.00
Difference	30.33		

Based from the historical data gathered on the locale of the study, for the year 2017, the total actual generated energy was computed to be 117,820 kWhr and 115,280 kWhr with a total cost of ₱1,117,604.28 and ₱1,087,866.43 for the year 2017 and 2018, respectively. The average total generated energy was computed to be 9,818.33 kWhr.

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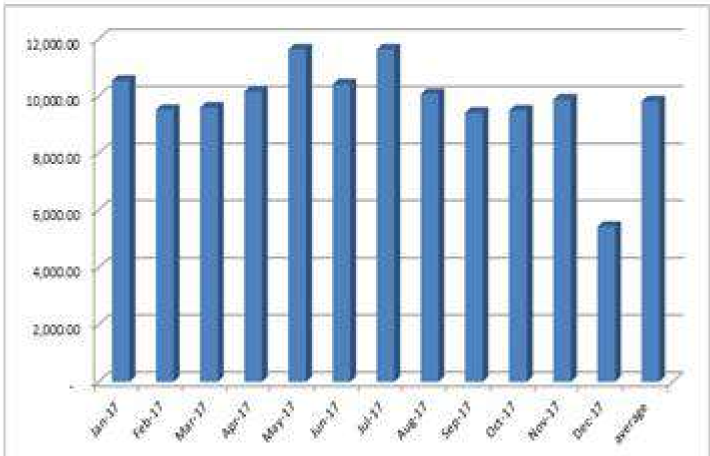
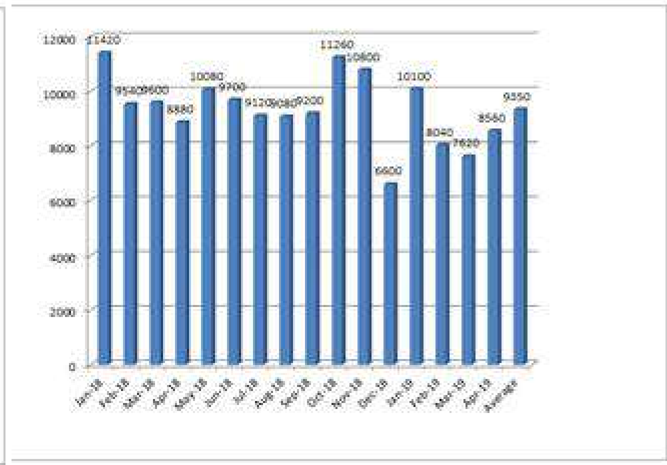


kWhr Consumption prior to installation of PV Panel, Year 2017



kWhr Billing after PV installation, Jan. 2018- April 2019

Fig 1 and 2: Comparison of Energy Before and After the Installation of the Installation of Solar PV System

Based on Table 1, the installation of the solar PV panels generated savings on the energy and cost of electricity being supplied in the government agency building. The average energy generated by the solar PV panels is 9,788.00 kWhr which is lower compared to the energy generated by the usual electricity provider which is 9,818.33 kWhr. The average cost of energy after installing the PV panels is ₱92,883.30 which is also less compared to the last year's average generated cost of ₱93,133.69.

Table 2: Computed Efficiency of Solar PV Panels in Institution A

Institution A	Inverter		Total	Efficiency
	3kW	5kW	8kW	27.98%
Average Monthly kWhr harvest	352.023	187.438	539.462	
Installed kW PV Panel	2.7	4.86	1927.8	
No. of Hours Operating	8.5			

Table 3: Computed Efficiency of Solar PV Panels in Institution B

Institution B	Inverter		Total	Efficiency
	30kW	30kW	60kW	52.47%
Average Monthly kWhr harvest	3717.5	3749.03	7466.53	
Installed kW PV Panel	27	27	14229	
No. of Hours Operating	8.5			

Table 2 and 3 exhibit the computed performance efficiency of the solar PV panels installed in both locales within 8.5 hours of daily operation for a year. Based on the results, solar panels installed in *Institution A* showed 27.98% efficiency while the ones installed in *Institution B* showed 52.47% efficiency.

Table 4: Percent Decrease of Generated Energy in the InstitutionA for the Year 2017 to April 2019

Month	kWhr Consumption		Billing Cost	
	Percent of Decrease for the Year 2017-2018	Percent of Decrease for the Year 2018-2019	Percent of Decrease for the Year 2017-2018	Percent of Decrease for the Year 2018-2019
January	-8.35	11.56	-4.80	12.52
February	-0.21	15.72	- 0.03	10.53
March	0.00	20.63	- 4.43	27.97
April	12.60	3.60	16.14	3.35
May	13.40		10.80	
June	6.91		10.27	
July	21.65		23.81	
August	9.92		9.93	
September	2.34		5.96	
October	-18.53		- 23.92	
November	-9.31		- 10.54	
December	-21.77		- 28.03	
Average percent of decrease	0.72%	12.88%	0.43%	13.59%

Tables 5 and 6 show the import and export energy of PV solar panel. Number of PV panels are 180, capacity generating energy of PV panel is 54.6 kW. Number of the days were considered import and export where in, the researcher used 24 days on school days a month while 6 days on weekends for a month. As seen on the table, a manual sizing tool sun peak hour was used for computing the estimated value for import and export energy kWh and also energy save in peso.

Table 5: Theoretical Computation of Import and Export Energy (Institution B)

DESCRIPTION	NUMBER OF PV PANELS	CAPACITY OF PV	NUMBER OF DAYS	kWh/month	PESO
IMPORT	180	54.6 kW	24	5702.4	39201.149
EXPORT	180	54.6 kW	6	1425.6	7128
TOTAL:				7128	46329.149

Table 6: Actual Computation of Import and Export Energy (Institution B)

DESCRIPTION	NUMBER OF PV PANELS	CAPACITY OF PV	NUMBER OF DAYS	kWh/month	PESO
IMPORT	180	54.6 kW	24	5780.6	39738.424
EXPORT	180	54.6 kW	6	1445.2	7225.8
TOTAL:				7225.8	46964.224

In comparing the total values, the researcher interpreted that the actual value of the import and export energy of the solar PV panels installed in Institution B which is 7225.8 kWh is greater than the projected value which is 7128 kWh.

Theoretical Computation Using manual sizing tool

For import energy,
Number of PV panel: 180 at 80% harvest
Wattage of Panels: 54.6 kW
<u>Used: 54.6 kW energy from PV panels</u>
54.6 kW X0 .80 = 43.68 kW

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Average kWh/day = 43.68 kW X 5.5 hours = 240.24 kWh

Used: 24 school days in one month,

EI = 240.24 kWh/day X 24 days = **5,765.76 kWh/month**

PESO = 9.83pesos/kWh x 5,765.76 kWh/month= **56,677.42 pesos**

For export energy,

Used: 54.6 kW from PV panels,

54.6 kW X .80 = 43.68 kW

Average kWh/day = 43.68kW X 5.5 hours = 240.24 kWh

Used: 6 days for weekends in a month,

EE = 240.24 kWh X 6 days = **1,441.44 kWh/month**

The DU's export energy rate is P5.50,

PESO = 5.5pesos/kWh x 1441.44kWh/month = **7,927.92 pesos**

Using Actual Energy Harvest of Inverters:

E1 = 3,717.5 kWh

E2 = 3,749.03 kWh

Average kWh/day inverter 1 = 3717.5 kWh / 31 days = 119.92 kWh/day

Average kWh/day of inverter 2= 3749.03 kWh / 31 days = 120.94 kWh/day

Total average Energy/day = 240.86 kWh/day

Used: 24 school days in one month,

EI = 240.86 kWh/day x 24 days = 5780.6 kWh/month

Used: DU's import energy rate is P9.83,

PESO = 9.83pesos/kWh x 5780.6 kWh/month = **56,823.30 pesos**

For export energy:

Used: 6 days for weekends in a month,

EE = 240.86 kWh/day x 6 days = **1,445.16 kWh/month**

Used: DU's export energy rate is P5.50,

PESO = 5.50pesos/kWh x 1445.16 kWh/month = **7,948.38 pesos**

Where in:

E1 = Energy Harvest in Inverter 1

E2 = Energy Harvest in Inverter 2

Table 7: Percent Decrease of Generated Energy in the Institution B for the Year 2017 to April 2019

	kWhr Consumption		Billing Cost	
Month	Percent of Decrease for the Year 2017-2019	Percent of Decrease for the Year 2018-2019	Percent of Decrease for the Year 2017-2018	Percent of Decrease for the Year 2018-2019
January	32.89	12.64	- 3.71	4.44
February	-1.02	5.91	- 1.93	3.50
March	-13.71	- 6.90	-30.36	- 9.66
April	-7.83	- 3.60	-18.30	4.13
Average percent of decrease	2.58%	2.01%	-13.58 %	0.60 %

Table 15 shows that there is a positive percent decrease of the generated energy for the periods 2017-2018 and 2018-2019 but a negative decrease was seen on the generated energy cost for 2017-2018. However, this is to be disregarded since the PV solar panels were not yet installed until the year 2019. A low but still positive percent decrease of generated energy cost can be observed in 2018-2019 because electricity was very much needed for the construction of the *Institution* B and other surrounding buildings in that time. Adding to the probable cause of low percent decrease is the dry season experienced from March to April. It can also be observed that the researcher only considered four months in the analysis of percentage off difference. This is because the solar panel systems were installed in January 2019 and the months after April is irrelevant to the analysis.

Based from the results, no savings have been acquired from the first three months of the operation of the PV panels. But in 4 out of 7 months, effective energy savings have been generated.

Hence, overheating reduces the efficiency of the panels dramatically (Akbarzadeh and Wadowski, 1996). This may be the cause why the efficiency of the installed Solar Photovoltaic Panel in the two buildings is low.

Return of Investment (*Institution A*)
Conversion of kWHR to fuel per gallon oil:
According to the standard American conversion factors, the heat content of one gallon of fuel oil roughly equals that of 41 kWh of electricity.

kg CO_2 emission = Fossil fuel consumption in volume unit X CO_2 emission factor (Ton per volume unit)
kg CO_2 emission factor (Ton per volume unit) =0.00265 for every liter of fossil fuel

kWhr computation:
AC rating = Average kWh per month / 30 days / average sun hours per day
Example: 903 kWh per month / 30 days / 5 hours = 6.02 kW AC
DC rating = AC rating / derate factor (.8 is conservative, but a range would be .8 – .85)
Example: 6.02 kW AC / .8 = 7.53 kW DC
Number of panels = DC rating / Panel R

According to the National Renewable Energy Laboratory (NREL), the generally accepted life span of PV solar panels is up to twenty (20) years. After 20 years of utility, the solar panel system is said to perform a lower rate of 92% of its performance.

Return of Investment (*InstitutionB*)
For the computation of return of investment, it will take 5 years to return the money that was used for installing the PV solar system at *Institution B.*

IV. CONCLUSION

Considering the analysis of the percentage of difference, savings were generally accumulated within the span of PV solar panel utilization.
The expected payback of the installation of PV solar panels (12 years and 6 years) is less than the usual life span of solar panels of 20 years, it shows that the capital used to procure and install these systems will eventually pay off within the usual life span of the PV solar panels.
Based from the problems reported by the end-users, a manual for sustainability is necessary.
The installation of the PV solar panels had a positive impact on the three pillars of sustainability. Increased energy generation is good for the users and the less cost of energy is also beneficial for the company. Overall, the PV solar panels installed in both locales is sustainable for the people, profit, and planet. However, the low score of awareness among end-users added determination for the researcher to propose a manual to guide them on how to operate, maintain, and troubleshoot the installed PV solar panels.

REFERENCES

[1] Clemente, J., (2015). The Need and Value of More Electricity. Forbes Magazine.
[2] Diez, D., Gomez, J., Gil, M., Santos, A. (2015). Hybridization of concentrated solar power plants with biogas production systems as an alternative to premiums: The case of Spain
[3] Markvartm T., (2014). Solar Electricity (2nd Ed.). Wiley, Chichester, England, New York, U.S.A.
[4] Tonui, J.K., Tripanagnostopoulos, Y., (2014). Air-cooled PV/T solar collectors with low cost performance improvements
[5] Akbarzadeh A, Wadowski T., (1996). Heat-pipe-based cooling systems for photovoltaic cells under concentrated solar radiation. Appl Therm Eng;16(1):81–7
[6] Chaniotakis, E., (2001). Modelling and analysis of water cooled photovoltaics.
[7] Yang, H.X, Burnet, L.J, (2013). Weather data and probability analysis of hybrid photovoltaic–wind power generation systems in Hong Kong.
[8] Sayigh A., (2010). Applied Energy
[9] Palyvos, J.A., (2009). Applied Thermal Engineering
[10] Incropera, F.P., DeWitt, D.P., (2002) Fundamentals of Heat and Mass Transfer.
[11] McAdams, W.H., (1954) Heat Transmisson (3rd Ed). McGraw-Hill, New York.
[12] Sharples, S., Charlesworth, P.S., (2013). Solar Energy.

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Attainment of Cooperative objectives and the performance of officers in performing their Management Functions: A Case of Cooperatives in Gapan City, Nueva Ecija

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Abstract— *Cooperatives have brought significant contributions to uplift the lives of many individuals and to resolve problems related to financial, marketing and production. This study was conducted to determine whether the different registered cooperatives in Gapan City, Nueva Ecija were attaining their objectives and whether the board of directors and officers were performing their duties and responsibilities by fulfilling their management functions. Furthermore, this study was conducted to determine the different constraints the cooperatives were facing that could affect their everyday operations. The researcher utilized the descriptive research design using a survey–questionnaire technique to gather the necessary information. Moreover, the researcher with the use of T–test determined whether there is a significant difference in the extent of attainment of the cooperative objectives, level of performance of the officers in performing their management functions and the constraints affecting the operations of the organizations based on the perceptions of the officials and the members of cooperatives. Findings have shown that the existing registered cooperatives in the city were able to attain their cooperative objectives to a very great extent. It has also been found out that the board of directors and officers were able to perform their management functions very satisfactory. On the other hand, the respondents perceived that the constraints affecting the operations of cooperatives were just minor problems. The two groups differ in their responses on the extent of attainment of their cooperative objectives and on the constraints affecting the operations of the cooperatives while both groups of respondents have the same perception as to the level of performance of the board of directors and officers in performing their management functions.*
Keywords— ***cooperatives objectives, management functions, level of performance, constraints.***

I. INTRODUCTION

Nowadays, the narrowing gap between the rich and the poor has becoming a phenomenal societal problem due to the fact that numerous number of business organizations in the community are becoming inefficient in producing products and delivering services to the community [1]. Economic problems such as high interest rates, poor quality of goods and services, high prices of commodities are motivators of people to look for other means to resolve these existing problems. Moreover, when people experienced problems in financial, production and marketing, they usually get encouraged to organize cooperatives.

Cooperatives contribute significantly to social integration, job creation and the reduction of poverty because it promotes democratic organization and economic orientation [2]. A cooperative is a group of people who establish an enterprise on a not–for–profit basis to serve themselves [3]. Also, cooperatives are viewed as potentially important vehicles for community development since they can solve local problems by mobilizing local resources into a critical mass, and by virtue of being locally owned and controlled, cooperatives can keep profits and responsibility in the hands of local citizens [4]. In fact, cooperatives play a substantial role in improving the livelihoods of rural communities [5].

Just like any other forms of business organizations, cooperatives also have its goals and objectives and for which must be stated in general and specific statements [1]. As observed by [6], most of the farmers formed cooperatives

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with the objective of generating greater profits by obtaining inputs and services at lower costs than they could obtain elsewhere. Thus, it only shows that cooperatives exist to attain its objectives for the welfare of its members. Notwithstanding the fact that most less developed countries are agrarian societies, where agriculture is considered to be the main source of livelihood, most rural communities across the country find the need to increase agricultural productivity through cooperatives [7].

As projected, cooperatives should provide maximum economic benefits to their members in a way that they must teach them the efficient ways of doing things and new ideas in business management which will allow the lower income groups to increase their ownership in the wealth of this nation [8]. In order to achieve economic viability, cooperatives should conduct their operations based on sound management principles and practices [9] including performing their corporate social responsibilities [10]. It has been emphasized that management is the primary force within the organizations for coordinating human and physical resources and that managers are the one responsible for organizational performance [11]. Management is actually considered as the link to economic progress [12]. Management exists to achieve the goals of an organization through its four functions of planning, organizing, leading and controlling while applying resources with efficiency and effectiveness[13].Therefore, it is noteworthy to know whether these management functions are being realized by the cooperatives. Actually, in other countries, some of the key factors that led to the success of different cooperatives proven on the case analysis conducted by [14] were professionalization of management, training and education programs.

This study was accomplished with the hope of determining whether the different cooperatives were attaining their objectives and whether the board of directors and officers were performing their duties and responsibilities by fulfilling their management functions. Furthermore, this study was conducted to determine the different constraints the cooperatives were facing that could affect their operations. Likewise, this may help the members of cooperatives develop confidence towards the attainment of their objectives and the management would be more conscious in performing their responsibilities especially in promoting their socio–economic well–being. Therefore this study is found significant and timely.

II. MATERIALS AND METHODS

The researcher utilized the descriptive research design using questionnaire technique to gather the necessary information. Descriptive research is devoted to the gathering of information about prevailing conditions or situations for the purpose of description and interpretation. This type of research design is not simply amassing and tabulating facts but also includes proper analyses, interpretation, comparisons, identification of trends and relationships [15] as cited by the authors in [16]. Moreover, “descriptive studies may be characterised as simply the attempt to determine, describe or identify what is, while analytical research attempts to establish why it is that way or how it came to be” [17]. In this study, descriptive research is used as a method at casting light on current issues or problems with the use of data collection that enabled the researcher to describe the situation more completely than was possible without employing this method [18]. The respondents of this study who were chosen purposively [19] were the sixty–one officials and seventy–five members of the fifteen registered cooperatives in Gapan City, Nueva Ecija. The researcher used a survey–questionnaire as the instrument in gathering data. The researcher floated and retrieved the questionnaires from the cooperative officials and members. The researcher applied the five–point Likert scale to determine the extent of attainment of the cooperative objectives, level of performance of the officers in performing their management functions and the constraints affecting the operations of the organizations. After the data were retrieved, the researcher tallied, analyzed and interpreted them. The following numerical and adjectival values were used:

Ranges	Rate	Table 1	Table 2	Table 3
4.20–5.00	5	to a very great extent	Very Satisfactory	Very serious problem
3.40–4.19	4	to a great extent	Satisfactory	Serious problem
2.60–3.39	3	to a moderate extent	Fair	Moderate problem
1.80–2.59	2	to a lesser extent	Dissatisfactory	Minor problem
1.00–1.79	1	to no extent at all	Very Dissatisfactory	Not at all a problem

Weighted mean was utilized determine the extent of attainment of the cooperative objectives, level of performance of the officers in performing their management functions and the constraints affecting the operations of the organizations. T–test was used to determine whether there is a significant difference in the extent of attainment of the cooperative objectives, level of performance of the officers in performing their management functions and the constraints affecting the operations of the organizations based on the perceptions of the officials and the members of cooperatives. The results were computed using Statistical Package for Social Sciences.

III. RESULTS AND DISCUSSION

This portionpresents, analyses and interprets the data on the extent of attainment of the cooperative objectives, level of performance of the officers in performing their management functions and the constraints affecting the operations of the registered cooperatives in Gapan City, Nueva Ecija.

Table 1: Extent of Attainment of Cooperative Objectives

Indicators		Officials	Members	Combination	
		WM	WM	WM	Verbal Description
1	Cooperative organizations basically work to provide self–help and mutual help	4.44	4.30	4.37	To a very great extent
2	To provide support and services to the members of the society and not to earn the profit	4.13	4.26	4.19	To a great extent
3	To help each other mutually and not to have competition	4..44	4.15	4.29	To a very great extent
4	To deliver the quality goods and produce to the end customers	4.31	4.22	4.27	To a very great extent
5	To practice fair and transparent business activities	4.31	4.11	4.21	To a very great extent
6	Providing, in the best possible conditions, the financial advice and services that members need.	4.38	4.30	4.34	To a very great extent
7	Contributing to the cooperative, economic and financial education of members that is to provide them with a way to achieve independence.	4.44	4.37	4.40	To a very great extent
8	Promoting and supporting community development.	4.25	4.00	4.13	To a great extent
9	It aims to provide facilities for better business and better living as well as carry out work of common economic interest and benefit to the members.	4.31	4.19	4.25	To a very great extent
10	Provide opportunities and channels to market goods and commodities produced from amongst its members.	4.19	4.22	4.20	To a very great extent
11	To carry out activities of publicity and promotion of its members and projects etc.	4.44	4.15	4.29	To a very great extent
12	Enter in partnership or into any arrangement for mutual understanding, union of interest, joint venture, etc.	4.31	4.15	4.23	To a very great extent
13	Raise money by way of cash, loans from members or non–members, government or any other banks.	4.38	4.11	4.24	To a very great extent
14	To sell and dispose of the products or services produced by the members in the most profitable	4.13	4.52	4.32	To a great extent

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	manner.				
15	Find profitable employment opportunities for its members by undertaking suitable jobs.	4.25	4.07	4.16	To a great extent
16	Obtaining contracts for execution of public or private works by the officer of tenders or otherwise.	4.38	4.11	4.24	To a very great extent
17	Apply to the members the necessities of life including consumer goods and also raw materials necessary for subsidiary and industrial occupation.	4.19	4.07	4.13	To a great extent
18	Encourage profitability	4.19	4.11	4.15	To a great extent
Overall Average Weighted Mean		**4.30**	**4.19**	**4.25**	**To a very great extent**

The table above presents the extent of attainment of cooperative objectives as described by the two groups of respondents. Both respondents answered that the objective of cooperatives in contributing to the economic and financial education of members by means of providing them a way to achieve independence (WM=4.40) were being attained to a very great extent. Cooperatives enable their members to generate income and jobs, and accumulate assets; provide affordable, quality goods and services; and develop human and social capital, as well as economic independence [20].
Also, the two groups responded that cooperative organizations basically work to provide self–help and mutual help were achieved to a very great extent (WM=4.37). The author in [21] mentioned that a cooperative society is a voluntary association of persons brought together on the basis of mutual help and equality to promote their economic interest. Moreover, the objective of cooperative that is concerned in providing, in the best possible conditions, the financial advice and services that their members need (WM=4.34) were realized to a very great extent too. The Cooperative Development Authority is on its track to provide technical, financial and institutional development assistances to micro and small cooperatives to transform them into medium and large cooperatives, thus making them profitable, sustainable and competitive in the market[22]. This finding clearly shows that the existing registered cooperatives in Gapan City were able to attain their cooperative objectives to a very great extent as stipulated in the overall average weighted mean of 4.25.
However, the cooperative objectives such as providing support and services to the members of the society and not to earn the profit; promoting and supporting community development; selling and disposing of the products or services produced by the members in the most profitable manner; finding profitable employment opportunities for its members by undertaking suitable jobs; and applying to the members the necessities of life including consumer goods and also raw materials necessary for subsidiary and industrial occupation were only attained to a great extent. Some officers missed the need for harmonious relationship within the organization as they have objectives not aligned with organizational goals and purpose. One of the solutions to address this concern is to motivate and encourage officials to attend trainings and seminars. In order for the officers to be familiar with their functions and be well–equipped with the needed attitude, skills and knowledge that would allow them to conceptualize and implement measures to improve the delivery of quality of services of their respective organizations, the need for relevant seminars to address the prevailing issues must be undertaken by stakeholders [23].

Table 2: Cooperatives Level of Performance

Indicators		**Officials**	**Members**	**Combination**	
		WM	**WM**	**WM**	**Verbal Description**
1	Assisting in developing the overall vision, mission, goals and objectives of the business	4.19	4.30	4.74	Very Satisfactory
2	They are an essential part of the decision making process.	2.94	4.30	4.62	Very Satisfactory

3	Managers set goals and objectives for day–to–day operations, design operating procedures and methods, and make financial projections.	4.00	4.19	4.09	Satisfactory
4	They plan and implement the tasks that accomplish the goals and objectives established by the board	4.31	4.33	4.32	Very Satisfactory
5	Managers also make annual projections of balance sheets and operating and cash flow statements.	4.19	4.04	4.11	Satisfactory
6	The supervisory function assures satisfactory performance in all phases of business.	4.88	4.269	4.07	Satisfactory
7	Measuring and evaluating the results of employee performance, executing board policies, and overseeing physical assets are critical to accomplishing the cooperative's goals and objectives.	4.00	4.41	4.20	Very Satisfactory
8	Managers are responsible for grouping operational processes, assets, and personnel and establishing their relationships for efficient day–to–day business operations.	4.06	4.22	4.14	Satisfactory
9	Developing personnel organization charts which show employee relationships, writing job descriptions, and establishing acceptable levels of performance are manager responsibilities.	4.13	4.63	4.38	Very Satisfactory
10	Coaching and leading the cooperative's employees, members, and customers are essential functions of the manager	4.13	4.67	4.40	Very Satisfactory
11	The manager must create positive employee working conditions and act as a liaison and spokesperson for the business, its owners, and other stakeholders	4.19	4.63	4.41	Very Satisfactory
12	Managers are responsible for staffing, training, and mobilizing the personnel under their supervision.	5.00	4.15	4.57	Very Satisfactory
13	Responsibility for internal and external interpersonal relationships places a heavy time demand on managers.	4.19	4.19	4.19	Satisfactory
14	Acknowledge how the same function relates to separate groups in the cooperative structure,	4.19	4.41	4.30	Very Satisfactory
15	Trains employees and orient new staff	4.13	4.11	4.12	Satisfactory
Overall Average Weighted Mean		**4.17**	**4.32**	**4.24**	**Very Satisfactory**

The table above presents the level of performance of the officials in performing their management functions. Both respondents agreed that the officials were very satisfactory in assisting in developing the overall vision, mission, goals and objectives of the business (WM=4.74). While a considerable number of cooperatives in the country were unable to meet sustainability for lack of continuing proper cooperative education, majority of the duly registered cooperatives have displayed themselves as exemplars of putting their vision into reality despite of the inadequate assistance extended to them by several government agencies and funding institutions, both foreign and local[9].Similarly, the two groups also perceived that the officers are an essential part of the decision making process as they have rated them very satisfactory (WM=4.62). A clear direction and a timely process of decision–making are key ingredients for any

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successful business [24]. While directors and officers often differ on many issues, they usually make a concerted effort for consensus, if not unanimous, decisions in the cooperatives [25]. It only means that strong leadership encouraged unity and teamwork among the members and officers [26].

Correspondingly, the two groups of respondents also observed that managers as responsible for staffing, training, and mobilizing the personnel under their supervision were able to perform their duties very satisfactory (WM=4.57). In the study of [27], they recommended that the government and the banking sector render financial support to cooperatives in rural communities to allow them to expand and diversify their business operations; constant training on leadership and management skills is provided to cooperatives' members.

This finding clearly shows that the board of directors and officers of the existing registered cooperatives in Gapan City were able to perform their management functions very satisfactory with an overall average weighted mean of 4.24.

Although the responsibilities of managers in setting goals and objectives for day–to–day operations, designing operating procedures and methods, and making financial projections; preparing annual projections of balance sheets and operating cash flow statements; performing the supervisory function that assures satisfactory performance in all phases of business; their responsibility for grouping operational processes, assets, and personnel and establishing their relationships for efficient day–to–day business operations; their responsibility for internal and external interpersonal relationships places a heavy time demand on managers; and training employees and orienting new staff were rated satisfactory by both groups of respondents. Elected representatives, managers and their employees need to be educated and trained often in order for them to contribute effectively to the development of the cooperatives[28].

Table 3: Constraints Affecting the Operations of Cooperatives

Indicators		Officials	Members	Combination	
		WM	WM	WM	Verbal Description
1	Lack of business penetration	2.44	2.44	2.44	Minor problem
2	Absence of mutual interest	2.56	2.33	2.45	Minor problem
3	Lack of interest	2.13	2.37	2.25	Minor problem
4	Lack of coordination	2.19	2.56	2.37	Minor problem
5	Corruption	1.75	2.11	1.93	Minor problem
6	Lack of secrecy	2.56	2.67	2.61	Minor problem
7	Insufficient motivation	2.31	2.81	2.56	Minor problem
8	Due to lack of funds, it is difficult to promote the business operation and sales promotion	3.13	2.41	2.77	Moderate problem
9	Lack of management skills to control and monitor the members	2.06	2.85	2.46	Minor problem
10	Management has to depend on honesty, integrity, and loyalty to the members	1.94	2.56	2.25	Minor problem
11	Inadequate public awareness	2.31	2.26	2.29	Minor problem
12	Lack of market or community support	2.44	2.30	2.37	Minor problem
13	Over reliance on government funds	2.38	2.11	2.24	Minor problem
14	The co–operative movement was initiated and established by the government	1.94	2.44	2.19	Minor problem
15	Inadequate rural credit	1.75	2.26	2.00	Minor problem
16	Co–operative societies are subject to excessive government regulation which affects their autonomy and flexibility.	2.19	2.19	2.19	Minor problem

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17	Many cooperative societies have faced financial troubles and closed down because of corruption and misuse of funds.	2.13	2.37	2.25	Minor problem
18	Co–operative societies cannot be introduced in all industries.	2.06	2.37	2.22	Minor problem
19	Lack of accountability	1.81	2.30	2.05	Minor problem
20	Inexperience staff	2.00	2.59	2.30	Minor problem
Overall AverageWeighted Mean		**2.20**	**2.41**	**2.31**	**Minor problem**

The table above presents the constraints affecting the operations of the registered cooperatives in Gapan City, Nueva Ecija. Both groups of respondents answered that the number one problem of the cooperatives is difficulty to promote the business operation and sales promotion due to lack of funds (WM=2.77) which is considered as a moderate problem of the cooperatives in Gapan City. The unavailability of reserve funds for most of the rural cooperatives is also one of the challenges for most rural cooperatives [27]. The above results concurred with the study by [29], who found out that many cooperatives in rural areas may not prosper because of lack of working capital.

On the other hand, the constraints affecting the operations of cooperative only got an overall average weighted mean of 2.31 which mean that they only viewed their constraints minor problems.

Table 4.Significant Difference in the Extent of Attainment of the Cooperative Objectives

Attainment of Objectives	Officials	Members
Mean	4.30	4.19
Variance	0.0116	0.0157
N	18	18
t Stat	2.94**	
p–value (two–tailed)	0.006	

**difference is significant @ 0.01 level

The table above reveals that there is a significant difference in the responses of officials (WM=4.30; Variance=0.0116) and members (WM=4.19; Variance=0.0157) as to extent of attainment of the cooperative objectives using t–test. This means that the null hypothesis of no significant difference between the responses of the two groups is rejected.

The two groups differ in their responses on the extent of attainment of their cooperative objectives. In their evaluation, the officials have higher evaluation on the extent of attainment of their cooperative objectives as compared to their members. Ideally, the mentors who are the officials should help their members match their individual objectives with the organizational objectives[30].

Table 5. Significant Difference in the Level of Performance of the Officers in Performing their Management Functions

Level of Performance	Officials	Members
Mean	4.17	4.32
Variance	0.2002	0.0378
N	15	15
t Stat	–1.23 Ns	
p–value (two–tailed)	0.2299	

Ns = no significant difference

The table above shows that there is no significant difference in the responses officials (WM=4.17; Variance=0.2002) and members (WM=4.32; Variance=0.0378) as to the level of performance of the officials in performing their management functions using t–test. This means that the null hypothesis of no significant difference between the responses of the two groups is accepted. This implies that both the officers and members are aware of the importance of management functions in terms of planning, organizing, directing and controlling in the attainment of the cooperatives purposes because they share the common view that the management practices must be carried out effectively and efficiently [9].

Table 6. Significant Difference in the Constraints affecting the Operations of Cooperatives

Constraints	Officials	Members
Mean	2.20	2.42
Variance	0.1093	0.0426
N	20	20
t Stat	–2.42*	
p–value (two–tailed)	0.0203	

*difference is significant @ 0.05 level

The table above reveals that there is a significant difference in the responses of officials (WM=2.20; Variance=0.1093) and members (WM=2.42; Variance=0.0426) as to the constraints affecting the operations of the registered cooperatives in Gapan City, Nueva Ecija using t–test. This means that the null hypothesis of no significant difference between the responses of the two groups is rejected.

The two groups differ in their responses on the constraints affecting the operations of the registered cooperatives in Gapan City, Nueva Ecija. In their evaluation, the members have higher evaluation on the constraints encountered by the cooperatives that affects the organization.

IV. CONCLUSIONS AND RECOMMENDATIONS

The extent of attainment of the cooperative objectives as perceived by both groups is being attained to a very great extent by the registered cooperatives in Gapan City, Nueva Ecija. As what [21] emphasized in his study, the cooperatives must recover costs and satisfy the basic economic objectives of every business organization which are the essence of their existence. Likewise, both the officials and the members agreed that the officers are performing their management functions very satisfactory. This only shows that they share the common view that the management practices must be carried out effectively and efficiently [9]. On the other hand, both groups have answered that the constraints affecting the operations of cooperatives are just distinguished as minor problems. In this way, cooperatives are real enterprises which help their members to cooperate in solving social problems they share[27].

As found in the study, the two groups differ in their responses on the extent of attainment of their cooperative objectives. In their evaluation, the officials have higher evaluation on the extent of attainment of their cooperative objectives as compared to their members. Contrary to that, the two groups of respondents have no significant difference in their answers as to the level of performance of the officials in performing their management functions. Correspondingly, the two groups differ in their responses on the constraints affecting the operations of the registered cooperatives in Gapan City, Nueva Ecija. In their evaluation, the members have higher evaluation on the constraints encountered by the cooperatives that affects the organization.

Based on the results of the study, the researcher would like to recommend to the different cooperatives to revisit their agreed cooperative objectives and spot those objectives that are not being attained by the cooperatives in order for them to take corrective actions. This can be done through careful evaluation by the board of directors together with the officers plus the help of their members. Furthermore, the cooperatives should continue to send their officers to different seminars and management trainings that could retool their officers especially in performing their management functions. The cooperatives may also include in their calendar of activities the conduct of planning for the development of their programs aimed at achieving the essence of cooperation. It is also essential that officials are getting feedback from their members and to all their stakeholders as to what areas in their performance can still be improved that would benefit the whole organization. It is further recommended that each officer must be provided with clear definitions of their duties and responsibilities to avoid overlapping of works and to lessen conflicts within the group. It is also suggested that they apply some management tools for their scheduling to avoid too much workload and to ensure synchronization among the officers and members in performing their various activities. The cooperatives should also endure all the constraints that could affect their organizations by making accurate decisions given available information [31]. Lastly, they should focus on those aspects that could contribute to the attainment of their objectives and have valuable financial contributions [32], particularly to their members.

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REFERENCES

[1] Fajardo, F. and Abella, F, 2002. Cooperatives.Rex Book Store, Inc. 35 pp.

[2] Miribung, G, 2018. The Contribution of Cooperatives to the Sustainable Development of Local Economic Circuit–premises, Possibilities, Outlook. Retrieved on October 20, 219 from:https://www.ica.coop/en/events/contribution–cooperatives–sustainable–development–local–economic–circuit–premises

[3] Goddard, W.J., 1968. The Cooperative Movement in the Republic of the Philippines.Agricultural Credit and Cooperatives Institute.October.Mimeo.

[4] Zeuli, K., Freshwater, D., Markley, D. and Barkley, D., 2004. Cooperatives in Rural Community Development: A New Framework for Analysis. Journal of the Community Development Society, Vol. 35, No. 2

[5] Ortmann, G.F. & King, R.P., 2007. Agricultural Cooperatives, History, Theory and Problems, Agrekon 46, 40–68. https://doi.org/10.1080/03031853.2007.9523760

[6] Barton, D., 2000. What is a Cooperative? Kansas State University, Manhattan, KS.

[7] Chitsike, L.T., 1988, Agricultural cooperative: Development in Zimbabwe, Zimfep, Harare.

[8] Republic Act No. 6938: Cooperative Code of the Philippines

[9] Bundoc, C., n.d.The Management Practices of Multipurpose Cooperatives in the First District of Ilocos Sur. University of Northern Philippines, Vigan City. Retrieved from: https://apps.pup.edu.ph/ojs/data/issue/attachment/e07abd201af98f84be1586227ea0a8d0c56809cd.pdf

[10] Mina, J.C., Barlis, P.T., Vega, N.C. and Subia, G.S. (2019) Corporate Social Responsibilities of Selected Resorts in Cabanatuan City, Nueva Ecija, Philippines. Open Access Library Journal, 6: e5292. https://doi.org/10.4236/oalib.1105292

[11] Kast, F.E. and Rosenzweig, J.E., 1972. General Systems Theory: Applications for Organization and Management. Academy of Management Journal, 1972, 447–466. http://dx.doi.org/10.2307/255141

[12] Farmer, R. and Richman, B., 1964. A Model for Research in Comparative Management. Volume: 7 issue: 2, page(s): 55–68 https://doi.org/10.2307/41162165

[13] Drucker, P., 2005. Classic Drucker: Essential Wisdom of Peter Drucker from the Pages of Harvard Business Review. Boston :Harvard Business Review Book, 2006.

[14] Pagdanganan, R., 1999. A Call for Cooperative Revolution.

[15] Aggarwal, Y.P., 2012. Descriptive Research.IJTBM. 2012, Vol. No.1,Issue No.6, April–June.

[16] Garcia, Mary Grace &Subia, Gener (2019). High school athletes: Their motivation, study habits,self-discipline and academic performance.International Journal of Physical Education, Sports and Health 2019; 6(1): 86-90

[17] Ethridge, D.E., 2004. Research Methodology in Applied Economics. John Wiley & Sons, p.24

[18] Fox, W. &Bayat, M.S., 2007. A Guide to Managing Research.Juta Publications, p.45

[19] Subia, G. (2018) Comprehensible Technique in Solving Consecutive Number Problems in Algebra. Journal of Applied Mathematics and Physics, 6, 447-457. doi: 10.4236/jamp.2018.63041.

[20] Yes Magazine, 2013. How Cooperatives are Driving the New Economy. Yes! Issue 65 (Spring): 17–49.

[21] Abarientos, E., 1977. Cooperatives as Strategy for Development. PSR 25 (1977): 75–78

[22] Republic Act 6938 (1990). An act to Ordain Cooperative Code of the Philippines, March 10, 1990, Philippines

[23] Cooperatives Europe, 2019. Cooperatives and Peace: a report on cooperatives' contributions to peace building and conflict resolution. https://coopseurope.coop/resources/news/cooperatives–and–peace–report–cooperatives%E2%80%99–contributions–peacebuilding–and–conflict

[24] Reynolds, B., 1997. Decision–Making in Cooperatives with Diverse Member Interests. Strategic Management and Planning–Cooperative Services

[25] Reynolds, B., 1995. Ibid,

[26] Abag, R. and Abubakar, S., 2013. Farmers' Cooperatives in the Conflict Ridden Areas: The Maguindanao. Journal of Social Science for Policy Implications, Vol. 1 No. 2

[27] Mhembwe, S. &Dube, E., 2017. The Role of Cooperatives in Sustaining the Livelihoods of Rural Communities: The Case of Rural Cooperatives in Shurugwi District, Zimbabwe. Jàmbá: Journal of Disaster Risk Studies 9(1), a341. https://doi.org/10.4102/ jamba.v9i1.341

[28] Tchami, G., 2007. Handbook on Cooperatives for Use of Workers' Organizations, ILO, Geneva.

[29] Mohammed, N. and Lee, B.W., 2015. Role of Cooperatives in Rural Development, the Case of South Nations Nationalities and People Region, Ethiopia', Science Journal of Business and Management 3(4), 102–108. https://doi.org/10.11648/j.sjbm.20150304.12

[30] Colarelli, S. and Bishop, R., 1990. Career Commitment: Functions, Correlates, and Management. Group and Organization Studies, Vol. 15 No. 2, June 1990 158–176

[31] Subia, GenerS.(2018). Think Like My Teacher (TLMT): a New Method in Assessing Millennial Learners. International Journal of Arts Humanities and Social Sciences. Volume 3 Issue 1 ǁ January 2018.www.ijahss.com

[32] Subia, G. S., Mina, J. C., Diaz, R. A., Campos, R. B., Jr., J., & Quijano, G. (2019). Re-Engineering on the Production of Surrogate Feeds for Broiler Chickens (Gallus–Gallus Domesticus): its Effects on Broilers' Live and Carcass Weights and Consumption Cost.International Journal of Environment, Agriculture and Biotechnology, 4(3). Retrieved from http://journal-repository.com/index.php/ijeab/article/view/334

Marketing Practices of Resorts in Cuyapo, Nueva Ecija: Implications to Business and Social Studies

Eileen Joy S. Domingo

Abstract*— The study presented the marketing practices of selected resorts in Cuyapo, Nueva Ecija. The study aimed to assess different marketing practices with focus on product offering, pricing and promotion of the selected resorts along with getting the satisfaction of the customers with the practices. The results of the study also highlighted the implications to business and social studies. The descriptive method of research was utilized and the normative survey technique was used for gathering data. The questionnaire served as the instrument for collecting data. Owners/ managers of three selected resorts in Cuyapo, Nueva Ecija were taken as respondents. Only the customers who were in the resorts during the data gathering period comprised the customer respondents. Pearson correlation and descriptive statistics such as weighted mean and percentages were primary statistical tools used in analyzing and interpreting the research data.

***Keywords*— marketing, pricing, product, promotion, resorts.**

I. INTRODUCTION

Resorts operate in a very competitive tourist accommodation market, with a variety of accommodation styles and quality available at a range of prices points to suit particular needs. Resort industry in the Philippines is booming and because it is a tropical country, resorts have a high demand especially during summer season. Because of its increasing demand, capitalists are now investing their money in putting up resorts.

In Municipality of Cuyapo in Nueva Ecija, more number of resorts are now operating with some of them making impact in the resort industry and becoming a must see destination by the tourists and sightseers. With the growing competition, resorts must pay attention on their marketing strategies since customers are influenced with the promotion, price and product of the resorts to Domingo (2018) marketing plays a very important role in the organization's success; it is a must to every organization to consider strategizing their different marketing practices.

The objective of this research is to explore marketing practices in the resort industry in terms of product offering, pricing, and promotion along with the relationship of customers' satisfaction with such practices.

Information on resort marketing practices is available through both industry and academic publications but these sources offer a limited depth of understanding. Numbers of studies about companies marketing practices have already been conducted. Despite of its growing importance, resort businesses' marketing practices remains an under researched area. A study that addresses this research gap is therefore necessary hence; the need for this study was realized.

Furthermore, the study could also impact business and social studies in through inspiring businessmen to be socially responsive and responsible.

II. OBJECTIVES OF THE STUDY

The study aimed at describing marketing practices of selected resorts in Cuyapo in Nueva Ecija. Specifically to:

1. Describe the profile of the resorts be described in terms of:
   1.1 Type of ownership
   1.2 Number of employees
   1.3 Years of existence
2. Describe the marketing practices of selected resorts be described in terms of:
   2.1 Product offering
   2.2 Pricing
   2.3 Promotion
3. Determine if there a significant relationship between the marketing practices of resorts and the business related factors
4. Describe the level customers' satisfactions be assessed in terms of:
   4.1 Product offering
   4.2 Pricing
   4.3 Promotion
5. Describe the implications of the study to Business and Social Studies.

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III. METHODOLOGY

The study used descriptive method of research in an attempt to analyze and interpret the Marketing Practices of Selected Resorts in Cuyapo, Nueva Ecija. The respondents of the study were the owners of three resorts in Cuyapo Nueva Ecija. Customers were also considered and assessed their satisfaction level towards the resorts' marketing practices. Only the customers who were in the resorts during the data gathering period comprised the customer respondents. Questionnaire was the main instrument used by the researcher in conducting this study. Questionnaire was structured based on the study of Sangkaworn, C. and Mujtaba, B., (n.d.).

IV. RESULTS AND DISCUSSION

Profile of the resorts

As to type of ownership, all resorts are under sole proprietorship type. As to number of employees the three resorts have more than 10 employees. In addition, one (1) resort is operating for 2-5 years, one (1) is in business for 6-8 years and one (1) is in resort industry for more than 15 years now.

Marketing Practices of Resorts

Product Offering

The level of implementation of marketing practices of selected resorts in Cuyapo, Nueva Ecija in terms of product offering is presented in Table 1.

Table.1: Marketing Practices of Resorts in terms of Product Offering

PRODUCT OFFERING	Weighted Mean	Description
1. Sanitation and cleanliness of the Resorts and their surroundings	5	Always
2. Prompt courteous service	5	Always
3. Availability of parking space	4.33	Always
4. Food and beverages	5	Always
5. Good and proper ventilation	5	Always
6. Completeness of swimming facilities	4.67	Always
7. Recreational Facilities	4.67	Always
8. Customer information service	4.33	Always
9. Attractiveness of arrangement of rooms/cottages	4.33	Always
10. Proper arrangement Facilities	5	Always
Total	**4.73**	Very High

Items 1, 2, 4, 5, and 10 got a weighed mean of 5.00 and rated "always". They consider the sanitation and cleanliness of the resorts and their surroundings, coupled with prompt and courteous service, food and beverages, good and proper ventilation and proper arrangement of facilities.

Meanwhile, considerations 6 and 7 both got weighted mean of 4.67 and rated "always". This denotes that they consider the completeness of swimming and recreational facilities.

On the other hand, items 3, 8 and 9 got a weighted mean of 4.33 and rated "always". This implies that resorts consider the availability of parking space, customer information service, and attractiveness of arrangement of cottages.

The results show that the selected resorts in Cuyapo, Nueva Ecija have a "Very High" (X=4.73) level of marketing practices in their product offerings.

These are the main factors they considered in the operation of the business in order to attract and retain loyal customers.

a. *Pricing*

Table 2 displays the level of implementation of marketing practices of resorts in terms of pricing.

Table 2. Marketing Practices of Resorts in terms of Pricing

PRICING	Weighted Mean	Description
The management uses the following means of pricing		
1. Based on cost/expense of product	3.67	Very Often
2. Based on demand	4	Very Often
3. Psychological (e.g. P 991.95,P399)	4	Very Often
4. Discount	4.33	Always
5. Based on the price of competitors	3	Often
Internal factors affecting pricing decision		

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1. Profit	4	Very Often
2. Available offer	4	Very Often
3. Cost	4	Very Often
4. Business structure	3	Often
External factors affecting pricing decision		
1. The market and demand	3.67	Very Often
2. Competitors price and offer	3.33	Often
3. Other factors such as political, environmental, demography, economic condition etc.	3.67	Very Often
Total	**3.72**	**High**

As to pricing, item 4 got a weighted mean of 4.33. This means that they always offer discounts to their clients. Considerations number 1 and both 2 and 3 got a weighted mean of 3.67 and 4.00, respectively and rated "Very Often". This implies that they use cost/ expense, demand and psychological factors as their basis in pricing their products very often. Meanwhile, item 5 got a weighted mean of 3.00 and rated "often". This denotes that they often use the price of the competitors as their basis. According to some owners/managers they oftentimes used cost and discount in pricing in order to cover all the necessary expenses needed in the operation of the business and to retain customer loyalty.

As to internal factors that affecting their pricing decision, items 1, 2 and 3 got a weighted mean of 4.00 and rated "very often". The results show that they consider available offers, profit and cost as internal factors in pricing. On the other hand, consideration number 4 got a weighted mean of 3.00 and rated "oftentimes". This denotes that oftentimes, they consider the business structure as internal factors in pricing decision.

As to external factors affecting their pricing decisions, items 1 and 3 got a weighted mean of 3.67 and rated "Very often". This implies that they very often consider market and demand and other factors such as political, environmental, demography, economic condition, etc. as external factors in price considerations. On the other hand item 2 got a weighted mean of 3.33 and rated "often". This denotes that they often consider also the price of their competitors as external factors in pricing decision.

It can be gleaned from the results that there is a "High" (X=3.72) level of marketing practices of the resorts in terms of pricing.

Since price is the only element among the P's of marketing mix that generates income, owner/managers of resorts always see to it that prices are fair and affordable in order to retain customers.

b. Promotion

Level of implementation of marketing practices of the resorts in terms of promotion is shown in Table 3.

As to factors observed to capture and maintain customers' loyalty, considerations 2 and 4 and got a weighted mean of 4.00 and 3.67, respectively and rated "very often. This denotes that they provide additional amenities such WiFi, radio and television plus cable TV, Telephone/intercom, greeting customers and being friendly and they also provide customers with clean and ventilated rooms/cottages. On the other hand, item 6 got a weighted mean of 1.00 and rated never. This implies that they never consider giving gifts and souvenirs.

Table.3: Marketing Practices of Resorts in terms of Promotion

Promotion	Weighted Mean	Description
Factors observed to capture and maintain Customers' loyalty		
1. Giving customers' discount	3	Often
2. Providing additional amenities such WiFi, radio and television plus cable TV, Telephone/intercom	4	Very Often
3. Providing additional assistance	3	Often
4. Greeting customers and being friendly	3.67	Very Often
5. Providing customers with clean and ventilated rooms/cottages	3.67	Very Often
6. Giving souvenirs and gifts	1	Never
The management uses the following promotion practice		
1. Personal selling	3.33	Often
2. Print media	3	Often

3. Sales promotion	4.33	Always
Ways of advertising resorts		
1. Local radio	2	Sometimes
2. Local newspaper	3.33	Often
3. Brochures distributed	3	Often
4. Billboard nearby	3.67	Very Often
The resorts observed the importance of promotion		
1. The resorts have sufficient budget for advertising	2.67	Often
2. The resorts have a strong promotion program	2	Seldom
3. Promotion affects the volume of sales	3.33	Often
4. The advertising activities could reach target clientele	3.33	Often
Total	**3.08**	**Fair**

These are the most common factors to be considered in order to capture and maintain customers' loyalty, considering that customers are the ones who give income to the business in return for services.

As to their promotional practice, they always use sales promotion as promotion practice. Sales promotion got a weighted mean of 4.33. Meanwhile, oftentimes the management of the resorts consider print media and personal selling as a promotion practice. Print media and personal selling got a weighted mean of 3.33 and 3.00, respectively.

Billboards are very often used by the resorts. Billboards got a weighted mean of 3.67. Sometimes they consider local radio with a weighted mean of 2.00. Oftentimes brochures are distributed through customers and used of local newspaper as a way to advertise their business. Brochures and news papers got a weighted mean of 3.00 and 3.33, respectively.

It can be seen from the results that there is a "Fair" (X=3.08) level of implementation of marketing practices in terms of promotion.

Owners/managers expressed that they give much thought and time to promotions since they are very important for their organization's success. The reason why they spend time to craft an innovative promotion strategy is to capture the attention of existing and prospective customer.

Relationship between the marketing practices of resorts and the business related factors

Correlation between the business related factors and the marketing practices of resorts were also examined in this study. Pearson correlation was used to determine the relationship between the two variables.

As to product offerings. Based on the results shown in table 4, the obtained Person r value for types of ownership and number of employees was -0.7559 which denotes strong negative correlation while years of service got a Person r value of -0.4193 which denotes moderate negative correlation.

*Table.4**:** Correlation between the Businesses Related Factors to Product Offering of Selected Resorts in Cuyapo, Nueva Ecija*

Business Related Factors	**Product Offering**		
	r	**Interpretation**	**Degree of correlation**
Types of Ownership	-0.7559	Not Significant	Strong Negative Correlation
Number of Employees	-0.7559	Not Significant	Strong Negative Correlation
Years of Existence	-0.4193	Not Significant	Moderate Negative Correlation
Average Correlation	-0.6437	Not Significant	Strong Negative Correlation

The results indicate that the marketing practices of the resorts have nothing to do with the present set up of the business. The product offering of the resorts are not influenced by the business related factors such as types of ownership, number of employees and years of existence.

The obtained average Person r value of business related factors was -0.6437 which denotes strong negative correlation. The data reveals that all of the three business-related factors failed to surpass the r required at .05 probability level which is 0.997. Therefore, the null hypothesis which states that there is no significant correlation between the level of marketing practices of selected resorts in Cuyapo, Nueva Ecija and the aforementioned business-related factors cannot be rejected. This means that the level of marketing practices in terms of product offering is not significantly related to the type of ownership, capital, number of employees, and the years of existence. The level of marketing practices of resorts in terms of product offerings are not influenced by the type of ownership, number of employees and the years of existence.

As to pricing. Based on the results shown in table 5, the obtained Person r value for types of ownership was -0.6934 which denotes strong negative correlation while number of employees got a Person r value of 0 which means no correlation. On the other hand, years of service got a Person r value of 0.8846 which denotes very strong positive correlation.

Table.5: Correlation between the Business Related Factors to Pricing of Selected Resorts in Cuyapo, Nueva Ecija

Business Related Factors	Pricing		
	r	Interpretation	Degree of correlation
Types of Ownership	-0.6934	Not Significant	Strong Negative Correlation
Number of Employees	0	Not Significant	No Correlation
Years of Existence	0.8846	Not Significant	Very Strong Positive Correlation
Average Correlation	0.06375	Not Significant	Slight Correlation

The results indicate that the marketing practices of the resorts in terms of pricing have nothing to do with the present set up of the business. The business related factors are not necessary consideration on their pricing decision and practices.

The obtained average Person r value of business related factors was -0.06375 which denotes slight correlation. The data reveals that all of the three business-related factors failed to surpass the r required at .05 probability level which is 0.997. Therefore, the null hypothesis which states that there is no significant correlation between the level of marketing practices of selected resorts in Cuyapo, Nueva Ecija and the aforementioned business-related factors cannot be rejected. This means that the level of marketing practices in terms of pricing is not significantly related to the type of ownership, capital, number of employees, and the years of existence. The level of marketing practices of resorts in terms of pricing are not influenced by the type of ownership, number of employees and the years of existence.

As to promotion. Based on the results shown in table 6, the obtained Person r value for types of ownership and years of service was -0.2044 which denotes little negative correlation while number of employees got a Person r value of 0 which denotes no correlation.

The results indicate that the marketing practices of the resorts in terms of promotion have nothing to do with the present set up of the business such as types of ownership, number of employees and years of existence. The business related factors are not considered by the selected resorts in their promotion practices.

Table.6: Correlation between the Business Related Factors to Promotion of Selected Resorts in Cuyapo, Nueva Ecija

Business Related Factors	Promotion		
	r	Interpretation	Degree of correlation
Types of Ownership	-0.2044	Not Significant	Little Negative Correlation
Number of Employees	0	Not Significant	No Correlation
Years of Existence	-0.2044	Not Significant	Little Negative Correlation
Average Correlation	-0.1363	Not Significant	Slight Correlation

The obtained average Person r value of business related factors was -0.1363 which denotes slight correlation. The data reveals that all of the three business-related factors failed to surpass the r required at .05 probability level which is 0.997. Therefore, the null hypothesis which states that there is no significant correlation between the level of marketing practices of selected resorts in Cuyapo, Nueva Ecija and the aforementioned business-related factors cannot be rejected. This means that the level of marketing practices in terms of promotion is not significantly related to the type of ownership, capital, number of employees, and the years of existence. The level of marketing practices of resorts in terms of promotion are not influenced by the type of ownership, number of employees and the years of existence.

Customers' Satisfaction

Table 7 presented the customers' satisfaction to measure the effectiveness of the different marketing practices of selected resorts in Cuyapo, Nueva Ecija.

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In terms of product offering, consideration number 5 and 6 got a weighted mean of 3.64 and 4.04, respectively. This implies that resorts' customers are much satisfied with the cleanliness and accommodation of the resorts. Items 1 and 4 got a weighted mean of 2.84 and 2.64, respectively. This means that customers are satisfied with the service and ambiance of the resorts. On the other hand, considerations 2 and 3 got a weighted mean of 2.22 and 2.14, respectively. This implies that customers are moderately satisfied with the recreational facilities and the arrangement of facilities.

The results show that customers are satisfied with the different product offerings of the resorts.

Table.7: Customers' Satisfaction

Customer Satisfaction	Weighted Mean	Description
On Product Offering		
1. Quality of Service	2.84	Satisfied
2. Quality of recreational facilities	2.22	Moderately Satisfied
3. Arrangement and presentation of cottages	2.14	Moderately Satisfied
4. Ambiance	2.64	Satisfied
5. Cleanliness	3.64	Much Satisfied
6. Accommodation	4.04	Much Satisfied
Total	**2.92**	**Satisfied**
Pricing		
1. Acceptance to the price	3.32	Satisfied
2. The prices vary according to quality of the services	3.9	Much Satisfied
Total	3.61	Much Satisfied
Promotion		
1. The use of radio advertising	1	Not Satisfied
2. The use of discounts as a promotion strategy	3.68	Much Satisfied
3. The use of local newspaper	1	Not Satisfied
4. The use of billboard(s)	2	Moderately Satisfied
5. The use of brochures given to customers	3.68	Much Satisfied
Total	**2.25**	**Moderately Satisfied**
Overall	**2.92**	**Satisfied**

In terms of pricing, item 1 got a weighted mean of 3.332. This denotes that customers are satisfied with the price. On the other hand, consideration number 2 got a weighted mean of 3.90. This implies that the customers are much satisfied with the price variation.

In terms of promotion, items 2 and 6 both got a weighted mean of 3.68. This denotes that customers are much satisfied with the discounts and brochures given by the resorts. Consideration number 2 got a weighted mean of 2.00 which implies that customers are much satisfied with the billboards of the resorts. On the other hand, items 1 and 3 got a weighted mean of 1.00 which denotes that customers are not satisfied with the radio and news paper advertising of the resorts as their way of promotion.

Overall, the above results show that customers are satisfied with the product offering, pricing and promotional activities of the resorts with an overall weighted mean of 2.92.

Implications to Business and Social Studies

This study was conducted to find out the marketing practices of selected resorts in Cuyapo, Nueva Ecija in terms of business-related factors which covered the type of ownership, number of employees, years of existence, the level of implementation of marketing practices along with product offering, pricing and promotion and their customers' satisfaction.

Since marketing now plays a very important role in the organization's success, it is a must to every organization to consider strategizing their different marketing practices. Presented herewith are the different considerations to which, if taken much attention would contribute to the success of company's marketing programs.

Attention on 3Ps would lead you to having a higher impact on the industry you are into. In addition, since business is about earning money, giving special attention on marketing could give an organization a favourable profit.

As for social studies, businessmen are not always profit-driven individuals. Resort owners continuously provide quality service to their customers because it is their social obligation to provide them satisfaction through their service offerings. Having a good corporate social responsibility can also be used as marketing strategy for a business as people patronized businesses which have a good reputation and provide customer-friendly, and safe place to be in. Most importantly, the customers value business that continuously maintains good relationship with them and doing something great to the society in general.

V. CONCLUSION

Based on the results of the study, the researcher arrived at the following conclusions:

a) All resorts are under sole proprietorship type and have more than 10 employees. In addition, one (1) resort is operating for 2-5 years, one (1) is in business for 6-8 years and one (1) is in resort industry for more than 15 years now.
b) The level of implementation of marketing practices of selected resorts in Cuyapo, Nueva Ecija in terms of product offering is very high, as to pricing, the level of implementation is high, while as to promotion the level of implementation is fair.
c) There is no relationship between the business related factors and the marketing practices of the resorts in terms of product, pricing and promotion.
d) Customers are satisfied with the product offering, pricing and promotional activities of the resorts.

REFERENCES

[1] Domingo, A.V. (2018).Product, pricing and promotional strategies of Restaurants in Nueva Ecija: An Assessment. International Journal of Advanced Engineering, Management and Science(ISSN: 2454-1311),4(11), 753-756. http://dx.doi.org/10.22161/ijaems.4.11.2

[2] Sangkaworn, C., Mujtaba, B., (n.d.). *Marketing practices of hotels and resorts in ChiangMai: a study of products, pricing, and promotional practices*. Retrieved from http://www.aabri.com/manuscripts/09383.pdf

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Smart cities of the future: An interdisciplinary literature review. Dimensions and proposed characteristics

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***Abstract*— *The purpose of this article is to classify knowledge of the state of the art about intelligent cities and their various perspectives in which it has been discussed; a qualitative methodology is employed in the review process for the analysis of terms. Several definitions, dimensions and applications of the elements that integrate an intelligent city were located, being the common one in all intelligent cities the presence of the technologies of the information and communication, although it is a not unified concept similar characteristics were detected that look for to improve the quality of life of its inhabitants and the optimization of the resources that are in the city. The results obtained from the literary review show that intelligent cities are based on a model with different dimensions according to the conditions of the same, the implementation of such models tend in the future to generate characteristics such as social openness, stable economy, low unemployment rates, promote equality among citizens. Finally a model is proposed that arises from the literary revision, this model includes aspects like; Economy, environment, intelligent government, people and mobility as dimensions that can improve the quality of life of its inhabitants.*

Keywords*— *Applications, Information Technologies and communication, Reference models, Smart cities.

I. INTRODUCTION

The relationship that exists between the human aspect, government, environment and economy, which interact with each other to satisfy needs, according to Howard (1965) proposes the concept of garden city that seeks to reverse the impacts of the modern city; as numerous environmental, social and economic crises. In metropolitan areas, initiatives have been generated that serve as support to improve infrastructure, urban services, improve the environment, social and economic conditions, as well as improve the attractiveness and competitiveness of the cities where they are applied (Yigitcanlar and Bulu, 2014; Trindade, Hinnig, Da Costa, Marques, Bastos, and Yigitcanlar, 2017).

The concept of garden city has evolved according to various academic publications with different approaches and approaches, the above is done a literary review to understand the necessary elements for the development of a new term that is based on the use of information and communication technologies (ICT) for the development of intelligent cities (Albino, Berardi and Dangelico, 2015). Intelligent cities arise as a way of addressing the needs of societies, where ICTs function as support tools to ensure social cohesion, security and sustainability, it is also necessary to mention their application in the area of health, mobility, energy use, education, knowledge transfer and human governance (Hotelescu, Lucaciu, Andone, Cismariu, Grosseck, Slavici, 2017; Alvarado, 2018).

In the 21st century, a worldwide process of urbanization has flourished, which has brought with it that cities have to face new challenges, such as the growing concentration of the population, the increase in consumption levels, greater mobility needs or the increase in the demand for citizen safety and participation in decisions. These new challenges affect different areas of the city, so the solution must be approached with an integrated and innovative vision from all perspectives and key areas of the city (Ramirez, 2016).

This document seeks to classify the knowledge of the state of the art on intelligent cities and their different perspectives in which it has been treated; in the following works published since 2007 are analyzed.

II. LITERATURE REVIEW

During the literary review it was detected that there are diverse cases of investigation that approach the topic intelligent city, from the perspective of the author different definitions have been generated from the characteristics that integrate the case study, of there is no exact definition of the construct and with recurrence it tends to show itself as a starting point to be a progressive and inclusive city, besides being an indicator of development in urban areas for the European Union (Hollands, 2008).

2.1 Smart Cities

There are different definitions of what an intelligent city is, so variations are present when replacing the term intelligent in a similar way with digital or intelligent. This leads to an inconsistent application, so that there is no single definition or defined scheme. In the 1990s, the California Institute for Intelligent Communities began work to determine the possibility that communities could be intelligent and cities could be planned based on the application of ICTs (O'Grady and O'Hare, 2012; Albino et. al., 2015), and the concept of intelligent city emerged from previous work.

According to Toppeta (2010), an intelligent city is a geographic space that unites ICTs and the social Web or Web 2.0 where bureaucratic processes are streamlined through user interaction, which facilitates the sharing of information, encouraging collaboration and identification of solutions to make city management more efficient, in order to direct it towards sustainability and habitability. For Batty, Axhausen, Fosca, Pozdnoukhov, Bazzani, Wachowicz, Ouzounis and Portugali (2012) is a city with high and advanced technology, with the aim of linking people, data and components of the city through the application of new technologies.

On the other hand Nam and Pardo (2011) argue that intelligent cities seek to develop an environment for the exchange of information, cooperation, capacity so that its components can be compatible with others, in addition to not present restrictions with new elements in the future, therefore its inhabitants accept technological innovation as a way in which services are modernized and ICT is used as the main element to provide infrastructure, platforms and solutions.

For Sikora-Fernandez (2017) an intelligent city is where advanced technologies are applied, with the aim of offering efficient mobility and communication systems, public lighting, public safety, optimization of natural resources. People who live in an intelligent city must have creative thinking and have the ability to include in their daily activities the use of technical and technological innovations.

Smart cities are integrated by technological systems based on advanced data processing in order to offer a more efficient government, which generates happy citizens, prosperous companies and a sustainable environment (Trilles, Granell, Degbelo and Bhattacharya, 2017). The common characteristics presented by intelligent cities according to Gil-García, Pardo and Nam (2015) is an urban context linked to technology, the application of ICT in their activities, which form a network structure integrated to the physical structure. Another feature that includes is the search to improve services to the population through the combination, interconnection and integration of systems and infrastructure.

A smart city is characterized by connectivity and structures of urban systems are clear, simple and malleable, using information technologies for efficient solution and informed citizens (Mahizhnan, 1999). According to Hall (2000) City that establishes conditions in its infrastructure that allows mobility, in a way for the optimization of resources to provide better services to its inhabitants. Territory with the ability to learn and innovate, based on the creativity of the population, institutions and digital infrastructure for communication and knowledge management (Komminos,2009).

An interconnected city with the capacity to capture and integrate information in real time, by means of sensors, personal devices, meters and similar devices that store them in platforms to generate communication between the different services of the city. (Harriso, Eckma, Hamilton, Hartswick,, Kalagnanam, Paraszczak y Williams, 2010). Nam y Pardo (2011) mention that a smart city is the Application of information in the structure of the city to optimize the conditions of life, facilitates transport, care of the environment, air, water and waste, collects information for an allocation resources and share data to collaborate across entities and domains. While Caragliu, Del Bo y Nijkamp (2011) they argue they argue, it is a City where human capital integrates modern factors such as ICT in a common urban environment, to generate a better quality of life, adequate management of natural resources and economic growth through the management of participatory government.

A city that integrates ICT merged with traditional infrastructure as an effective way of coordinating urban technologies; methods for applying urban data at spatial and temporal scales through new forms of governance, to create a competitive and innovative sustainable city, better trade and better quality of life (Batty et al., 2012). According to Angelidou (2014) the concept intelligent city conglomerates themes such as intelligent urbanism, intelligent economy, sustainable environment, intelligent mobility, health and quality of life. While Maestre and Nieto (2016) mention the intelligent city as a territory characterized by the intensive use of technologies, mainly information and communication, to promote collaboration, innovation and efficiency in improving the quality of life and sustainability of cities through technological services to citizens.

An intelligent city is a concept closely linked to ICT for sustainable economic development, natural resource management, generating a better quality of life, for the management of future urban development (Baucells, Moreno y Arce, 2017). Vision of the future in six dimensions; competitiveness, human and social capital, participation, transport and ICT, natural resources and quality of life, developed on an intelligent combination of endowments and activities (Gascó-Hernández, 2018).

2.2 Smart City Models

To develop and implement intelligent cities requires experts in various fields; economics, sociology, engineering, politics and information technologies. The literary review revealed the existence of various models proposed by researchers, most of which consist of six dimensions or components: government, economy, mobility, environment and people (Gil-García et al., 2015). Gascó-Hernández (2018) highlights the importance of linking physical and digital infrastructure to create intelligent cities in which its structure in six dimensions stands out: intelligent economy, human and social capital, intelligent government, mobility, intelligent environment and quality of life. While Nam and Pardo (2011) argue the existence of three dimensions in an intelligent city; technology as the axis of transformation, people as human capital and community as support to the government.

Kumar, Graham, Hennelly and Srai (2016) propose a model in which they seek to understand how the intelligent city model can change the furuta supply chain, and propose a model in which they interact; manufacturing systems, supply chain, technology, processes, people, information flow and value structure. An intelligent city is not only technology, it must also be taken into consideration that technology is at the service of the inhabitants, so Trilles et al. (2016) mentions an intelligent city model which divides it into three areas; empowerment of people through citizen participation and citizenship literacy, a second area methods and tools of analysis in which qualitative and quantitative data are linked for the adoption of standards, and finally an area for services based on citizens such as personal services and persuasive user-centered interfaces.

According to Maestre and Bernal (2011) an intelligent city should generate investments in human capital (education), social capital, physical infrastructure and communication infrastructure are sustainable dimensions that generate economic growth to generate quality of life for its population. Komninos (2009) identifies four dimensions in an intelligent city, starting with the dimension that includes various electronic and digital components that build the digital environment, wireless with data flowing and fed the government processes; the second dimension is the application of new technologies to make a transformation of the quality of life; the third dimension detected is the integration of ICT to the physical infrastructure and finally highlights the creation of a lifestyle where one can innovate, learn and develop knowledge.

Griffinger, Fertner, Kramar, Meijers and Pichler-Milanovic (2007) present a model in which they talk about dimensions in intelligent cities, which they identify as intelligent factors; Smart economy, smart environment, smart governance, smart living, smart mobility and smart people, are measured by the application of national and international indicators. According to Lim, Kim and Maglio (2018) detected 12 areas where an intelligent city can be applied; intelligent device", "intelligent environment", "intelligent home", "intelligent energy", "intelligent building", "intelligent transport", "intelligent logistics", "intelligent agriculture", "intelligent safety", "intelligent health", "intelligent hospitality" and "intelligent education". As part of the literature review, several models composed of key dimensions of an intelligent city that are supported by various authors were detected, and the proposed models are shown in TABLE 1. One of the most named dimensions in the works is the economic part applied to knowledge, which arises from the application of research and development, followed by technology transfer between academia and industry, thereby encouraging the development of innovative and high-tech enterprises (Gil-García et al., 2015). The intelligent economy then becomes a competitive advantage in the cities where it is applied; when migrating to E-Commerce or electronic commerce, not only is a system or platform required, a legal system is required to track electronic intellectual property, identification of people, contracts, transactions. Therefore, manipulation-proof equipment must be available to guarantee the security of users (Mahizhnan, 1999).

Intelligent cities are developed according to the needs, characteristics, priorities, in addition to the technology available at the local level, there is currently no literature that mentions the theory of extrapolating the strategies

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applied in the intelligent city to migrate to the concept of intelligent country (Angelidou, 2014). City dwellers aspire to a wide range of services and facilities, green spaces, efficient transport, beauty and good signage, a sense of community and safe environments; they seek personal well-being. However, it has been detected that only a small part of the population is interested in aspects of environmental relations, cities also emit large amounts of emissions into the atmosphere, what an intelligent city seeks from the environmental dimension is to reduce carbon emissions into the atmosphere (Joffe and Smith, 2016).

Table 1. Dimensions in the smart cities model

Key Dimensions	Source
Economy Environment Governance Mobility People	Griffinger et al. (2007)
Governance Technology Economy Infrastructure Environment Politics People	Nam y Pardo (2011)
Smart economics Intelligent people Intelligent governance Intelligent mobility Intelligent environment Smart Life	Batty et al (2012)
Environment and energy Transport and mobility Buildings Housing Government Economy People	Neirotti, De Marco, Cagliano, Mangano, Scorrano (2014)
Public services Administration and municipal management Human capital and creativity Growth economy Infrastructure and environment Big data, ICT and other technologies	Gil-García et al. (2015)
Economy Environment Transport and communications People Quality of life Intelligent management	Sikora-Fernández y Stawasz (2016)
Smart economics Intelligent environment Intelligent governance Intelligent Life Intelligent mobility Intelligent people	Holotescu et al.(2017)

Source: Own preparation

2.3 Smart City applications

Smart cities provide services to their inhabitants through their own resources or subcontracted according to needs. Although this has always been done, it is now done through digital assets which can be used by their inhabitants; a set of data and digital resources, which allows complementary services to be offered with greater access and lower cost from the existence of more technology (Abella, Ortiz de la Urbina and De Pablos, 2015).

Intelligent cities have a difference compared to the rest of the cities, that difference is to have a virtuality to contribute in a more agile and efficient way, to a larger number of the population, which produces an increase in the economic and social progress of the physical city. The services available in intelligent cities according to Vivas, Britos, García-Martínez and Cambarieri (2013) are classified into three groups; citizen services where the dimensions of environment, education, intelligent government, health, work are applied, they can also count on e-commerce services offering E-Learning, GeoMarketing, Digital Contents, B2B and B2C e-commerce, and finally free access services such as education, religion, addiction prevention and senior citizens.

According to Benítez and Ortega (2015), 70% of Europe's energy capacity is consumed in the four large cities where 68% of the continent's population is concentrated; Paris, Madrid, London and Berlin. One of the main challenges presented by these cities is to reduce the impact on the environment, maintain economic development and improve the quality of life of their inhabitants with the support of intelligent electricity grids for energy management through; measurement from sensors and monitoring, demand management, energy efficiency programs, integrating alternative energy sources and distributed storage.

In order to make mobility more efficient and less polluting, cities have opted to offer inhabitants a non-motorized transport system, while also seeking to reduce the number of automobiles in the city. In intelligent cities, the use of bicycles as a non-motorized means is promoted, as well as the use of dissuasive parking, calm traffic of 30 Km/h, vehicle sharing, improvement of public transport, with the aim of improving mobility in large cities (Segui, Mateu, Ruiz and Martínez, 2016).

In order to have an efficient mobility system, it is necessary to apply ICTs to manage demand and provide services through traffic analysis systems, route mapping, demand analysis and payment management. This brings benefits for administrators and users, where strategies can be established to reduce traffic congestion, city planning, new transport systems from applications, forms of electronic payment or prepaid cards (Tablecloth, 2015).

Another application of smart cities is the health sector, which seeks to improve the quality of life of citizens and for this can be used data analysis and decision making in health services by applying data mining, analysis of neural networks and decision trees, descriptive analysis and the use of specific software. In order to provide a better service and quality of life to users, the support of the system can be reinforced through big data databases (Oviedo, Oviedo and Vélez, 2015).

III. METHODOLOGY

The present research was developed by choosing the type of qualitative approach with an exploratory scope because it examines the existing information on intelligent cities in a period from 2013 to 2018. The term or definition of Intelligent Cities in the last decade has been approached by several authors and has had to be analysed from different perspectives and relevant changes according to its application. For the development of the present work, the methodology used consisted of 4 stages: Obtaining the information, Selecting the information, identifying and synthesizing the information.

For the development of this work, publications (journal articles, conferences and books) were searched in the database Scopus and emerald, with the following search criteria: keywords, smart cities in the fields of titles, abstract and key words, then the publication period 2013-2018. On the basis of these search criteria according to TABLE 2, a total of 108 papers were identified, of which a content discrimination was initiated.

Table 2. Database consulted

Database	Paper
Scopus	78
Emerald	30
Total	108

Source: Own preparation

From the previous search, the works began to be discriminated according to the contributions on the subject, considering those works that deal with subjects such as: mobility, intelligent environment, intelligent economy, governance, use of information technologies, people and quality of life. Once the previous points were concluded, the articles were read, identifying the areas of application, the contributions and definitions of the exposed authors.

IV. CONCLUSION

The literary review shows that the common in all intelligent cities is the presence of information and communication technologies, although it is with non-unified concept were detected similar characteristics such as seeking to improve the quality of life of its inhabitants and optimization of resources found in the city. The cities where the concept of intelligent city is applied have determined characteristics such as: social openness, stable economy, low unemployment rates, promote equality among citizens.

An intelligent city is sustained in a model that is supported in diverse dimensions according to the author and to the characteristics of the city, a total of 10 models proposed by diverse authors were analyzed in where it is possible to be observed that the common dimension between them is that it must have a mobility, economic and environment. Mobility is required for its inhabitants by reducing travel times, offering less polluting transport, must be highly competitive cities that promote commerce and e-commerce, and finally must seek to be sustainable cities.

In order to determine the degree of implementation of the concept of intelligent city in Poland, the actions carried out by the government are identified and evaluated by making a relation with the intelligence of the activities of management, exchange of information between inhabitants. Roman's study (2018) detected that the lack of coordination between the development and manufacturing activities of the systems used generates an inefficient use of resources in the urban structure, as a consequence it has a negative impact on the complexity of the city.

According to the revised literature is proposed a model with the dimensions and characteristics, agree with the revision should contain an intelligent city according to TABLE 3, within a city there should be a solid economy where it promotes the development of innovative enterprises and high technology and has a large presence of transactions through electronic commerce. The means should be sought to have a sustainable city where there are green spaces for various activities, have gardens in houses, vertical gardens, program for reducing emissions into the atmosphere, with the aim of offering quality of life to its inhabitants.

Table 3. Dimensions and proposed characteristics

Dimension	Characteristics		
Economy	E-Comerce	Innovation	Entrepreneurship
	Productivity	International integration	Economy and brands
Environment	Environment protection	Sustainable management	Use of resources
Smart government	Participatory decision making	Transparency	Public and social service
People	Lifelong learning	Social plurality	Creativity
	Social participation	Highly qualified	
Mobility	Easy access	Sustainable transport	Availability of access TIC´s
	Safe transport		

Fuente: elaboración propia

According to the characteristics of each intelligent city you can count on an intelligent government that relies on the information it generates and is stored in databases in order to offer more agile processes and avoid bureaucratic procedures, thus increasing people's satisfaction. People within a smart city can usually come up with constant ideas for innovation and entrepreneurship that support the community. They can also count on an effective transportation system that reduces distances and transportation times, there must be programs that encourage the use of non-motorized means such as bicycles and the construction of special lanes for this type of transportation, the capacity of public transportation must meet the demand of the population.

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REFERENCES

[1] Albino, V., Berardi, U., & Dangelico, R. (2015). Smart Cities: Definitions, Dimensions, Performance, and Initiatives. *Journal of Urban Technology , 22*(1), 3-21.

[2] Alvarado López, R. A. (2018). Ciudad inteligente y sostenible: hacia un modelo de innovación inclusiva. *Paakat: Revista de Tecnología y Sociedad, 7*(13).

[3] Angelidou, M. (2014). Smart city policies: A spatial approach. *Cities, 41*, S3-S11.

[4] Batty, M., Axhausen, K., Fosca, G., Pozdnoukhov, A., Bazzani, A., Wachowicz, M., y otros. (2012). Smart cities of the future. The European Physical Journal Special Topics, *214*(1), 481-518.

[5] Baucells Aletà , N., Moreno Alonso, C., & Arce Ruiz, R. M. (2017). Smart Mobility and Smart Environment in the Spanish cities. *Transportation Research Procedia, 24*, 163-170.

[6] Benítez, L., & Ortega, M. (2015). Las TIC y la gestión de los desafíos de sostenibilidad energética de las ciudades inteligentes. *Economía industrial, 395*, 87-94.

[7] Caragliu, A., Del Bo, C., & Nijkamp, P. (2011). Smart cities in Europe. *Journal of Urban Technology , 18*(2), 65-82.

[8] Gascó-Hernandez, M. (2008). Building a Smart City: Lessons from Barcelona. *Communications of the ACM, 61*(4), 50-57.

[9] Gil-Garcia, J. R., Pardo, T. A., & Taewoo, N. (2015). What makes a city smart? Identifying core components and proposing an integrative and comprehensive conceptualization. *Information Polity, 20*(1), 61-87.

[10] Giffinger, R., Fertner, C., Kramar, H., Kalasek, R., & Pichler-Milanović, N. (s.f.). Smart cities Ranking of European medium-sized cities.

[11] Giffinger, R., Fertner, C., Kramar, H., Kalasek, R., & Pichler-Milanović, N. (s.f.). Smart cities Ranking of European medium-sized cities.

[12] Hall, P. (200). Creative Cities and Economic Development. *Urban Studies, 37*(4), 639–649.

[13] Harrison, C., Eckman, B., Hamilton, R., Hartswick, P., Kalagnanam, J., Paraszczak, J., y otros. (2010). Foundations for Smarter Cities. *IBM Journal of Research and Development, 54*(4), 1-16.

[14] Hollands, R. G. (2008). Will the real smart city please stand up? *City, 12*(3), 303-320.

[15] Holotescu, C., Lucaciu Goțiu, L. O., Andone, D., Cismariu, L., Grosseck, G., & Slavici, T. (2017). Entrepreneurship Learning Ecosystem for Smart Cities through MOOCs. *BRAIN: Broad Research in Artificial Intelligence and Neuroscience, 8*(2), 33-42.

[16] Joffe, H., & Smith, N. (2016). City dweller aspirations for cities of the future: How do environmental and personal wellbeing feature? *Cities , 59*, 102-112.

[17] Komninos, N. (2009). Intelligent cities: towards interactive and global innovation environments. *International Journal of Innovation and Regional Development, 1*(4), 2009.

[18] Kumar, M., Graham, G., Hennelly, P., & Srai, J. (2016). How will smart city production systems transform supply chain design: a product-level investigation. *International Journal of Production Research, 54*(23), 7181-7192.

[19] Lim, C., Kim, K.-J., & Maglio, P. P. (2018). Smart cities with big data: Reference models, challenges, and considerations. *Cities*.

[20] Luis Vivas, H., Britos, P., García-Martinez, N., & Cambarieri, M. (2013). Investigación en Progreso: Estudio y Evaluación de Tecnologías de la Información y la Comunicación para el Desarrollo de Ciudades Inteligentes. *Revista Latinoamericana de Ingeniería de Software, 1*(4), 147-151.

[21] Maestre Góngora, G. P., & Nieto Bernal, W. (2015). Factores Clave en la Gestión de Tecnología de Información para Sistemas de Gobierno Inteligente. *Journal of Technology Management & Innovation, 10*(4), 109-117.

[22] Mahizhnan , A. (1999). Smart cities: The Singapore case. *Cities, 16*(1), 13-18.

[23] Mantelero, A. (2015). Smart cities, movilidad inteligente y protección de los datos personales. *Revista D`Internet, Dret I Política, 21*(12), 37-40.

[24] Nam, T., & Pardo, T. (2011). Conceptualizing Smart City with Dimensions of Technology, People, and Institutions . *The Proceedings of the 12th Annual International Conference on Digital Government Research*(págs. 282-291). ACM.

[25] O'Grady, M., & O'Hare, G. M. (2012). How Smart Is Your City? *Science , 335*(6076), 1581-1582.

[26] Oviedo Carrasca, E. A., Oviedo Carrasca, A. I., & Vélez Saldarriaga, G. L. (2015). Míneria de datos: Aportes y tendencias en el servicio de salud de ciudades inteligentes. *Revista Politécnica2015, 11*(20), 111-120.

[27] Ramírez Autrán, R. (2016). Smart Cities: alegoría del progreso en el nuevo siglo. Idioma: Spanish. *Revista Cartográfica*(93), 119-123.

[28] Roman, K. (2018). Analysis and Evaluation of the Implementation Level of the Smart City Concept in Selected Polish Cities. *BRAIN: Board Research in Artificial Intelligence and Neurosciencie , 9*(1), 138-145.

[29] Sikora-Fernandez, D. (2017). Factores de desarrollo de las ciudades inteligentes. *Revista Universitaria de Geografía, 26*(1), 135-152.

[30] Sikora-Fernandez, D., & Stawasz, D. (2016). The concept of smart city in the theory and practice of urban development management. *Romanian Journal of Regional Science , 10*(1).

[31] Toppeta, D. (2010). *The Smart City vision: How Innovation and ICT can build smart, "liveable", sustainable cities.* The Innovation Knowledge Foundation .

[32] Trilles, S., Granell, C., Degbelo, A., & Bhattacharya, D. (2017). Open City Toolkit: el rol de las ciencias geoespaciales para la realización de ciudades abiertas y participativas. *Mapping, 26*(181), 42-50.

[33] Trindade, E. P., Farias Hinning, M. P., Moreira da Costa, E., Sabatini Marques, J., Cid Bastos, R., & Yigitcanlar, T. (2017). Sustainable development of smart cities: a systematic review of the literature. (S. Singapore, Ed.) *Journal of Open Innovation: Technology, Market, and Complexity, 3*(11).

[34] Yigitcanlar, T., & Bulu, M. (2016). Urban Knowledge and Innovation Spaces. *Journal of Urban Technology, 23*(9), 1-9.

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The analysis of Influence of Supervision and organizational climate to Teachers' Performance with Work Ethic as an Intervening Variable

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Abstract**—***The research objective to be achieved by the researcher is to discover whether there is a direct or indirect influence of supervision variables, organizational climate on teachers' performance with work ethic as an intervening variable. The population in this research is the teachers at the Masjid Meranti Foundation. In this research all populations are taken as samples, while the implemented data analyzing method was that of path-analysis. The findings of the study indicated that all the hypotheses were accepted, the supervision variable has a significant direct influence on work ethic; the organizational climate variable has a significant direct influence on work ethic; the supervision variable has a significant direct influence on consumer teacher performance; the organizational climate variable has a significant direct influence on teacher performance; work ethic variable has a significant direct influence on teacher performance; And the supervision variable and organizational climate indirectly have a significant effect on teacher performance through work ethic.*

Keywords**—*****supervision, organizational climate, work ethic, performance.***

I. INTRODUCTION

Supervision is very important to be carried out by the organization in its operational activities to prevent the possibility of deviations by taking corrective actions against these deviations to achieve the goals set by the previous organization. Effective supervision provides aid for efforts to organize work in order for better implementation. The supervisory function is the last function of the management process. This function consists of the tasks of monitoring and evaluating organizational activities in order to achieve the target of the. In other words, the monitoring function assesses whether the plan that has been set in the planning function has been reached.

The Principal as leader certainly has the responsibility to manage the improvement program of education quality. Therefore, the Principal should be able to carry out effective supervision as mandated in the Minister of National Education Regulation Number 13 of 2007 concerning Standards of Principal. The importance of successful supervision to the improvement of education quality certainly adds to the demand for the implementation of supervisory programs prepared by the school principal.

Supervision by the school principal is as an effort of the school principal in guaranteeing that each teacher carries out their duties and functions efficiently, effectively, productively and responsibly. In addition, the supervision of the principal also functions as a tool for evaluating the performance of a teacher to determine the policy that will be taken by the Principal for the teacher concerned, such as promotion or transfer of duty (mutation).

Supervision activities at the Meranti Mosque Foundation in Central Jakarta are usually carried out without prior notification to the teachers so that the teachers feel trapped. Frequently, principals as supervisors keep a distance from the teachers. With these conditions, many teachers try to show their best performance only when observations take place therefore the teacher's actual performance cannot be measured.

In addition to the supervision carried out by the principal, the conditions of organizational climate in the school also affect work ethic and teacher performance. Principal leadership is expected to be able to create conducive organizational climate, in order to improve teacher performance. Gibson (2003) states that organizational climate is a series of environmental conditions that are felt directly and indirectly by employees. This illustrates organizational climate as a number of conditions or a series of conditions that can directly or indirectly, consciously or unconsciously, affect employees. The organizational climate that describes the atmosphere and working relations among educators, between educators and school principals, between educators and other education personnel and between services in their environment is a manifestation of a conducive work environment. This atmosphere is very much needed by educators and principals to carry out their work more effectively.

Negative climate manifests itself in the form of competitive, contradictory, invidious, opposed, ignorant, individualistic, selfish intercommunications. Negative climate can reduce teacher performance. Positive climate shows a close relationship with each other in many ways. There is mutual cooperation between them. All problems that arise are resolved together through deliberation. Positive climate shows that activities run harmoniously and in a peaceful, calm atmosphere that provides a sense of peace, comfort to the teachers. Positive climate in school forms if there is a good and harmonious relationship between the principal and teachers, teachers with teachers, teachers with administrative staffs, and students.

From observations, the organizational climate in the Central Jakarta Meranti Mosque Foundation appear quite conducive, but there are still some teachers who cannot be requested to work together in supporting teaching and learning activities, less accountable for teaching and learning activities which can be seen from those who only provide notes on the blackboard for students to write down or just work on the questions in the Student Activity Sheet, while the teacher doesn't do anything except to sit quietly at the front desk. The formation of a conducive climate for organizations can be a supporting factor for improving performance because comfort in work contains teachers to think calmly and will concentrate solely on the tasks being carried out.

Aside from a conducive school organizational climate, a high teacher work ethic is needed in improving his/her performance. A high teacher work ethic will determine the success of the effort and the learning process in school. An employee who has a high work ethic generally has a mental attitude in carrying out activities or work that is manifested in work behavior such as punctuality, responsibility, hard work, rationality and honesty. So, it is clear that the values contained in work ethic are very important in supporting the achievement of the level of employee performance. Teachers in the world of education have an important role in the success of learning. Teachers who have good personalities and characteristics are the main capital in achieving learning success. In order to optimize the quality of learning, teachers are required to be able to achieve their intended goals. One factor that needs to be considered in work ethic of teachers is the characteristic of someone who always prioritizes the quality of work to obtain maximum results. The work ethic possessed by the teacher will produce maximum quality of work.

In relation to the teacher's tasks in carrying out the daily learning process in school, the optimum results that can be achieved are in the form of a smooth learning process of students, and leading to high achievement or student learning outcomes, all of which is a reflection of the performance of a teacher. In carrying out his/her daily tasks, the performance of a teacher is reflected in his/her role and function in the learning process in the classroom or outside the classroom, namely as an educator, teacher, and trainer. In carrying out their roles and functions in the learning process in the classroom, performance of a teacher can be seen in the activities of planning, implementing, and evaluating the learning process in which the intensity is based on the moral and professional attitude of a teacher.

Based on these conditions, it is necessary to conduct a research entitled “Analysis of the Influence of Supervision and Organizational Climate to Teachers’ Performance with Work Ethic as an Intervening Variable in the Central Jakarta Masjid Meranti Foundation”. The research objective to be achieved by the researcher is to discover whether there is a direct or indirect influence of supervision variables, organizational climate on teachers’ performance with work ethic as an intervening variable.

II. THEORETICAL REVIEW

2.1. Supervision

Supervision is one of the functions of organizational management. As one of the management functions, the notion of supervision has specifically developed. Arikunto and Yuliana (2008) state that supervision is a control that aims to measure the level of effectiveness of work activities that have been carried out and the level of efficiency of the use of other components in the management process. While according to Simbolon (2004) supervision is the process by which the leader would like to recognize the results of the implementation of the work carried out by subordinates in accordance with the plans, orders, objectives, policies that have been determined.

The supervision system will be effective if the monitoring system meets the principle of flexibility. In educational organizations, supervision techniques according to Purwanto (2005) consist of:

- Individual techniques, comprising of: holding class visits, conducting observation visits, and guiding teachers related to curriculum implementation.
- Group techniques, comprising of: holding gatherings/meetings, group discussions, and in-service trainings.

Some previous studies related to the influence of supervision on work ethic, among others: Mardiana (2013), where supervision of the principal has a relationship with the teachers' work ethic; Sukarman, et al (2013), the results of the research indicate that clinical supervision can significantly improve the teachers' work ethic; Rahayu and Sutardji (2015), prove that the impact in the implementation of supervision by principals in improving the ethic of teachers' work is fair or moderate.

While previous research related to the influence of supervision on employee performance, among others: Suryani and Yarosi (2015), Amanda (2016), Rulandari (2017), Herdino and Andri (2017), Yousaf et.all (2018), Averus and Pitono (2018), the results of the research show that supervision has a significant effect on employee performance.

2.2. Organizational Climate

Kurt Lewin in the 1930s introduced the use of the term organizational climate. This term was then used by R. Tagiuri and G. Litwin. According to Wirawan (2008), organizational climate is the perception of organizational members (individuals and groups) and those who are constantly in touch with the organization on what is regularly present or occurring in the organization's internal environment, which affects organizational attitudes and behavior and the performance of organizational members which will then determine the organization's performance. In line with the opinion of Lussier (2005), organizational climate is an employee's perception of the internal environment quality of the organization relatively felt by members of the organization which will then influence their subsequent behavior.

According to Litwin and Stringer (1968) there are 6 (six) dimensions of organizational climate indicators, namely:

1. Responsibility. Describes the feelings of employees of becoming leaders themselves and never ask for opinions in regards to their decisions from others. This includes independence in completing their work.
2. Standards. Measuring the feeling of pressure to improve performance and the degree of pride felt by the employees in conducting their work satisfactorily. This includes working conditions experienced by employees in the company.
3. Structure. Structure illustrates the feeling that employees are well organized and have a clear definition of their roles and responsibilities. This includes the position of employees in the company.
4. Recognition. The feeling of the employee being granted a decent reward after completing the work properly. This includes rewards or wages that employees receive after completing work.
5. Commitment. Describes the feeling of pride and commitment as members of the organization. This includes employee understanding of the goals to be achieved by the company.
6. Support. Describes the feeling of employees regarding trust and mutual support that apply in work groups. This includes relationships with other colleagues.

Several previous studies related to the influence of organizational climate on work ethic, among others: Ayuningtyas (2011); Fisandho (2011); and Alang (2014). The results of the research show that organizational climate has a significant effect on work ethic. Whereas previous studies related to the influence of organizational climate on employee performance, among others: Rahmadewi and Fauzan (2013); Karundeng (2013); Herman, et al (2014); Pasaribu and Kariono (2014); Setiawan (2015); Tantowi and Astuti (2016). The results of the research indicate that organizational climate has a significant effect on employee performance.

2.3. Work Ethic

High work ethic of a teacher will determine the success of the effort and the learning process in school. Atmodiwirio (2000) suggests that work ethic is a person's views and attitudes in assessing what work means as part of life in order to improve their lives. Specifically, the notion of work ethic is the basis for improving work performance/operation of each employee. In reference to this research, it is work ethic of the teacher in carrying out his duties at school. In this case work ethic of the teacher is seen in terms of carrying out the tasks skillfully.

According to Tasmara (2002), indicators of employees' work ethic can be influenced by several factors, including: a) On time, teachers who are on time are teachers who show an attitude of obedience to the provision of time. b) Responsibility, teachers who are responsible show the attitude of: (1) Completing tasks well and on time, (2) Obedient and compliant to school disciplines. c) Honest, honest teachers are transparent in providing value to students; And d) Confidence. Teachers who have the attitude of confidence in carrying out their tasks can be reflected through: (1) Confidence of their own abilities, (2) Optimistic.

Several previous studies related to the influence of work ethics on performance, among others: Wahyudi et al (2013), Hadiansyah and Yanwar (2015), Yuliarti (2016), Bawelle and Sepang (2016), Salahudin et al (2016), and Sapada et al (2017) The results of the research show that work ethic has real influence on employee performance.

2.4. Performance

Performance in an organization is one element that cannot be separated in carrying out organizational tasks, either in the government or in private institutions. According to Mangkunegara (2008), employee performance is the quality and quality of work achieved by an employee in carrying out his/her duties in accordance with the responsibilities given to him. According to Sedarmayanti (2007), the notion of performance is the result of work that can be achieved by a person or group of people in an organization, in accordance with their respective authority and responsibility in an effort to achieve the objectives of the organization legally, not violating the law and in accordance with morals or ethics.

Therefore, performance or operation in the context of the teaching profession is an activity that includes learning planning, learning implementation/KBM, and evaluating or assessment of the learning result (MONE, 2008), which is the actualization of teacher competencies. The measurement results of the three activities illustrate the quantity and quality of the process and work results achieved by the teacher in teaching for a certain period of time. Thus, indicators of teacher teaching performance are:

a. Learning planning. This stage is related to the teacher's ability to master teaching material. The ability of the teacher can be seen from the way or process of preparing the learning activities carried out by the teacher, namely developing syllabus and plan for the implementation of learning.
b. Implementation of learning. Learning activities in the classroom are the core of the implementation of education which is characterized by classroom management activities, media use and teaching methods.
c. Evaluation of learning results. At this stage a teacher is required to have the ability to determine approaches and methods of evaluation, preparation of evaluation materials, processing and the use of evaluation results.

2.5. Research Conceptual Framework

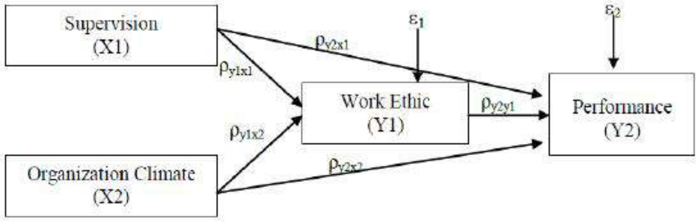

Fig.1: Research Model

2.6. Research Hypothesis

Based on the conceptual framework above the research hypothesis can be formulated as follows:

a. It is assumed that supervision variable has direct influence on work ethic.
b. It is assumed that organizational climate variable has direct influence on work ethic.
c. It is assumed that supervision variable has direct influence on teacher performance.
d. It is assumed that organizational climate variable has direct influence on teacher performance.
e. It is assumed that work ethic variable has direct influence on teacher performance.
f. It is assumed that supervision variables and organizational climate have an indirect influence on teacher performance through work ethic.

III. RESEARCH METHOD

The research method being used is a survey research, which focuses on relational research, i.e. researching the relationship of variables either directly or indirectly which places the emphasis on the research hypothesis. The population in this research is the teachers at the Masjid Meranti Foundation, both 39 permanent and non-permanent teachers. In this research all populations are taken as samples. Data sources are obtained from primary data and secondary data.

Based on the formulation of the problem, the frame of mind and the hypothesis proposed, the variables in the research are identified as follows:

1. Monitoring Variable (X1). Definition of supervision in general is an act of monitoring or examining the activities of an organization to ensure that the achievement of objectives is in accordance with the plan previously determined. The indicator of supervision assessment conducted by the principal in this research refers to the supervision technique (Purwanto, 2005), which consists of: individual technique and group technique.
2. Organizational Climate Variable (X2). Organizational climate is a concept that describes the internal environmental quality of the organization that affects

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the behavior of organizational members in carrying out their work. There are 6 (six) dimensions required bu the indicator of organizational climate based on the concept of Litwin and Stringer (1968), namely: responsibility, standards, structure, recognition, commitment, and support.

3. Work Ethics Variable (Y1). The definition of teacher work ethic in general is a characteristic that is shown by a teacher in regards to his/her enthusiasm, and performance in work (teaching), as well as attitudes and views on work. The indicator of work ethic in this research is taken from the theory of Tasmara (2002), namely: punctuality, responsibility, honesty, and confidence.
4. Teacher Performance Variable (Y2). Definition of performance is a quality and quantity result of work achieved by someone in carrying out their duties in accordance with the responsibilities granted to him. Teacher performance indicators in this research are taken from the Ministry of National Education (2008), namely: learning planning, implementation of learning, and evaluation of learning results.

Determination of score for each question against each statement uses a Likert scale which consists of 5 alternative choices, namely: strongly disagree (score 1) to strongly agree (score 5). After the questionnaire data is collected, the research materials are tested in the form of validity & reliability tests, as well as classic assumption tests. If the quality of data requirements is met, analysis of the data will be performed by using the path analysis approach. Path analysis is used to determine the causal relationship, with the aim of explaining the direct and indirect consequences of a set of variables, which is as a causal variable and consequential variable.

IV. RESEARCH FINDINGS AND DISCUSSION

4.1. Research Finding

The results of the validity test will show that the value of *r*for each statement indicator of each variable has a value of r ≥ 0.30, meaning that all items submitted are declared valid. While the reliability test results will show the value of Cronbach's alpha, each variable that is in accordance with the criteria has a value of ≥ 0.70, meaning that each variable has a fairly good level of reliability. The results of the classic assumption test will show that the linear and normal data, and there is no multicollinearity between independent variables.

Hypothesis testing is done by using the Regression Weight test (loading factor), by looking at the significance of the probability value (P), to which the cut-off value of p <0.05 will be considered significant. The hypothesis test results are as follows:

Table.1: Result of Hypothesis Testing

			Estimate	S.E.	C.R.	P	Label
Y1	<---	X1	.418	.122	3.427	.000	par_1
Y1	<---	X2	.672	.122	5.493	.000	par_2
Y2	<---	Y1	.330	.156	2.117	.034	par_3
Y2	<---	X1	.274	.134	2.041	.041	par_4
Y2	<---	X2	.523	.157	3.323	.000	par_5

Description: C.R = t count; Estimate = Coefisient; P = Probability

Based on the table above can be explained as follows:

1. Supervision (X1) has a significant direct influence on work ethic (Y1), with a probability value of 0,000.
2. Organizational climate (X2) has a significant direct influence on work ethic (Y1), with a probability value of 0,000.
3. Supervision (X1) has a significant direct influence on consumer teacher performance (Y2), with a probability value of 0.041.
4. Organizational climate (X2) has a significant direct influence on teacher performance (Y2), with a probability value of 0,000.
5. Work ethic (Y1) has a significant direct influence on teacher performance (Y2), with a probability value of 0.034.

To see the direct and indirect influences between the research variables, path analysis technique is used. The following are the results of direct, indirect, and total effects that are standardized between endogenous and exogenous variables.

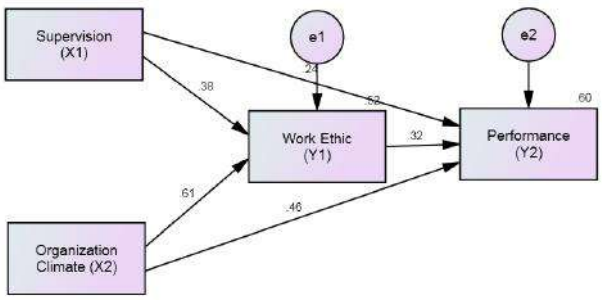

Fig.2: Result Path Analysis

Table 2. Standardized Direct, Indirect and Total Effects.

<table>
<tr><th>Variable</th><th>Effects</th><th>Count</th><th>Total Effect</th></tr>
<tr><td>X1 ➔ Y1</td><td>Direct</td><td>0.383</td><td>0.383</td></tr>
<tr><td>X2 ➔ Y1</td><td>Direct</td><td>0.614</td><td>0.614</td></tr>
<tr><td rowspan="2">X1 ➔ Y2</td><td>Direct</td><td>0.240</td><td rowspan="2">0.361</td></tr>
<tr><td>Indirect</td><td>0.121</td></tr>
</table>

X2 ➔ Y2	Direct	0.457	0.651
	Indirect	0.194	
Y1 ➔ Y2	Direct	0.315	0.315

Based on the images and tables above, it can be explained as follows:

a. Supervision (X1) has a direct influence on work ethic (Y1) by 0.383.
b. Organizational climate (X2) has a direct influence on work ethic (Y1) by 0.614.
c. Supervision (X1) has a direct influence on teacher performance (Y2) by 0.240 and indirectly by 0.121, so the total effect is 0.361.
d. Organizational climate (X2) has a direct influence on teacher performance (Y2) by 0.457 and indirectly by 0.194, so the total effect is 0.651.
e. Work ethic variable (Y1) has a direct influence on teacher performance (Y2) by 0.315.

The contribution of supervision variable (X1) and organizational climate (X2) to work ethic (Y1) is 52.4%, while the contribution of supervision variable (X1), organizational climate (X2) and work ethic (Y1) to teacher performance is 60%.

4.2. Discussion

1. First Hypothesis: It is assumed that supervision variable has direct influence on work ethic.
   The results showed that the supervisory variable (X1) had a significant direct influence on work ethic (Y1), with an effect of 0.363. This means that the better supervision carried out by the leadership at the Masjid Meranti Foundation, the better impact it will have on work ethic of the teachers at the foundation. Significance value by 0.000 <0.05, means that the first hypothesis which states that the supervisory variable has direct influence on work ethic, can be accepted. The results of this research are in line with previous studies conducted by Mardiana (2013); Sukarman, et al (2013); and Rahayu & Sutardji (2015).
   Supervision in the world of education is carried out with the intention of being able to find positive and negative matters in implementing education. So it's not solely looking for mere mistakes. There are at least several factors that can improve the teacher's work ethic, both internal and external factors. According to Mulyana (2006), there are several factors, among others: a) Encouragement to work, b) Responsibility for the task, c) Interest in the task, d) Award for the task, e) Opportunity to develop, f) Attention from the principal, g) Interpersonal relationships with teachers, h) Personal experience of a teacher, i) Can improve the teacher's work ethic, and j) Library services. Based on this explanation, it can be seen that the teacher must obtain attention or supervision from the principal so that the teacher can improve his/her work ethic and a teacher must have a good work ethic in order to achieve formal education. The principal is required to be able to lead while organizing and managing the implementation of teaching programs held at the school he leads. In this case, the principal must be able to be a good supervisor, because supervision is very important for schools to improve the quality of education (Arikunto, 2008).
2. Second Hypothesis: It is assumed that organizational climate variable has a direct influence on work ethic.
   The results showed that organizational climate variable (X2) had a significant direct influence on work ethic (Y1), with an effect of 0.614. This means that the better and conducive organizational climate in the Masjid Meranti Foundation, the better impact it will have on work ethic of the teachers at the foundation. Significance value of 0.000 <0.05, means that the second hypothesis which states that organizational climate variable has direct influence on work ethic can be accepted. The results of this research are in line with previous research conducted by Ayuningtyas (2011); Fisandho (2011); and Alang (2014). Based on the theory explained by Hoy and Miskel in Soetopo (2010), it states that if the organizational climate does not reflect a conducive situation, it will have an impact on the decline of individual and/or group incentives to provide trust and work effectively in running the organization. The basis of developing work ethic is a unity of interests that have mentioned many kinds of desires and needs of a person and group and to which these factors influence the success of a leader. According to Lubis in Sinamo (2002), good leaders must be able to foster a work ethic to develop values and something interesting in the organization. The leader must also be able to influence subordinates in carrying out daily tasks in order to achieve established organizational goals, with a maximum work ethic that will have a positive value on organizational success (Alang, 2014).
3. Third Hypothesis: It is assumed that supervision variable has direct influence on teacher performance.
   The results showed that the supervisory variable (X1) had a significant direct influence on teacher performance (Y2), with a direct influence of 0.240 and an indirect influence of 0.121. This means that the better supervision carried out by the leaders at the Meranti Mosque Foundation, the better impact it will

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have on the performance of teachers at the foundation. Significance value of 0.041 <0.05, means that the third hypothesis which states the supervisory variable has a direct influence on teacher performance can be accepted. The results of this research are in line with previous research conducted by Suryani and Yarosi (2015), Amanda (2016), Rulandari (2017), Herdino and Andri (2017), Yousaf et.al (2018), Averus and Pitono (2018).

One of the factors that support good performance of an employee is the supervision carried out by the leader to its employees in improving performance. With supervision, it is expected that employees can comply with the regulations set by the organization. Supervision is now part of an important factor in influencing employee performance in this case the teachers because it is a means of controlling or monitoring the activities within an organization. Through this supervision, employees can be monitored properly so that they can improve employee discipline in their work and have an impact on achieving maximum employee performance (Marpaung and Agustin, 2013).

4. Fourth Hypothesis: It is assumed that organizational climate variable has direct influence on teacher performance.

The results showed that the organizational climate variable (X2) had a significant direct influence on teacher performance (Y2), with a direct influence of 0.457 and an indirect influence of 0.194. This means that the better and conducive organizational climate in the Meranti Mosque Foundation will have a good impact on the performance of teachers at the foundation. Significance value of 0.000 <0.05, means that the fourth hypothesis which states that organizational climate variable has direct influence on the performance of teachers can be accepted. The results of this research are in line with previous research conducted by Rahmadewi and Fauzan (2013); Karundeng (2013); Herman, et al (2014); Pasaribu and Kariono (2014); Setiawan (2015); Tantowi and Astuti (2016).

Siagian (2011) explains the organizational climate as a physical and non-physical work condition and the work environment should influence behavior and which can be a motivational factor that needs the attention of every leader in the organization. This means that organizational climate is a condition of the work environment, both material/physical and non-material/non-physical, which can affect the behavior/performance of teachers within an organization (school). Organizational climate is important to create because it is a person's perception of what is given by the organization and is the basis for determining the behavior of the next member. Climate is determined by how well members are directed, built and valued by the organization. (Pasaribu and Kariono, 2014).

5. Fifth Hypothesis: It is assumed that work ethic variable has direct influence on teacher performance.

The results showed that the work ethic variable (Y1) had a significant direct influence on teacher performance (Y2), with a direct influence of 0.315. This means that the better the work ethic of the teachers at the Meranti Mosque Foundation, the better impact it will have on the performance of teachers at the foundation. Significance value of 0.034 <0.05, means that the fifth hypothesis which states work ethic variable has a direct influence on teacher performance can be accepted. The results of this research are in line with previous research conducted by Wahyudi et al (2013), Hadiansyah and Yanwar (2015), Yuliarti (2016), Bawelle and Sepang (2016), Salahudin et al (2016), and Sapada et al (2017).

Anoraga (2001) states that success in work competition requires not only expertise and capability but also the need for dedication, hard work, and honesty in work. Someone who is successful must have a view and attitude that values work as a noble factor for human existence. Employees who have noble thoughts about their work can work sincerely. A view and attitude towards work is known as work ethic.

A high work ethic should be owned by every employee because every organization really needs hard work and high commitment from every employee, otherwise the organization will find it difficult to develop, and win the competition in seizing its market share. Every organization that always wants to advance will involve its members for their performance, in other words every organization must have work ethic. Individuals or community groups can be declared to have a high work ethic (Yuliarti, 2016).

6. Sixth: It is assumed that supervision variable and organizational climate have indirect influence on teacher performance through work ethic.

The results show that the first hypothesis until the fifth hypothesis are all accepted and proven to be true. This means that the sixth hypothesis which states the supervision variable and organizational climate have indirect influence on the performance of teachers through work ethic is a. The contribution of supervision variable (X1) and organizational climate

(X2) to work ethic (Y1) is 52.4%, while the contribution of supervision variable (X1), organizational climate (X2) to teacher performance through work ethic (Y1) is 60%.

V. CONCLUSION

Based on the results of the research and discussion it can be concluded that the supervision variable (X1) has a significant direct influence on work ethic (Y1). Similarly, the organizational climate variable (X2) has a significant direct influence on work ethic (Y1). The results also show that the supervisory variable (X1) has a significant direct influence on consumer teacher performance (Y2). Likewise, the organizational climate variable (X2) has a significant direct influence on teacher performance (Y2). Furthermore, work ethic variable (Y1) has a significant direct influence on teacher performance (Y2). And the supervision variable (X1) and organizational climate (X2) indirectly have a significant effect on teacher performance (Y2) through work ethic (Y1).

REFERENCES

[1] Alang, Syamsu. (2014). "Pengaruh Iklim Organisasi dan Kepemimpinan Kepala Sekolah Terdapat Etos Kerja Guru Serta Pegawai Pada SMP Negeri 120 Jakarta". MAP. Volume 1 Nomor 1, Juli 2014. p: 1-89.

[2] Amanda, Regina. (2016). "Pengaruh Pengawasan Terhadap Kinerja Karyawan Melalui Disiplin Kerja Sebagai Variabel Intervening di PT Astra International Tbk Waru pada Bagian Part & Accesories (Depo)". Jurnal Ilmu Manajemen. Volume 4 Nomor 4 – Jurusan Manajemen Fakultas Ekonomi Universitas Negeri Surabaya. p: 1-8.

[3] Amin Wahyudi., Tulus Haryono, Asri Laksmi Riyani, and Mugi Harsono. (2013). "The Impact of Work Ethics on Performance Using Job Satisfaction and Affective Commitment as Mediating Variables: Evidences from Lecturers in Central Java". Issues in Social and Environmental Accounting. Vol. 7, No. 3 September 2013. p: 165-184.

[4] Arikunto, Suharsimi. (2006). Metode Penelitian Kualitatif. Jakarta: Bumi Aksara.

[5] Arikunto, Suharsimi dan Lia Yuliana. (2008). Manajemen Pendidikan. Yogyakarta: Aditya Media.

[6] Atmodiwirio, S. (2000). Manajemen Pendidikan Indonesia. Jakarta: PT Ardadizya Jaya.

[7] Averus, Ahmad., dan Andi Pitono. (2018). "Pengaruh Pengawasan Terhadap Kinerja Pegawai dalam Meningkatkan Pelayanan Kesehatan di Kota Palu Provinsi Sulawesi Tengah". Sosiohumaniora Jurnal Ilmu-ilmu Sosial dan Humaniora. Vol. 20, No, 1, Maret 2018. p: 15-21.

[8] Ayuningtyas. Liya Febriyana. (2011). "Pengaruh Iklim Organisasi Terhadap Etos Kerja Pada Karyawan Bulu Mata di PT. Royal Korindah Purbalingga". Skripsi. Fakultas Psikologi. Universitas Muhammadiyah Purwokerto.

[9] Bawelle, Mouren., dan Jantje Sepang. (2016). "Pengaruh Etos Kerja, Gairah Kerja dan Disiplin Kerja Terhadap Kinerja Karyawan PT. BRI Cabang Tahuna". Jurnal EMBA. Vol. 4 No. 5, September 2016. p: 303-408.

[10] Davis dan Newstorm. (2000). Perilaku Dalam Organisasi. Jakarta: Erlangga.

[11] Davis, Keith dan John W. Newstrom. (1985). Perilaku Dalam Organisasi. Jakarta: Erlangga.

[12] Depdiknas. (2008). Penilaian Kinerja Guru. Jakarta: Depdiknas.

[13] Fisandho, Pieter Armand. (2011). "Pengaruh Iklim Organisasi Terhadap Etos Kerja Karyawan PD. Utama Semarang". Skripsi. Fakultas Ekonomi Jurusan Manajemen. Universitas Katolik Soegijapranata Semarang.

[14] Hadiansyah, Andri., dan Rini Purnamasari Yanwar. (2015). "Pengaruh Etos Kerja Terhadap Kinerja Karyawan PT. AE". Jurnal AL-AZHAR INDONESIA SERI HUMANIORA. Vol. 3. No. 2, September 2015. p: 150-158.

[15] Harahap, Sofyan. (2001). Sistem Pengawasan Manajemen. Jakarta: Penerbit Quantum.

[16] Henny. (2018). "Supervisi Kepala Sekolah dalam Meningkatkan Profesional Guru Pada SMA Methodist Kota Banda Aceh". Available at https://media.neliti.com/media/publications/242787-supervisi-kepala-sekolah-dalam-meningkat-143d0db2.pdf (accesed 10 Desember 2018).

[17] Herdino, Dido., dan Seno Andri. (2017). "Pengaruh Pengawasan Terhadap Kinerja Karyawan Pada PT. Holcim Indonesia Cabang Perawang Kabupaten Siak". Jom FISIP. Volume 4 No. 2 Oktober 2017. P:1-11.

[18] Herman, Djailani AR, dan Sakdiah Ibrahim. (2014). "Pengaruh Iklim Organisasi dan Kepuasan Kerja Terhadap Kinerja Guru". Jurnal Administrasi Pendidikan Pascasarjana Universitas Syiah Kuala. Volume 4, No. 2, November 2014. p: 157- 167.

[19] Karundeng, Christine Chely. (2013). "Pengaruh Iklim Organisasi Terhadap Kinerja Karyawan Pada PT. Taspen (Persero) Cabang Manado". Jurnal Acta. Vol. 2 No. 3.

[20] Litwin Gh, & Stringer Ra Jr. (1968). Motivation And Organizational Climate. Boston: Harvard University Press.

[21] Lussier, N Robert. (2005). Human Relations in OrganizationApplications and skill Building. New York: Mc Graw Hill.

[22] Mangkunegara, A.A. Anwar Prabu. (2008). Manajemen Sumber Daya Manusia. Cetakan kelima. Bandung: Penerbit PT. Remaja Rosdakarya.

[23] Mardiana. (2013). "Hubungan Supervisi Kepala Sekolah Dengan Etos Kerja Guru di Sekolah Menengah Pertama Negeri 29 Pekanbaru". Skripsi. Fakultas Tarbiyah dan Keguruan Universitas islam Negeri Sultan Syarif Kasim Riau Pekanbaru.

[24] Marpaung, Rio dan Agustin, Tri Dinda. (2013). "Pengaruh Pengawasan dan Disiplin Kerja Terhadap Kinerja Pegawai Kejaksaan Tinggi Riau". Jurnal Sosial Ekonomi Pembangunan. Vol.III (8). p: 141-164.

[25] Mulyasa, E. (2006). Kurikulum Tingkat Satuan Pendidikan (KTSP). Bandung: Remaja RosdaKarya.
[26] Pasaribu, Safran Efendi., dan Kariono. (2014). "Pengaruh Iklim Organisasi Terhadap Kinerja Pegawai Pada Biro Rektor Universitas Muhammadiyah Tapanuli Selatan". Jurnal Administrasi Publik. Vol. 2 No. 2. p: 177-195.
[27] Pasaribu, Safran Efendi., dan Kariono. (2014). "Pengaruh Iklim Organisasi Terhadap Kinerja Pegawai Pada Biro Rektor Universitas Muhammadiyah Tapanuli Selatan". Jurnal Administrasi Publik. Vol. 2 No. 2. p: 177-195.
[28] Purwanto, Ngalim. (2005). Administrasi dan Supervisi Pendidikan. Edisi Revisi. Bandung: Remaja Rosda Karya.
[29] Rahayu, Retno Indah., dan Sutardji. (2016). "Supervisi Kepala Sekolah Dalam Peningkatan Etos Kerja Guru". Jurnal Magister. Vol. 01 Nomor 07. Juni 2015.
[30] Rahmadewi, Suci., dan Rizky Fauzan. (2013). "Pengaruh Iklim Organisasi dan Kepuasan Kerja Terhadap Kinerja Karyawan (Studi Pada Stasiun Meterologi Kelas II Supadio Pontianak)". Jurnal Eksos. November 2013, Th. IX, No. 3. p: 135-152.
[31] Rulandari, Novianita. (2017). "The Effect of Supervision and Professionalism on Staff Performance at the Office of Social Affairs in East Jakarta Administrative City". International Journal of Humanities and Social Science. Vol. 7, No. 2; February 2017. p:184-192.
[32] Salahudin , Shahrul Nizam bin., Mohd Nur Ruzainy bin Alwia, Siti Sarah binti Baharuddina, and Siti Syafina binti Halimat. (2016). "The Relationship between Work Ethics and Job Perfomance". BE-ci 2016. 3rd International Conference on Business and Economics. 21 - 23 September, 2016. p: 465-471.
[33] Sapada, Achmad Faisal A., H. Basri Modding, Ahmad Gani, and Syamsu Nujum. (2017). "The Effect of Organizational Culture and Work Ethics on Job Satisfaction and Employees Performance". The International Journal of Engineering and Science (IJES). Volume 6. Issue 12. p: 28-36.
[34] Sedarmayanti. (2013). Manajemen Sumber Daya Manusia. Bandung: Refika.
[35] Setiawan, Kiki Cahaya. (2015). "Pengaruh Iklim Organisasi Terhadap Kinerja Karyawan Level Pelaksana di Divisi Operasi PT. Pusri Palembang". Psikis Jurnal Psikologi Islami. Vol. 1 No. 1. p: 23-32.
[36] Sinamo, Jansen. (2002). Etos Kerja Profesional di Era Digital Global. Jakarta: Institut Darma Mahardika.
[37] Sobri, dkk. (2009). Pengelolaan Pendidikan. Yogyakarta: Multi Pressindo.
[38] Soetopo, Hendyat. (2010). Perilaku Organisasi: Teori dan Praktik Di Bidang Pendidikan. Bandung: PT. Remaja Rosdakarya.
[39] Sondang P. Siagian. (2011). Manajemen Sumber Daya Manusia. Jakarta: PT. Bumi Aksara.
[40] Sugiyono. (2009). Metode Penelitian Kuantitatif, Kualitatif dan R&D. Bandung: Alfabeta.
[41] Sukarman, Ketut., Nyaman Dantes, dan Made Sutama. (2013). "Pengaruh Implementasi Supervisi Klinis Terhadap Etos Kerja dan Keterampilan Mengelola Pembelajaran Pada Para Guru SD Se-Kecamatan Buleleng". e-Journal Program Pascasarjana Universitas Pendidikan Ganesha Program Studi Pendidikan Dasar. Volume 3 Tahun 2013.
[42] Suryani, Lilis., dan Yarosi. (2015). "Hubungan Pengawasan dan Kinerja Pegawai Pada Dinas Kebudayaan dan Pariwisata Kota Tangerang Selatan". Kreatif Jurnal Ilmiah Prodi Manajemen Universitas Pamulang. Vol. 2, No. 2, April 2015. p: 93-110.
[43] Tantowi, Ridwan., dan Hesti Widi Astuti. (2016). "Pengaruh Iklim Organisasi Terhadap Kinerja Karyawan Pada PT. Bank Danamon Simpan Pinjam Unit Metro". Jurnal Bisnis Darmajaya. Vol. 02 No. 02, Juli 2016. p: 134-145.
[44] Tasmara, Toto. (2002). Membangun Etos Kerja Islam. Jakarta. Gema Insani Pers.
[45] Wirawan. (2008). Budaya dan Iklim Organisasi. Jakarta: Salemba Empat.
[46] Yousaf, Usman., Bushra Usman, and Talat Islam. (2018). "Effects of Supervision Practices of Principals on Work Performance and Growth of Primary School Teachers". Bulletin of Education and Research. April 2018, Vol. 40, No. 1. P: 285-298.

Academic Stress and coping Strategies of Filipino College Students in private and public universities in Central Luzon

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Abstract— *This study explored the academic stress and coping mechanisms of three hundred eighty-two (382) college students from public and private universities in Central Luzon, Philippines using descriptive research design. Results showed that major contributors to the respondents' stress were from teachers, completion of requirements and peers who commit cheating. They felt academically stressed and experience sleeping problems low self-confidence and moodiness. Respondents coped with stress through spirituality, one of the prominent traits of Filipinos. The study highlights the need to comply with the mental health protocol and to create avenues to attain well-being for students with varying interests.*

***Keywords* — Academic stress, coping mechanism, mental health, stress, stress management.**

I. INTRODUCTION

Students pursuing college degrees are undeniably confronted by many challenges and problems. Everyone can attest that college life is difficult. It presents the first real challenge to students' academic motivations and skills. Moreover, college is a stage where students face a myriad of pressures and challenges in the academic environment as they seek to maintain optimal performances or even to remain in the academic program.

For some individuals, college is a high point in their lives where they look forward to it enjoy it and carry pleasant memories when they graduate. Along with these unforgettable memories are experiences filled with anxiety, doubt and struggle [1].

Finishing college education nowadays is very challenging. These challenges come in the form of problems and difficulties that students need to overcome in order for them to finish college. Identifying these problems provides information on improving the student guidance and counseling services of the school. It helps students handle the challenges of academic life, thus giving them a better chance to survive and finish college [2].

The causes and levels of stress may vary from one person to the other. No person is free from stress, regardless of how privileged, reasonable, clever, and intelligent he may be. Every person will be challenged at times by frustrations, losses, changes and conflicts [3].

Academic stress is commonly experienced by college students. There are many stressors within academic life such as academic demands and achievements from parents, a personal inclination for academic self-actualization, amount of assignments, conflict with a classmate and final writing assignments (thesis), and so on. Earning high grades is a source of stress that affects them to succeed in making good impressions to their parents, classmates and significant other people. Failures become pressures that come from intrapersonal, interpersonal, academic and environmental stressors [2]. Since not all students have the ability to cope with the above-mentioned stressors, consequently they experience academic stress.

With the help of family, friends, and perhaps campus stress-management resources, many students are able to keep their stress levels relatively under control or even thrive in the college setting. However, for some students, the challenges and frustrations of campus life appear to lead to severe emotional problems.

The present generation of graduating college students belongs to the most time-pressed generation in history. With this, the need for research concerning stress experience is deemed necessary. Stress management was developed and premised on the idea that stress is not a direct response to a stressor but rather one's resources and ability to cope mediate the stress response and are amenable to change, thus allowing stress to be controllable, thus, this study finds meaning and significance.It sought to present the academic stress management of Filipino college students in private and public universities in Central Luzon. It specifically focuses on the causes, effects of academic stress and the coping mechanisms of students in different universities taking up different bachelor degree courses.

II. METHODOLOGY

This study utilized the descriptive research design in determining the challenges encountered by the respondents. According to [4], as cited by the authors in [5], "descriptive research systematically describes a situation, problem, phenomenon, service or program, attitude toward an issue or simply, it provides information on a subject". The researcher used a questionnaire because it is most frequently a very concise, pre-planned set of questions designed to yield specific information to meet a particular need for research information about a pertinent topic. The research information is attained from respondents normally from a related interest area, easy to tabulate and interpret. The study was conducted in public and private universities in Central Luzon, Philippines. The respondents of the study who were chosen purposively [6] were from public and private universities in Central Luzon, Philippines.This study was delimited into 382 students in public and private universities in Central Luzon Philippines as the respondents.

III. RESULTS AND DISCUSSION

1. Causes of Academic Stress

1.1 Teacher Related Academic Stress

Table 1. Teacher Related Academic Stress

Teacher-related	Weighted Mean	Verbal Interpretation
1. Difficult to deal with teachers	3.35	Moderate likely cause of stress
2. Unfair treatment of teacher (favoritism)	3.23	Moderate likely cause of stress
3. Teachers absenteeism	3.17	Moderate likely cause of stress
4. Unapproachable teachers	3.07	Moderate likely cause of stress
5. Inconsiderate teachers	3.32	Moderate likely cause of stress
Average Weighted Mean	**3.23**	**Moderate likely cause of stress**

It may be gleaned on the table that the teacher-related academic stress of the respondents. Statement 1 "Difficult to deal with teachers" obtained the highest weighted mean of (3.35) with a verbal interpretation of "Moderate likely cause of stress" while statement 4 "Unapproachable teachers" obtained the lowest weighted mean of (3.07) with a verbal interpretation of "Moderate likely cause of stress". The average weighted mean of the table is (3.23) with a verbal interpretation of "Moderate likely cause of stress".
This shows that the respondents have difficulty dealing with teachers which caused academic stress to the students which might affect their academic performance.

1.2 Subject-Related Academic Stress

Table 2. Subject-Related Academic Stress

Subject-Related	Weighted Mean	Verbal Interpretation
1. Poor interest in hard subjects	3.23	Moderate likely cause of stress
2. Examination results	3.47	Likely cause of stress
3. Requirements completion	3.68	Likely cause of stress
4. Early schedule	3.42	Likely cause of stress
5. Understanding the subject matter.	3.67	Likely cause of stress
Average Weighted Mean	**3.49**	**Likely cause of stress**

It is clearly shown in Table 2 the subject-related academic stress of the respondents. Statement 3 "Requirements completion" got the highest weighted mean of (3.68) with a verbal interpretation of "Likely cause of stress" while statement 1 "Poor interest in hard subjects" got the lowest weighted mean of (3.23) with a verbal interpretation of "Moderate likely cause of stress". The average weighted mean of the table is (3.49) with a verbal interpretation of "Likely cause of stress". This implies that subject-related academic stress can be a contributory factor to students' stress levels which can lead to absenteeism or feelings of hopelessness that interfere with effective study habits and then further weaken academic achievement. The authors in [7] made a conclusion that "academic stress not only impedes academic performance but also an adjustment to a greater extent"

1.3 Classmate-Related Academic Stress

Table 3. Classmate-Related Academic Stress

Classmate-related	Weighted Mean	Verbal Interpretation
1. Uncooperative	3.37	Moderate likely cause of stress
2. Competitive classmates	3.22	Moderate likely cause of stress
3. Bully classmates	3.37	Moderate likely cause of stress
4. Cheaters	3.58	Likely cause of stress
5. Poor relationship	3.22	Moderate likely cause of stress
Average Weighted Mean	**3.35**	**Moderate Likely cause of stress**

Table 3 presents the classmate-related academic stress of the respondents. Statement 4 “Cheaters” earned the highest weighted mean of (3.58) with a verbal interpretation of “Likely cause of stress” while statement 2 “Competitive classmates” and statement 5 “Poor relationship” both earned the lowest weighted mean of (3.22) with a verbal interpretation of “Moderate Likely cause of stress”. The average weighted mean of the table is (3.35) with a verbal interpretation of “Moderate Likely cause of stress'. This implies that students often face pressure from their classmates to experiment with potentially harmful behaviors.

2. Effects of Academic Stress

2.1 Physical Effects of Academic Stress

Table 4. Physical Effects of Academic Stress

Physical	Weighted Mean	Verbal Interpretation
1. Body pains/fatigue	3.27	Moderate likely cause of stress
2. Lack of appetite	3.18	Moderate Likely cause of stress
3. Physically weak	3.10	Moderate Likely cause of stress
4. Gained/ lost weight.	3.10	Moderate Likely cause of stress
5. Tired and sleeping more/ less	3.60	Likely cause of stress
Average Weighted Mean	**3.25**	**Moderate likely cause of stress**

It is presented in Table 4 the physical effects of academic stress on the respondents. Statement 5 “Tired and sleeping more or less” gained the highest weighted mean of (3.60) with a verbal interpretation of “Likely cause of stress” while statement 3 “Physically weak” and statement 4 “Gained or lost weight” both gained the lowest weighted mean of (3.10) with a verbal interpretation of “Moderate likely cause of stress”. The average weighted mean of the table is (3.25) with a verbal interpretation of “Moderate likely cause of stress”.

This indicates that students who are tired or do not feel well because of the physical effects of academic stress will find that their performance or attendance in class suffers.

According to [8]“headache, excess perspiration, and fatigue were the most common symptoms of stress experienced by students in terms of physical stress while negative thinking, tension, and feeling of failure are the most commonly encountered in terms of behavioral stress. As academic activities become tougher, the higher stress levels become and different coping mechanisms are applied”.

2.2 Psychological Effects of Academic Stress

Table 5. Psychological Effects of Academic Stress

Psychological	Weighted Mean	Verbal Interpretation
1. Paranoid	2.98	Moderate likely cause of stress
2. Low morale	3.05	Moderate Likely cause of stress
3. Absent-minded/forgetful	3.07	Moderate Likely cause of stress
4. Self-confidence	3.18	Moderate Likely cause of stress
5. Unmotivated	3.07	Moderate Likely cause of stress
Average Weighted Mean	**3.07**	**Moderate Likely cause of stress**

It is shown on the table above the psychological effects of academic stress on the respondents. Statement 4 "Self-confidence" obtained the highest weighted mean of (3.18) with a verbal interpretation of “Moderate likely cause of stress” while statement 1 “Paranoid” obtained the lowest weighted mean of (2.98) with a verbal interpretation of “Moderate likely cause of stress”. The average weighted mean of the table is (3.07) with a verbal interpretation of “Moderately Agree”.This implies that students having low morale and unmotivated cannot concentrate well in their studies which may affect their academic performance.

2.3 Emotional Effects of Academic Stress

Table 6. Emotional Effects of Academic Stress

Emotional	Weighted Mean	Verbal Interpretation
1. Moody	3.53	Likely cause of stress
2. Sensitive	3.27	Likely cause of stress
3. Depressed	3.40	Likely cause of stress
4. Irritable	3.12	Moderate Likely cause of stress
5. Insecure	2.97	Moderate Likely cause of stress
Average Weighted Mean	**3.26**	**Moderate likely cause of stress**

Table 6 shows the emotional effects of academic stress on the respondents. Statement 1 “Moody’ gained the highest weighted mean of (3.53) with a verbal interpretation of “Likely cause of stress” while statement 5 “Insecure” gained the lowest weighted mean of (2.97) with a verbal interpretation of “Moderately Agree”. The average weighted mean of the table is (3.26) with a verbal interpretation of “Moderate likely cause of stress”.

This shows that having emotional academic stress may not only affect the student itself but it can also affect the people around them because of their becoming moody, sensitive, depressed, irritable and insecure. The authors in [9] said that “stress reactions to various situations affect the overall level of a person’s health. One that they felt is always overwhelmed while they eat poorly, sleepless and overwhelmed with stressful events”. All the presented literature and studies that deal with stress related to the present study in terms of the feelings and emotions of college students about stressors and the result of these factors affecting them especially in family and peer relationships, while meeting the demands of school related works.

3. Coping Mechanisms

Table 7. Coping Mechanisms

Coping Mechanisms	Weighted Mean	Verbal Interpretation
1. Go out with friends	3.60	Likely cause of stress
2. Ask the advice of friends/classmates/family	3.53	Likely cause of stress
3. Keep self-busy	3.60	Likely cause of stress
4. Watching movies and other programs on television	3.41	Likely cause of stress
5. Engaging in sports	3.43	Likely cause of stress
6. Using the internet (chat, Facebook, etc.) and playing online games	3.42	Likely cause of stress
7. Limiting your contact to the source of stress	3.58	Likely cause of stress
8. Go out of town to unwind	3.40	Likely cause of stress
9. Be more spiritual	3.67	Likely cause of stress
10. Get some rest	3.63	Likely cause of stress
Average Weighted Mean	**3.53**	**Likely cause of stress**

Table 7 presents the coping mechanisms of the respondents. The statement "Be more spiritual" got a highest weighted mean of (3.67) with a verbal interpretation of “Likely cause of stress” while statement 8 “Go out of town to unwind” got the lowest weighted mean of (3.40) with a verbal interpretation of “Likely cause of stress”. The average weighted mean of the table is (3.53) with a verbal interpretation of “Likely cause of stress”. This implies that students can overcome whatever trial that God put in their way, how they perceived the problems within their reach or way beyond their control is also a factor on how they can cope with the stress they experienced.When under stress, individuals employ coping responses to either change the nature of the situation to make it more manageable or to reduce their negative effect [10].

IV. CONCLUSIONS AND RECOMMENDATIONS

In the light of the findings, the following conclusions were drawn: As to the causes of academic stress, the majority of the students are having difficulty in dealing with teachers, requirements completion, and having cheater classmates. The students agreed that because of academic stress, they were tired and sleeping more or less which affects their self-confidence and they are being moody. Furthermore, respondents agreed that to cope with academic stress they choose to be more spiritual.

Based on the findings, proper utilization of coping mechanisms can be designed to help students to manage their stress and be competent enough in their academic performance. The teachers may support the students all the time to establish a harmonious and professional relationship with them. Discussion for the most practical adaptation to prevent the existence of the excessive amount of stress in the students should be conducted to train the learners for increasing their analytical skills in situational settings by solving both complex and simple problems [11]. Furthermore, the most possible activities should be given to decrease the strength of stressors that could effect on the physical, psychological and mental behavior of the students. Lastly, a follow-up study on the stress factors and academic performance of the college students may be conducted for a broader and deeper understanding of the problem.

REFERENCES

[1] Shaikh, B.T., Kahloon, A., Kazmi, M., Khalid, H., Nawaz, K., Khan, K.A. & Khan, S. (2004). Students, stress and coping strategies: A case of Pakistani Medical School. Education for Health, 17 (3), 346-353.

[2] Lucier, Kelci Lynn.(2013). How to Identify the Sources of Stress inCollege. USA: About.com.collegelife.

[3] Chadna, Pradeep (2006). Stressors-External and Internal. The StressBarrier-Nature's Way to overcoming Stress. Dublin, Ireland: Blackhall Publishing

[4] Kumar, R.(2014). Research Methodology : A step-by-step guide for beginners (4th.ed.) SAGE,CA: Thousand Oaks

[5] Subia, G.S., Trinidad, C.L., Pascual, R.R., Medrano, H.B. & Manuzon, E.P.(2019). Learning Styles and Preferred Teaching Styles of Master of Arts in Teaching (MAT), major in Vocational Technological Education (VTE) Generation Y Learners. International Journal of English Literature and Social Sciences (IJELS).Vol-4, Issue 2, Mar-Apr, 2019. https://dx.doi.org/10.22161/ijels.4.2.35

[6] Subia, G.S.(2018). Comprehensible Technique in Solving Consecutive Number Problems in Algebra. Journal of Applied Mathematics and Physics, 6, 447-457. https://doi.org/10.4236/jamp.2018.63041

[7] Hussain, A., Kumar, A. & Husain A. (2008). Academic stress and adjustment among high school students. Journal of the Indian Academy of Applied Psychology, 34, 70-73.

[8] Laguador, J., Ramirez, Y., & Pagcaliwagan, A. (2013). Vulnerability of the graduating students to different symptoms of stress and its influence to level of satisfaction. International Journal of Behavioral Social and Movement Sciences, 2.

[9] Archer, James.Ph.D., Christina Carroll, Ph.D, Jaquelyn Liss Resnick, Ph.D. (2003). University of Florida Counseling Center 301 PeabodyHall, Gainesville FL 32611 (352) 392-1575

[10] Wood, J. (2007). Understanding and addressing attendance problems in urban schools. In Gates, G.S. *Emerging thought and research on student, teacher, and administrator stress and coping.* (pp. 3-34). Charlotte, North Carolina: Information Age Publishing, Inc.

[11] Subia, GenerS. (2018). Think Like My Teacher (TLMT): A New Method in Assessing Millennial Learners. International Journal of Arts, Humanities and Social Sciences. Volume 3. Issue 1.www.ijahss.com