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Weighing the Teachers' Motivation, Teaching Pedagogies, Students Level of Academic Achievement a Millennial Goal to Science Education

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Abstract:- In harmony to the teaching millennium goal this study weighted the academic achievement of high school students as to their grade point average (GPA) and national achievement test (NAT) score in Science subjects using the frequency count and percentage, weighted mean, contingency of coefficient, thru Descriptive-correlational methods. Wherein teachers' perspective, motivation, pedagogies of teaching were given importance. Eventually, this study are beneficial to the *Science Education Supervisors, School Administrators, Science Teachers, Science Students,* and Future *Researchers.*

Keywords:- *Motivation, Teaching Pedagogies, Academic Achievement, Science Education, Student Achievement.*

I. INTRODUCTION

Science education worldwide affirmed its dismal status, global trend showed poor performances of in developing countries compared to other subjects in many schools despite the fact that teachers are determined to ensure that this performance is improved even though they face many challenges (Mukabane, 2016). Based DepEd reports, despite of the major educational reform in the K to 12 Program, academic achievement of elementary and high school students in Science continually decreases as time spent in school, their performance in the National Achievement Test (NAT), their performances in Science and Mathematics (Benito, 2010); (Imam, Abas-Mastura & Jamil, 2013). Previous literatures revealed that academic achievement of Science education as mediocre, disappointing and devastating in spite of the reported reforms in Science education even in the first world countries. Under the K to 12 Program, Science had been pointed out by the as among the 10-point basic education agenda aimed at rebuilding structure for Science education so the Philippines can produce quality graduates in the field of science to ensure the country's pool of expert professional who are globally competitive (De Justo, Digal & Lagura, 2012); (Sergio, 2014). An Analysis of the Policy: K-12 Education Program. Science education under the new curriculum is geared toward global responsiveness and competitiveness as measured against the standards of regional or international organizations such as the ASEAN Economic Community (AEC). The K-12 Program is a strategy that prepares the Philippines in parallel assessment on quality of graduates along with competitors in regional or international economic communities (Ogena, 2015). Along this line, the teachers play a very important role in the achieving the millennium goal of Science education. It is assumed that when teachers are not motivated, then they may leave their teaching professions to pursue other careers or teach poorly. This may affect the academic performance of their students. Teachers are an essential element in ensuring that the realization of National and International educational goals is achieved through the transfer of knowledge (Akyeampong, 2009); (Lauwerier & Akkari, 2015); Iliya, A., & Ifeoma, L. G. (2015). The teachers' use of effective pedagogies is also deemed necessary to improve teaching and learning in Science subject (Van riel, Verloop, & De Vos, 1998); (Gess-Newsome, & Lederman, (Eds.), 2001); Magnusson, S., Krajcik, J., & Borko, H. (1999). This includes professional competence of teachers, pedagogical contents, and general pedagogy (Blömeke & Delaney, 2014). This could also refer to the teachers' positive attitudes, strategies and teaching practices in facilitating effective teaching and learning (Ejiwale, 2012) Brookfield, S. (1986). This implies provision of an advanced and more responsive Professional Development Program for Science teachers in order to improve the status of Science education which according to studies have continuously deteriorated. Thus, there was a need to conduct a study to ascertain the motivational factors of Science teachers, the pedagogies they used and the level of academic achievement of students particularly in the locality. The findings of the study served as basis for developing a program to boost the morale of Science teachers and help them develop effective pedagogies in teaching the Science subjects. The choice of the locale of the of the study which comprised the Mainit 1 and 2 Districts was a personal choice of the proponent being a Science subject teacher in one of the public schools in Mainit. The researcher observed the low academic achievement of students in Science subjects based on the National Achievement Test (NAT) in Science subjects for the last three years. This condition prompted the researcher to conduct this study. The study ascertained the level of teacher motivation, pedagogies of teaching and the learning achievement of students in science subjects. The

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study assumed that the level of teacher motivation and their pedagogies of teaching in science subjects significantly contribute learning achievement of students (Anderson & Iwanicki, 1984); (Ames & Ames, 1984).

II. STATEMENT OF THE PROBLEM

Scenario determined that National Achievement Test (NAT) results were continually decreases wherein this results detrimentally affected the performances of teachers both in district 1 and district 2 of Mainit District, Mainit, Surigao del Norte, Philippines. Besides this NAT results contemplated as basis for Performance Based Bonus (PBB) as gauged for monetary incentive. By then, the author wishes to address this concern, to resolve issues that hindered the purpose therein, and to contribute resolution onward to vindicate the school out from students' poor performance cognizant to NAT.

III. PURPOSE OF THE STUDY

❖ *Significance of the study*

The study will add to the body of knowledge in the field of science education. Specifically, this will be beneficial to the following;

➢ *Science Education Supervisors.*

The findings will provide them feedback to improve their supervisory programs and activities in science education.

➢ *School Administrators*.

This will provide feedback that can be used in developing responsive and contextualized program to increase the level of teacher motivation and enhance their pedagogies in teaching the Science subjects.

➢ *Science Teachers*.

Understanding the perceptions of students towards science teaching and learning provides them insight on how to motivate students to learn science and plan out a more responsive teaching strategy to ensure quality science education.

➢ *Science Students.*

They will be more motivated to learn since this study help enhance the quality of science education instruction.

➢ *Future Researchers*.

They can make use of the present findings as reference of future related studies.

IV. OBJECTIVES OF THE STUDY

The study determined the level of teacher motivation, pedagogies of teaching and level of academic achievement of high school students in Mainit 1 and 2 Districts SY 2015-2016. Descriptive-correlational methods of research were employed based on perceptions of the 30 Science teacher respondents and the grade point average (GPA) and national achievement test (NAT) score in Science subjects. Data gathered were analyzed using the frequency count and percentage, weighted mean, contingency of coefficient.

V. RESEARCH QUESTIONS

Purposive to determine the level of teacher motivation, the extent of pedagogy of Science teachers and the academic achievement of high school students in Mainit 1 and 2 Districts, Division of Surigao del Norte. Specifically, the study sought answers to the following questions:

1. What is the level of teacher motivation in teaching Science along the following aspects:

1.1 Personal;
1.2 School;
1.3 Community?

2. To what extent do teachers apply pedagogy in Science in terms of:

2.1 Knowledge Pedagogy;
2.2 Psychological Pedagogy;
2.3 Teaching Pedagogy?

3. What is the academic achievement of students in Science in the following components:

3.1 GPA in Science;
3.2 NAT score in Science?

4. Is there a significant relationship between academic achievement of students in Science and the:

4.1 teacher motivation; and the
4.2 application of pedagogies teaching?

5. On the basis of the findings, what program can be proposed?

VI. STATEMENT OF HYPHOTHESES

Ho_1. There is no significant relationship between academic achievements of students in Science of teacher motivation.
Ha_1. There is a significant relationship between academic achievements of students in Science of teacher motivation.

Ho_2. There is no significant relationship between academic achievements of students in Science of application of pedagogies teaching.

Ha_2. There is a significant relationship between academic achievements of students in Science of application of pedagogies teaching.

VII. METHODOLOGY

In this study descriptive research design used to assess the level of teacher motivation, teaching pedagogies in science education based on perceptions, 30 high school Science teachers (see Table 1 & 2). Purposive sampling was employed in selecting teachers' participant on the basis of their teaching experience in Science subject. The GPAs and NAT results of high school students of the 2 districts are the baseline in measuring academic achievement. Gathering of data made possible thru survey using questionnaire, gathering of data done during free or vacant time, this also involve documentation by photocopying the grades and NSAT scores in Science subjects within and during the SY 2016-17. This is to gauge the academic achievement in Science subjects in Grade 10 students from the two districts in Mainit, Surigao del Norte, Philippines. *Frequency count and percentage*. These were used to describe the profile of the respondents; *Mean and standard deviation.* These were used in determining the level of teacher motivation and extent of use of pedagogies in science education, and the academic achievement of Grade 10 students in Science subjects;

- *Coefficient Contingency*

This was used in finding out significant relationship between the level of teacher motivation and extent of pedagogies and the level of academic achievement of high school students in Science subjects.

Distribution of Participants		
District	**Sample Size of Teachers**	**Sample Size of Students**
School 1 (Mainit NHS)	**6**	**60**
School 2 (Magpayang NHS	**6**	**40**
School 3 (Paco NHS)	**6**	**40**
School 4 (Matin-ao NHS)	**6**	**100**
School 5 (Hacienda NHS)	**6**	**60**
Total	**30**	**300**

Table 1:- The Participants

❖ *Data Analysis*

Data gathered in the study were analyzed using the following statistical tools through Statistical software:

- *Frequency Count and Percentage*.

These were used to describe the profile of the respondents;

- *Mean and Standard Deviation.*

These were used in determining the level of teacher motivation and extent of use of pedagogies in science education, and the academic achievement of Grade 10 students in Science subjects;

- *Coefficient Contingency*.

This was used in finding out significant relationship between the level of teacher motivation and extent of pedagogies and the level of academic achievement of high school students in Science subjects.

VIII. RESULTS

Findings and results are presented by tables for more illustrative discussions, see details below

Profile of the Science Teachers		
Variables	*f*(n=30)	%(100)
Gender:		
Male	3	10
Female	27	90
Age		
30 years and below	5	16.67
31 to 40 years	7	23.33
41 to 50years	12	40.00
51 to 60 years	6	20.00
Highest Educational Attainment		
BS degree	15	50.00
With master's units	6	20.00
Master's degree	6	20.00
Doctoral units	3	10.00
Field of Specialization		
Science Major	18	60.00
Non-Science Major	12	40.00
No. of Years Teaching Science		
1 to 5 years	5	16.67
6 to 10	10	33.33
11 to 15	9	30.00
16 years and above	6	20.00

Table 2:- Profile of the Participants

Findings showed that Science teachers are dominantly female, with an age ranging from 41 to 50 years, a bachelor's degree holders with major in Science and in the service from 6 to 10 years, probably with sufficient training and experiences in teaching. Though, their background implied the need to pursue graduate education to upgrade their professionally endeavor. As observed there were those who are not inclined to science education but involved in teaching Science subject but results supplementary convened that teachers were highly motivated in all aspects as demonstrated above in table 2.

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Motivational Factor			
Indicators	**Mean**	**VI**	**QD**
Personal			
I am passionate about teaching profession	3.60	SA	Highly Motivated
I love teaching Science subjects	3.90	SA	Highly Motivated
I enjoy working with pupils	3.50	SA	Highly Motivated
I am satisfied of the Salaries/wages I received	3.50	SA	Highly Motivated
I enjoyed the benefits in teaching profession	3.50	SA	Highly Motivated
Average	**3.68**	**SA**	**Highly Motivated**
School			
Our school provides full administrative support	3.30	SA	Highly Motivated
Educational policies in school are favorable and meaningful	3.55	SA	Highly Motivated
Instructional facilities in our school are sufficient	2.70	A	Motivated
Learning resources in our school are available and sufficient	2.90	A	Motivated
Our workload is fair and manageable	3.50	SA	Highly Motivated
Physical environment in our school is healthy and conducive	3.60	SA	Highly Motivated
We have good relationship with people in the workplace	3.70	SA	Highly Motivated
Average	**3.31**	**SA**	**Highly Motivated**
Community Factors			
Stakeholders always support our programs & activities	3.50	SA	Highly Motivated
We have good relationship with parents	3.60	SA	Highly Motivated
We have good relationship with community	3.60	SA	Highly Motivated
We always consult stakeholders in planning & decision making	3.30	SA	Highly Motivated
We consider stakeholders as partners in Science education	3.50	SA	Highly Motivated
Average	**3.50**	**SA**	**Highly Motivated**

Parameters	***Verbal Interpretation***	***Qualitative Description***
4.00 to 3.26	Strongly Agree	Highly Motivated
3.25 to 2.51	Agree	Moderately Motivated
2.50 to 1.76	Disagree	Less Motivated
1.75 to 1.00	Strongly Disagree	Not Motivated

Table 3:- Level of Teacher Motivation

Based on data, teachers uphold the school's public policies as they manifested love in teaching, they are fond with pupils, working with passion, satisfied with the salaries they earned from teaching, and with good community relations as to parents, stakeholders, organization and to the environment. Eventually, this study reflected that teachers' performance were highly motivated in teaching the Science subjects as manifested in their intrinsic and extrinsic behaviors both in personal and professional features this evidently evident that in this study the administrators and teachers shared their tasks and responsibilities in working together towards the attainment of common goals in the spirit of trust, cooperation, and innovation (Benell & Akeamping, 2015; Duke, 2015). This is also attributed to effective school leadership, as assumed that the level of motivation in teachers highly contributes performance of students particularly in in Science subjects (Alemayehu, 2015; Mukabane, 2016). Thus, it can be inferred that sufficient teaching and learning conditions have been provided to students which consequently help them achieve higher learning performance particularly in Science subjects.

Pedagogies of Teaching			
Indicators	**Mean**	**VI**	**QD**
Knowledge Pedagogy			
I demonstrate mastery of learning contents	3.40	SA	Very High
I can construct/build new knowledge in Science	3.10	A	High
I demonstrate continuous monitoring and assessment of learning	3.50	SA	Very High
I can sense opportunity for learning	3.50	SA	Very High
Average	**3.37**	**SA**	**Very High**
Psychological Pedagogy			
I can implement various teaching methods in Science	3.40	SA	Very High
I know when and how to apply each method	3.40	SA	Very High
I can formulate learning objectives and plan the lesson process	3.50	SA	Very High
I always observe lesson planning and evaluation	3.30	SA	Very High
I can deal with heterogeneous learning groups	3.50	SA	Very High
Average	3.42	SA	Very

			High
Teaching Pedagogy			
I can facilitate effective teaching and learning	3.40	SA	Very High
I always observe good classroom management	3.60	SA	Very High
I develop and employ strategies of feed backing	3.40	SA	Very High
I can create safe and conducive learning environment	3.50	SA	Very High
I can draw concepts on student's background and experiences	3.50	SA	Very High
Average	3.44	SA	Very High
Average Mean	3.41	SA	Very High

Parameters	***Verbal Interpretation***	***Qualitative Description***
4.00 to 3.26	Very High	Strongly Agree
3.25 to 2.51	High	Agree
2.50 to 1.76	Low	Disagree
1.75 to 1.00	Very Low	Strongly Disagree

Table 4:- Results on the pedagogies of teaching

Table 4. Explained that Science teachers had their own way of observing classroom management, conducive learning environment, facilitated effective learning-teaching and effective strategies in feed backing. Psychologically, the teachers demonstrated pedagogical understanding in formulating learning objectives and process in attaining plan, dealing with heterogeneous learner groups, understanding and applying effective methods in teaching. Furthermore, it is evident that Science teachers in the districts demonstrated knowledge on how to sense opportunity for learning and continuous monitoring and assessment of learning, as it was denoted based on scale and symmetrical results that teachers' pedagogies in learning-teaching is conventionally with very high verbal interpretation, which mainly agreeable as emphasized by Westbrook (2013) that these pedagogies of teaching promote active participation, cooperative learning and inquiry-based learning. Pedagogy as a practice means that the teachers had the skills in eliciting information, asking questions, and following up questions to support learning (Barrett, 2007, Childs et al., 2012, Epstein and Yuthas, 2012). Pedagogy as an idea indicates not just what teachers do in the classroom, but also their ideas, knowledge and attitudes in relation to the learners, the teaching and learning process and the curriculum. This could change the teachers' attitudes towards teaching and could fully develop more critical thinking and enhance professionalism in the field of teaching (Dorner & Gorman, 2011); (Marshall & Sorto, 2012).

Distribution of GPAs of High School Students SY 2015-2016			
Grade Point Average (GPA)	**Level**	**F(n=30)**	**Percent (%)**
Developing	(75-79)	6	18%
Approaching Proficiency	(80-84)	9	30%
Proficient	(85-89)	11	37%
Advanced	(90 & Above)	4	15%
Mean GPA	**84.60% Proficient**		
National Achievement Test (NAT)			
Developing	(75-79)	8	26.67%
Approaching Proficiency	(80-84)	12	40.00%
Proficient	(85-89)	7	23.33%
Advanced	(90 & Above)	3	10.00%
Mean NAT	**82.40% Proficient**		

Table 5:- Level of Academic Achievement in Science Subjects

Table 5. Basically expound that teacher motivation, their pedagogies of teaching based on results of the Students' grade point average (GPA) and mean percentage score in the National Achievement Test (NAT) of the Grade 10 students of Mainit 1 and 2 Districts of the SY 2015-2016 obtained an score of 84.60% GPA this means that students met the Proficient level of achievement. And precisely, the National Achievement Test of an over-all average of 82.40%, also qualitatively described as Proficient. Generally, it can be seen that the academic achievement of the Grade 10 high school students in Science subjects in Mainit 1 and 2 Districts was within the proficiency level. Proficiency level of academic achievement describes learners to have acquired minimum knowledge, skills and competencies set by the DEpEd in these specific subjects. Furthermore this indicated that the students had yet to acquire more advanced knowledge and develop more competencies in Science sufficient enough for them to demonstrate scientific attitude in dealing with various situations in life.

Correlation Between Students' Academic Achievement and the Independent Variables				
Variables	**Mean**	**r(xy)**	**p-value**	**Decision**
Motivation	3.50	.826	.001	Significant
Pedagogies of Teaching	3.41	.804	.001	Significant
National Achievement Test	**82.40**			
Motivational Factor	3.50	.867	.001	Significant
Pedagogies of Teaching	3.41	.878	.001	Significant

Table 6:- Relationship between Motivation, Pedagogies of Teaching and the Academic Achievement in Science *Legend: Significant at .05 level*

As shown in Table 6, there was a significant correlation between the students' general perceptions towards Science teaching and learning and the over-all academic performance of students on the correlation coefficient value (r) .850 and a p-value of .0001 which is lower than the critical value set at .05 level of significance. The pattern of relationship that as the teacher was highly motivated towards Science teaching, the more likely should the students achieve higher academic achievement. On the same vein, the more extensive was the application of pedagogies in Science teaching, the higher is the tendency that students achieve higher academic achievement. Thus, consistent with the findings on the high motivation of teacher and the application of teaching pedagogies and their significant relationship with the academic achievement of students, the study concluded that the teacher motivation and pedagogies of teaching are significant predictors of academic achievement in Science subjects. The present finding corroborated previous findings which revealed significant contributions of teacher motivation and pedagogies of teaching in enhancing students' learning achievement (Arkorful, 2012); (Epstein & Yuthas, 2012).

IX. CONCLUSION

Findings revealed that Teachers' Motivation attributed to personal factors, posted the highest mean among the indicators used, their pedagogies in teaching Science subjects is beyond the proficiency standards, their teaching performance reflexive to the academic achievement of students based on grade point average GPA) of 84.60% and the national achievement test (NAT) of 82.40%. This significantly correlates between the students' GPA, and teacher motivation (r=.826), and pedagogies of teaching (r=.804). This further explained that there is a significant correlation between the students' NAT and the teacher motivation (r=.867), and pedagogies of teaching (r=.878). The study emphasized that Science teachers in Mainit 1 and 2 developed and practiced pedagogies in teaching the Science subjects. They demonstrated teaching pedagogy in classroom management and in learning contents. The academic achievement of students was proficient based on grade point average (GPA) and the percentage score in the national achievement test (NAT). The level of teacher motivation and the extent of application of pedagogies of teaching were significant determinants of academic achievement of students in Science subjects.

RECOMMENDATIONS

Based on the conclusions, the following recommendations are offered:

1. Teaching motivation and pedagogical practices of Science teachers in Mainit 1 and 2 Districts should serve as benchmark for other teachers. However, school administration should further motivate the teachers by providing them sufficient instructional facilities and learning resources;
2. The Science teachers in Mainit 1 and 2 districts needed to enhance their teaching pedagogy constructing or building new knowledge in the field of Science education;
3. Effective intervention programs and activities should be developed and be implemented to enhance the application teaching pedagogies among the Science teachers in the districts; and
4. Science teachers should manifest very high level of teacher motivation and pedagogies to improve the academic achievement of the students.

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