Correlation of Teaching Competencies among Science and Non - Science Majors and the Level of Mastery among Students in Selected Public Secondary Schools in Northern Samar, Philippines

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ABSTRACT

The respective roles of teachers and students in teaching and learning science have become at present on of the most important domain of science education. Thus this study was conducted to determine the teaching competency of science and non-science teachers in teaching science and how it is related to student's level of mastery of science concepts in selected public secondary school in Northern Samar. This study also tried to find out the significant relationship between the teaching competence of the respondents and the student's level of mastery of science. The significant difference between the teaching competence of science and non-science majors was also determined in this study as well as the significant difference in the level of mastery of science concepts between students under a science major and those who are under non-science teachers. Each geographical area of Northern Samar was represented: the pacific area; the central area; and the balicuatro area. The respondents of the study included the science and non-science teachers of the said schools, chosen randomly through fishbowl method, and the students under these teachers which were chosen through random sampling method. This study utilized the descriptive-correlational research design and questionnaire as its main instrument. The level of competency of teachers was found to be "highly competent" in terms of their teaching skills, classroom management and majority indicated "competent" in terms of knowledge. On the other hand, a majority of the students were found to be "low" in terms of their level of mastery in science concepts. A significant relationship was indicated between the teaching competency of teachers and student's level of mastery. Similarly, a significant relationship was found out on the test of difference between the teaching competence of science and non-science majors in teaching science subjects as well as to the level of mastery of science concepts between students under science and non-science major teachers.

KEYWORDS: *teaching competencies; science majors; level of mastery; secondary schools; Northern Samar*

I. INTRODUCTION

Teaching science in the context of science, technology and society is basically relating science to everyday life. People today spend their lives where society is more challenging, highly competitive with more advanced knowledge and means of living through science and technology. Thus, one can say that science education is very important to equip the people skills that will be suited to the kind of society where they live.

The respective roles of teaching and students in teaching and learning science have become at present on of the most important domain of science education. Understanding the various science context domains has comprehensively been one of the focus

of the Philippines educational system together with the area of English and Mathematics. It is in this spirit that it cannot be that-science and technology education has long been recognized as an indispensable competent of economic progress and self-sufficiency. It is a dynamic force that can bring about socio-cultural change and improve the quality of life.

In order to become truly literate in an area of science, students must, (a) have a deep foundation of factual knowledge, (b) understand facts and ideas in the context of conceptual framework, and (c) organize knowledge in way that facilitate retrieval and application.

Teachers have high competency in social regard for learning, diversity of learners, curriculum, planning, assessing and reporting, community linkages, and personal growth and professional development. Teachers consider themselves to possess the strength to be successful educators. Most of them have completed already the training and development needs. It can be concluded that most teachers plan and carry out competency-based education in mind and in practice. They approach instruction and assessment on the perspective that places primary emphasis on identifying and measuring specific learning outcomes or competencies (Ty, Sanico, 2021).

Andarino (2021) on her study of biology in high school revealed that biology teachers are highly skilled professionals, therefore, they are expert in their field of specialization. This is because of the strict selection/admission policy on hiring teachers such that teachers. It also revealed that there is a significant relationship between the teacher's educational attainment and the student's performance in biology.

Suryanarayana (2011) stated that the keystone in the educational edifice is doubtless the teacher. On him depends much more than any other the progress and prosperity of children. Nobody can effectively take his place or influence children in the manner and to the degree; it is possible, for him alone to do. It is strongly believed that to be a teacher is to be the member of a holy order.

Cabotaje (1989) conducted a study on teaching competencies of secondary school teacher in the newly nationalized High School of Alcala, Pangasinan. He considered four skills/areas of teachers such as teaching skills, guidance skills, management skills and evaluative skills. He also included the profile of the teachers such as age, sex, civil status, teaching experiences, educational qualification and in-service training. In his study he found out that teachers were "competent" in their evaluative skills and "very competent" in teaching skills, guidance skills and management skills as rated by themselves.

Gatongay (1983) conducted a study to find out the scientific abilities of third year students in selected public and private high schools with the use of a teacher made test. An examination was conducted in the central region of Northern Samar to find out the student's achievement in Chemistry so as to better channel student's direction. The study found out that the recall, like chemical shortcuts, identifying laboratory apparatus, existence of atoms and patterns of change were the scientific concepts mostly possess by the two comparable schools, while the concepts, skills and that abilities that need respondent-teaching were the nuclear model, acid base and salts, power of numbers of Avogadro's concept.

A meta-analysis was done by Davis and Sorell (1995) which contained 27 studies addressing five areas: student achievement, student retention, time variables, student affect and teachers' variables, they found that achievement results were overwhelming positive, but varied greatly from study to study. Students in mastery learning program at all levels showed increased gains in achievement over those in traditional instruction programs affects were somewhat in elementary and Junior high school classes than the high school level. Effects in Language Arts and Social Studies classes were slightly larger than those attained in Science and Mathematics classes. Students retained what they had learned longer under mastery learning, both in short-term and long-term studies. In addition, students who were engaged in learning for a larger portion of the time they spent in mastery classes and required decreasing amount of corrective time over a series of instructional units developed more positive attitudes about their ability to learn. Finally, teachers who used mastery learning developed more positive attitudes toward teaching, higher expectations for students and a greater personal responsibility for learning outcomes.

The growing complexity of societal needs and activities coupled with the explosion of scientific at teachers' knowledge has led to the question aimed competencies in teaching. One of the problems of a teacher in all levels of educational system is how to make students learn effectively. Mastery of the subject calls for the teachers' expertise in their own field coupled with their ability to make concepts understandable to the learners. With the present educational technology teaching competence and students' science know-problems that greatly affect

not only the ho ware stake holders of any school but more importantly the thrusts of the national government. Thus the researcher tried to determine the factors affecting the student's level of mastery of science concepts, particularly the teaching competency of science and non-science majors would be of vital help in developing science instruction.

II. Methodology

This study was conducted in selected secondary public schools in the province of Northern Samar. The province comprises three (3) geographical area, namely: Balicuatro Area situated at the north-western part of the province consisting of the municipalities of Rosario to San Isidro including its adjacent island municipalities; Central Area covering the municipalities of Mondragon to San Jose including the towns of Biri and Lope de Vega; and the Pacific Area embracing the towns in the eastern part of the province from San Roque to Lapinig including the municipalities of Catubig and Las Navas. In consideration for which the study conducted, each geographical area was represented such as the Pambujan National High School (PNHS) in the pacific area, the Eladio T. Balite Memorial School of Fisheries (ETBMSF) in the central area, and Basilio B. Chan Memorial Agricultural and Industrial School (BBCMAIS) in the Balicuatro Area.

The population of this study composed the teachers handling science and technology subjects, and students in the selected public secondary schools of the province. the high schools included in the study were selected on the consideration that they had at least three (3) teachers who were science major and three (3) who were non-science majors teaching the subject in either or both science technology I, II, and III. The high schools having more than three (3) science or non-science majors, the respondent-teachers were chosen using fish bowl method. The student-respondents in each curriculum year of every high school were selected using the sample size formula with 95%±5 confidence interval. The respondents will answer a survey questionnaire. The scoring and interpretation of the data is presented below.

Part I of the questionnaire was scored and interpreted using frequency counts and percentage. Part II adapted the rating scale of the original authors shown as follows:

Scale Scoring Interpretation
54.2 - 5.0 Highly Competent
43.4 – 4.1 Competent
32.6 – 3.3 Moderately Competent
21.8 – 2.5 Slightly Competent
11.0 – 1.7 Less Competent

The scoring and interpretation of the Part III of the research instrument which is the level of mastery of students in General Science, Biology and Chemistry subjects was adapted according to the way the Department of Education (DepEd) employed it whose rating is as follows:

Score Interpretation
40 – 50 Very High
30 – 39 High
20 – 29 Average
10 – 19 Low
1 – 9 Very Low

III. Results and Discussion

This chapter will present the frequency distribution on the level of competency of the level of competency of the science and non-science major teachers in terms of general knowledge/mastery, teaching skills, classroom management, and evaluation skills. To determine the level of competency of the teachers, the weighted mean and frequency counts were used. In Table 1, the data gathered revealed that a majority of the respondents indicated "highly competent" in terms of their teaching skills, classroom management, and evaluation skills, while in terms of general knowledge they only indicated "competent."

The finding revealed that a majority of the respondents indicated "competent" in terms of comprehensiveness and accuracy grasp of the subject matter; relating the subject matter to other fields of knowledge; and enriching discussions with contemporary issues and events. "Highly competent" was however indicated in terms of integrating subject matter with relevant topics; answering student's inquiry intelligently; and contributing to the intelligent resolution of student's questions.

It has an average mean of 4.13 with a descriptive rating of "competent". This implies that one can be an effective science teacher if s/he professes the mastery on the general science knowledge. Salandanan(2002) further states that a mastery of the basic science concepts introduced on the elementary or secondary level is definitely a must. This body of facts, principles, and theories is leaned and accumulated for the late during the students' education.

The data presented revealed that a majority of the respondents indicated "highly competent" in terms of organizing and presenting of subject matters clearly and coherently; communicating in English and/or Filipino fluently; presenting the lessons systematically and analytically; adjusting teaching methods to students' needs, interests and capabilities; using of variety of techniques, approaches and

strategies to make the lessons interesting and meaningful; relating lessons to existing conditions and real-life situations; encouraging students to ask questions and to express their own point of view ; and analyzing and identifying specific learning tasks. Meanwhile, the respondents indicated "competent" in on the following: using effectively of language in expressing ideas in class discussions; stimulating thinking and clarifying lessons through effective questions; using visual aids to illustrate and clarify the subject matter when the need arises; providing challenging tasks, problems and assignments; selecting, preparing and utilizing of instructional materials effectively in achieving teaching objectives; identifying and capacitating individual students and providing adequacy for these; and motivating the lessons and asking questions effectively to develop critical thinking and creativity.

It has an average mean of 4.2 and interpreted as "highly competent". This implies that both the science and non-science major teachers can be competent in science teaching coupled with teaching skills. This was confirmed by Salandanan (2002) that a teacher must exhibit genuine eagerness and an excellent capacity to learn and impart scientific knowledge as well as gain and provide experiences for developing skills in the basic science processes.

The data gathered showed that a majority of the respondents indicated "highly competent" in terms of commanding respect from students; preparing adequately for the day's learning activities; starting learning activities promptly; coming to class and leaving it on time; utilizing class periods productively; awakening and maintaining student's interest in the lessons and class discussions; and administering test effectively and returning corrected paper and other student's work promptly. "Competent" was however indicated by the teachers in achieving teaching objectives to the optimum degree possible for the particular subject, lessons, or activity within a reasonable time frame.

It has an average mean of 4.4 with descriptive rating of "highly competent." This implies that the teachers are dedicated and committed to make the school environment more conductive to learning. This was confirmed by Aquino (1998) who stated that without teachers, the other elements of the educational environment (physical features, classrooms and laboratories, teaching aids, instructional materials) would be ineffective, for they guide, direct and stimulate the youth in their goal seeking.

The data gathered showed that a majority of the respondents indicated "highly competent" in terms of evaluating students' performances fairly and uses

adequate and accurate measures of evaluation; and utilizing evaluation result as a result for improving instruction. Meanwhile, "competent" was indicated in terms of selecting and utilizing criterion referenced tests; and analyzing and interpreting evaluation results skillfully. It has an average mean of 4.3 having a descriptive rating of "highly competent." This implies that the teachers are giving emphasis on identifying the students' strengths and weaknesses towards science subjects.

Table 1 Frequency distribution on the level of competency of teachers

Items	Average Mean	Interpretation
A. General Knowledge/ Mastery	4.13	Competent
B. Teaching Skills	4.2	Competent
C. Classroom Management	4.44	Highly Competent
D. Evaluation Skills	4.3	Highly Competent

Table 2 presents the frequency distribution on the students' level of mastery in science concept as grouped into non-science and science major teachers.The data revealed that majority of the students or 62.04% out of 108 students had "low" level of mastery in science concepts. Meanwhile, 33.33% or 36 of the students had "average" mastery on science concepts while three (3) or 2.77% had high and two (2) or 1.86% had very low level of mastery in science concepts. This implies that the teachers must find ways to improve the students' mastery in science subjects. This was averred by Cortes that the students' low performance which results to low mastery level of concepts brought about by the following factors such as teaching methods employed by the teachers.

Table 2 Frequency distribution on the level of mastery in science concepts of the students

	Frequency	Percent
High (30 -39)	3	2.77%
Average (20-29)	36	33.33%
Low (10-19)	**67**	**62.04%**
Very Low (0-9)	2	1.86%
Total	**108**	**100.0%**

Table 3 presents the relationship between the teachers' teaching competency and the students' level of mastery of science concepts. The finding revealed that the teaching competence of teachers is significantly related to the students' level of mastery of science concept. The F ratio of 3.52 was greater

than the significant F of 0.078 that lead to the rejection of the null hypothesis. This signifies that teaching competency could greatly determine the students' level of mastery of science concepts as supported by the coefficient of determination of 18.03%. This implies that the higher the competency level of the teachers in teaching science the higher will be the mastery and learning of the students. This is confirmed by Salandanan (2002) that the mastery learning of the teachers is judged on the basis of the student's performance level, which is predetermined and which will be the sole criterion for evaluating mastery of a certain topic.

Table 3 Summary Result on the Relationship between the Teaching Competency of Teachers and Students' Level of Mastery of Science Concepts

	F Ratio	Significant F	Coefficient of Determination	Interpretation
Teaching Competency	3.53	0.078	18.03%	Significant

Table 4 presents the summary result on the difference between the teaching competency of science and non-science majors in teaching science subject. The computed data showed that there is a significant difference between the teaching competency of science and non-science majors in teaching science subject. The t-tabular value of -1.198 was less than the t-computed value of 2.119 that led to the rejection of the null hypothesis. This implies that the effectiveness in teaching science subject is dependent on whether the teacher is a science major or not. Furthermore, Lardizabal(1995) stated that teaching may also be affective acts in ways that are favorable to the development of a desirable personality in the learner.

Table 4 Summary result on the difference between the teaching competency of science and non-science majors in teaching science subjects

Teaching Competency	N	Means	Mean Difference	Tabular Value		Interpretation
				t-computed	t-tabular	
Non-Science Major	9	143.4	10.9	2.119	-1.198	Significant
Science Major	9	132.5				

Table 5 presents the summary result on the difference in the level of mastery of science concepts between students under science and non-science major teachers. The data revealed that there is a significant difference in the level of mastery of science concepts between students under science and non-science major teachers. The t-tabular value of 0. 089 is less than the t-computed value of 1.982 that leads to the rejection of the hull hypothesis. This signifies that those under a science major teacher differ in the level of mastery of science concepts from those students who are under a non-science major teacher. This implies that the delivery be effective teaching science could be affected by those teachers who are major in science. this was affirmed by Salandanan (2002) who stated that to become an effective and efficient science teacher one must not only possess proficiency and skills in teaching but it must be coupled with scientific attitude.

Table 5 Summary result on the difference in the level of mastery of science concepts between students under science and non-science major teachers

Teaching Competency	N	Means	Mean Difference	Tabular Value		Interpretation
				t-computed	t-tabular	
Non-Science Major	9	18.57	0.09	1.982	0.089	Significant
Science Major	9	18.48				

IV. Conclusion

The level of competency of teachers was found to be "highly competent" in terms of their teaching skills, classroom management, and a majority indicated "competent" in terms of general knowledge. This implies that a teacher can be effective in teaching science regardless of their mastery as long as they have the passion and skills in teaching. It can be also inferred that the teachers are dedicated and committed in making the school environment more conducive to learning. Likewise, the teachers were importance on identifying the students' strengths and weaknesses towards science subject. A significant relationship was found out between the teaching competency of teachers and student's level of mastery. This implies that the higher the competency level of the teachers in teaching science the higher will be the mastery and learning of the students.

Meanwhile, there a significant difference was found out on the test of difference between the teaching competency of science and non-science majors in teaching science as well as the level of mastery of science concepts between students under science and non-science major teachers. This implies that the

delivery of teaching science by those teachers who are major in science.

Based on the findings of the study, the following recommendations were formulated: (1) the Department of Education must provide more trainings for the science teachers specially those who are not science major. Through this the teachers will be able to upgrade their mastery in science thus, improving their students' academic performance; (2) the school administrator must regularly assess the competency and performance of the science teachers to identify their strengths and weaknesses; (3) science facilitators and other laboratory equipment must be provided adequately by the school to further advance the learning of the students; and (4) in the absence of the science facilities and laboratory equipment, the school must encourage teachers to use indigenous as a substitute. They must also be encouraged to use innovative but effective ways of teaching science to their students.

References

[1] Andarino FC. 2021. Biology in High School: Skills of Biology Teachers in the University of Eastern Philippines Laboratory High School. Psychology and Education, 58(4):4289-3292.

[2] Asuncion N. 2002. Why blame the teacher on pupil's low performance? The Philippine Journal of Education, 86(4).

[3] Aquino GV. 1998. Principles of Teaching Education Technology. Manila, Philippines. National Book Store.

[4] Cabotaje ZL. 1989. Teaching Competencies of Secondary Teachers in the Newly Nationalized High School of Alcala, Pangasinan. Dagupan City, Philippines.

[5] Corpuz J. Improving teacher and employee performance through coaching, mentoring, and counseling. The Philippine Journal of Education, 94(8).

[6] Davis, D., & Sorrell, J. (1995). Mastery learning in public schools. *Educational Psychology Interactive*. Valdosta, GA: Valdosta State University. Retrieved [2010], from http://www.edpsycinteractive.org/files/mastlear.html

[7] Gatongay JA. 1983. A Comparative Study of Students' Performance in Chemistry Test in Selected Public and Private High School in Central Region of Northern Samar. Unpublished Master's Thesis of the University of Eastern Philippines, Catarman, Northern Samar, Philippines.

[8] Salandanan GG. 2002. The Teaching of Science. Catha Publishing Inc., Quezon City, Philippines.

[9] Suryanarayana NVS. 2011. Teaching Competency and Teacher Job Satisfaction among Secondary School Teachers.Phi Delta Kappa, 24(6).

[10] Lardizabal AS. Principles and Methods of Teaching, 3rd ed. Phoenix Publishing House, Inc., Quezon City, Philippines.

[11] Ty AL, Sanico FL. 2021. Competencies of Public Elementary School Teachers in the Second District of Northern Samar, Philippines. Ilkogretime Online – Elementary Education Online, 20(4):1277-1284.