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Research Article

Science Teachers' Teaching Styles, Students' Learning Styles and Their Academic Performance in The Secondary Public Schools of Zambales

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ABSTRACT

This research was conducted to determine the relationship of Science teachers' teaching styles and the students' learning styles and academic performance. The study was conducted among the public secondary school in Subic, Zambales during the academic year 2018 – 2019. The descriptive survey research design was used where the teaching styles of eighty-five teachers and six hundred high school students. Data were analyzed using the percentage, mean and chi square test. The findings of the study revealed that the science teachers are adults with the most of them are female. The students are teenagers mostly male in Grade 8. The teaching styles of the science teachers is of a formal authority and the learning styles of the students is generally visual. The academic performance in science is satisfactory. The teaching styles of the teachers was dependent on education, field of specialization, length of service. The learning styles of the students were not dependent significantly on their age and year level. The learning styles of the students were significantly dependent on teaching styles of their science teachers and the academic performance of the students significantly dependent on the teaching styles of the science teachers. The academic performance of students are significantly dependent on their learning styles. With these findings and conclusions follow up studies exploring other factors affecting the performance level of the students in Science is recommended as well as the effectiveness of the various teaching styles and learning styles to promote learning and better understanding in the subject must be conducted.

***Keywords**: Learning styles, academic performance, teaching styles, secondary level, Subic, Zambales*

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Background

The necessity for specific instruction has heightened efforts to determine what knowledge and abilities teachers require in order to engage students in effective science learning (Ratcliffe, 2018). More and more academics from various professions are realizing the relevance and influence of scientific education, as well as the existing and emerging difficulties and opportunities in the subject. People live in a world where science must adapt, and teachers and educators of the topic must grasp right away that they are not teaching a static subject. As new knowledge and concepts develop to replace ones that have become obsolete, they must widen their own boundaries.

Curriculum, learning resources, teachers, and student performance all provide challenges while teaching science. Teachers frequently claim that the curriculum is overburdened, that they are unable to complete particular year levels' content, and that there are insufficient teaching-learning materials. Some teachers claim that certain topics are too difficult for them to (Nebres and Vistro-Yu, 1998). In many schools, learning tools such as books and science equipment are either unavailable or insufficient. In addition, scientific laboratories are scarce in most schools. Teachers' manuals, which are supposed to help them teach more successfully, have also been criticized as being insufficient. A science teacher may be employed to teach a science subject that is not his major due to a shortage of science teachers in general and majors in certain science fields. To teach all science fields, a teacher must be multi-skilled. However, this is not the case (Mendoza, 1998).

Significance of the Study

In line with the concern for improving the Science education in the Philippines, the researcher believes that the findings of the study would provide for improvement of education.

The results therefore would be significant to the following:

Superintendent/Science Supervisor. They could develop training/seminar programs within the Division of Zambales in their struggling effort to improve the quality of Science education. They could also develop undertakings or activities to learners based on their learning styles and further enhance their academic performance.

School Principal. This would aid in managing the school especially the students and teachers. They have the authority to review instructional materials as well as to supervise their teachers effectively in the use of different teaching methods, strategies, and styles of teaching. They could also propose an in-house training or coaching/mentoring program for teachers as well as students for an improved academic performance.

Science Teachers and other Teachers. This would help them explore teaching styles other than their own and create lessons and instructional materials that cater to the learning styles of their students. They would be able to assess their own teaching styles, their strengths and weaknesses and investigate possible adjustments based on the learning styles of their students. They should also apprehend their learners' individual differences through the survey of their learning styles.

Students. This would help them identify and know the process that forms the uniqueness of their own learning style which gives them the most comfortable way to learn. They would benefit by improving their academic performance through effective teaching as a result.

Parents. They would become conscious of what kind of learner is their son/daughter. This would help them offer the necessary support, motivation, and assistance to their children based on their respective learning styles.

Statement of the Problem

This study aims to find out the correlation of Science teachers' teaching styles and students' learning styles with their academic performance among the public secondary schools in Zone 4, Division of Zambales for Academic Year 2018-2019.

Specifically, this study aims to answer the following questions:

1. What is the profile of the:
    1.1 teacher-respondents in terms of:
        1.1.1 age;
        1.1.2 sex;

1.1.3 civil status;
1.1.4 educational attainment;
1.1.5 field of specialization;
1.1.6 length of service; and
1.1.7 number of seminars / trainings attended?

1.2 student-respondents in terms of:
1.2.1 age;
1.2.2 sex; and
1.2.3 year level?

2. How are the teaching styles of the science teachers be described as:
2.1 Expert;
2.2 Formal Authority;
2.3 Personal Model;
2.4 Facilitator; and
2.5 Delegator?

3. How are the learning styles of the student-respondents be described as to:
3.1 active learners;
3.2 reflective learners;
3.3 sensing learners;
3.4 intuitive learners;
3.5 visual learners;
3.6 verbal learners;
3.7 sequential learners; and
3.8 global learners?

4. What is the academic performance in Science among the public high school students of Zone 4 in the Division of Zambales?

5. Is the teaching styles of Science teachers dependent on their profile variables?

6. Is the learning styles of the students dependent on their profile variables?

7. Is the academic performance in Science of students dependent on their learning styles?

Scopes and Limitations

This study focused on the correlations of Science teachers' teaching styles and students' learning styles with their academic performance in Science. The study was conducted among the secondary schools in Zone 4, Division of Zambales for Academic Year 2018-2019 was brought into focus in this study.The locale of the study were the secondary public schools of Zone 4, Division of Zambales.

Methods

Research Design

The research method that was used in the study is descriptive method through correlational survey technique. (Ritchie et al., 2013) opined that by using the descriptive method the researcher will be able to observe a large mass of target population and make required conclusions about the variables. It can help also in effectively design a pre-structured questionnaire with both open ended and closed ended questions. The information collected from the responses of can be statistically presented in this type of research method for the easy interpretation of the report users.

The purpose of the descriptive type of research is to observe, describe, and explore aspects of a situation. It is also designed to obtain information regarding the prevalence, distribution and interrelationship of variables within a population (Polit and Hunger, 1994).

Descriptive means that surveys are made in order to discover some aspects of teacher's teaching style and the word survey denotes an investigation of a field to ascertain the typical condition is obtaining (Barberos et al., 2018).

Descriptive methods assist in knowing how to accomplish our desired purposes in the shortest available time. Moreover, descriptive studies have been used in many areas of investigation because they apply to varied kinds of problems (Sevilla et al., 1998).

Descriptive information in this study is obtained using correlation-survey. Since the primary goal of the study is to find out correlations of Science teachers' teaching styles and students' learning styles with their academic performance among the secondary public schools of Zone 4, Division of Zambales for Academic Year 2018-2019.

Respondents and Location

The respondents of the study would be the Science teachers and students of the public secondary schools of Zone 4, Division of Zambales. For teacher-respondents and student-respondents, stratified random convenient sampling was employed because the samples were from the different strata of the population who were pick-out in the most convenient and fastest way. The teachers that would be selected

should be all full-time, regular and teaches Science subjects while the students are officially enrolled during the School Year 2018-2019. Shown in Figure 2 are the locations of these schools.

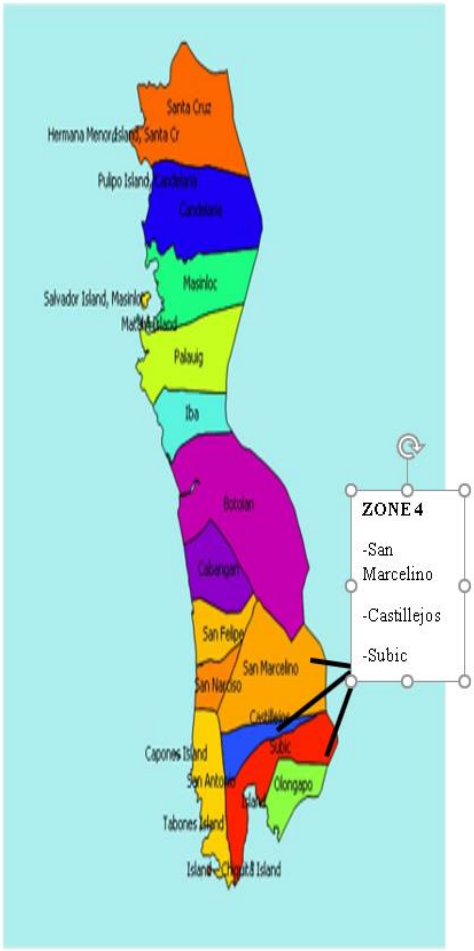

Figure 2. Map of Zambales Showing the Location of the Study

Instruments

The questionnaire and checklists for both teacher-respondents and student-respondents, which were the major instrument in collecting data for this study, were constructed from different sources such as journals, references and unpublished materials from the Internet. The researcher also adapted the two instruments using the standardized test of Grasha-Reichmann teaching style survey and the ILS model learning styles standardized tool by Felder and Soloman. Both were retrieved from the Internet.

For teacher-respondents, it is composed of two parts. Part I is on the personal profile such as the name of the respondents, school, age, sex, civil status, length of service, and educational attainment. Part II questions are related to Grasha-Reichman five predominant styles: expert, formal authority, personal model, facilitator and delegator.

For the student-respondents, forty-four (44) statements were given to assess if they are active, reflective, sensing, intuitive, visual, verbal, sequential and global learners in multiple type of choice. This is a standard instrument based on ILS model developed by Felder and Soloman which is an on-line instrument.

The Index of Learning Styles model or 'inventory', usually abbreviated to ILS, provides a simple way to explain and understand one's own learning style (and learning styles of others). ILS model is now a favorite of the accelerated learning community because its principles and benefits extend to all type of learning and development, far beyond its early applications.

Results and Discussion

This chapter presents the results of the study to answer the specific problems posited in Chapter 1. Analysis and interpretation of the results based on the data gathered are also provided.

Correlation of Teaching Styles and the Personal Profile Variables of the Teacher-Respondents

Reflected in Table 1 is the test of independence of teaching styles to the personal profile variables of the Science teachers in Zone 4, Division of Zambales.

It can be noted that the teaching styles is dependent to educational attainment, field of specialization, length of service and number of seminars/trainings attended with a Chi Square values of 34.221, 41.899, 40.005 and 38.419, respectively which are higher than the tabular values at 0.05 level of significance. Thus, the null hypothesis is rejected since all the computed values are significant. It is also noted that the teaching styles of the Science teachers are independent to their age, sex and civil status.

Table 1.Correlation of Teaching Styles and the Personal Profile Variables of the Teacher-Respondents

Personal Profile Variables	Tabular X^2 at α =05	Df	Computed X^2	Decision
Age	36.415	24	23.456	Accept Ho Not Significant
Sex	9.488	4	7.653	Accept Ho Not Significant
Civil Status	9.488	4	5.439	Accept Ho Not Significant
Educational Attainment	21.026	12	34.221	Reject Ho Significant
Field of Specialization	26.296	16	41.899	Reject Ho Significant
Length of Service	31.410	20	40.005	Reject Ho Significant
No. of Seminars/ Trainings Attended	21.026	12	38.419	Reject Ho Significant

Correlation of Learning Styles and the Personal Profile Variables of the Student-Respondents

Table 2 reveals the test of independence of the learning styles and the personal profile variables of the student-respondents. It shows that the learning styles of the students are not dependent significantly on their age, sex and year level with Chi Square values of 46.909, 9.333 and 19.325, respectively. These computed values are less than the tabular values at 95% confidence level, thus the null hypothesis is accepted.

The students' learning styles refers to the independent forms or ways students receive and process information, it implies that the student skills and preference in receiving and processing information differ. The learning styles exhibited by students depend on two major factors namely: the way students perceive information and the way they process the information. Other factors may also affect the learning styles but not so much in terms of learners' age and sex (Udeani and Adeyemo, 2011).

Table 2. Correlation of Learning Styles and the Personal Profile Variables of the Student-Respondents

Personal Profile Variables	Tabular X^2 at α =05	Df	Computed X^2	Decision
Age	58.124	42	46.909	Accept Ho Not Significant
Sex	14.067	7	9.333	Accept Ho Not Significant
Year Level	32.671	21	19.325	Accept Ho Not Significant

Correlation of Teaching Styles of Science Teachers and Learning Styles of their students

Table 3 exposed the crosstab and test of independence of the teaching styles of the Science teachers and the learnng styles of their students. It can be deduced that the learning styles of the students are dependent on the teaching styles of their Science teachers with a computed Chi Square value of 51.18. This value is significant since it is higher than the tabular value of 41.337 at 0.05 level of significance. The null hpothesis is rejected.

Table 3. Crosstab with Computed Chi-Square of the Correlation of Teaching Styles of Science Teachers and Learning Styles of Their Students

Learning Styles of the Students	Teaching Styles of Science Teachers					Total
	Expert	Formal Authority	Facilitator	Delegator	Personal Model	
Verbal	11	12	17	10	8	58
Visual	13	33	61	18	9	134
Intuitive	6	9	14	12	8	49
Sequential	7	11	16	13	6	53
Sensing	9	13	20	12	7	61
Reflective	5	16	16	12	7	56
Active	17	47	20	11	7	102
Global	10	31	21	15	10	87
Total	78	172	185	103	62	600
Computed $X^2 = 51.18$						
Tabular Value at $\alpha = 0.05$ and df = 28 is 41.337						
Decision: Reject Ho						

It is widely believed that understanding students' learning style and preferences can benefit both students and teachers. As students learn in various ways, it appears impossible to change the learning style of each student in the classroom. Instead, teachers might modify their teaching style so as to be more consistent with their students learning style. Moreover, it is suggested that teachers should take a balanced approach to teaching styles so that they can cope with various learning styles (Awla, 2014).

Correlation of Teaching Styles of the Science Teachers and the Academic Performance of Students in Science

It is shown in Table IV the test of independence of the academic performance of students in Science and the teaching styles of their teachers. The computed Chi Square value is 160.32 which is significantly higher than the tabular value of 31.410 at 0.05 level of significance. Thus, the null hypothesis is rejected. The academic performance in Science among student-respondents is significantly dependent on the teaching styles of their Science teacher.

Table 4. Crosstab with Computed Chi-Square of the Correlation of Teaching Styles of Science Teachers and Academic Performance of the Students in Science

Academic Performance in Science	Teaching Styles of Science Teachers					Total
	Expert	Formal Authority	Facilitator	Delegator	Personal Model	
96 – 100	4	3	7	2	1	17
91 – 95	18	13	23	12	33	99
86 – 90	18	36	45	18	30	147
81 – 85	9	14	65	13	11	112
76 – 80	8	20	8	20	4	60
71 – 75	15	43	17	69	21	165
Total	72	129	165	134	100	600
Computed $X^2 = 160.32$						
Tabular Value at $\alpha = 0.05$ and df = 20 is 31.410						
Decision: Reject Ho						

Correlation of Learning Styles and the Academic Performance of Students in Science

Table 5 reveals that the computed Chi Square for the test of independence of the academic performance in Science among students and their learning styles is 164.27. This value is greater than the tabular of 49.756 at 95% confidence level, thus it is significant and rejected the null hypothesis. This means that the academic performance in Science among students and their learning styles are dependent.

Table 5. Crosstab with Computed Chi-Square of the Correlation of Learning Styles and the Academic Performance of Students in Science

Learning Styles of the Students	Academic Performance in Science						Total
	71 - 75	76 – 80	81 – 85	86 – 90	91 – 95	96 – 100	
Verbal	8	7	18	18	7	5	58
Visual	27	7	54	36	10	2	134
Intuitive	13	7	9	13	7	2	49
Sequential	13	8	5	18	9	2	53
Sensing	10	8	11	20	12	1	61
Reflective	6	10	13	19	8	1	56
Active	62	4	7	14	15	1	102
Global	26	9	4	14	31	3	87
Total	165	60	112	147	99	17	600
Computed $X^2 = 164.27$							
Tabular Value at $\alpha = 0.05$ and df = 35 is 49.756							
Decision: Reject Ho							

Conclusions and Recommendations

1. Correlation of Teaching Styles and the Personal Profile Variables of the Teacher-Respondents

   Teaching styles was dependent to educational attainment, field of specialization, length of service and number of seminars/trainings attended with a Chi Square values of 34.221, 41.899, 40.005 and 38.419, respectively which are higher than the tabular values at 0.05 level of significance. Thus, the null hypothesis was rejected.
2. Correlation of Learning Styles and the Personal Profile Variables of the Student-Respondents

   The learning styles of the students were not dependent significantly on their age, sex and year level with Chi Square values of 46.909, 9.333 and 19.325, respectively. These computed values are less than the tabular values at 95% confidence level, thus the null hypothesis was accepted.
3. Correlation of Teaching Styles of Science Teachers and Learning Styles of Their Students.

   The learning styles of the students are significantly dependent on the teaching styles of their Science teachers with a computed Chi Square value of 51.18. at 0.05 level of significance. The null hypothesis was rejected.
4. Correlation of Teaching Styles of the Science Teachers and the Academic Performance of Students in Science

   The academic performance in Science among student-respondents was significantly dependent on the teaching styles of their Science teachers. The computed Chi Square value is 160.32 which is significantly higher than the tabular value of 31.410 at 0.05 level of significance. Thus, the null hypothesis was rejected.
5. Correlation of Learning Styles and the Academic Performance of Students in Science.

   The academic performance in Science among students and their learning styles are significantly dependent with computed Chi Square value of 164.27. This value is greater than the tabular of 49.756 at 95% confidence level, thus it is

significant and rejected the null hypothesis.

Conclusions

Based on the findings, the following conclusions were drawn:

1. Most of the Science teacher-respondents were still young adults. Majority were female, married, still in the process of pursuing their master's degrees, specialized in Science, neophytes in the teaching profession, and have limited seminars/trainings attended.
2. The student-respondents are within the normal age for secondary schooling, majority are male and most them are in Grade 8.
3. Most of the student-respondents were classified as visual learners and few were intuitive learners.
4. A great percentage of the student-respondents obtained a failing grade and passing grade of 75 which is fairly satisfactory. But the overall mean academic performance is satisfactory.
5. Teaching styles of the Science teachers is dependent on their educational attainment, field of specialization, length of service and number of seminars/trainings attended.
6. The learning styles of the students are not dependent significantly on their age, sex and year level.
7. The students' academic performance in Science is not significantly dependent on their age, sex and year level.
8. The learning styles of the students are significantly dependent on the teaching styles of their Science teachers.
9. The academic performance in Science among student-respondents is significantly dependent on the teaching styles of their Science teachers.
10. The academic performance in Science among students and their learning styles are significantly dependent.

Recommendations

The following recommendations are hereby given:

1. Science teachers must regularly attend seminars/trainings related to their specialization and in the teaching profession.
2. The teaching styles of the Science teachers must vary from time to time depending on their topic and types of learners that they have.
3. Science teachers should address the low performance level of most students in their subject.
4. Students must develop various learning styles through the guidance of their teachers through varied classroom activities for individual multiple intelligences and learning styles.
5. A follow up studies exploring other factors affecting the academic performance of the students in Science is recommended as well as the effectiveness of the various teaching styles and learning styles to promote learning and better understanding in the subject must be conducted.

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