

LEARNING STYLES AND TEACHERS' TEACHING STYLES IN RELATION TO THE STUDENTS' ACADEMIC ACHIEVEMENTS IN ENGLISH AND MATHEMATICS SUBJECTS

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This study aimed to determine the students' learning styles and teachers' teaching styles in relation to the students' academic achievement in English and Mathematics. The respondents of the study were 233 second year high school students and two teachers teaching English and Mathematics, respectively. The study employed descriptive survey and interview methods with frequency, mean, standard deviation. Analysis of Variance (ANOVA), and Chi-square were utilized as statistical treatments. Results show that majority of the students are visual and kinesthetic learners. Their academic achievement in the abovementioned subjects when grouped according to learning styles ranges from low average to average. There is no significant difference in the academic achievement in English and Mathematics when grouped according to learning styles. Likewise, the most preferred teaching style of the English teacher is discussion while discovery and discussion are the preferred style of the Mathematics teacher. There is no significant relationship between the preferred teaching styles of the Mathematics teacher and the learning styles and academic achievement of the students.

Introduction

The Philippine educational system is in crisis and the quality of education has been declining for many years. According to the United National Educational, Scientific and Cultural Organization (UNESCO), the Philippines ranked 74th in terms of Education Development Index, ranking below Mongolia, Vietnam, Indonesia, and China. Results of the National Elementary Achievement Test and National Secondary Achievement Test

showed that students could only correctly answer less than 50 percent of the questions. The Philippine students performed poorly in the Trends in International Mathematics and Science study, ranking 41st in a field of 45 in Science and 42nd in Mathematics (Philippine Daily Inquirer, 2007).

A senior Department of Education (DepEd) official stated that “Our schools are failing to teach the competence the average citizen needs to become responsible, productive and self-fulfilling. We are graduating people who are learning less and less.” (Meinardus, 2007).

In this fast changing world, the quality of education is challenged—a kind of training responsive to the globally competitive needs should be emphasized both in the private and public schools.

In the school, the teachers are expected to do the task of educating the students to prepare them not only intellectually but also globally. They are also expected to be knowledgeable about content, methodologies, and skills contributory to effective techniques (Salandanan, 2000). Results of a research work conducted on learning and teaching styles of Grade Six pupils and Grade Six English teachers, Bautista (2007) stated that there is a significant relationship between the teaching styles and the academic achievement of the students, thus making teaching style influential to the academic achievement of the students.

Learning is the logical purpose of teaching in a school setting although learning can take place without direct teaching. However, the quantity and the quality of learning the student acquires depend upon their capacity to absorb and the way the student processes the information given because there are factors that may influence their learning. Such factors may include (but not limited to) students’ interest in the subject matter, motivation, learning environment and learning style.

The achievement of the second year students in Region XI both in English and Mathematics during the School Year 2006-2007, based on the Center for Educational Measurement (CEM) test result showed that their performance in all the content areas of these 2 subjects did not reach the Adequate Difficulty Level (ASL), the mean of the national norm.

In a High School Department, the teachers submitted academic reports of periodic failures to the Guidance Office and such reports also showed that there are more students, particularly boys, who have poor academic achievement in English and Mathematics compared to other subject areas. Furthermore, anecdotal reports on students' misbehavior in class such as inattention and transferring of seats are also submitted to the office. It was assumed that poor academic achievement and disorderly behavior of students have significant relationship to the learning styles of the students. Thus, it is hoped that by conducting the study it would help solve or minimize the problems encountered by the teachers and students in a teaching-learning environment.

Theoretical / Conceptual Framework

This study is anchored on the theoretical foundations of the Dunn and Dunn Learning Style Model developed by Dr. Rita Dunn (as cited in Tenedero, 2006). These theoretical foundations are the following:

Firstly, the learning style preferences of individuals differ significantly from each other. It is important that compatible instructional strategies be provided to match the preferred learning styles of a child.

Secondly, accommodating individual learning style preferences through complementary educational, instructional, teaching and counseling interventions results in greater academic achievement and improves students' attitude towards learning.

Thirdly, given responsive environments, resources and approaches learners attain statistically higher achievement and aptitude test scores in congruent or (matched) rather than dissonant (mismatched) treatments.

Figure 1 shows the conceptual framework of the variables of the study. It is assumed that the teachers' teaching styles are significantly correlated to the learning styles of the students whether visual, auditory, or kinesthetic. It is also assumed that the students' learning styles and teachers' teaching styles have

significant relationship to the students' academic achievements in English and Mathematics.

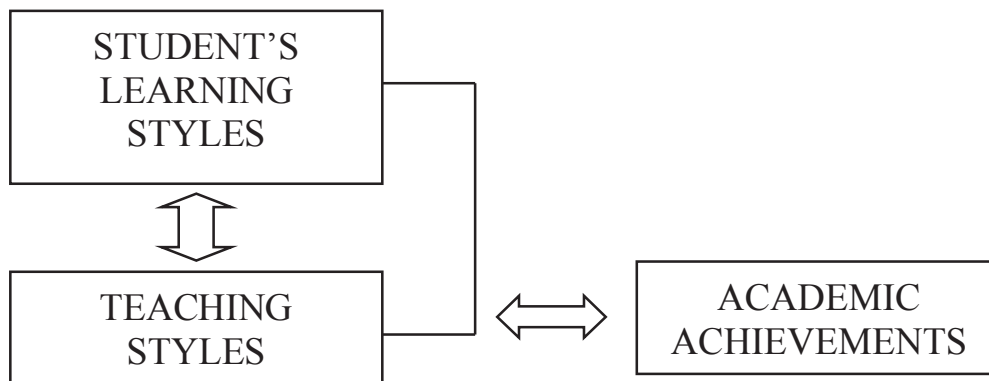


Figure 1. The Schematic Diagram of the Variables of the Study

Methods

The study employed a descriptive and qualitative method. This involved the collection of data to answer questions on the current status of the subjects using survey questionnaire and interview. It also determined the relationship among the variables of the study.

The respondents of the study were the second year students and the second year English and Mathematics teachers of a high school during School Year 2007-2008. The students were graduates from different private and public elementary schools in the neighboring and far flung places of the school. There were 233 second year students, 121 are boys and 112 are girls, with age ranging from 12 year old to 18 years old. The students, prior to their admission to the school, were given the placement test, the Ottis Lennon School Ability Test (OLSAT). The students were also given the pretest and posttest of the Diagnostic test in English, Mathematics and Science. The Diagnostic Tests were subscribed from a testing services center. Based on the achievement test result, the student performed poorly both in English and Mathematics.

This study was conducted in a Catholic high school. It is the only private-Catholic school in its locale. The school offers preschool, complete grade school, and secondary education.

The study used universal sampling in which all the 233 second year students were taken as respondents of the study. This was done in order to determine the learning styles of each individual student in the second year level. There were two second year teachers, a female and a male teacher, who were also respondents of the study. They were English and Mathematics teachers, respectively.

The Learning Style Survey questionnaire for the students adopted from the Metts Learning Style Inventory and the researcher-formulated teaching style interview schedule were the research instruments used in this study. The Learning Style Questionnaire determined learning styles of the students, whether visual, auditory, or kinesthetic. It has 24 items and the scoring is based on the following: 1 – Never; 2 – Rarely; 3 – Occasionally; 4 – Often and 5 – Always. Item numbers 3, 6, 9, 10, 14, 16, 19 and 20 determine the visual learning style; item numbers 2, 5, 8, 12, 15, 17, 21 and 23, the auditory leaning style and kinesthetic learning style are determined through item numbers 1, 4, 7, 11, 18, 22 and 24. The scoring sheet has three columns. The first column is for items under visual learning styles; the second column is for the items that determined auditory learning style and the third column is for the items that determined the kinesthetic learning style. To determine the learning style preference of the students, the scores of each column were added. The column that had the highest score obtained indicates the dominant learning style of the students.

The composite grade for the second grading periods was used as the source of data for the academic achievement of the students in English and Mathematics.

A formulated teaching style interview guide was used to determine the teaching styles of the English and Mathematics teachers.

The school registrar was the source of the age profile of the students. The placement test result of the students, the OLSAT, was obtained from the Guidance Office. The office also provided the record of the age, experience, qualification, and the performance ratings of the two teacher-respondents. The performance ratings were obtained from the teachers' evaluation by the students.

To conduct the study, permission was sought from the Director-Principal. One subject period was granted to conduct the study after permission was given. Instructions were carefully read before the respondents answered the survey questionnaire, and were given around 45 minutes to answer. The scoring was done by the students so they had the chance to know their learning style preference. The retrieval of the survey questionnaire followed. A time for the interview of the two teacher-respondents were set at their most convenient time using the formulated teaching style interview guide.

The statistical treatments used in the study were frequency counts and percentages for the demographic profile of the respondents, the profile of the learning styles of the students, and the most preferred teaching styles of the English and Mathematics teacher. Mean and standard deviation were used to determine academic achievement of the students in English and Mathematics according to learning styles. The ANOVA was used to determine the significant difference in the academic achievement of the students in English and Mathematics when grouped according to learning styles. Finally, Chi-square was used to describe the relationship between the learning styles and academic achievement of the students in Mathematics; the relationship between the English teacher's most preferred teaching styles and students' learning styles; the relationship between the Mathematics teacher's most preferred teaching styles and students' learning styles; and the relationship between the Mathematics teacher's most preferred teaching styles and students' academic achievement in Mathematics.

This study on Students' Learning Styles and Teachers' Teaching Styles is limited to the 233 Second Year students as student-respondents and two Second Year teachers for teacher-respondents who are teaching English and Mathematics to the five sections of the second year level during School Year 2007-2008.

The study focused on the students' learning styles namely: visual, auditory, and kinesthetic. Variables such as age, intellectual capacity, socio-economic status and other pertinent data were excluded from the study. The study adopted Metts Learning Style Inventory by Ralph E. Metts, copyrighted in 1987 was used to determine the learning styles of the students. The formulated

teaching styles interview guide was used to assess the teaching styles of the English and the Mathematics teachers. This teaching style interview guide is limited only to the methods, strategies, approaches or techniques used by the teachers in teaching English and Mathematics subject to the second year students.

The students' academic achievements are based on their grades in two subjects: English and Mathematics, during the Second Grading Period.

While it is true that the conduct of this study was primarily intended for the concerned student-respondents during the aforementioned specified period of time, however, the results of the study may be used as basis for further studies that will involve the different year levels in other subject areas with diverse variables.

Results and Discussion

As shown in Table 1.a, students' age ranges from 12 to 18 years old. There are five students whose age are between 11 to 12 years old; 211 students who are 13 years to 14 years old; 15 students who are 15 to 16 years old, and two of them whose age are 16 to 18 years old. Majority of the students are 13 to 14 years old and this comprises 90.56 percent of the total student population.

Table 1.a.

Frequency Distribution of the Student-Respondents According to Age

Age Range	<i>f</i>	%
11 to 12 years old	5	2.14
13 to 14 years old	211	90.56
15 to 16 years old	15	6.44
17 to 18 years old	2	.86
Total	233	100

Table 1.b shows the profile of the students according to their placement test result based on the OLSAT. There are 166 students whose scores are between the scores 0 to 28, with below average description; 66 students with scores between 29 to 51, with average description and one student whose score is between

52 to 72, which is above average. This profile indicates that 71.24 percent of the students had below average performance as measured by the OLSAT.

Table 1.b.

Distribution of the Student-Respondents According to the Placement Test Result

Score Range	Description	<i>f</i>	%
0-28	Below Average	166	71.24
29-51	Average	66	28.33
52-72	Above Average	1	.43
	Total	233	100

Table 2 presents the profile of the teacher-respondents according to age, qualification, experience and performance rating. The teacher-respondents are between 22 to 27 years old. Both are graduates of a Bachelor of Science in Education course with one year teaching experience and were rated *good* by the students in the teachers' Performance Evaluation Scale.

Table 2

The Profile of the 2 Teacher-Respondents According to Age, Qualification, Years of Experience and Performance Rating

Age Range	<i>f</i>	Qualification	Years of Experience	Performance Rating
22 to 24 years old	1	BSEd ^a	1	Good
25 to 27 years old	1	BSEd ^a	1	Good

^a= Bachelor of Science in Education

Table 3 shows the frequency distribution of learning styles of the students according to gender. There were 233 second year students, 121 are male and 112 are female. Based on the result of the Learning Styles Survey Questionnaire the following learning styles preferences were identified: Visual, Kinesthetic, Auditory, Visual-Kinesthetic, Visual-Auditory and Auditory-Kinesthetic. The table reflects that there are 81 students or 34.8 percent of the population who are visual learners; 44 or 18.9 percent are males and 37 or 15.9 percent of the population are females. It is observed from the table that there are more male visual learners than females. The same is true with the kinesthetic learners, having 81 or 34.8 percent of the total student population, 32 are

male and 49 are female kinesthetic learners. There are more female kinesthetic learners than males. The auditory learners constitute 18.8 percent of the total population or 44 students, 29 of whom are male students and 15, females. There are 11 students or 4.7 percent of the student population, four male students and seven females, who are both visual and kinesthetic learners. Nine students or 3.9 percent of the student population are identified as the Visual-Auditory learners. Three percent or seven students, five males and two females are auditory-kinesthetic learners.

The result indicates that the student population in the second year level is composed of different types of learners. Majority of the 233 students, or 206 of them have one preferred learning styles while 27 students have two modes of learning styles. Thus, the preferred learning styles of majority of the student population are the visual and kinesthetic styles. The visual learners learn and understand better when they have something to see or to look at like pictures, videos, and illustrated textbooks to name a few while the kinesthetic learners learn better through moving or touching. They find it difficult to sit for a long period of time. The Mathematics teacher confirmed during the interview that majority of the students are very participative during games. The same was confirmed by the English teacher, who mentioned that majority of the students are very participative in classroom activities like games and role playing.

Table 3

Gender	Learning Styles												Total	Total %
	V ^a		K ^b		A ^c		VK ^d		VA ^e		AK ^f			
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%		
M	44	18.9	32	13.7	29	12.4	4	17	7	3	5	2.1	121	51.9
F	37	15.9	21	21	15	6.4	7	3	2	.9	2	.9	112	48.1
Total	81	34.8	81	34.8	44	18.8	11	4.7	9	3.9	7	3	233	100
	a- Visual				b- Kinesthetic				c- Auditory					
	d- Visual-Kinesthetic				e- Visual-Auditory				f- Auditory-Kinesthetic					

Presented in Table 4 is the academic achievement of the students in English and Mathematics according to their learning styles. The visual, kinesthetic, auditory, visual-kinesthetic learners

have average academic achievement in English with the means of 80.5, 81.0, 81.2, 80.2, respectively; while visual-auditory and auditory-kinesthetic learners' mean academic achievement is 78.6 and 78.7, respectively. Both are described as low average academic achievement. The students' total mean academic achievement in English is 80.7 and is described as average academic achievement.

In Mathematics, the kinesthetic learners have a mean achievement of 80.1 or average achievement. On the other hand, the visual, auditory, visual-kinesthetic, visual-auditory and auditory-kinesthetic have low average academic achievement with means of 79.7, 79.9, 78.4, 77.3, and 78.4, respectively. The students' total mean achievement in Mathematics is 79.7 and is described as low average academic achievement. It can be gleaned from these results that the different learners in Mathematics subject have low average academic achievement except for kinesthetic learners who have an average academic achievement. The academic achievement of the kinesthetic learners in English is consistent with their academic achievement in Mathematics which is average. This implies that the performance of kinesthetic learners in English is more or less the same with their performance in Mathematics. There is consistency in their performance in both subjects insofar as learning styles are concerned.

Table 4

Academic Achievement in English and Mathematics of the Students According to Learning Styles

Academic Achievement	Learning Style	N	Mean	SD ^a	Description
English	Visual	81	80.5	5.1	Average
	Kinesthetic	81	81.0	4.9	Average
	Auditory	44	81.2	5.5	Average
	Visual-Kinesthetic	11	80.2	4.4	Average
	Visual-Auditory	9	78.6	4.0	Low Average
	Auditory-Kinesthetic	7	78.7	7.1	Average
	Total	233	80.7	5.1	Low Average
Mathematics	Visual	81	79.7	4.2	Average
	Kinesthetic	81	80.1	4.3	Low Average
	Auditory	44	79.9	5.4	Low Average
	Visual-Kinesthetic	11	78.4	2.7	Low Average
	Visual-Auditory	9	77.3	2.2	Low Average
	Auditory-Kinesthetic	7	78.4	5.2	Low Average
	Total	233	79.7	4.4	

^a= standard deviation

Table 5 shows the difference in the academic achievement of the students in English and Mathematics according to their learning styles. The result shows that the computed f value for English is .712 and the p value is .615. For Mathematics, the computed f value is .994 with the p value of .422, accepting the null hypothesis. This clearly indicates that the students' academic achievement in English does not significantly differ from their academic achievement in Mathematics according to their learning styles. This clearly implies that how the students performed in their English subject is more or less the same as their performance in Mathematics.

Table 5

Significant Difference in the Academic Achievement of Students in English and Mathematics According to Learning Styles

Variables	Computed f	p value	Decision	Interpretation
English	.712	.615	Accept Ho	No significance
Mathematics	.994	.422	Accept Ho	No significance

Level of Significance (α) = .05

Table 6 shows the relationship between the students' learning styles and students' academic achievement in English and Mathematics. As shown in the table, the computed r value for English is -.015 with the p value of .757, accepting the null hypothesis. The students' learning styles are not significantly correlated with their academic achievement in English. This finding does not confirm the study of Bautista (2007) on learning styles where a significant relationship between the students' learning styles and their English achievement was found. In Mathematics, the computed r value is -.060 and the computed p value is .230, accepting the null hypothesis. The students' learning styles are not significantly correlated with their academic achievement in Mathematics. It was revealed in the study that the pupils were poor in English; poor in Mathematics. The poor performance of Grade IV pupils in Mathematics was significantly associated with the learning styles in terms of visual and tactile, while the Grade VI pupils' fair performance in English are significantly associated with visual learning styles, respectively.

Table 6

Significant Relationship between Students' Learning Styles and Students' Academic Achievement in English and Mathematics

Variables	<i>r</i> value	<i>p</i> value	Decision	Interpretation
English	-.015	.757	Accept Ho	No significance
Mathematics	-.060	.230	Accept Ho	No significance

Level of Significance (α) = .05

Table 7.a shows the English teacher's teaching styles and the rank of each style according to preference. The teaching strategies used by the teacher in the five sections of the second year level were lecture, discussion, role playing, games, and dyad. Among these, discussion ranked number one. When conducting lecture and discussion in class, the teacher used the board, chalk board, and pictures as visual aid in teaching. Some behaviors observed during lecture and discussion were inattentiveness of most boys, making unnecessary movements, talking with classmates, transferring seats and those who belong to the average and above average performers in the class were seen copying the writings on the board. For role playing activities, the students prepared the props needed. According to the teacher, during games and role playing, the students were very participative.

Table 7.a

English Teacher's Teaching Styles Used and Rank According to Preference

Section	Teaching Styles Used	Rank
S01	Lecture	2
S02	Discussion	1
S03	Role Playing	3
S04	Games	4
S05	Dyad	5

Table 7.b shows the teaching styles of Mathematics teacher according to preference. In an interview with the Mathematics teacher, different teaching styles were used in teaching Mathematics to the five sections of the second year level. In section S01, discovery method, games, reporting, discussion, research and group tutorial were used. The same styles were used

in the other four sections except for reporting. It can be seen from the table that in section S01, discovery method was ranked 1; while in the other four sections, discussion was ranked 1. S01 is considered the first section in the second year level. Top students of the said year level were placed in this section. Majority of the students in this section, particularly girls, can easily understand, are challenged and are delighted doing the activity using the discovery method. The teacher used aids such as strips and flow charts while using the said teaching style. It was also observed by the teacher that when games were used in class, the students, both boys and girls, were very participative. They always liked activities that made them move. Cards were used as visual aids when employing games in class. In reporting, it was observed that there were students who did not pay attention to the reporter or showed no interest to the report itself. Since majority of the students are kinesthetic and visual learners, reporting was not interesting to them because they prefer to move than listen or chose to see visual materials. Other behaviors observed were talking with classmates, making unnecessary noise or movements while in their seats. But there were still some who listened to the reporter. In discussion, the teacher used strips and flow chart as aids in teaching. There were students who listened to the discussion, there were others who made unnecessary movements and those who are average and above average performers were seen copying the writings on the board. In group tutorial, the students were more participative than in reporting. In teaching Mathematics, the teacher encountered the following problems: most of the boys in section S01 were not attentive; in section S03, the students admitted that they do not like Mathematics; most of the students in section S04 as observed by the teacher, were quite slow in understanding the explanation and almost all of the boys and some girls in section S05 were passive.

Table 7.b

Mathematics Teacher's Teaching Styles Used and Rank According to Preference

Section	Teaching Styles	Rank
II-S01	Discovery	1
II-S01	Games	3
	Reporting	5
	Discussion	2
	Research	4
	Group tutorial	6
	Discovery	2
II-S02	Games	3
II-S03	Discussion	1
II-S04	Research	4
II-S05	Group tutorial	5

Indicated in Table 8 is the relationship between the Mathematics teacher's teaching styles and students' learning styles. The computed p value for the Mathematics teacher's teaching styles and students' learning styles is .672, accepting the null hypothesis. There is no significant relationship between the Mathematics teacher's teaching styles and the students' learning styles. The teaching style of Mathematics teacher is not correlated with the learning styles of the students.

Table 8

Significant Relationship between Mathematics Teacher's Teaching Style and Students' Learning Styles

Variables	p value	Decision	Interpretation
Mathematics Teacher's Teaching Styles and Students' Learning Styles	.672	Accept Ho	No significance

Level of Significance (α) = .05

Presented in Table 9 is the relationship between the Mathematics teacher's teaching styles and student's academic achievement in Mathematics. The computed r value and p value for Mathematics teacher's teaching styles and students' academic achievement in Mathematics is .029 and .592, respectively,

accepting the null hypothesis. There is no significant relationship between the Mathematics teacher's teaching styles and the students' academic achievement in Mathematics. This implies that the Mathematics teacher's most preferred teaching style is not correlated to the students' academic achievement in Mathematics. This finding does not confirm the result of the study of Bautista (2007) that there is significant relationship between the teaching styles and the academic achievement of the students. Significant factors, other than teaching styles that affected the achievement of the students, like difficulty of the subject or lack of interest in the subject, were not included in the study.

Table 9

Relationship between the Mathematics Teacher's Teaching Styles and Student's Academic achievement in Mathematics.

Variables	<i>r</i> value	<i>p</i> value	Decision	Interpretation
Mathematics Teacher's Teaching Styles and Students' Academic Achievement in Mathematics	.029	.592	Accept Ho	No significance

Level of Significance (α)= .05

Conclusions and Recommendations

The study concludes that majority of the students are between 13 to 14 years old and were categorized as *below average*. Majority of them are visual and kinesthetic learners. Their academic achievement in English and Mathematics when grouped according to learning styles fall under low average to average. However, the kinesthetic learners have consistent academic achievement both in English and Mathematics. There is no significant difference in the achievement of the students in English and Mathematics when grouped according to learning styles, as well as between the learning styles of the students and their academic achievement in English and Mathematics.

The most preferred teaching style of the English teacher is discussion while discovery and discussion are most preferred by the Mathematics teacher. There is no significant relationship between the Mathematics teacher's most preferred teaching styles and the students' learning styles. There is also no significant relationship between the Mathematics teacher's most preferred teaching styles and the students' academic achievement.

The study recommends that since the students exhibited diverse learning styles, it is imperative on the part of the teachers to be fully aware and conscious of this diversity of learning styles to understand students better and to prepare activities that would fit the different learning styles to make teaching-learning environment more interesting and enjoyable. The administration of the Learning Styles Survey Questionnaire on new students must be at the beginning of the school year for the teachers to become aware of the learning style of the students. The school administrator, subject area coordinators, as well as English and Mathematics teachers, in cooperation with the guidance personnel, should work together to come up with activities that will improve the academic performance of the students both in English and Mathematics. It is also recommended that replication of the study using larger samples and more teacher respondents be done in other localities. Likewise, a follow up of the study may be conducted to include other variables that were not included for a more comprehensive result. And finally, experimental studies on learning and teaching styles may be conducted to determine improvement in the academic achievement of the students when learning styles are considered in the choice of teachers' teaching styles for their assigned subject/s.

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