Study Habits, Attitude Towards Mathematics, and Mathematics Achievement of DOSCST Students

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Abstract

This study investigated study habits, attitude towards Mathematics and the achievement in Mathematics of the students in Davao Oriental State College of Science and Technology. It used both the descriptive and inferential method of research. Three hundred five Math 10(College Algebra and Trigonometry) students enrolled during the first semester of 2009-2010 answered the questionnaires. Statistical tests were applied to treat the data. The results showed that the more students study and the more positive attitude they have towards Mathematics, the greater is their chance of getting high grades in Mathematics. It has also been found out that the students' study habit did not differ when they were grouped according to gender, place of origin and course. Their attitude also did not differ when they were grouped according to gender and place of origin. However, those who were enrolled in BS Math showed a significantly more positive attitude towards mathematics compared with other students taking other courses.

The study of Mathematics involves learning about numbers and operations, shapes and space, functions and relations, and uses them in various actions such as counting, measuring, comparing, evaluating, decision making among others, (Nik Pa, 2003, as cited in Zakaira, Yaakob, Maat, & Adnan, 2010) all of which are inevitable activities of human beings. People thus, consciously or unconsciously, apply Mathematics in various ways of their daily lives. With this, students, who are expected to be devoting their time on doing worthy task preparing for their future, must thoroughly learn Mathematics. Sadly though, this is not always true to all students.

In DOSCST for instance, one of the reasons the Mathematical Sciences Department started to offer two degrees for Bachelor of Science in Mathematics starting on the first semester of SY 2009-2010 is to attract more enrollees in the BS Mathematics programs considering the decrease in the number of its students in the past school years.

With these two scenarios – Mathematics playing a vital role in the lives of the people and the decline in the number of enrollees that focuses on Mathematics, the researcher find it of value to take a closer look at the students' study habit and attitude towards Mathematics, specifically in DOSCST.

This study aimed to determine the relationship between study habits and attitude towards Mathematics to the Mathematics Achievement of students in the Main Campus of Davao Oriental State College of Science and Technology.

Methods

The study was conducted among 305 the students enrolled in the main campus of Davao Oriental State College of Science and Technology during the 2nd semester of SY 2009 – 2010.

The study used two (2) instruments. These were 1.) The Study Behavior Inventory, which was a 46-item questionnaire designed by Leonard Bliss (n.d.) and which has a reliability of .82; and 2.) The Attitudes Toward Mathematics Inventory (ATMI), which was a 40-item questionnaire developed by Martha Tapia (1996) and which has a reliability of .91. Permission from the authors was sought for the use of the questionnaire. Both instruments were constructed using a Likert-format scale of five alternatives for the responses.

Weighted mean, arithmetic mean, correlation, and t-test, and analysis of variance were used to analyze the data.

Results and Discussions

Profile of Students' Study Habit

Tables 1 - 5 show the study habit profile of the DOSCST students in the following categories: a) Frequency of studying sessions, b) Advance reading of materials, c) Self testing, d) Rehearsal of learned materials and e) Studying in a conducive time and environment.

Table 1.
Frequency of Studying Session as a Factor of Study Habit

Statement	Mean	Verbal Interpretation
I wait until the last minute to study my notes.	3.02	Neutral
I study my lesson two or more days before the examination day.	3.33	Neutral
I keep on reading materials related to the Lesson.	3.20	Neutral
I don't use my time well. I spend too much time on some things other than studying.	2.91	Neutral
Over-all	3.11	Average

On Table 1, all the sub-criteria received a neutral response. This revealed that students had their own method of scheduling their study sessions and spent an average amount of time studying.

Table 2.
Advance Reading of Materials as a factor of study habit

Statement	Mean	Verbal Interpretation
I read the materials so that I can understand it even before the class start.	3.17	Neutral
I read lesson – related materials even without an assignment or test.	2.81	Neutral
I find it easy to understand my new lesson, if I read in advance.	3.64	Neutral
Over-all	3.21	Average

Table 2 showed that students find time to read the topics related to their lesson in advance. Doing so was beneficial to them for it made comprehension of the new lesson in class easier.

Table 3.
Self-testing as a Factor of Study Habit

Statement	Mean	Verbal Interpretation
I try to connect the things I learn in each class with the things I learned in the class the previous days.	3.42	Agree
After reading a long topic, I stop at times to review the main points in the material that just read.	3.47	Agree
When I am having a trouble in a lesson, I try to meet with the teacher to talk over the problem.	2.47	Disagree
When I fall behind in my school work, I make up through reading without the teacher having to mention it to me.	3.15	Neutral
I love to challenge myself and that I am encourage to practice solving especially for which I need improvement.	3.67	Agree
Over-all	3.23	Average

Table 3 revealed that when it came to self-testing, students agree that they try to connect their previous lesson with the present one. This means that students were doing their best to examine their learning even in their own capacity. This was in agreement with Idris' (2005, as cited in Zakaira, et al., 2010) statement that the focus of Mathematics curriculum should be a

balance between understanding concepts and mastering skills. The result also showed that students did not find it appealing to meet with their teachers in clarifying matters related to their lesson.

Table 4.
Rehearsal of Learned Material as a factor of study habit

Statement	Mean	Verbal Interpretation
I have to go over written materials several times. The words don't have much meaning the first time I go over them.	3.29	Neutral
I keep on trying to pick up important details that will later on appear on a test.	3.84	Agree
I keep on practicing my mathematical skill on previous lessons to strengthen my learning.	3.20	Neutral
I keep on taking notes during lesson proper because I understand that it helps me a lot when preparing for a test.	4.10	Agree
Over-all	3.61	High

Table 4 showed that students practice what they have learned by going over their notes and practicing their skills in solving even on their own.

Table 5.
Conducive Time and Environment as a Factor of Study Habit

Statement	Mean	Verbal Interpretation
When I begin to study I organize the things I have to do so that I can use my time the best way possible.	3.67	Agree
I can study better when I am alone rather than with a group of other students.	3.95	Agree
I prefer to study in a quiet and private place so I can concentrate well.	4.13	Agree
I do my reading/studying in a well- ventilated study place to have focus.	3.44	Agree
Over-all	3.80	High

Table 5 shows the preference of students to study in an environment that was organized, quiet and well-ventilated. According to Creemers and Reezigt (2005, as cited in Tahar, Ismail,

Zamani, Adnan, 2010) a favorable school environment affects students' achievement in Mathematics.

In sum, the profile of students study habit revealed that the students of DOSCST study frequently, do some advance reading and self-checked themselves. Rehearsal of learned materials and studying in a conducive time and environment, as factors in students' study habits showed high result. This only means that the students, though not as perfect as their instructors and parents would want them to be, were exerting effort to improve their study habit.

Profile of Students' Attitude Towards Mathematics

Tables 6 - 9 show the profile of the DOSCST students' attitude towards mathematics in terms of the following strategies: a) Self – confidence, b) Importance, c) Enjoyment and d) Motivation.

Table 6.
Confidence as a Factor of Students' Attitude Towards Mathematics

Statement	Mean	Verbal Interpretation
I have a lot of self confidence when it comes to Mathematics.	2.91	Neutral
I expect to do fairly well in any math class I take.	3.20	Neutral
I learn Mathematics easily.	2.75	Neutral
I am confident that I could learn advance Mathematics.	3.22	Neutral
I believe I am good at solving Math problems	2.86	Neutral
Over-all	2.99	Average

Table 6 shows that students were confident to take Mathematics. This had to be strengthened, since students with little confidence in their ability to do Mathematics tended to take the minimum number of required Mathematics courses, which could greatly limit their career choice options (Garry, 2005, as cited in Kargar, Tarmizi, Bayat, 2010).

Table 7.
Importance as a Factor of Students' Attitude Towards Mathematics

Statement	Mean	Verbal Interpretation
Mathematics is a very worthwhile and necessary subject.	4.08	Agree
Mathematics helps me develop the mind and teaches a person to think.	4.00	Agree
Mathematics is important to everyday life.	4.27	Strongly Agree
Mathematics is one of the most important subjects for people to study.	4.24	Strongly Agree
Mathematics subjects would be very helpful no matter what work I will have.	4.13	Agree
I can think of many ways that I use math outside of school.	3.68	Agree
I think studying advance Mathematics is useful.	4.04	Agree
I believe studying Math helps me with problem solving in other areas.	3.97	Agree
A strong math background could help me in my professional life.	4.01	Agree
Over-all	4.05	High

Table 7 shows the responses of the students on their perception regarding the importance of Mathematics as a subject. The students looked at Mathematics as a worthwhile subject, which helped develop their critical thinking. This finding concurred with Yaakob's (2010) statement that Mathematics could be used in one's daily life.

Table 8.
Enjoyment as a Factor of Students' Attitude Towards Mathematics

Statement	Mean	Verbal Interpretation
I get a great deal of satisfaction out of solving a Mathematics problem.	3.43	Agree
I am able to solve Mathematics problem without too much difficulty.	2.79	Neutral
I like to solve new problems in Mathematics.	3.09	Neutral
I am happier in Math class then in any other subjects.	2.86	Neutral
Mathematics is a very interesting subject.	3.62	Agree
The challenge of Math appeals to me.	3.48	Agree
I am comfortable answering questions in Mathematics.	2.92	Neutral
Over-all	3.18	Average

Table 8 shows that students are able to solve Mathematics problems with less difficulty and that they were comfortable answering it. This implied that the students were not experiencing much anxiety in their Mathematics class.

Table 9.
Motivation as a Factor of students' Attitude Towards Mathematics

Statement	Mean	Verbal Interpretation
I want to develop my Mathematical skills.	4.43	Strongly Agree
I feel sense of insecurity when attempting Mathematics.	3.08	Neutral
I would prefer to do an assignment in Math than to write an essay.	3.11	Neutral
I really like Mathematics.	3.11	Neutral
I am willing to take more than the required amount of Mathematics.	3.03	Neutral
I plan to study as much mathematics as I can during vacation.	3.01	Neutral
Over-all	3.30	Average

Table 9 shows that students like Mathematics and that they are willing to spend much time studying the subject even during vacation. Walter and Hart (2009, as cited in Tahar, et al., 2010) in their study also found that social-personal motivations influenced the students' attitudes in learning Mathematics.

In sum, of the four factors affecting students' attitude towards Mathematics, only importance got a high mean. This implies that the students gave much value on the usefulness of Mathematics. This was opposed to the notion that students do not consider Math as worthwhile and necessary in their lives. The other three factors - self-confidence, enjoyment and motivation received a neutral response. It would help if these factors would be developed among students taking Mathematics.

Profile of Students' Mathematics Achievement

Table 10 presents the profile of students' Mathematics achievement. The result implies that students do fairly well in class. Their grades may not be excellent; but nevertheless, they were still able to pass the subject. They may be experiencing difficulties; but this hardship is not an experience unique to Mathematics.

Table 10.
Students' Achievement in College Algebra and Trigonometry (Math 10)

	N	Mean	Std. Deviation
Grade of the respondents	305	2.80	0.59

Difference between the students' study habit and Mathematics achievement

Table 11 shows the relationship between the students' Mathematics achievement and study habits. It can be seen that there was a strong negative association between the Mathematics achievement and the study habits of the student.

Table 11.
Correlation between the Students' Study Habit and Mathematics Achievement

		Math Achievement	Study habit
Math Achievement	Pearson Correlation	1	-.106
	Sig. (2-tailed)		.064
	N	305	305
Study habit	Pearson Correlation	-.106	1
	Sig. (2-tailed)	.064	
	N	305	305

Difference Between the Students' Attitude Towards Mathematics and their Achievement

Table 12 shows the relationship between the students' Mathematics achievement and attitude towards Mathematics.

Table 12
Correlation Between the Students' Attitude Towards Mathematics and their Achievement

		Math Achievement	Attitude towards Math
Math Achievement	Pearson Correlation	1	-.208**
	Sig. (2-tailed)		.000
	N	305	305
Attitude towards Math	Pearson Correlation	-.208**	1
	Sig. (2-tailed)	.000	
	N	305	305

***. Correlation is significant at the 0.01 level (2-tailed).*

Table 12 shows that there was a negative relationship between the students' attitude towards Mathematics and their achievement in this subject. This means that if they had positive attitude towards Mathematics, they also got grades with low numerical value.

Difference Between Students' Study Habits When Grouped According to Gender, Place of Origin and Course

Tables 13 – 15 discloses the difference between the computed mean of study habits among the DOSCST students grouped according to gender, place of origin and course.

Table 13.
Difference of Students' Study Habits According to Gender

Gender	Mean	SD	Study habit Rating	t-value	Remarks	Relationship
Male	3.34	1.03	Average	-0.64	|t|<1.96	Not significant
Female	3.42	0.97	High			

The table above shows that at 5% level of significance, there is no significant difference between the study habits of male and female students in DOSCST. This means that students had the same study habit regardless of their gender.

Table 14.
Difference of Students' Study Habits According to their Place of Origin

Place	Mean	SD	Study habit Rating	F-com	F-tab (5% sig)	Relationship
M	3.36	0.96	Average			
wDO	3.49	0.99	High	1.74	3.0	Not significant
oDO	3.34	1.08	Average			

Legend: *M – within Mati*
wDO – outside Mati, but within Davao Oriental
oDO – outside Davao Oriental

In this section, the places of origin were grouped into three, those living within Mati, those living outside of Mati but within Davao Oriental, and those living outside of Davao Oriental. Among the three groups, those living outside of Mati but within Davao Oriental showed the highest mean of study habits. Table 16 also reveals that the students' study habit did not differ significantly regardless of their place of origin, with the computed F-value lesser than its tabular value.

Table 15.
Difference of Students' Study Habits According to their Courses

Course	Mean	SD	Study habit Rating	F-com	F-tab (5% sig)	Relationship
BSED	3.47	0.97	High			
BSIT	3.28	0.99	Average			
BA	3.54	0.98	High	2.31	2.37	Not significant
BSM	3.28	0.86	Average			
Others	3.41	0.84	High			

Legend: *others – BSES, BSBIO and BIT*

The results shown were not statistically significant. This means students' study habit did not significantly differ regardless of the course they take as the computed F-value was lesser than its tabular value.

Difference Between Students' Attitude Towards Mathematics When Grouped According to Gender, Place of Origin and Course

Tables 16 – 18 display the difference between the computed means of the categories of study habits among the DOSCST students grouped according to gender, place of origin and course.

Table 16.
Difference of Students' Attitude Towards Mathematics According to their Gender

Gender	Mean	SD	Attitude rating	t-value	Remarks	Relationship
Male	3.54	0.90	High	1.65	$\|t\|<1.96$	Not significant
Female	3.44	0.87	High			

Table 16 shows that both male and female students had high attitude rating. It shows that students' attitude towards Mathematics did not significantly differ regardless of gender. This is in contradiction with Patterson, et al.(2003, as cited Tahar, 2010) findings that gender statistically affects attitude towards Mathematics.

Table 17.
Difference Between Students' Attitude Towards Mathematics According to their Place of Origin

Place	Mean	SD	Study habit Rating	F-com	F-tab (5% sig)	Relationship
M	3.44	0.86	High	1.62	3.0	Not significant
wDO	3.51	0.90	High			
oDO	3.44	0.92	High			

Legend: *M – within Mati*
wDO – outside Mati, but within Davao Oriental
oDO – outside Davao Oriental

Table 17 shows that the three groups of places had high attitude ratings. This means that the place where students came from did not affect their attitude towards Mathematics.

Table 18.
Difference Between Students' Attitude Towards Mathematics According to their Courses

Course	Mean	SD	Study habit Rating	F-com	F-tab (5% sig)	Relationship
BSED	3.55	0.90	High			
BSIT	3.37	0.90	Average			
BA	3.43	0.84	High	2.79	2.37	Significant
BSM	3.76	0.71	High			
Others	3.29	0.64	Average			

Table 18 shows that students taking BSED, BA, and BSM had more positive attitude towards Mathematics than those who were taking BSIT and other courses. Students' attitude towards Mathematics affects the kind of course they were enrolled in.

Table 19 reveals the result of the post hoc test. It shows that among students enrolled in the college, those who were taking BS BIO, BS ES and BIT had negative attitude towards Mathematics. Those same courses also happen to have fewer Mathematics subjects. Their aversion to Mathematics could have led to take those courses.

Table 19.
Post Hoc Test of the Relationship Between students' Attitude towards Mathematics and their courses

Course	N	Mean
Others	9	88.78^{a}
IT	108	90.81^{ab}
BA	61	92.44^{ab}
Educ	102	95.80^{bc}
BSM	19	101.63^{c}

Note: Means with the same letter superscript are not significantly different from each other at α = 0.1

Unsurprisingly, students taking BSM showed the more positive attitude towards Mathematics. This was logical considering that they chose Mathematics as their major field of study. It would have been ironic if they had negative attitude towards the subject.

DOSCST students practice study habit and they expressed positive attitude towards

Mathematics. Gender and place of origin had no significant difference on both students' study habits and attitude towards Mathematics. The kind of course that the students took had no significant difference on their study habit. However, the course they took had been significantly influenced with their attitude towards Mathematics.

After a thorough analysis of the data, the following recommendations are hereby made: The College should formulate, support and encourage programs that aim to strengthen study habits among students and their attitudes towards Mathematics. Curriculum may also be re-visited.

The faculty of Mathematics Department may reinforce their consultation period by making it compulsory for students to visit them on a scheduled basis. Further, this study also recommends that teachers use strategies that would build up teacher-student rapport. Harmonious relationship is also encouraged and should be strengthened. The Department can also supervise student-based program of tutorial among the students. Peer-coaching is highly recommended. Another program could be a faculty-student tutorial session.

This study also recommends a college-wide symposium on fostering good study habits among students, which will include the ways of improving their study skills as well as the importance of doing so. Another symposium on developing positive attitude towards all subjects should also be conducted.

This study advocates that parents should be hands on when it comes to their children's study habits. This study also recommends for students to develop good study habits and positive attitude towards Mathematics. This will not ensure a passing grade, but not having a good study habit is a sure way to fail. Lastly, they should realize that they need to help themselves. As Landly (1996) emphasized, genuine education is at bottom self-education. Further study can

also be conducted on how study habits affect the students' achievement in their specific courses and how their attitudes towards Mathematics influence their attitude towards other subjects.

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