FRESHMAN COMPUTER ENGINEERING STUDENTS' ATTITUDE CAPABILITY IN SOLVING SOLID MENSURATION MAJOR EXAM PROBLEMS

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ABSTRACT:

This study aimed to determine the capability of the first year Computer Engineering students to solve Solid Mensuration major exam problems particularly in Midterm and Semi-Final Examinations. The descriptive survey type of research was utilized in the study. The respondents were 45 First year BSCoE students enrolled in Solid Mensuration course during 2nd Semester SY 2011-2012 at Lyceum of the Philippines University in Batangas City. Students who obtained lower scores in two major exams almost obtained significantly low scores in the removal exam, while those who obtained higher scores also obtained significantly higher scores than the other students with low scores from the actual exam. Students with high attitude capability during actual exams were the same students with higher attitude capability during removal and those students with low attitude capability during actual were also the same students with lower attitude capability during removal exam. Female engineering students have significantly higher attitude capability in solving Solid Mensuration problems than their male counterpart in both removal examinations.

KEY WORDS: Attitude Capability, Computer Engineering students, LPU, Problem Solving, Solid Mensuration,

INTRODUCTION

Word problem solving involves the construction of two different mental representations, namely, mathematical and situational. Word problem solving is faced by teachers as a mechanical and non-reflexive task which involves limited situational knowledge (Rosales, 2012). The course in Solid Mensuration provides students with firm knowledge on the basic geometric plane and solid figures most commonly encountered in engineering problems like prism, cylinder, cone, pyramid and sphere. Possessing the right attitude in solving math problems would help the students' motivation to solve more problems in a certain major examination and achieve higher grade than just obtaining passing grade. Analyzing the capability of the students to solve math problems would provide baseline information how they answered the major examination.

This study aimed to determine the attitude capability of the first year Computer Engineering students to solve Solid Mensuration major exam problems particularly in Midterm and Semi-Final Examinations only during 2nd Semester, SY 2011-2012.

The study also documented and analyzed not only the grades of the students obtained from actual exam and removal exam but this study also considered the attitude of the examinees on how they exerted effort to solve the problems, maybe they stopped solving in the middle of the solution or they did not try or write anything in the test booklet to get the final answer.

Students were given actual major exams and after one or two meetings of remedial classes and giving them sort of advises and encouragements to increase their interest to pass the subject, they were given removal exam which has similarities in the way how to solve the problems from the previous exam.

The result of the study will serve as baseline information for teachers who will handle the same students. They will be informed regarding the attitude capability of these students in solving math problems like Solid Mensuration.

OBJECTIVES OF THE STUDY

This study primarily aimed to determine the first year BS Computer Engineering students' attitude capability in solving Solid Mensuration major exam problems during SY 2011-2012.

1. To determine the result of major examination of First year BS Computer Engineering students enrolled in Solid Mensuration during SY 2011-2012 in terms of:
   1.1 Midterm exam
       1.1.1   Actual Exam
       1.1.2   Removal Exam;
   1.2 Semi-final Exam;
       1.2.1   Actual Exam
       1.2.2   Removal Exam.

2. To determine the attitude capability of the First year Computer Engineering students in solving problems in Solid Mensuration during:
2.1 Midterm Exam; and
       2.2 Semi-Final Exam.

3. To determine if there is a significant relationship between the results of actual and removal exams during:
3.1 Midterm Exam; and
3.2 Semi-Final Exam.

4. To determine if there is a significant relationship between the results of midterm and semi-final exams in the attitude capability of the students.

5. To determine if there is a significant difference between male and female students in their attitude capability in two major exams during removal examination.

HYPOTHESIS

This study was guided by the following hypotheses:

1. There is no significant relationship between the results of actual and removal exams during:
   1.1 Midterm Exam; and
   1.2 Semi-Final Exam.

2. There is no significant relationship between the results of midterm and semi-final exams in the attitude capability of the students.

3. There is no significant difference between male and female students in their attitude capability in two major exams during removal examination.

Related Literature

Zakari (2009) conducted a study to determine the attitudes and problem solving skills of Malaysian matriculation college students. The study examined whether there were differences in attitudes towards solving algebra problems and problem solving skills in algebra based on gender and course of study. Two instruments were used to gather data: a problem-solving test in algebra and a questionnaire on attitudes towards solving algebra problems. The findings showed that matriculation students had moderately favorable attitudes towards algebra problem solving. There were no significant differences in attitudes and problem-solving skills based on gender. However, the findings indicate that there were significant differences in attitudes--specifically, with regard to self-confidence--and problem solving skills between students in different courses of study.

Similarly, Lim (2000) also found that students' weakness in solving word problems is that they make avoidable preliminary mistakes. Students' carelessness, as well as inabilities to understand what they read, to plan and to choose suitable mathematical operations, are among the factors that prevent them from solving word problems correctly. It was found that students' inabilities to understand a question and their weak semantic skills involving symbols and meanings of terms as well as vocabulary are the main factors that cause difficulties in solving word problems.

Radzali (1997) found that moderate and weak students face difficulties in simplifying algebraic expressions that contain more than one unknown, and in determining the expansion of multiplication for two linear expressions. Results from interviews indicated that weak students face difficulties at the level of understanding. Moderately successful students have difficulties at the level of formulating processes.

Students initially resisted the idea of having to think and reason from task descriptions. Instead, they expected to be explicitly told about the particular method to use, or alternatively, the relevant procedures should be suggested in the problem. For example, students expected to just "do" the problem (i.e., carry out the procedure to get an answer) usually with some external prompting most often from the teacher, but, seemingly, without putting much individual effort into "thinking" and "reasoning" from task descriptions. Apparently, students' previous mathematics experiences had reinforced the mathematical belief, or practice that if they are not immediately able to solve a problem (Afamasaga-Fuata'I, 2009).

Nicolaidou and Philippou (2001) stressed that some literature refers to attitude as a learned predisposition or tendency of an individual to respond positively or negatively to some object, situation,

concept or another person. This positive or negative feeling is of moderate intensity and reasonable stability; sometimes it is especially resistant to change. In the variety of definitions of attitudes towards Mathematics (ATM) proposed in research studies, two main categories can be identified. Using a simple definition, ATM is just a positive or negative emotional disposition towards Mathematics (Mc Leod, 1994). Using a multidimensional definition, ATM comprises three components: an emotional respond to Mathematics, positive or negative, a conception about Mathematics, and a behavioral tendency with regard to Mathematics (Hart, 1989). Ma & Kishor (1997) propose a wider definition; they conceive ATM as "an aggregated measure of a liking or disliking of Mathematics, a tendency to engage in or avoid mathematical activities, a belief that one is good or bad at Mathematics, and a belief that Mathematics is useful or useless".

MATERIALS AND METHODS

The descriptive type under quantitative method of research was utilized in the study. Quantitative Research is characterized by the use of statistical analysis with the objectives of describing, comparing and attributing causality. Each of these objectives is done through the assignment of numerical values to variables and the mathematical analysis of those values (Costales and Zulueta, 2003).

Subjects
The respondents of the study were 45 First year BSCoE students enrolled in Solid Mensuration course during 2nd Sem Sy 2011-2012 at Lyceum of the Philippines University in Batangas City.

Instrument
Data were collected using documentary analysis of the midterm and semi-final examinations as well as the result of removal examination with the analysis of how did the students answer each question from the exam.

Procedure
Data were gathered right after each major examination and the examination results were recorded together with the result using the scale in attitude capability used by the researcher in the study.

Data Analysis
The data were collected, classified, tabulated and coded for analysis. The following statistical tools were applied in interpreting the data obtained from the study, including the frequency count, percentage, rank and Pearson product moment correlation coefficient to test the significant relationship between the results of actual and removal exams during Midterm Exam and Semi-Final Exam and between the results of midterm and semi-final exams in the attitude capability of the students while t-test was used to determine if there is a significant difference between male and female students in their attitude capability in two major exams during removal examination.

The five-point likert scale was used to interpret the result of the attitude capability of the engineering students.

Weight	Range	Verbal Interpretation
5	4.50 – 5.00	With correct solutions
4	3.50 – 4.49	With minor error in solutions
3	2.50 – 3.49	With solution but wrong answer
2	1.50 – 2.49	With solution but no final answer
1	1.00 – 1.49	Without Solution/No answer

RESULTS AND DISCUSSION

Table 1 presents the result of actual and removal Midterm Examinations of BSpE 1 in Solid Mensuration

Table 1

Result of Actual and Removal Midterm Examinations of BSpE 1 in Solid Mensuration

	Actual Midterm Exam		Cumulative Frequency		Removal Midterm Exam		Cumulative Frequency		
	F	**%**	**<**	**>**	**F**	**%**	**<**	**>**	**Diff**
96-100	1	2.2	1	45	4	8.9	4	45	6.7
91-95	1	2.2	2	44	5	11.1	9	41	8.9
86-90	0	0.0	2	43	1	2.2	10	36	2.2
81-85	1	2.2	3	43	2	4.4	12	35	2.2
75-80	4	8.9	7	42	6	13.3	18	33	4.4
71-74	4	8.9	11	38	5	11.1	23	27	2.2
66-70	8	17.8	19	34	5	11.1	28	22	-6.7
60-65	26	57.8	45	26	17	37.8	45	17	-20.0
Total	**45**				**45**				

Thirty-eight (38) out of 45 students or 84.4 percent have failed their actual midterm exam wherein more than half of those who failed belong to the lowest group with 60 – 65 percent exam result. After giving them enough time to study for the removal examination after a week, there were great difference of 20 percent who moved –up their scores from 60 – 65 percent. From 38 student who failed from the first exam, only 27 left failed in the second exam, wherein additional 11 students passed the examination. Students who passed the first exam also took the second exam.

Table 2 shows the result of actual and removal semi-final examinations of BSpE 1 in Solid Mensuration.

Thirty-seven (37) out of 45 students or 82.2 percent have failed their actual midterm exam wherein more than half of those who failed belong to the lowest group with 60 – 65 percent exam result. This result is really closed to the result of the actual midterm exam. After giving them enough time to study for the removal examination after a week, there were great difference

of 21.5 percent who moved –up their scores from 60 – 74 percent to 75 and higher scores. From 37 students who failed from the first exam, only 23 left failed in the second exam, wherein additional 14 students passed the examination. Students who passed the first exam also took the second exam while seven students who missed the removal exam were absent.

Table 2
Result of Actual and Removal Semi-Final Examinations
of BSpE 1 in Solid Mensuration

	Actual Semi Exam		Cumulative Frequency		Removal Semi Exam		Cumulative Frequency		
	F	%	<	>	F	%	<	>	% Diff
96-100	1	2.2	1	45	4	10.5	4	38	8.3
91-95	3	6.7	4	44	1	2.6	5	34	-4.1
86-90	2	4.4	6	41	6	15.8	11	33	11.4
81-85	1	2.2	7	39	3	7.9	14	27	5.7
75-80	1	2.2	8	38	1	2.6	15	24	0.4
71-74	2	4.4	10	37	-		15	23	-4.4
66-70	11	24.4	21	35	5	13.2	20	23	-11.2
60-65	24	53.3	45	24	18	47.4	38	18	-5.9
Total	**45**				**38**				

Thirty-seven (37) out of 45 students or 82.2 percent have failed their actual midterm exam wherein more than half of those who failed belong to the lowest group with 60 – 65 percent exam result. This result is really closed to the result of the actual midterm exam. After giving them enough time to study for the removal examination after a week, there were great difference of 21.5 percent who moved –up their scores from 60 – 74 percent to 75 and higher scores. From 37 students who failed from the first exam, only 23 left failed in the second exam, wherein additional 14 students passed the examination. Students who passed the first exam also took the second exam while seven students who missed the removal exam were absent.

The frequency distribution of BSCpE 1students in the level of their attitude capability in answering removal midterm exam is presented in Table 3.

Table 3
Frequency Distribution of BSCpE 1 Students in the Level of their Attitude Capability in
Answering Removal Midterm Exam

Attitude Capability	Q1	Q2	Q3	Q4	Q5	Mean	Mean %
With correct solutions	13	9	2	35	6	13	27.7
With minor error in solutions	13	16	3	2	14	10	20.4
With solution but wrong answer	17	17	32	2	6	15	31.5
With solution but no final answer	3	2	5	3	7	4	8.5
Without Solution/No answer	0	2	4	4	13	5	9.8

In average almost one-third or 31.5 percent of students who took the removal exam in midterm have solutions but arrived with wrong answers in five problems while 13 or 27.7

percent have correct solutions from questions 1 to 5 and 10 students or 20.4 percent with minor error in solutions. There were 4 or 8.5 percent of the students with solution but no final answer and 5 or 9.8 percent without solution or didn't try to write anything in their test booklet.

Table 4 shows the frequency distribution of BSCpE 1 students in the level of their attitude capability in answering the actual semi-final exam.

Table 4
Frequency Distribution of BSCpE 1 Students in the Level of their Attitude Capability in Answering Actual Semi-Final Exam

Attitude Capability	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Mean	% Mean
With correct solutions	11	7	1	4	15	5	18	7	8.5	18.5
With minor error in solutions	1	1	0	4	1	1	0	2	1.3	2.7
With solution but wrong answer	13	19	17	12	11	16	7	6	12.6	27.4
With solution but no final answer	17	9	11	10	11	9	6	12	10.6	23.1
Without Solution/No answer	4	10	17	16	8	15	15	19	13.0	28.3

In semi-final examination, 13 students or 28.3 percent have no answer and solution in almost 8 problems while 12.6 in average nearly 13 students or 27.4 percent have solutions but they arrived in wrong answers. Almost 11 students or 23.1 percent with solutions but haven't arrived in the final answer or they stopped solving the problem in the middle of the solution while 9 students or 18.5 percent have correct answers and solutions and only 1 student or 2.7 percent with minor error in the solution.

From the result of their attitude capability to solve these 8 problems during semi-final exam, it clearly shows that majority of the students were not trying their best to solve these problems. In every ten students, only two students have arrived in final answers with correct solutions. On the other hand, 3 out of ten of the students have tried to solve the problems but arrived in the wrong answer. But almost half of this group certainly received failing grades in the semi-final exam due to their attitude of not solving even a little try in each number.

Table 5 presents the frequency distribution of BSCpE 1 students in the level of their attitude capability in answering removal semi-final exam.

Table 5
Frequency Distribution of BSCpE 1 Students in the Level of their Attitude Capability in Answering Removal Semi-Final Exam

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Mean	% Mean
With correct solutions	16	13	11	11	16	13	16	11	13.4	32.7
With minor error in solutions	2	0	1	3	0	1	0	3	1.3	3.2
With solution but wrong answer	16	11	21	12	16	10	13	7	13.3	32.4
With solution but no final answer	6	3	3	4	5	7	5	8	5.1	12.4
Without Solution/No answer	1	14	5	11	4	10	7	12	8.0	19.5

In the removal of semi-final exam, almost one-third of the students certainly passed the exam because they arrived in the final answers with correct solution and another set of one-third received considerations for having solutions in the test booklet but arrived in the wrong answer. From the actual semi-final exam, half of them almost didn't try to solve the problems but in the removal exam there were only 30 percent of them. It means that there were 20 percent of the students were already tried to solve problems.

Table 6 shows the difference in the attitude capability scores of the actual and removal semi-final exam

Table 6
Difference in the Attitude Capability Scores of the Actual and Removal Semi-final Exam
(Scores in 2nd Exam: Removal Less 1st Exam)

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Total
With correct solutions	5	6	10	7	1	8	-2	4	39
With minor error in solutions	1	-1	1	-1	-1	0	0	1	0
With solution but wrong answer	3	-8	4	0	5	-6	6	1	5
With solution but no final answer	-11	-6	-8	-6	-6	-2	-1	-4	-44
Without Solution/No answer	-3	4	-12	-5	-4	-5	-8	-7	-40

There is an increase of 39 students who answered correctly the 8 problems who obtained wrong answer from the actual semi and arrived with correct final answer in the removal of semi-final. It means that there is an increase in average of 5 students each number who answered the 8 problems correctly and a decrease in average of 6 students per number with solutions but no answer and 5 students decrease without trying at all. The result of semi-final exam removal was considered good because it shows that most of the students have tried their effort to answer the 8 problems.

Table 7 reveals the significant relationship between the results of actual and removal examination scores during midterm exam and semi-final exam.

Table 7
Significant Relationship between the Results of Actual and Removal Examination Scores
during Midterm Exam and Semi-Final Exam

Scores	r-value	p-value	Remarks	Decision
Midterm	.674	.000	Significant	Reject
Semi	.776	.000	Significant	Reject

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

The computed p-values between the results of actual and removal exam scores both for midterm and semi-final exams were less than the 0.01 level of significance, therefore, the null hypotheses of no significant relationships were rejected. This signifies that those students who obtained lower scores in these two major exams almost obtained significantly low scores in the removal exam, while those who obtained higher scores also obtained significantly higher scores than the other students with low scores from the actual exam.

Table 8 reveals the significant relationship between the results of attitude capability of the students in actual and removal examinations.

Table 8
Significant Relationship between the Results of Attitude Capability of the students in Actual and Removal Examinations

	r-value	p-value	Remarks	Decision
Attitude Capability	.571	.000	Significant	Reject

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

The computed p-value between the results of attitude capabilities in actual and removal exam both for midterm and semi-final exams were less than the 0.01 level of significance, therefore, the null hypotheses of no significant relationship were rejected. This implies that the students with high attitude capability during actual exams were the same students with higher attitude capability during removal against those students with low attitude capability during actual were also the same students with lower attitude capability during removal exam.
Table 9 reveals the significant difference between male and female students in their attitude capability in two major exams during removal examination.

Table 9
Significant Difference Between Male and Female Students in their Attitude Capability in Two Major Exams During Removal Examination

Attitude Capability	Mean		t-value	p-value	Remarks	Decision
	Male	Female				
Midterm Exam	3.31	3.98	-2.587	.013	Significant	Reject
Semi-Final Exam	2.85	4.05	-3.186	.003	Significant	Reject

The computed p-values for the result of both examinations are less than the 0.05 level of significance, therefore the null hypothesis of no significant difference between male and female is rejected. This implies that the female engineering students have significantly higher attitude capability than their male counterpart in both removal examinations.

Conclusions

Almost one-fourth of the students were added to the group who passed in the midterm while almost one-third were added to the students who passed the semi-final because of the removal examinations conducted. Majority of the Computer Engineering first year students have the attitude of answering the problems but have the tendency of arriving in the wrong final answer during major examination with little difference in the removal exam when the computed attitude capability is much higher than the actual major exam.

Students who obtained lower scores in two major exams almost obtained significantly low scores in the removal exam, while those who obtained higher scores also obtained significantly higher scores than the other students with low scores from the actual exam. Students with high attitude

capability during actual exams were the same students with higher attitude capability during removal against those students with low attitude capability during actual were also the same students with lower attitude capability during removal exam. Female engineering students have significantly higher attitude capability than their male counterpart in both removal examinations.

Recommendations

Giving removal examination is not always necessary every after major examination but providing remedial teaching would enhance the knowledge of the students in particular topics discussed. The freshmen BS Computer Engineering during SY 2011-2012 need more motivation and encouragement to have proper study habits in school and at home. Students must be given enough assignments, projects and exercises to work on during their spare time and at home to practice whatever they have learned during classroom discussion.

Guiding them well and lot of patience and understanding must be given to these group of students because of their levels of ability that need to be nourished to survive in more complex challenges of engineering especially male students. Follow-up study may be conducted to analyze the attitude capability of these students under study if they still have the same behaviour in solving math problems during their second year level.

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