Class Size and Academic Performance of BISU-MC Engineering Students

VIRGILIA ARANJUEZ,
ADELAIDA LEONOR CAYUNDA,
RYAN TORRALBA,
ERIC BALILI,
AND ANN JELLY POLO
mar_m_a@hotmail.com
Bohol Island State University

Abstract - The main thrust of the study was to determine the relationship between class size and the academic performance of Engineering students of BISU MC during the academic years 2008-2009, 2009-2010 and 2010-2011. Specifically, the study sought to identify the profile of students' class size and academic performance, the difference between the academic performance of students belonging to a class size of less than or equal to 50 and a class size of greater than 50, the relationship between class size and the academic performance and the action plan that could be proposed based on the result of the study. The study made use of the descriptive documentary method wherein the academic performance ratings were obtained from the Registrar's Office. Z-test was used to get the difference between the academic performance of students belonging to a class size of less than 50 and

students belonging to a class size of greater than 50. Pearson Product-Moment Correlation Coefficient was used to get the relationship between class size and the academic performance. It was found out that there is no significant difference in the academic performance of students belonging to a class of less than or equal to 50 and students belonging to a class of greater than 50. It was also found out that there was no significant relationship between class size and academic performance of students. The researchers suggest the following recommendations: For the convenience of both students and teachers, observance to the CHED Memorandum Order No. 52 on the ideal class size is recommended. They also recommend having further studies on the instructors' teaching efficiency and their attitudes toward students in large classes as well as on the effects of big class sizes to students. Finally, other researchers may replicate this study to further verify different variables such as the economic factors, family background, etc. that may influence students' academic performance. The researchers come up with a proposed action plan for the improvement of the learning conditions of the students.

INTRODUCTION

Education in its broadest sense is any act that has formative effect on the mind, character or physical ability of an individual. It plays an important role in the life of an individual since it provides him the necessities for living and relating with others. Hence, education process must be very effective.

The success and effectiveness of education lies in many factors. To properly put into effect the said process, one primary factor to consider is an environment conducive for learning. Evidently, a lesser number of students in a class influences the conduciveness of the environment. With a limited number of students in a class, instructors can easily

facilitate, assess and evaluate students' academic performance. There will be an increase of the level of concentration for the students. Sufficient classroom space may also be provided for group activities.

Educational institutions, with their discretion have designed their own class size according to purposes that serve them best. These academes both private and public may have considered such factors as number of enrollees, number of faculty members to handle specific subject areas and availability of classrooms. On the contrary, government agencies delegated with education have issued orders regarding the ideal number of students in a class. Public schools and state universities must place top priority or conformity with these memorandum orders.

The Bohol Island State University is one of the leading and growing institutions. It accommodates many young people of Bohol and other provinces who choose professional and vocational courses. Specifically, in the College of Engineering and Architecture of BISU - Main Campus at Tagbilaran City, the number of enrollees has been increasing in the recent years. These breathtaking increases in enrolment inevitably lead to college/university students facing larger class sizes. With this, the number of students in a section has reached to 60 or even more. Accommodating such a greater number of students in a class poses some major concerns and problems for both students and instructors.

To this end, the researchers conducted a study to find out how class size may affect students' academic performance. It sought to determine the relationship between class size and academic performance of first year Engineering and Architecture students of BISU MC in the academic years 2008-2009, 2009-2010 and 2010-2011.
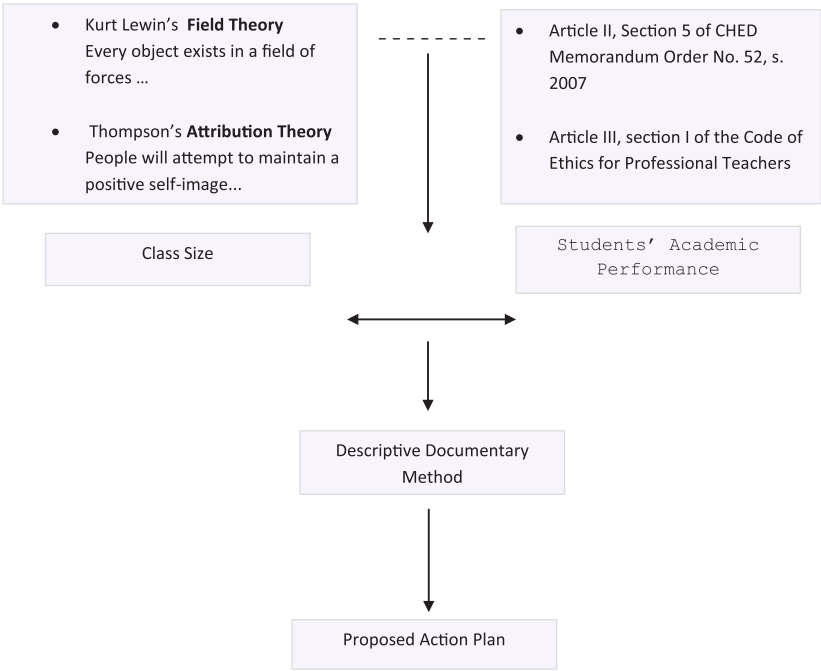
FRAMEWORK

Class size or group size is the direct measure of the number of students in each class. It is the average number of students per class calculated by dividing the number of students enrolled by the number of classes. (Education at a Glance OECD, Paris, 2002, Glossary). Currently, it is understood by the educational community to be the best measure of a teacher's "true opportunity to build direct relationships with each student."

According to Russell P. Chuderewicz, in his brief review on whether smaller class size improve student performance, practically everyone, students, teachers, and the concerned public would without a doubt, prefer smaller class sizes relative to larger class sizes. (http://www.fiu.edu/documents/classsize_rschud.doc).

From the information presented in *Education Week's* recent special report on the state of public education in America, class size is pointed out as one of the most commonly named culprits in the decline of its education system.

In addition to, the established literature on class size effects in primary and secondary schools provides useful guidance (Krueger 1999, Angrist and Lavy 1999, Hoxby 2000), in universities where the range of class sizes is typically larger than at other levels of the education system. Although tertiary education may involve self-learning than primary or secondary education, class size remains solidly at the top of the policy agenda and concerns of both faculty and students in United Kingdom. (http://www.voxeu.org/index.php?q=node/4471).

- Kurt Lewin's **Field Theory**
  Every object exists in a field of forces …

- Thompson's **Attribution Theory**
  People will attempt to maintain a positive self-image…

- Article II, Section 5 of CHED Memorandum Order No. 52, s. 2007

- Article III, section I of the Code of Ethics for Professional Teachers

Class Size

Students' Academic Performance

Descriptive Documentary Method

Proposed Action Plan

In the Philippine educational system, the standard class size of the State University for the undergraduate courses in a lecture class shall be 50 students. Departure from the foregoing rules shall only be upon the authorization of the Department Chairman and the Dean concerned, with the approval of the Dean of Instruction. The State college (now a University) may limit its enrollment, if such limitation is reasonably necessary. (http://www.carsu.edu.ph/index.php/class-size-in-the-university.html)

Article II, Section 5 of the CHED Memorandum Order No. 52, Series of 2007 states that for lecture classes, the ideal size is 35 students or less per class, and the maximum should be 50. Special lectures with class size more than 50 may be allowed as long as the attendant facilities are provided which means that, if a classroom is bigger and has enough space for more chairs with proper ventilation and the necessary facilities are provided, then having more than 50 students in a class could be considered.

In connection to the aforementioned memorandum, Article III, Section 1 in the Code of Ethics for Professional Teachers (Reganit, et. al, 2004) states that:

A teacher is a facilitator of learning and of the development of the youth; he shall, therefore, render the best service by providing an environment conducive to such learning and growth.

It is the teacher's responsibility to create and maintain a learning environment that would promote and enhance students' opportunities for learning.

Teachers as custodian of the learning opportunities of the students must design his classroom considering the factors that cannot be altered easily such as students' needs and class size.

Of significance to this study is Kurt Lewin's Field Theory. Lewin's basic premise is that every object exists in a "field of forces" that moves to change it, define it or give it a degree of stability and substance (Lundgren, 1980:314). The behavior of an individual at a given moment is the result of existing forces operating simultaneously in his life space. In Lewin's view, the ideas, expectations, feelings, attitudes, and needs of the individual constitute the internal forces; while everything in the physical world including other human beings, with which the internal forces interact at a given moment constitute the external forces

of his life space. Changes in any of these forces are likely to result in changes of behavior. It also emphasized the properties and structure of the field or surrounding or setting in which behavior occurs. Students should be exposed in a well-organized classroom so that the behavior of the students will be developed and that learning would be achieved (Meece, 2002).

This study is also anchored on Thompson's Attribution Theory which states that people will attempt to maintain Self-image. Therefore, when they do well in an activity, they are likely to attribute their success to their own efforts or abilities; but when they do poorly, they will believe that their failure is due to factors over which they have no control. It means that, as much as people would like to give the attributions of all their success and achievements to themselves, they as well hate to accept blame of all their failures instead throw the blame to the factors in their environment that is beyond their control, believing that this could not lessen their good self-image in fact increase or maintain it. In relation to our study, if students are performing poorly in the class they most likely attribute their failures into the environmental factors that is beyond control. One of those is a less conducive classroom due to big class size.

In view thereof, the above facts served as basis for the researchers to conduct this study. They perceived that the class environment particularly class size has a great impact on the students' academic performance.

OBJECTIVES OF THE STUDY

In the A.Y. 2008 – 2009, 2009 – 2010, and 2010 - 2011.
Specifically, the study sought to answer the following questions:
1. What is the profile of the students' class size?
2. What is the academic performance of the students:
   a. in a class of less than or equal to 50, and
   b. in a class of greater than 50?
3. Is there a significant difference between the academic performance of the students in a class size of lesser than or equal to 50 and in a class size of greater than 50?
4. What is the relationship between class size and students' academic performance?

5. What action plan can be implemented based on the result of the study?

Null Hypothesis

There is no significant relationship between class size and academic performance of the students.

Significance of the Study

The researchers believed that this study would be of great help to the following:

Students. The findings of the study provided positive feedback regarding the students' academic performance that despite having bigger class size, they were performing well.

Instructors. The study encourages them to find teaching strategies suitable for big classes. The study could possibly provide them necessary information in the consideration of class size reduction. Using it as the basis, they may propose to implement the class size reduction.

Administrators. This study would provide relevant feedback on the academic performance of Engineering students belonging to a class size of lesser than or equal to 50 and a class size of more than 50. This could also serve as their basis in planning a program that could hopefully improve the students' academic performance such as the increased use of balanced instructional methods including higher degrees of individualization.

Guidance Counselors. The result of this study will provide basis for what action plan should be taken to assess the students' needs.

Future Researchers. This study may be used as reference material in pursuing related or parallel study.

MATERIALS AND METHODS

The researchers used the descriptive documentary method. It made use of the data based on the records obtainable at the Registrar's Office. Documentary analysis was employed in this study.

The researchers used this design in order to determine the relationship between the class size and the students' academic performance of the Engineering students.

Research Environment and the Participants

The research study was conducted at the Bohol Island State University, Main Campus, situated along CPG North Avenue, Tagbilaran City. It is one of the campuses of BISU System. It covered the academic years 2008-2009, 2009-2010, and 2010-2011.

The research participants of the study were the Engineering students who enrolled in English 1, English 2, Filipino 1, and Filipino 2 during the academic year 2008-2009, 2009-2010 and 2010-2011. They were composed of Bachelor of Science in Mechanical Engineering, Bachelor of Science in Electrical Engineering, Bachelor of Science in Civil Engineering and Bachelor of Science in Computer Engineering students.

The researchers used the unrestricted random sampling to get the targeted respondents. The study focused on the class size and academic performance of Engineering students.

Research Instrument

In conducting the study, the researchers used the students' final grades in English 1, English 2, Filipino 1, and Filipino 2 which were copied from the records obtainable at the University Registrar's Office.

The students' final grades in their academic subjects and the profile of class size made up the data to be analyzed using statistics.

OPERATIONAL DEFINITION OF TERMS

For unified and clear understanding of the terms used in this study, the following are defined:

Academic Performance. This pertains to the final grades obtained by a student in his academic subjects English 1, English 2, Filipino 1, and Filipino 2.

Class Environment. It refers to the surroundings where students are engaged in. This also includes students' age group.

Class Size. It is the direct measure of the number of students in each class.

Descriptive-Documentary Method. It is a research methodology that presents a factual account of an event or activity.

RESULTS AND DISCUSSION

These data were collated, tabulated and analyzed with the application of statistical formula that resulted in the interpretation and solution of the problem viewed in this study.

Table 1 presents the profile of class size of Engineering students in BISU MC for the academic years 2008-2009, 2009-2010, and 2010-2011. It shows the varied class sizes that range from 18 to 71. These varied class sizes were grouped into two: 1) class size of less than or equal to 50, and 2) class size of greater than 50. As shown, 24 sections out of 66 had a class size of less than or equal to 50 while the other 42 sections had a class size of greater than 50.

Table 1. Profile of students' class size total no. of sections = 66

≤50	F	%	R	>50	F	%	R
18	1	4.17	9.5	51	2	4.76	9.5
34	2	8.33	6.5	52	3	7.14	5.5
36	1	4.17	9.5	53	4	9.52	3
37	1	4.17	9.5	54	2	4.76	9.5
43	2	8.33	6.5	55	1	2.38	15.5
44	1	4.17	9.5	56	4	9.52	3

45	4	16.67	1	57	2	4.76	9.5
47	3	12.50	3.5	58	6	14.29	1
48	3	12.50	3.5	59	4	9.52	3
49	3	12.50	3.5	60	3	7.14	5.5
50	3	12.50	3.5	61	2	4.76	9.5
				62	1	2.38	15.5
				63	1	2.38	15.5
				64	2	4.76	9.5
				65	1	2.38	15.5
				66	1	2.38	15.5
				69	2	4.76	9.5
				71	1	2.38	15.5
Total	**24**	**100**		**Total**	**42**	**100**	

Rank 1 of the 1st group is the class size of 45 that got a frequency of 4 or 16.67% while rank 1 of the second group is the class size of 58 with a frequency of 6 or 14.29%.

If the classroom area of the Engineering Building is taken into consideration, it is expected that majority of the students had experienced a classroom which was too crowded.

Table 2. Mean academic performance of engineering
students in a class size of less than or equal to 50 and in a
class size of greater than 50

Academic Performance	Descriptive value	Class size of less than or equal to 50			Class size of greater than 50		
		F	%	Rank	F	%	Rank
1.0 – 1.5	Excellent	2	8.33	3.5	2	4.76	4
1.6 – 2.0	Very satisfactory	13	54.17	1	12	28.57	2
2.1 – 2.5	Satisfactory	7	29.17	2	21	50.00	1
2.6 – 3.0	Poor	2	8.33	3.5	7	16.67	3
3.1 - below	Failed	0	0.00	5	0	0.00	5

Table 2 shows the mean academic performance of students belonging to a class of less than or equal to 50 and to a class of greater than 50.

The academic ratings revealed the performance of the students. It illustrates that of the students belonging to a class of less than or equal to 50, 54. 17% got a grade of 1.6 – 2.0 which is described as very satisfactory. This range is ranked 1. It is followed by 29.17% or seven sections of students that got a grade of 2.1 – 2.5, described as satisfactory. There were also two sections or 8.33% that got a grade of 1.0 – 1.5, described as excellent and two other sections or 8.33% that got a grade of 2.6 – 3.0, described as poor.

Conversely, twenty-one sections or 50% of all the students belonging to a class of greater than 50 got a grade of 2.1 – 2.5, described as satisfactory. It is followed by another twelve sections or 28.57% that got a grade of 1.6 – 2.0. This range is described as very satisfactory. Another seven sections got a grade of 2.5 – 3.0, described as poor. This range got a percentage of 16.67% and ranked 3. There were also two

sections or a percentage 4.67% that got a grade of 1.0 – 1.5, described as excellent. This range is ranked 4.

Table 3 presents the difference between the academic performance of students belonging to a class size of less than or equal to 50 and a class size of greater than 50.

It shows the result of z-test. The tabulated value is 1.96 while the computed value is 0.108.

Table 3. Difference between academic performance of students in a class size of less than or equal to 50 and in a class size of greater than 50

Difference between	Tabular Value	Computed z	Level of Significance	Description
Academic Performance of students In a class size of less than or equal to 50 and in a class size Of greater than 50 size	1.96	0.108	0.05	No significance

The table shows that there is no significant difference in the academic performance of students belonging to a class size of less than or equal to 50 and a class size of greater than 50. Specifically, there is no significant increase in the academic performance of the students as manifested by their final grades in English and Filipino subjects.

As presented in Table 4, the variables have slight correlation. The results confirm that class size has no adverse effect on the students' academic performance. Thus, the null hypothesis is accepted.

Table 4. Relationship between class size and students'
academic performance

Relationship between Class Size and the Academic Performance	Computed r	Level of Significance	Interpretation
	0.32	0.05 df	Slight Correlation, Definite but Small Relationship

CONCLUSIONS

In the light of the findings, the following conclusions are formulated:

There is no significant difference in the academic performance of students when grouped by class size. It means that the Engineering students of BISU MC are performing well despite their large class sizes. These students have learned how to manage their studies and adapt themselves to the existing conditions.

The class size of the Engineering students did not influence their academic performance.

Thus, it can be concluded that students' academic performance is not dependent on class size.

LITERATURE CITED

Reganit, A.A.
2004   Essentials of Student Learning. Mutya Publishing House: Valenzuela City.

Bustos, A.S.
1996 Psychological, Anthropological, and Sociological Foundations of Educations. Katha Publishing Co., Inc.: 388 Quezon Avenue, Quezon City.

Gonzalos, C.L.
2008   Students' Perception on Classroom Environment in Relation to Their Academic Performance. Central Visayas State College of Agriculture, Forestry and Technology, Tagbilaran City Campus, Tagbilaran City.

INTERNET SOURCES

http://cea.fiu.edu.documents/classsize_rschud.doc
http://www.voxeu.org/index/php?q=node/4471
http://www.carsu.edu.ph/index.php/class-size-in-the-university.html