

# DE LA SALLE UNIVERSITY

Republic of the Philippines  
DEPARTMENT OF EDUCATION, CULTURE AND SPORTS  
National Capital Region  
Metro Manila

## THESIS ABSTRACT

**TITLE:** Development, Validation and Evaluation of Modules  
On Selected Topics in Probability and Statistics

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**RESEARCHER:** Rizaldi Nocon

**ADVISER:** Dr. Maxima Acelajado

**SCHOOL:** De La Salle University

**SUBJECT AREA:** Probability and Statistics

**DEGREE CONFERRED:** Master of Science in Teaching

**MAJOR:** Mathematics

### STATEMENT OF THE PROBLEM:

This study aimed to develop, validate and evaluate modules in probability and statistics to determine their effects on the academic achievement of engineering students taking the subject Engineering Probability and Statistics at Adamson University.

Specifically, this study sought answers to the following questions:

1. What are the difficulties of Adamson University



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engineering students in probability and statistics?

2. How did the evaluators assess the proposed modules as regards their

2.1 content?

2.2 readability?

2.3 format?

3. What are the effects of the modularized instruction and the traditional instruction on the academic achievement in probability and statistics of the students as inferred from the answers to the following questions:

3.1 Is there a significant difference in the academic achievement of the experimental group of students before and after undergoing modularized instruction?

3.2 Is there a significant difference in the academic achievement of the control group of students before and after undergoing traditional instruction?

3.3 Is there a significant difference in the academic achievement of the students who underwent traditional instruction and those who were subjected to modularized instruction?



## PROCEDURE:

This study made use of two research designs, namely, the research and development design and the pretest-posttest control group design. This is basically a research and development study because the modules were developed after finding out the difficulties of the students taking the subject Engineering Probability and Statistics. The modules were then field tested and subsequently evaluated by means of an experiment using the pretest-posttest control group design. Based on this design, the control and experimental groups were given pretests before they were allowed to undergo different treatments and then were given posttests. The experimental group was subjected to modularized instruction while the control group underwent traditional instruction on the topics covered by the modules.

To identify the difficulties of the students in probability and statistics, the study made use of the following instruments: diagnostics test and student and teacher questionnaires.

To validate the modules, the study made use of the following assessment instruments: Feedback-based Readability Formula, student questionnaire for the evaluation of the modules and teacher questionnaire for the evaluation of the modules.



To determine the effects of the traditional and modularized instruction on student achievement, the experimental group was given modularized instruction in the selected topics while the control group was exposed to traditional instruction throughout the term. Pretests and posttests were given to both groups on the selected topics.

The t-test for dependent samples and t-test for independent samples were used to test the hypotheses of the study.

## FINDINGS:

Following are the findings of the study:

1. Based on the results of the diagnostic test administered to two Engineering Probability and Statistics and on the responses to evaluation questionnaires given to both teachers and students, it was determined that the three most difficult topics covered in an Engineering Probability and Statistics course are Probability Sampling Theory and Mathematical Expectation.
2. The different assessment procedures employed during the validation stage of the module development phase revealed the following:
  - 2.1 The modules are readable as far as the student evaluators are concerned based on .



the computed communication indices (C.I.). The C.I.s classified all modules as "quite clear" instructional materials.

2.2 The modules possess all characteristics required of an effective instructional material as far as the following aspects are concerned:

- 2.2.1 objectives
- 2.2.2 subject matter
- 2.2.3 design
- 2.2.4 learning activities
- 2.2.5 adaptability
- 2.2.6 evaluation

This was evidenced by the responses given by the teachers.

2.3 The lessons contained in the modules are quite clear and useful outside the classroom while the activities in the lessons are quite interesting as far as the student evaluators are concerned.

3. The statistical tests performed on the hypotheses of the study during the module evaluation phase revealed the following:

3.1 There is a significant difference between the pretest and posttest scores of the



students in the experimental group for all the modules.

3.2 There is a significant difference between the pretest and posttest scores of the students in the control group for all the topics covered by the modules.

3.3 There is a significant difference between the posttest mean scores of the experimental and control groups for all the involved topics.

## CONCLUSIONS:

Since the posttest scores of both the experimental and control groups are significantly higher than the pretest scores, it may be concluded that the students can learn probability, mathematical expectation and sampling theory regardless of whether or not they use modules during concept formation. However, since the posttest mean score of the experimental group is significantly higher than that of the control group, then the use of modularized instruction is more effective than traditional instruction in the three topics mentioned.

## RECOMMENDATIONS:

The researcher makes the following recommendations based on his findings and conclusions:



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1. Adamson University may adopt the modules, with the Mathematics Department disseminating them, on a try-out basis and evaluate their effectiveness after one semester of implementation.
2. Future researches may be conducted
  - 2.1 to validate the findings of the study using a larger sample.
  - 2.2 to replicate the study, but in other mathematics courses in the college level.

