WEST VISAYAS STATE UNIVERSITY
COLLEGE OF EDUCATION
GRADUATE SCHOOL
Iloilo City

FLIPPED CLASSROOM ON PROBLEM SOLVING, CRITICAL THINKING SKILLS, AND STUDENTS' MATHEMATICS PERFORMANCE

A Dissertation Presented to the

Faculty of the Graduate School

College of Education

West Visayas State University

La Paz, Iloilo City

In Partial Fulfilment

of the Requirements for the Degree

Doctor of Philosophy in Science Education

(Mathematics)

by

Noeda M. Madamesila

May 2021

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APPROVAL SHEET

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Abstract

This quasi-experimental research aimed to determine the effects of flipped classrooms on the problem-solving, critical thinking skills, and mathematics performance of first year college students enrolled in Mathematics in the Modern World. A total of 50 BS Pharmacy students for AY 2018-2019 were the participants of the study, 25 students from each intact class. Researcher-made questionnaires namely Problem Solving Skills Questionnaire, Critical Thinking Skills Questionnaire, and Mathematics Performance Questionnaire were utilized. Findings revealed that the problem solving and critical thinking skills of both the non-flipped and flipped classroom groups were "developing" and their mathematics performance was "low" before the intervention. After the intervention, the non-flipped classroom group of students' problem solving and critical thinking skills were "competent", while the flipped classroom group of students' problem solving skills was "accomplished" and their critical thinking skills was "competent". Moreover, the mathematical performance of both non-flipped and flipped classroom groups of students was "high". Furthermore, results showed no significant differences in the pretest scores of problem solving, critical thinking skills, and mathematics performance of the non-flipped and flipped classroom group of students, and no significant differences in their posttest scores of problem-solving skills

and academic performance. However, there was a significant difference in the critical thinking skills' posttest scores of students of both groups with an effect size *(d=1.01).* In terms of their pretest and posttest scores of non-flipped and flipped classroom, there were significant differences in problem solving skills with effect sizes *(d=2.55 and d=2.40)*, critical thinking skills with effect sizes *(d=1.01 and d=2.41)*, and mathematics performance with effect sizes *(d=2.44 and d=3.70).* Lastly, there was no significant difference in the mean gain scores in problem–solving skills of students of both groups after the intervention. However, there were significant differences in the mean gain scores in critical thinking skills and mathematical performance of the two groups with effect sizes *(d=1.29 and d=0.58), respectively.* Based on the results, it can be inferred that flipped classroom approach is more effective than non-flipped approach in developing students' thinking skills and performance in mathematics. Thus, to enhance students' problem solving, critical thinking skills and Mathematics performance, learning guides were developed. The enhanced instructional materials developed by the researcher may be used by mathematics teachers which can enhance students'

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