EPRA International Journal of Environmental Economics, Commerce and Educational Management
Journal DOI: 10.36713/epra0414 |ISI I.F Value: 0.815|SJIF Impact Factor (2021): 7.743 ISSN: 2348 – 814X
Volume: 9 | Issue: 4 | April 2022

MATH-TULUNGAN PARA MATH-TUTO: A TECHNOLOGY-BASED TUTORIAL AS INTERVENTION IN SOLVING PROBLEMS INVOLVING PROBABILITY

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Article DOI: https://doi.org/10.36713/epra9925
DOI No: 10.36713/epra9925

ABSTRACT

From Trends International Mathematics and Sciences Study (TIMSS) shows the Philippines scored significantly lower than other countries that participated in the Math and Science assessment. The Philippines only scored 297 in Mathematics. That is, 19% of Filipino students were on the low benchmark, which means that they had some basic mathematical knowledge, while 81% did not even reach this level. The knowledge of probabilistic concepts is difficult, given the diversity of representations associated with this concept. Probability is hard to understand for various reasons, including the disparity between intuition and conceptual development(Mullis et al., 2020). Moreover, the percentage distribution in Region 2, Grade 6 test-takers on proficiency level in Mathematics. Reveals that 0.17% of the total number of examinees are highly proficient in Mathematics while 2.29% are proficient. And 97% of the examinees fall under the proficiency level in Mathematics(Department of Education, 2019). The previous year's result also reveals that Canocotan National High School scored only 71.21% of the proficiency level in Mathematics for school year 2018-2019. That is too low for the proficiency level target of about 75%. It is on that premise mentioned above that the researcher is inspired to conduct a study math-tulungan para math-tuto: a technology-based tutorial as intervention in solving problems involving probability. The completion of this study could be of great help to the administration and management system as a basis of policy review and implementation.

KEYWORD: ***Technology-Based, Tutorial as Intervention in Solving Problems Involving Probability.***

INTRODUCTION

The Philippines scored much worse than other nations that took part in the Math and Science evaluation, according to the Trends International Mathematics and Sciences Study (TIMSS). The Philippines only received a score of 297 in Mathematics, indicating that 19% of Filipino pupils met the low standard, indicating that they possessed some fundamental mathematical understanding, but 81% did not. Understanding the variety of representations connected with probabilistic notions is challenging. For various reasons, including a disconnect between intuition and conceptual development, the probability is difficult to grasp (Mullis et al., 2020). Furthermore, the percentage distribution of Grade 6 test-takers on Mathematics competence level in Region 2. It is discovered that 0.17 percent of all examinees are extremely skilled in Mathematics, whereas 2.29 percent are proficient. Moreover, 97 percent of the test takers are below the skill level in mathematics (Department of Education, 2019).

Canocotan National High School earned just 71.21 percent of the competency level in Mathematics for the school year 2018-2019, according to the previous year's results. That is insufficient for the goal proficiency level of roughly 75%. The researcher is motivated to perform a study math-tulungan para math-tuto: a technology-based tutorial as an intervention in answering probability questions based on the assumption above.

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As a foundation for policy evaluation and implementation, the completion of this study might be extremely beneficial to the administration and management system. The research will follow the scope of "Math-Tulungan Para Math-Tuto: A Technology-Base Tutorial as Intervention in Solving Problems Involving Probability. This study focuses on the competency of Grade 11 Statistics and Probability subject, solving problems involving probability (week three). The intervention Math-Tulungan Para Math-Tuto applies in the experimental group. The group of students participating in the intervention will be selected purposively in the SY 2021-2022.

PROPOSED INTERVENTION

This Intervention will resolve the gap between teachers and learners in solving probability in distance learning modalities. Using the right platform and giving the learners accurate learning materials will help reduce the notion that probability is difficult. Math-tulungan Para Math-Tuto**:** A technology-based tutorial from competency intervention will help least learners, especially in mathematics subject grade 11. The intervention will cover the 4th quarter period within June to August 2022. Falling under the competency of problem solving involving probability.

Step 1: The selection of learners for both control and experimental groups will be based on the least or bottom proficiency in the third quarter. Five males and five females will be selected. Another three excellent students are also included in each of the groups.

Step 2: A researcher-made 20 items 4th quarter assessment (Pretest) with Test of Specification will be employed and validated.

Step 3: Only the experimental group will use the Math-Tulongan, Para Math-Tuto intervention.

Step 4: A researcher made 20 items 4th quarter assessment (Posttest) with Test of Specification will be employed.

Step 5: Analysis of data for the result.

Step 1:	**Selection of Learners from Grade 11** 3 excellent learners 9 least learners 1 teacher facilitator
Step 2	**Employing Assessment** 4th Quarter Assessment 20 items test with TOS
Step 3:	**Math-Tulungan, Para Math-Tuto** Make a messenger GC for Instruction and Announcement Send link for E-classroom platform Input Probability Materials SLM, Video Tutorial (teacher made or from NEARPOD) and other related competency base IM. Discussion (Cell Group) Apply: Think Pair-Share Strategy Subject teacher: Facilitate only

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Step 4

Employing Re - Assessment
4th Quarter Re - Assessment

20 items test with TOS

Step 5:

Data Analysis

Lastly, after the input discussion of the teacher. Selected excellent learners will follow the "think – pair strategy" that is facilitated by the teacher and go together with their assigned co-learners.

RESEARCH METHODOLOGY

This section presents the method of the study. This includes the research design, research participants, data gathering procedure, statistical treatment, statistical tools, and ethical considerations. This action study will use a quantitative quasi-experimental approach, in which an independent variable will be manipulated without randomly assigning participants to conditions or ordering of conditions. The critical designs are nonequivalent group designs, pretest-posttest designs, and interrupted time series designs. The pretest-posttest design is similar to that of a within-subjects experiment in that each participant is tested first in the control condition and subsequently in the treatment condition.

Pre-test and post-test research are many forms of quasi-experimental design(Stratton, 2019). The pre-test and post-test in this study is the 4th quarter assessment period, and it means that there is testing of the pre-test and post-test/ before and after intervention with a Math-tulungan Para Math-tuto.

Participants and Other Sources of Information/ Data

The respondents of this study are the grade 11 learners of School A, Division of Tagum City school year 2021 – 2022. A purposive sampling method will be utilized to identify the study's respondents. A sampling technique in which the researcher relies on his or her own judgment when choosing population members to participate in the study. The least learners will be identified according to the classroom proficiency that is based on their previous third quarter assessment.

The Experimental group and control group is from the three sections of grade 11 in School A of Tagum Ctiy Division with a population of 129 learners. A sample of 20 learners from 67 in the experimental group and 20 learners from 23 in the control group respectively. Both sections are heterogeneous, informed consent will be given since the respondents are minors and parent consent as well.

Data Gathering Procedures

The researcher undertakes the following procedures in gathering the data needed for the study.

Pre-Intervention Period. The researcher will ask permission and seek approval from the Office of the Superintendent of the Department of Education, Tagum City Division for the conduct of the study. Administration and Retrieval of Assessment. Upon the approval of the Superintendent and the school principal of the school, the researcher will distribute the assessment to the respondents. Questions from the respondents are entertained and instructed to carefully ensure honesty of the answers. To ensure the validity of the assessment test of specification is craft and be validated by experts. After the validation the pilot-test will be conducted in school B to establish reliability at 0.75 using Cronbach alpha. Following, the assessment will be facilitated by the researcher and retrieval of the assessment right after the respondents thoroughly answer all the questions.

The selection of the participants is based on the third quarter assessment of learners having low scores. Both pre-test and post-test will be 20 items. Preparation of the intervention is carefully planned before the conduct of the experiment.

Research Instrument

This study makes use of the researcher-made assessment tool. There is one set that suites to evaluate the Pretest and post-test scores of the students in the competency Solving Problems Involving Probability. Both of the

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assessment tools will compose of 20 items questions. Test Of Specification (TOS) is considered in making the assessment and the rubrics. Moreover, a panel of experts will validate the researcher-made assessment to ensure the content knowledge, consistency, and appropriateness.

Intervention Period. Covering the experimentation period is the 4th quarter of the school year 2021-2022, specifically May-June 2022. The pretest is given to both Experimental group and Control Group will employ a pretest of 20 items. Then, the researcher will conduct the intervention Math-Tulungan para Math-Tuto only in an experimental group right after. The learners of section earth will employ the intervention and the learners of section venus will be delivered the usual modular setting. Pottest will be administered after finishing the lesson in the competency. The same test will be given to both experimental and control groups.

Post Intervention Period. After the pretest and posttest of the experimental and control group, the scores are recorded for statistical treatment, analysis and interpretation of data.

Data Analysis Plan

The following statistical tools will be used in the computation and in testing the hypothesis at a 0.05 level of significance.

Mean. This is used to determine the level of performance in the Pretest and post-test score of experimental group and control group. It is also used to answer numbers 1 and 2 research questions.

t-test for Dependent Samples. This will test the significance of the difference between the pretest and posttest mean score within each group.

t-test for Independent Samples. This will be used to test the significance of the difference between the pretest score of the control group and experimental group as well as the mean gain scores in both groups.

Ethical Issues

To establish ethical consideration, this study adopts the Belmont Report, one of the concerning ethics protecting the subject and participants in research studies. This consists of beneficence, justice and respect for a person.

The respondents of the study are the grade 11 learners. Therefore, their safety and full protection is ensured. This is to preserve the trust they have given to the researcher. The researcher follows the ethical standards in conducting the study as stated in Belmont Report.

Beneficence treats a person with utmost respect for their decisions, protects and makes an effort to secure their well-being. All research has both risks and benefits to make sure they balance. Beneficence requires a commitment to minimizing the participants' risk rather than maximizing the benefits that are due to the (Creswell, 2017).

To establish goodwill, the researcher informs and assures the confidentiality and anonymity of the respondents. They will be treated with utmost care and protection.

The respondents sign the informed permission since they are minors together with the informed consent from their parents or guardians. The researcher will ask for the convenient time of the respondents and the place to answer the assessment. The place is conducive and free from any distractions. In this study, the researcher makes sure that the respondents are free from harm. The respondents will be given one hour to answer the questionnaires. Each of them is given informed consent before conducting the study.

Justice. Fairness in distribution and equal treatment imposing the benefits of participation refers to justice. All classification (race, gender, ethnicity, age, etc.) should be equally subjected to the risks and benefits of research. People should be included or excluded only for reasons that have to do with research questions or hypotheses(Adams et al., 2019).

To establish justice, the respondents are given utmost respect and equal treatment. One benefit of the respondents is the potential to generalize knowledge about the problem being studied and non-material compensation to respondents that may come in the form of other benefits. In this study, the researcher makes sure that the respondents will benefit and be treated equally. While, the questions asked are relevant to the community and the respondents.

Respect for a person requires an individual to be protected and treated as a person with autonomy. The researcher treats the participants as autonomous individuals. This means that each person is independent, self-giving, and capable of making decisions for themselves as long as they are given sufficient information to make the decisions. This principle forms the basis of informed consent (Creswell, 2017).

Plans for Dissemination and Utilization

Learning Action Cell (LAC) Session. Within October 2022, the findings of this study will be shared with 6 math teachers who are part of the researcher's LAC group. It will inform them about the significance of technology-based tutorial in Mathematics using learning materials in the Self-Learning Modules.

In-Service Training. The findings of this study will be useful to all the math online class course creators to provide more seminar workshops on Technology-based Mathematics tutorial.

School Improvement Plan (SIP). The study's findings will aid LEAP Project School A in being included in the SIP for budget allocation for in-service training for online class courses for the entire 3-year plan ending in June 2022.

Annual Improvement Plan (AIP). The study's findings will assist LEAP Project School A in being included in the AIP for budget allocation for in-service training for online class courses in May 2022.

School Report Card. The findings of this study will reflect the students' performance whether math performance increased or not in School Year 2021- 2022.

Research Congress. The results of this study will be presented to Tagum City Division researchers in December 2022, focusing on the research output and its implications for the teaching and learning process.

Research Journal. The findings of this study will be widely disseminated by submitting the manuscript to a local or credited open access repository under a creative commons attribution on an international/national platform for academic exchange, collaboration, and technological advancement.

Teaching Practice/Classroom Engagement. The results of this study will be presented to Grade 11 students by their math teacher as part of an interactive intervention designed to improve the students' math performance in the School Year 2022-2023.

ACKNOWLEDGEMENT

I, Johnell E. Zamora, would like to express my heartfelt gratitude to the all the people who made a significant contribution to the success of this research. Most especially to the panel examiners, for their constructive criticism and suggestions, this greatly aided in the improvement of this paper and my colleagues for assisting me in completing this work for publication.

In addition, I'd want to express my gratitude to my family, friends, and students who helped me complete this study in such a short amount of time. Finally, and most significantly, I want to express my gratitude to our dear GOD for giving me the direction and power I needed to attain this tremendous aim.

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