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# QUEXBOOK APPLICATION IN TEACHING STATISTICS AND PROBABILITY

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**ABSTRACT**

The study evaluates the efficiency of using Quexbook Application to teach Statistics and Probability to Madridejos Community College S. Y. Grade 11 ABM (Accountancy and Business Management) students. 2020 - 2021. With the aid of tests created by the researcher, the study used a non-equivalent quasi-experimental method of research. It is held at Bunakan, Madridejos, Cebu's Madridejos Community College. It is determined that teaching Statistics and Probability via Quexbook Application and the conventional lecture technique both considerably improved students' math skills. Comparing the means of the students exposed to the lecture method and the Quexbook Application, there is, however, no discernible difference. However, using the Quexbook application has a little advantage over the conventional lecture mode of instruction because it has more resources than the latter and has greatly improved student performance. The use of Quexbook and/or other learning applications that can boost/improve students' academic progress, particularly in Mathematics disciplines, should be included in any action plan that is proposed.

**Keywords:** Mathematics teaching, Probability, Quasi-experimental study, Quexbook application, Statistics

## INTRODUCTION

Thinking about nature and the world using mathematics is helpful. Exploring patterns in nature and the wider world is made possible by the nature of mathematics. It is a crucial component of daily life, both formally and informally. It is utilized in business, technology, health, data sciences, construction, and the natural and social sciences. Since mathematics has so many uses in society, it is essential (Daligdig, 2019). Additionally, the Philippines was placed second-worst in the world among 79 nations in the 2018 PISA (Programme for International Student Assessment) worldwide assessment for science and mathematics. The poll recommended that interventions be made for pupils in nations like the Philippines where there is a high correlation between a student's socioeconomic position and performance (CNN Philippine Staff, 2019). It has been noted that several seniors in high school, along with their teachers, find it challenging to learn the topic of mathematics in the local context of Madridejos Community College. Many times, even after receiving a series of exercises and tasks from their professors, kids are unable to respond appropriately. Additionally, they processed basic mathematical concepts very slowly and could not even recall simple formulas from their earlier school years. The examples provided are extremely typical and what students who are taught using the conventional mode

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of instruction may expect. This inspired the researcher to look for strategies for assisting children in learning arithmetic in the most effective way. Additionally, it was noted that the majority of students used their mobile phones and other gadgets for academic purposes. Many students downloaded programs like Facebook, Instagram, and others that were useless in their classrooms. The researcher then considers: because the students were occupied with anything on their devices, why not take advantage of the current trends and introduce them to educational applications. By allowing the students to use the Quexbook application in the teaching of grade 11 mathematics (Statistics and Probability), the school and the community may be able to solve issues related to the kids' academic success.

The study identifies and evaluates the Quexbook Application's efficacy in teaching Statistics and Probability to grade 11 ABM students at Madridejos Community College throughout the 2020–2021 academic year. The outcome served as the foundation for a suggested action plan. Specifically, this study sought answers to the following questions: What are the pretest performances in mathematics of the control and experimental groups? What are the posttest performances in mathematics of the control and experimental groups? What is the significance of the difference between the pretest performances in mathematics of the control and experimental groups? What is the significance of the difference between the pretest and posttest performances of the: control; experimental groups? What is the significance of the difference between the mean gains in the posttest's performances of the control and experimental groups? What action plan can be proposed based on the findings of the study? The following null hypothesis will be tested at 0.05 level of significance in this study. $Ho_1$ – The pretest performances of the students in mathematics both in the control and experimental groups are not significantly different. $Ho_2$ – The pretest and posttest performances of the students in mathematics both in the control and experimental groups are not significantly different. $Ho_3$ – The mean gains in the posttest performances of the students in mathematics between the control and experimental groups are not significantly different.

## RESEARCH METHODOLOGY

### Research Design

This study was treated using a non-equivalent quasi-experimental method of research which is generally used to establish the causality (effect of independent variable on dependent variable), since the researcher was not able to randomly assign the subjects to groups because the sample size is small and sections were already intact since enrolment. This method is very well fit to obtain the objectives of the study. Two groups of Grade 11 students were exposed to using Quexbook Application and traditional method way in teaching Statistics and Probability.

A schematic diagram below shows the flow of the study. The inputs are the Quexbook Application in teaching Grade 11 Mathematics and the traditional method of teaching mathematics of control and experimental group. The process involves the descriptive method of research: the gathering, organizing, analyzing and interpreting of data. The output is the proposed action plan.

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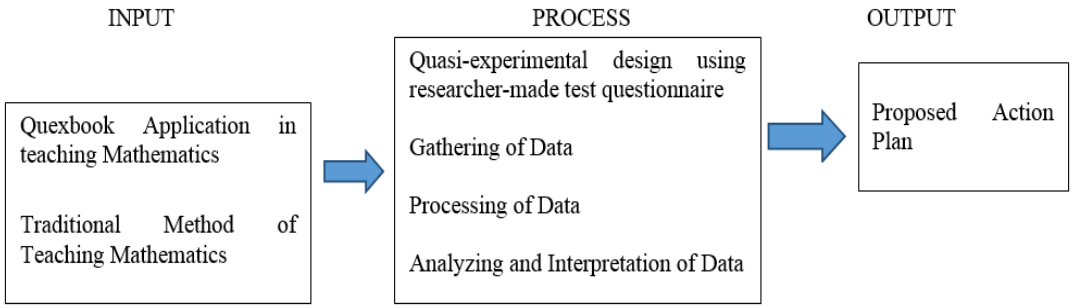


**Fig. 1: Flow of the Study**

## ESULTS AND DISCUSSION

### Pretest Performances

This section presents the pretest of the control and experimental groups. Table 1 summarized the results.

**Table 1: Pretest Performances of the Control and Experimental Groups**

| PRETEST PERFORMANCE / GROUPS | | CONTROL | | EXPERIMENTAL | |
|---|---|---|---|---|---|
| **Scales** | **Interpretation** | **Count** | **Proportion** | **Count** | **Proportion** |
| 33 - 40 | Outstanding | 0 | 0% | 0 | 0% |
| 25 - 32 | Very Satisfactory | 2 | 7% | 5 | 17% |
| 17 - 24 | Satisfactory | 17 | 57% | 19 | 63% |
| 9 -16 | Fairly Satisfactory | 11 | 37% | 6 | 20% |
| 0 - 8 | Did Not Meet Expectation | 0 | 0% | 0 | 0% |
| Total | | 30 | 100% | 30 | 100% |
| | Weighted Mean | 20.37 | Satisfactory | 22.77 | Satisfactory |
| | Standard Deviation | 6.17 | | 5.43 | |

As shown in table 1, there were 57% or 17 who got scores between 17 – 24 is described as satisfactory performance; followed by 37% or 11 of the students in the control group who got scores between 9 – 16 which is described as having a fairly satisfactory performance and 7% or 2 who got scores between 25 – 32 which is described as having a very satisfactory performance.

On the other hand, there were 20% or 6 of the students in the experimental group who got scores between 9 – 16 is described as having a fairly satisfactory performance; 63% or 19 of the students who got scores between 17 – 24 is described as having a satisfactory performance and 17% or 5 of the students who got scores between 25 – 32 is described as having a very satisfactory performance.

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The control group had a weighted average of 20.37 and a standard deviation of 6.17 described as satisfactory while the experimental group had a weighted average of 22.77 and a standard deviation of 5.43 described as satisfactory. Most of the students in control and experimental group had satisfactory performance in their pretest. Based from the descriptive data given, it implies the both groups have the same performance at the beginning of the study.Those groups were having the same performance from the start because both were not yet exposed to the new lesson taught or they only have little knowledge about it making their level of understanding somewhat similar.This finding is supported by the study of Pirrone and Tienken (2018) on the influence of building block play on Mathematics achievement and logical and divergent thinking in Italian Primary school Mathematics classes where the difference in the pretest mathematics achievement between the groups (experimental and control) was not statistically significant.

**Posttest Performances**

This section presents the posttest performances of the control and experimental groups. Table 2 summarized the results.

**Table 2: Posttest Performances of the Control and Experimental Groups**

| POSTTEST PERFORMANCE / GROUPS | | CONTROL | | EXPERIMENTAL | |
|---|---|---|---|---|---|
| **Scales** | **Interpretation** | **Count** | **Proportion** | **Count** | **Proportion** |
| 33 –40 | Outstanding | 3 | 10% | 10 | 33% |
| 25 –32 | Very Satisfactory | 20 | 67% | 17 | 57% |
| 17 –24 | Satisfactory | 7 | 23% | 3 | 10% |
| 9 – 16 | Fairly Satisfactory | 0 | 0% | 0 | 0% |
| 0 – 8 | Did Not Meet Expectation | 0 | 0% | 0 | 0% |
| Total | | 30 | 100% | 30 | 100% |
| | Weighted Mean | 28.37 | Very | 30.77 | Very |
| | Standard Deviation | 3.23 | Satisfactory | 4.29 | Satisfactory |

As shown in Table 2, there were 67% or 20 students in the control group who got scores between 25 – 32 described as having a very satisfactory performance; followed by 23% or 7 of the students who got scores between 17 – 24 described satisfactory performance and 10% or 3 students who got scores between 33 – 40 described as outstanding performance.

In the experimental group, there were 57% or 17 students who got scores between 25 – 32 described as very satisfactory performance; 33% or 10 students got scores between 33 – 40 described as outstanding performance and 10% or 3 students who got scores between 17 – 24 described as satisfactory performance.

Most of the students in the control and experimental group had very satisfactory performances in their posttests. The control group had a weighted mean of 28.37 with a standard deviation of 3.23 while the experimental group had a weighted mean of 30.77 with a standard deviation of 4.29. It can be seen that the experimental group had a higher weighted mean compare to the

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control group. However, this descriptive data result is subject for confirmation utilizing the test for hypothesis.

Both of the students in the control and experimental group did well in the lesson discussion and participation resulting to a better performance in their posttests. They all understood well the topic whether a learning application were introduced or not.

The findings are supported by Walia (2016) in his study where that all the mean gain scores of total mathematical creativities along with all its dimensions of experimental group are higher than those of control group. It means mathematical creativity of experimental group to be better than that of control group.

**Difference Between the Pretest Performances**

This section presents the difference of the pretest performances of the control and experimental groups. Table 3 summarized the results.

**Table 3: Difference Between the Pretest Performances of the Control and Experimental Groups**

| PRETESTS GROUP | N | MEAN | StDv | df | t-value | Sig. (α=.05) | REMARK |
|---|---|---|---|---|---|---|---|
| Control | 30 | 18.27 | 4.54 | 58 | 1.545 | 0.128 | Not Significant |
| Experimental | 30 | 19.97 | 3.96 | | | | |

α = .05 level of significance

As shown in table 3, the pretest performance of the control group is a mean of 18.27 and a standard deviation of 4.54 and the pretest performance of the experimental group is a mean of 19.97 and a standard deviation of 3.96 had a t-value of 1.545. This revealed that there is no significant difference between the pretest performances of the control and experimental groups. It showed that the significant value 0.128 is greater than the significance level at 0.05. This implies that both groups had comparable knowledge before the start of the study.

This finding is supported by Zhang (2003) in his study where there is no significant difference between the pretest of the two groups (control and experimental group).

**Difference Between the Pre-Posttest Performances**

This section presents the difference of the pretest and posttest performances of the control and experimental groups. Table 4 summarized the results.

**Table 4: Difference Between the Pre-Posttest Performances of the Control and Experimental Groups**

| PRE-POST GROUP | N | MEAN GAIN | StDv | df | t-value | Sig. (α=.05) | REMARK |
|---|---|---|---|---|---|---|---|
| Control | 30 | 9.433 | 5.056 | 29 | 10.219 | 0.000 | Significant |
| Experimental | 30 | 10.733 | 5.356 | 29 | 10.977 | 0.000 | Significant |

α = .05 level of significance

Based on table 4 above, the pre-posttest performances of the control group had a mean gain of 9.433, a standard deviation of 5.056 and a t-value of 10.219 while the pre-posttest performances

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of the experimental group had a mean gain of 10.733, a standard deviation of 5.356 and a t-value of 10.977. It was revealed that there is a significant difference between the pre-posttest performances of both the control and experimental groups. It showed that the significance value 0.000 is lesser than the significance level at 0.05 in the control group. Also, it showed that the significance value 0.000 is lesser than the significance level at 0.05 in the experimental group. This implies that both the traditional method of teaching and the use of Quexbook application in teaching significantly increased students' learning in grade 11 Mathematics (Statistics and Probability).

The finding is supported by Lashier and Wren (1977) who suggested that there is evidence that providing students with detailed "Knowledge of Results" following a pretest can have a positive effect upon subsequent learning. Thus, as shown in the above table, there is a significant difference in both the pretest and posttest of the control and experimental groups.

**Difference Between the Mean Gains in the Posttest Performances**

This section presents the difference between the mean gains in the posttest performances of the control and experimental groups. Table 5 summarized the results.

**Table 5: Difference Between the mean gains in the Posttest Performances of the Control and Experimental Groups**

| POSTTESTS GROUP | N | MEAN GAIN | StDv | df | t-value | Sig. (α=.05) | REMARK |
|---|---|---|---|---|---|---|---|
| Control | 30 | 9.43 | 5.056 | 58 | 0.967 | 0.338 | Not Significant |
| Experimental | 30 | 10.73 | 5.356 | | | | |

Based on the table 5 above, the mean gains in the posttest performances of the control group were 9.43, a standard deviation of 5.056 and a t-value of 0.967 while the experimental group had a mean gain of 10.73, a standard deviation of 5.356 and a t-value of 0.967. It showed that there is no significant difference between the mean gains in the posttest performances of the control and experimental groups. It showed that the significant value 0.338 is greater than the significance level at 0.05. Based on the data results, the Quexbook Application with the traditional lecture method in teaching were effective since they significantly improved students' mathematics performance. However, teaching using Quexbook Application does not significantly surpassed the traditional lecture method. But based on the mean, the experimental group which utilized Quexbook Application achieve higher mean of 10.73 than the control group which were exposed to the traditional lecture method with a mean of only 9.43. So, basically as shown in the figures, experimental group achieve more than the control group.

Kaloo & Mohan (2012) reveal that the students were able to improve their performance and they were excited about using a mobile device for learning. They adapted well to using this method of learning for the first time.

This finding is supported by Aviles-Garay (2005), interestingly in his study, the comparison on achievement between the control and the experimental groups at the end of the study was not significant. This was the student's mathematics achievement in linear functions.

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## Findings

In the light of the data gathered, analyzed and interpreted, the following were evident:

1. The students' mathematics pretest performances both in the control and experimental groups were satisfactory.

2. The students' mathematics posttest performances both in the control and experimental groups were very satisfactory.

3. There is no significant difference between the pretest performances of the control and experimental groups.

4. There is a significant difference between the pre-posttest performances of both the control and experimental groups.

5. There is no significant difference between the mean gains in the Posttest performances of the control and experimental groups.

## Conclusions

Using Quexbook Application in teaching Statistics and Probability significantly increase students' performance in Statistics and Probability. In addition, the traditional method in teaching also significantly increases students' performance. However, there is no significant difference upon comparing the means of the students exposed in lecture method and Quexbook Application. Although, using Quexbook Application had a bit better edge to traditional lecture method in teaching since it has greater means than the traditional which highly significantly increased the students' performance.

## Recommendations

In the light of the results of the study, the researcher suggests the following recommendations:

There should be an alternative learning application for the students to be guided in learning Statistics and Probability aside from Quexbook Application.

It is also recommended that reading comprehension in the language of discipline must be emphasized and action plan for using a learning app like Quexbook Application must be proposed especially for those students with low grades and who are just taken for granted.

Give more problem-solving exercises on Statistics and Probability to the students to improve their skills and analysis in addition to the Quexbook application.

An action plan in Statistics and Probability be prepared by a group of faculty members to improve learning.

There should be similar researches to be conducted in other departments and even in the other areas of the same school.

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