Effectiveness of Math Apps in Improving the Performance of the Grade 11 Students in Probability and Statistics

Jhena B. Cantonjos¹, Aldin D. Labo²

Abstract: This study determined the effectiveness of math apps in improving the performance of the grade 11 students in probability and statistics at Bagahanglad National High School, San Jacinto District in the Division of Masbate-Province, school year 2019-2020. The descriptive method of research would utilize in this study. The respondents were 50 Grade 11 students who were currently taking probability and statistics subject. The study used quantitative method to describe the performance level of the grade 11 learners in Probability and Statistics subject along the four identified topics and evaluate the Math Apps being used the Data analysis, and a qualitative method was used to know the effectiveness of the Math Apps in improving the performance of Grade 11 in Probability and Statistics subject. Data were gathered through test administration and interview. A researcher-made test questions and interview schedule were utilized as the main instruments of the study. The data were tabulated, checked, analysed and interpreted using frequency count, mean, interview, and t-test. The findings of the study revealed that the Performance Level results in Pre-test of the control and experimental group along the four identified topics belongs to below 75 and interpreted as low performance while the Performance Level results in post-test of the control are almost belongs to below 75 and experimental group where almost bracket 85-89 and interpreted as very satisfactory. Math Apps is very effective in improving the performance of the students in Probability and Statistics subject. It also revealed that it helped them to compute the mathematics problem easier and faster, and clearly understand the concepts. It also helped them to enhance their knowledge and skill in Probability and Statistics subject. The computed t-test for Control group was 5.685 which were greater than the critical value of 1.795. The computed t-test for experimental group was 9.493 which were greater than the critical value of 1.795. This result showed that the post-test result was higher than the pre-test result. Based from the findings it was concluded that most of the students from experimental group got a passing results in four identified topics. The majority of the grade 11 students did not meet the expectations of the lessons and it has a low performance. The post-test result is higher than the pre-test result. The results revealed that the application was effective instructional materials to the grade 11 students. The Math Apps is very effective in improving the performance of the students in Probability and Statistics subject. Based from the conclusions drawn, the following recommendations are made: the Math apps in Probability and Statistics be submitted for further study and enhancement to ensure high mastery of the learning competencies. The Math Apps may not only focused on unlocking difficulties but also provide more activities during and after the mathematical problems. Design training and workshop to the teachers in secondary to improve the new techniques in probability and Statistics. Trainings and seminar workshop should impose to the students in order for them to alleviate the performance in Mathematics as a whole. Research parallel to this may also be conducted in other subjects and on wider scope.

1. Introduction

Educational technology has long been recognized as a valuable approach to improving the mathematics achievement (Chang, et. Al, 2013). According to the National Council of Teachers of Mathematics (2000), “Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students’ learning” (p. 11).

DO 78, s. 2010 – Guidelines on the Implementation of the DepEd Computerization Program (DCP), the legal mandate of promoting the right of all citizens to take appropriate steps in making education accessible to all, the Department of Education (DepEd) is geared towards the transformation of education through the DepEd Computerization Program (DCP). DCP aims to provide public schools with appropriate technologies that would enhance the teaching-learning process and meet the challenges of the 21st century. The objectives of the DepEd Computerization Program are as follows: Provide computer laboratory packages to secondary schools; Provide e-classroom to elementary schools; Provide laptop units to mobile teachers; Integrate ICT in the school system; Raise the ICT literacy of learners, pupils, students, teachers and school heads; and Reduce the computer backlog in public schools.

ICT pertain to forms of technology that are used to deliver, process, store, create, display, share or exchange information by electronic means. ICT has many different types of electronic systems that include LCD projectors, Cyber schools, printers, scanners, digital/video cameras, cellular phones, calculators and networks, and computer software.

The primary focus of appropriate teaching is to bring about a desirable change in the behavior of learning. It is brought about by the teacher using teaching strategies to achieve the objectives of the lesson. This makes teaching more difficult yet very challenging because it requires different methods and techniques for different learner abilities and behavior. Based on the study of Meilang Zhang, et, Al (2015) Using Math Apps for improving student learning showed that the use of the math apps improved student learning in mathematics and reduced the achievement gap between struggling students and typical students.

Mobile technology opens a new avenue for teaching and learning mathematics in schools in the 21st century. Based on the study of Etcuban, et. Al (2018) The Effects of Mobile Application in Teaching High School Mathematics, the study revealed that there is an increase in the posttest scores of the control and experimental groups. It was concluded that the use of the mobile application in teaching mathematics to the students had helped enhance students’ achievement and learning.
These circumstances as stipulated by different authors are observed to be also true in Grade 11 students of Bagahanglad National High School, where the schools are equipped with ICT infrastructures. The researcher had observed students’ low level of achievement in Mathematics. These students performed better on rote learning and poorly on items that require comprehension, and problem-solving skills. With this in mind, the researcher would like to investigate whether a Math application specifically a Data Analysis is of great help in teaching mathematics to Grade 11 students from a public national high school. Also, this could be an instructional tool in the teaching of Probability and Statistics subject for a better teaching-learning experience that could be utilized by all types of learners. It is on this juncture that the researcher engaged in this research endeavor to purposely looking into how effective the Math Apps in improving the performance of Grade 11 students in Probability and Statistics.

Research Questions
This study aimed to determine the effectiveness of Math Apps in improving the performance of Grade 11 in Probability and Statistics at Bagahanglad National High School S.Y. 2019-2020.

Specifically, it sought to answer the following problems:
1) What is the pre-test Performance Level of control and experimental group along:
   a) ANOVA b) Z-test c) regression correlation d) Pearson-product moments correlation
2) What is the post-test Performance Level of control and experimental group along:
   a) ANOVA b) Z-test c) regression correlation d) Pearson-product moments correlation
3) Is there a significant difference between the pre-test and post test of the control group and experimental groups along the identified variables?
4) How effective are the Math Apps in improving the performance of grade 11 Probability and Statistics?
5) What training Design could be proposed to address the needs of the respondents?

2. Methodology
This study determined the effectiveness of math apps in improving the performance of the grade 11 students in probability and statistics at Bagahanglad National High School, San Jacinto District in the Division of Masbate-Provence, school year 2019-2020.

The sample
The sample comprised of 50 Grade 11 students of Bagahanglad National High School, Bagahanglad, San Jacinto, Masbate, who were taken probability and statistics subject.

To get the sample, purposive sampling was done. 50% of the respondents were the control group and the other 50% of the respondents were the experimental group.

The Instrument
The researcher utilized a questionnaire to determine the effectiveness of Math Apps in improving the performance of Grade 11 in Probability and Statistics subject along the four identified topics.

To determine the index of difficulty and the reliability of the questionnaire the researcher devised a table of equivalent for the percentage equivalent and description and used the Cronbach’s alpha score for the level of reliability.

<table>
<thead>
<tr>
<th>Difficulty Indices</th>
<th>Level of Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>91% - 95%</td>
<td>Very Easy</td>
</tr>
<tr>
<td>76% - 90%</td>
<td>Easy</td>
</tr>
<tr>
<td>25% - 75%</td>
<td>Average</td>
</tr>
<tr>
<td>10% - 24%</td>
<td>Difficult</td>
</tr>
<tr>
<td>5% - 9%</td>
<td>Very Difficult</td>
</tr>
</tbody>
</table>

Cronbach’s Alpha Score

<table>
<thead>
<tr>
<th>Cronbach’s Alpha Score</th>
<th>Level of Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0 – 0.20</td>
<td>Less reliable</td>
</tr>
<tr>
<td>&gt;0.20 – 0.40</td>
<td>Rather reliable</td>
</tr>
<tr>
<td>&gt;0.40 – 0.60</td>
<td>Quite reliable</td>
</tr>
<tr>
<td>&gt;0.60 – 0.80</td>
<td>Reliable</td>
</tr>
<tr>
<td>&gt;0.80 – 1.00</td>
<td>Very reliable</td>
</tr>
</tbody>
</table>

The instrument for data gathering was composed of 12 items questions about probability and statistics subject along the four identified topics three items each topic.

The instrument reviewed to make sure that it could generate authentic and valid results. A dry run and item analysis was conducted to validate the instrument. The researcher then solicited comments and suggestions from the panel members before proceeding to its final distribution to the respondents.

Data Gathering Procedures

The researcher guided by the following steps in the data gathering procedures. Firstly, the acquisition of the approval of the proposal by the panel, a written permission from the Schools Division Superintendent, and Secondary School Head of Bagahanglad National High School.

The Data Analysis is the math apps being used in Probability and statistics subject along the four identified topics the ANOVA, Z-test, Regression correlation and Pearson-product moment correlation which are discussed after the pre-test of the respondents. The pre-test was conducted one hour before the discussion and the post-test was administered after the discussion of the four identified topics.
using the Data analysis, it is for experimental group and traditional instruction for control group.

The respondents given instructions in answering the questionnaire and it would 100% retrieval. March 16, 2020 was the distribution of the questionnaires. The respondents were given instructions by the researcher. They would advise to answer it promptly according to the instruction using the Math apps and the Data analysis. There would be enough time to answer the questionnaire.

Upon the retrieval of the questionnaires, an unstructured interview was done regarding to the effectiveness of Math apps in answering the problems. Total of 100% of the questionnaires would retrieve. Finally, the data would collect, tallied, tabulated, analyzed and interpreted.

The secondary sources of data would take from unstructured interview, curriculum guide, and readings from books, unpublished graduate thesis, and journals. The researcher was also use resources from the Internet to widen the ideas and scope of the study.

Data Analysis Procedures

The statistical measures and tools used in this study were the frequency count, mean, interview, and the t-test. Frequency count and mean were used to determine the performance level of the students in pre-test and post-test along the four identified topics: ANOVA, Z-test, Regression correlation, and Pearson-product moment correlation.

To determine the performance level, the mean was used with the following formula:

\[ \text{Performance Level (PL)} = \frac{\text{Number of Correct Response} \times 100\%}{\text{Total number of respondents}} \]

To determine the difference between pre-test and post-test result of control and experimental group along the four identified topics, the t-test was used with following formula:

\[ t = \frac{\bar{D}}{\sqrt{\frac{\sum D^2 - (\sum D)^2}{n(n-1)}}} \]

Where:
- \( \bar{D} \) – the mean difference between the Pre-test and the Post-test
- \( \sum D^2 \) - the sum of the squares of the difference between the Pre-test and Post-test
- \( \sum D \) - the summation of the difference between the Pre-test and Post-test
- \( n \) – the sample size

To determine the descriptive interpretation of the level of performance, the researcher devised a table of equivalent for the percentage equivalent and description.

<table>
<thead>
<tr>
<th>Performance Level</th>
<th>Qualitative Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 – 100</td>
<td>Outstanding</td>
</tr>
<tr>
<td>85 – 89</td>
<td>Very Satisfactory</td>
</tr>
<tr>
<td>80 – 84</td>
<td>Satisfactory</td>
</tr>
<tr>
<td>75 – 79</td>
<td>Fairly Satisfactory</td>
</tr>
<tr>
<td>Below 75</td>
<td>Did Not Meet Expectations</td>
</tr>
</tbody>
</table>

To determine the effectiveness of Math Apps, the interview was used.

3. Results and Discussions

Findings

Based from the data gathered, the following findings were revealed:
1) The Performance Level results in Pre-test of the control and experimental group along the four identified topics belongs to below 75 and interpreted as low performance.
2) The Performance Level results in post-test of the control are almost belongs to below 75 and experimental group where almost bracket 85-89 and interpreted as very satisfactory performance.
3) There is a significant difference between the Pre-test and Post-test of the control and experimental groups along the four identified topics. In Control group, the inference is based from the computed value of 5.685 which is greater than the critical value of 1.795 when the degree of freedom of 24 at .05 level of significance. This result showed that the post-test result is higher than the pre-test result. In experimental group, the inference is based from computed value of 9.493 which is greater than the critical value of 1.795 when the degree of freedom of 24 at .05 level of significance.
4) Math Apps is very effective in improving the performance of the students in Probability and Statistics subject. Based on the interview, it helps them to compute the mathematics problem easier and faster, and clearly understand the concepts. It also helps them to enhance their knowledge and skills in Probability and Statistics subject.
5) Training Design could be proposed to address the needs of the grade 11 students.

4. Conclusions

Based form the findings, the following conclusions are drawn:
1) It is clearly seen that most of the students from experimental group got a passing results along the four identified topics.
2) The majority of the grade 11 students did not meet the expectations of the lessons and it has a low performance.
3) The post-test result is higher than the pre-test result. The results revealed that the application is effective instructional materials to the grade 11 students.
4) The Math Apps is very effective in improving the performance of the students in Probability and Statistics subject
5) Proposed Training Design based on the Result of the Study

5. Recommendations

Based from the conclusions of the study, the following recommendations are made:

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1) The Math apps in Probability and Statistics be submitted for further study and enhancement to ensure high mastery of the learning competencies.

2) The Math Apps may not only focused on unlocking difficulties but also provide more activities during and after the mathematical problems.

3) Design training and workshop to the teachers in secondary to improve the new techniques in probability and Statistics.

4) Trainings and seminar workshop should impose to the students in order for them to alleviate the performance in Mathematics as a whole.

5) Research parallel to this may also be conducted in other subjects and on wider scope.

References


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[36] Nimer Bay’a’a, Mathematics Teachers’ Readiness to Integrate ICT in the Classroom: The Case of Elementary and Middle School Arab Teachers in Israel (March 2013), retrieved from https://online-journals.org/index.php/i-jet/article/view/2386, in September 2019.


