THE COMPARISON OF USING MICROSOFT MATHEMATICS AND TRADITIONAL TEACHING ON STUDENTS' ACHIEVEMENT – TEACHING MATHEMATICS IN SENIOR HIGH SCHOOL

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ABSTRACT

A quasi experimental study (non equivalent control group design) compares two strategies in teaching and learning which used Information and Communication Technologies (ICT) or not. National Council of Teacher of Mathematics (NCTM) said that technology has an important role in learning, especially give influence in the mathematics learning process. Ekawati (2008) found that teaching mathematics by using technology increased students' motivation, support individual learning and increase students' achievement. Two classes of grade ten were participated in the study. Control group was taught by using traditional teaching method that is lecturing, while treatment group was taught by using ICT (Microsoft Mathematics software). Evaluation students' achievement was collected before and after treatment by giving post-test. This study found that students' achievement who taught by using Microsoft Mathematics is higher than who taught by traditional teaching methodologies.

Field of Research: Mathematics Education, Students’ Achievement, Information Communication and Technology.

1. Introduction

Many mathematics teachers still use traditional teaching methods as the only strategy to deliver content of learning. In traditional teaching methods, teacher has powerful control on learning activity, resources and assessment. Mostly, mathematics teacher only deliver the formula and students were forced to remember it. Students’ mind in traditional teaching methods looks like empty bottle that should be ready fulfilled with knowledge and teachers’ wisdom (Murtini, 2006). They often only accept the concept without getting any chance to think critically.
2. Today's Generation

Today’s generation as Y generation need integration of technology on their learning process to help and challenge their understanding (Shaw and Fairhurst, 2008); (Wheeler and John, 2008). Purpose of this study is to find out the effect of using Microsoft mathematics and traditional teaching methods on students’ achievement.

3. Integration Technology

National Council of Teachers of Mathematics (NCTM) stated technology have important role and give powerful influence on teaching and learning mathematics. Microsoft mathematics is one of free software that could help mathematics teacher teach several mathematics contents such as calculus, statistics, trigonometry and linear algebra.

4. Research Question

Does traditional teaching methods and Microsoft mathematics influence students achievement in learning mathematics (focus on limit topic)?

5. Theoretical Framework

Wadhani (2008) stated the purpose of learning mathematics in school is to make student have several skills such as understanding mathematical concept, explain the relation between two or more concepts and applied the concept to solve problem; using logical reasoning to manipulate, prove and generalize statement; solving problem by modeling the problem and interpret the result; communicating the idea by symbol, diagram or other media to clarify problem; and having curiosity in learning process and solving problem. The benefits of integrating ICT in learning mathematics according to Ekawati (2008) are improving student’s motivation and achievement and also support individual learning. According to Microsoft Corporation (2010) there are three benefits using Microsoft mathematics in learning mathematics, those are freeware with structured menu, some of the menu provide solution and visualization.

6. Methodology

6.1 Sample and data collection method

This study used quasi experimental design (non equivalent control group design) which control group is students who taught by traditional teaching methods and treatment group
is students who taught by Microsoft mathematics. Population: Four classes of grade eleven social science. Sample: Two classes of grade eleven social science, experimental group (N = 28), control group (N = 25).

6.2 Instrumentation

Essay pre and post written test was developed to find out the influence among the groups on students achievement.

7. Finding & Discussion

7.1 Normality analysis

<table>
<thead>
<tr>
<th>Tests of Normality</th>
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Sig value (Kolmogorov-Smirnov statistics) more than 0.05 indicates normality of the distribution improvement test score.

The Cronbach’s alpha coefficient value for all variables in the study revealed a range of coefficient value from .78 to .82 accordingly. The dependent variable of subsequent career intentions scale had a high reliability coefficient of .82 as compared to the independent variables. The independent variables of workplace bullying and emotional dissonance had coefficient values of .78 and .79 respectively.
Significant value in Levene’s test is less than 0.05, it means the variances for the groups are not the same.

7.2 Descriptive statistics, Compare Two Means & analysis

<table>
<thead>
<tr>
<th>Class</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre Test</td>
<td>25</td>
<td>8.80</td>
<td>77.77</td>
<td>56.3920</td>
<td>2.52899</td>
</tr>
<tr>
<td>Post Test</td>
<td>25</td>
<td>27.27</td>
<td>100.00</td>
<td>63.7273</td>
<td>4.27103</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Experiment Group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre Test</td>
<td>26</td>
<td>49.00</td>
<td>86.67</td>
<td>61.2386</td>
<td>2.47432</td>
</tr>
<tr>
<td>Post Test</td>
<td>26</td>
<td>25.00</td>
<td>100.00</td>
<td>69.1220</td>
<td>3.63378</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>26</td>
<td></td>
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</tbody>
</table>

In the output presented above, there are improvement in for both control and experimental group, where mean differences between pre test and post test on experimental higher than control group.

<table>
<thead>
<tr>
<th>Improvement Score</th>
<th>Equal variances assumed</th>
<th>Equal variances not assumed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r</td>
<td>df</td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-0.441</td>
<td>-0.441</td>
<td>61</td>
</tr>
<tr>
<td>-0.438</td>
<td>-0.438</td>
<td>42.207</td>
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</tbody>
</table>

Significant value (2-tailed) column is above 0.05, it means there is no significant difference between the two groups.

The findings showed that the distribution of gender was higher for females with a total of 157 female respondents (67.7%). On the other hand, there were 75 male respondents or 32.3 percent out of the total respondents. The age of the respondents showed that most of them were 21 years old, 13.4% were 20 years old and the rest (15.1%) were above 21 years old.

8. Conclusion and Future Recommendation

The findings of the study revealed that the difference between groups in term of students achievement in the improvement score was not significant. It’s probably influence by students motivation and weakness of the software constrain. Students couldn’t connect the dot of limit concept into real life application. Microsoft mathematics in limit topic doesn’t provide the solution, only answer.
Acknowledgement

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References

(2010). *Your Students’ Interest will Multiply with Microsoft Mathematics 4.0*. Microsoft Cooperation