Walking, Explore Race and Flying Fox Adventure Activity in Learning Statistics: Effect on Leadership Skills

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Abstract. The unemployment issue has opened the eyes of academic scientists and government. These things give the impression that the teaching and learning needs to be improved. One of the strategies that have been suggested by the Malaysia Education Blueprint (Higher Education) is to use experience-based approach. Teaching methods and adventure-based learning is a method characterized by experiential learning and inquiry learning. It is seen as having the characteristics of improving the skills of the 21st century in terms of leadership. The main objective of this study was to examine the effects of adventure-based learning through walks, explore race and flying fox in learning statistics (mathematics) against the student leadership skills. This study will employ a quantitative approach research using a quasi-experimental pre and post-test non-equivalent control group design. The sample for this study will be selected randomly at one Malaysia Teacher Training Institute and will be involved semester two students in Program Persediaan Ijazah Sarjana Muda Perguruan. Three main instruments will be used in this study such as the fundamental statistic achievement test, critical thinking test and leadership assessment questionnaire. The sample will be divided into two groups: the experimental groups will undergo an adventure-based learning approach while control groups remain to the conventional approach. The results of this study are expected to provide an alternative teaching approach that can be implemented by lecturers, teachers and educators in practicing the teaching and learning for the 21st century.

Keywords: adventure activity, learning statistics, leadership skills

Introduction

Innovation and transformation in the field of education often occurs. This matter must be addressed by educators and abroad. Dropping knowledge in the field of teaching and learning will have a negative impact on students in the country. The affects of the strategies or method of teaching issues undertaken by teachers is still in debated. Teachers still use methods of delivering lectures, individual exercises and discussion of answers in math (Yeo & Zhu, 2005; Richmond, 2007).

The current trend shows that, a new transformation of education in particular aspects of teaching and learning methods need to be done. The expected transformation must include various aspects of 21st century skills. This skill need to be the main focus for the discussion. The 21st century skills are required as digital literacy (ICT), inventive thinking (problem-solving, higher order thinking skills, critical, creative and innovative), and interactive
communication (Binkley et al., 2012). This clearly shows that strengthen teaching and learning methods seen is one of the ways that can be used.

History Adventure Based Learning (ABL) approach starts from the establishment of the Outward Bound by Kurt Han in 1941. He has been using the ABL approach to increase confidence and perseverance young sailor (Hattie, Marsh, Neill, & Richards, 1997). In fact, students are reported to have established a variety of skills in leaderships such as adaptability, perseverance, planning, problem solving, time management, communication, teamwork, and group reflection. In addition, the ABL also benefit physical activity, self-confidence, self-awareness, and foster peer relationships (Cooley, Holland, Cumming, Novakovic, & Burns, 2014). Overall, ABL presented an alternative approach that can be used to development of human capital.

Problem Statement

The problem of unemployment is often a topic in the media whether printed or electronic. To overcome the problem of unemployment, Ministry of Education (2015) have suggested that immediate action through the proposed use of experiential learning strategies implemented by the lecturer. They are also proposed extra-curricular activities to be carried out in public institutions of higher education. However, students viewed not have time to participate in the activities (Gordon, 1995). Several studies conducted found that students are not aware of the importance of these activities when it has nothing to do with academics. This causes them apathetic and not interested in participating in these activities (Khaidzir Hj. I, Khairil A, Shaharuddin A., & Jumali Hj. S., 2010; Roslina Ahmad Faisal, Salleh Amat, & Noriah Ishak, 2010). This can be overcome if the activities that form of self-development and soft skills can be applied in academics teaching and learning session. Thus, the selection of appropriate teaching methods needs to be done.

Hui and Cheung (2004) consider that the adventure-based learning is an appropriate method used to develop personality and social groups. This statement is supported by Weilbach, Meyer, & Monyeki (2011) and Scrutton and Beames (2013). Additionally, ABL is often used in various fields to enhance interpersonal and intrapersonal skills of individuals in leadership (Rhodes & Martin, 2013; Sutherland & Stuhr, 2012). In fact, the ABL seen a multi-dimensional approach which involves students in terms of intellectual, ethical, physical, and spiritual (Larson, 2010). Therefore, the ABL is an approach that is able to produce human capital especially in leaderships.

ABL currently are large in size, scope, duration, and funding. However, the ABL also can be implemented on a small scale in various areas (Veletsianos & Kleanthous, 2009). It gives the
sense that the ABL can be practiced by teachers and lecturers in teaching and learning. The studies of the principles that form the basis of the ABL have been carried out, but the empirical data collected on the ABL itself is still less (Moos & Honkomp, 2011). He and his colleagues said it still lacks conclusive research on the relationship between ABL on student achievement. Besides, ABL program of small-scale practiced in this country, especially in view of mathematics education is still lacking. This statement is supported by Karppinen, (2012) in an actions research that has been implemented. The effectiveness of the ABL approach is still less studied by researchers, but the interpretation of this approach is still under discussion (Veletsianos & Kleanthous, 2009). Therefore, the need to carry out small-scale PBA in mathematics education is very high and studying its impact on leadership skills provides the additional knowledge in mathematics teaching and learning methods. So that, the result of the study will be contribute to the mathematics education itself. So this method can be used as an alternative method to the teaching and learning of mathematics. Based on the issues stated earlier, the general purpose of this study was to test the effects of walking, explore race and flying fox activities in learning Statistics on the leadership skills.

**Research Methodology**

A quasi experimental study involving semester two Program Persediaan Ijazah Sarjana Muda Perguruan students will be conduct to serve the purpose of the study. Sample of the study consists of teacher trainees from teacher training colleges in Malaysia. The sample will divide into two main groups: the experimental and the control group. The experimental groups will undergo an ABL approach while control groups remain to the conventional approach. All groups were given a pre-test, a post-test and a post-posttest.

The main instrument used in this study is Leadership Assessment Questionnaire. There are 25 items that need to be answered by the sample. Pre-test is given at the beginning of the study. Then, the sample was divided into two groups: the experimental groups will undergo an ABL approach while control groups remain to the conventional approach. The intervention period is for 10 weeks. After that, sample need to answer second test that we call is post-test. After 8 weeks post-test, the researcher was carried out another test to sample. This test is post-posttest. It aims to assess the skills that can be applied to the sample is maintained by long time. Statistical analysis will be use is descriptive and inferential statistics. Inferential statistics will be use is analysis of variance (ANOVA) which is the test is used to distinguish the impact between two groups. Anova is selected due to the use of the difference between the two groups. The Figure 1 shows a research procedure to be carried out as mention above.
Activities implementation

This learning activities wants to try something new to support the concept that someone could learn most effectively when they:

a. fun learning activities,
b. interested in what you have learned,
c. participate actively in their learning,
d. feeling controlled on what they have learned,
e. able to reflect the experience afterwards, and
f. make connections to other learning or other life situations.

There are three activities that student doing while learning Statistics. Statistics topics studied include statistical data handling, numerical size and correlation analysis. There are cycling or walking adventure (data handling), explore race adventure (numerical size), and flying fox adventure (correlation analysis). Here are some of the adventure activities implemented during the test of the effectiveness by topic. Figure 2, Figure 3 and Figure 4 shows a scenario of adventure activities in the learning process.
Research Finding

Table 1 shows the result of ANOVA test between treatment groups and the control group for the leadership skill pretest. ANOVA analysis results showed there is no significant difference between treatments and the control group \([F(1,28)=2.89, p>0.05]\).

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contrast</td>
<td>126.485</td>
<td>1</td>
<td>126.485</td>
<td>2.887</td>
<td>.100</td>
<td>.093</td>
</tr>
<tr>
<td>Error</td>
<td>1226.667</td>
<td>28</td>
<td>43.810</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 shows the result of ANOVA test between treatment groups and the control group for the basics statistics achievement posttest. ANOVA analysis results showed there is significant difference between that group \([F(1,28)=10.46, p<0.05]\).
Table 2. ANOVA Post-Test between Two Groups

<table>
<thead>
<tr>
<th>Dependent Variable: Post-test Leaderships Skills</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contrast</td>
<td>346.800</td>
<td>1</td>
<td>346.800</td>
<td>10.456</td>
<td>.003</td>
<td>.272</td>
</tr>
<tr>
<td>Error</td>
<td>928.667</td>
<td>28</td>
<td>33.167</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Table 3 show the result of ANOVA test between treatment groups and the control group for the basics statistics achievement posttest. ANOVA analysis results showed there is no significant between that group [F(1,28)=1.08, p>0.05].

Table 3. ANOVA Post-Test between Two Groups

<table>
<thead>
<tr>
<th>Dependent Variable: Post Post-test</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contrast</td>
<td>26.133</td>
<td>1</td>
<td>26.133</td>
<td>1.077</td>
<td>.308</td>
<td>.037</td>
</tr>
<tr>
<td>Error</td>
<td>679.733</td>
<td>28</td>
<td>24.276</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

The F tests the effect of Kumpulan. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

Figure 5 shows the result of experimental group versus control group for posttest. The test results of the experimental group were better than the control group during the posttest. Figure 6 show the result of experimental group versus control group for post-posttest. The test results of the experimental group were better than the control group during the post-posttest.

Conclusion

In the early stages of study, students are required to sit the pre-test achievement test covering leadership skills. Intervention will be included 20 hours of lectures. Once completed, the post-test will be given to the study. After eight weeks posttest, students will be given a post-posttest retained. Data collected subsequently analyzed using the SPSS software. Data for the pre-test, post-test and post-posttest will be retained in the test using Univariate Analysis of
Variance (ANOVA) Assess the impact will also be reported. The results of this study are expected to provide an alternative teaching approach that can be implemented by lecturers, teachers and educators in practicing the teaching and learning for the 21st century.

The findings showed that there was no significant difference the pre-test leadership skills between experimental groups and control group. This means that the level of their leadership skills for the two groups were similar for all sample under review. In other words, both groups were homogenous before intervention.

Based on the results of the second analysis, there was a significant difference for the post-test between the control group and the experimental groups of the variables achievement statistics. This study has confirmed that the meta-analysis was performed by Cooley, Burns, and Cumming (2015). The findings of the meta-analysis, he and colleagues showed positives effects on leadership skills. The third findings indicate that there is significant difference between groups of post-posttest for the leadership skills. This shows that the approach to teaching and learning both provide long-lasting effect on students' knowledge and skills.

The analysis showed very significant improvement in the experimental group compared to the control group. It is illustrated by the following: (a) mean values for the pretest leaderships skills experimental group and the control group gap was originally small, after the posttest was given. It was found that the mean value of both groups is increased. However, mean experimental group increased more sharply than in the control group. This matter can be seen through the small gap at posttest mean became larger after posttest. (b) Mean value of post posttest experimental groups still larger than mean value of control groups. This means, the experimental group students can maintain their leadership skills better than in the control group.

This statement shows that adventure based learning (ABL) approach is better than the conventional approach. Thus, the ABL is an alternative approach that is seen as capable of responding to the call of Mission and National Aspirations as stated in the Malaysia Education Blueprint. Then it should be given serious attention by researchers and educators out there. This is because the ABL approach of this research contributed to the development of human capital and also gives all the element such as student centered, fun learning, participants become active in their learning process, able to reflect the experience afterwards and make connections to other learning or other life situations.

Reference


