Usability Adventure Statistics' Module

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ABSTRACT— *The issue of declining achievement scores in Trends in Mathematics and Science Study for mathematics and science has opened the eyes of scientists from academia and Malaysian government. These things give the impression that the teaching and learning of mathematics and science needs to be improved. One of the strategies that have been suggested by the Blueprint (Malaysia Education Blueprint [Higher Education]) is to use experience-based approach. Adventure learning is a hybrid approach that has basic characteristics of experiential learning and inquiry learning. It is seen as having the characteristics of improving the skills of the 21st century in terms of leadership and critical thinking skills. A module that implements learning adventure-based learning on Statistics has been developed. The main objective of this study is to see the students' perceptions of Adventure Statistics Modules after they followed the learning process. The quantitative approach is used to measure student perceptions. Data were analyzed using descriptive statistics. Data shows that students have a positive perception on this modules. So, this module has a high degree of usability, 90.2% of unit 1, 94.12% of Unit 2, unit 3 is 91.15% and 96.47 for the overall. Therefore, this module should be used and tested for its effectiveness against students in the future*

Keywords— Adventure Statistics' module, Adventure Based Learning, Modules

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1. INTRODUCTION

Malaysia Education Blueprint 2015-2025 (Higher Education), Blueprint (PT) [9] proposed major changes to the system of higher education in Malaysia. Change is focused on the needs and interests of students, and underlines the government's commitment to provide access to equity-based education and quality education of international standards. In the first phase of the implementation of the action plan Blueprint initiative, the main focus is to ensure the realization began immediately with momentum and provide basic transformation. The proposed strategy is to introduce experiential learning and service more widely among institutions. This strategy is in line with the National Higher Education Strategic Plan (PSPTN) where one of the seven main pillars to improve the quality of teaching and learning [8]. The Strategic Plan also provides for the establishment of first class human capital needs to be done by educators to students who produced a global standard that has 21st-century skills. In order to realize the aspirations of teaching and learning in line with program targets critical agenda project (CAP) by the year PSPTN implementation of phase two. The goal for this phase is 100% of lecturers will be able to implement teaching and learning with student-centered strategy, then a study should be undertaken to introduce a new method of teaching and learning in higher education.

The Adventure-Based Learning (ABL) is seen as an alternative approach that characterized the development of human capital. Adventure-based learning is a method that can be used to develop the personality and society [5],[15]. In addition, the ABL is often used in various fields to enhance interpersonal and intrapersonal skills of individuals in leadership [13], [14]. In fact, the ABL seen a multi-dimensional approach which involves students in terms of intellectual, ethical, physical, and spiritual [7]. Thus, the researchers argue that the PBA is an approach that is able to produce human capital with the skills of the 21st century.

From the literature, the ABL has not yet practiced in Malaysia especially in mathematics education. Then, the researchers want to develop and test the impact of ABL module on fundamental statistics achievement, critical thinking and leadership skills. This module is call statistics' adventure modules. Therefore, it is hoped that this study will provide guidance in creating a first-class human capital. Statistics' adventure modules under review are expected to be able to

give guidance to the lecturers for teaching and learning practice on students centered, encourage innovation and creativity, build and enhance higher-order thinking, build good character and lifelong learning. In addition, this study was able to highlight the potential of an institution in order to provide a superior education in teaching and learning, particularly in niche areas of mathematics education.

2. PROBLEM STATEMENT

All In the first phase of the implementation of the action plan initiative, Blueprint 2015-2025 (Higher Education), Blueprint (PT) [9] focusing on ensuring the prompt achievement by starting momentum and provide basic transformation. The proposed strategy is to introduce experiential learning and service more widely among institutions. Adventure-Based Learning (ABL), which will be built and tested in this study using experiential learning and inquiry learning approach In addition, this module 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.

National Higher Education Strategic Plan (PSPTN) one of the seven core focus is improving the quality of teaching and learning [8]. The Strategic Plan also underlines that educators should develop a first class human capital. In order to realize the aspirations of teaching and learning parallel to the successful implementation of the CAP with a goal in PSPTN Phase 2, which is able to form 100% of lecturers can teach a student-centered strategy, then a study should be undertaken to introduce a new method of teaching and learning in higher education. Research literature indicates guide Adventure-Based Learning (ABL) is seen as an alternative approach that characterized the development of human capital. Adventure-based learning is a method that can be used to develop the personality and society [5], [15]. In addition, the ABL is often used in various fields to enhance interpersonal and intrapersonal skills of individuals in leadership [13], [14]. In fact, the ABL seen a multi-dimensional approach which involves students in terms of intellectual, ethical, physical, and spiritual [7]. This approach also use a student centered strategy [10].

Recognizing the excellence of an institution or university as an organization of high prestige in the field of education, research and education related to methods to improve teaching and learning practices should be a priority. Thus, this study should be undertaken to introduce a guide to the new teaching and learning modules to be developed at the Institute of Higher Education and in particular at the Teacher Training Institute so that this method could become a landmark for the country in terms of teaching and learning. With this module, expected to help the lecturers at the university, especially in the field of mathematics education stints as had been suggested in the blueprint (Higher Education) (2015) [9].

3. OBJECTIVES OF STUDY

The objectives to be achieved in this research is to measure the usability of Statistics' adventure modules.

4. RESEARCH METHODOLOGY

This study is a quantitative study using the experimental group and just given a posttest only. This design is suitable for testing the usability of the module. The procedure begins with arrangement the samples into one group. This group sample is then followed by modular session. Once the modular unit completed, the questionnaire given to the groups sample. Samples were given time to answer the questionnaire. This process is carried out in three rounds. This is because the Statistics' adventure consists of three units. The process is summarized in Figure 1.
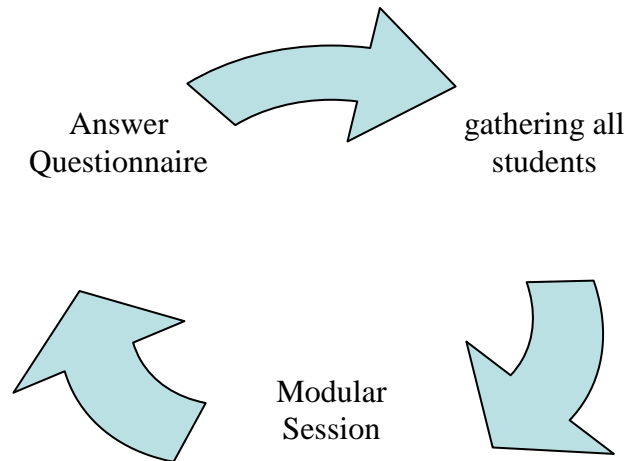
Figure 1: Data Collection Process

Data were collected with the help of the 25-item questionnaire. The questionnaire was developed by the researchers based on the modules objectives. This is done based on the recommendations Jamaludin [6]. It was done as a survey method. These methods are useful to measure opinions, attitudes and behaviors [1], [4]. Sample survey is a survey carried out against part of the population studied. If researchers are able to carry out random sampling technique effectively, the result of the data can be generalized to the population being studied. Therefore, the selection of the design of this study is accurate.

This study focuses on a sample of the modular learning only. It consists of 17 students of semester two *Program Persediaan Ijazah Sarjana Muda Perguruan* in Teachers Education Institutes Campus Temenggong Ibrahim. The number of samples is sufficient as recommended by Myers, Plutchik and Chua [11], [12,[2]. The minimum number of samples of the experimental method is 10 people. The selection of sample size is too small due to the module itself. This is because it involves adventure activities. A small number of samples provided for researchers to control discipline and safety aspects. Data were analyzed using descriptive statistics to see the usability of the module teaching and learning methods based adventure. The data described by the percentage. This can give a clearer picture to assess the level of usability module.

4.1 Modules implementation

Statistics' adventure Module is divided into three units by topic. The unit is cycling or walking adventure, explore race adventure, and flying fox adventure. This module was developed based on the model Doering [3] in accordance with the procedures of ADDIE development model and integration with Kemp model. Here are some of the adventure activities implemented during the test of the effectiveness modules by topic. Figure 2, Figure 3 and Figure 4 shows a scenario of adventure activities in the module.
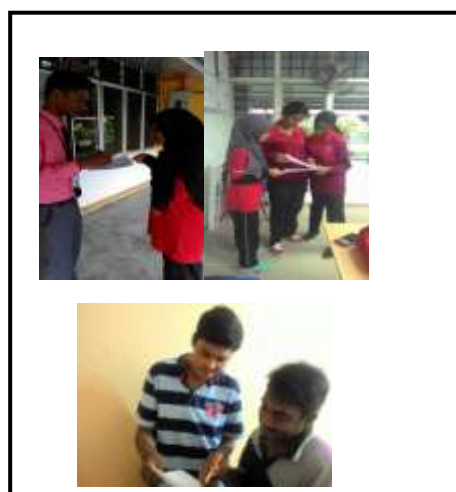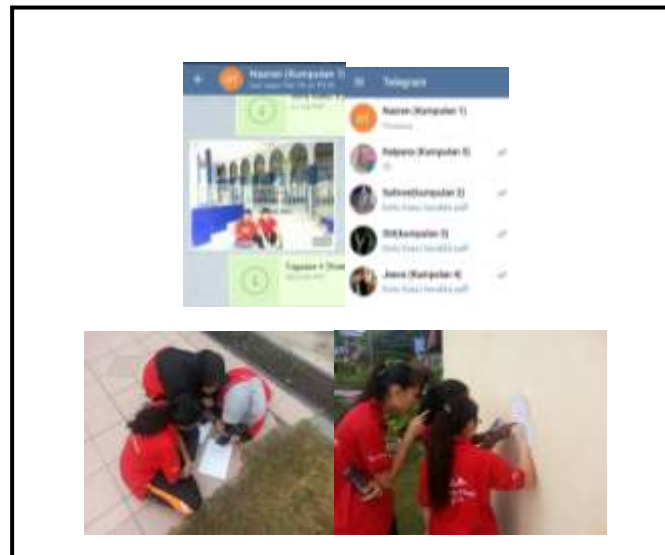

Figure 2: Walking adventure

Figure 3: Explore Race with telegram aplication adventure

Figure 4: Flying fox adventure

5. RESEARCH FINDINGS

This module consists of three units of learning. Therefore, data were analyzed based on the perception by the unit. Table 1 shows the level of students' perceptions of the learning unit 1. Response 1 represents strongly disagree, 2 represents disagree, 3 represents agree and 4 represent strongly agree.

Table 1: Students' perceptions on Statistics' Cycling or Walking adventure

No.	Statements	Response			
		1	2	3	4
1.	I was able to collect data.			29.4%	70.6%
2.	I can compile data systematically.			29.4%	70.6%
3.	I can present data well.			29.4%	70.6%
4.	I can understands the data provided.		17.6%	23.5%	58.8%
5.	I can conclude from the data representation.			47.1%	52.9%
6.	I was able to apply this topics (operting data) into the daily life.		41.2%	47.1%	11.8%

Table 1 shows the level of students' perceptions of the learning unit 2.

Table 2: Students' perceptions on Statistics' Explore Race Adventure

No.	Statements	Response			
		1	2	3	4
7.	I was able to make a calculation on measures of central tendency unit.			58.8%	41.2%
8.	I can do the calculations for dispersion measurement.			23.5%	76.5%
9.	I was able to interpret the data provided.			64.7%	35.3%
10.	I was able to evaluate the computed data.			58.8%	41.2%
11.	I can apply this topics knowledge in everyday life.		29.4%	70.6%	

Table 1 shows the level of students' perceptions of the learning unit 3.

Table 3: Students' perceptions on Statistics' Flying Fox Adventure

No.	Statements	Response			
		1	2	3	4
12.	I can determine the correlation between two variables.			58.8%	41.2%
13	I was able to make the interpretation of the correlation between two variables.		11.8%	35.3%	52.9%
14	I can evaluate data based on the correlation between two variables.			23.5%	76.5%
15.	I can apply the knowledge of correlation analysis for everyday life.		23.5%	23.5%	52.9%

Table 1 shows the summary of students' perceptions.

Table 4: Overall Perceptions

	tidak setuju	Setuju
Unit 1	9.80%	90.20%
Unit 2	5.88%	94.12%
Unit 3	8.83%	91.15%

6. DISCUSSION

Based on the analysis carried out found that students' perceptions of Statistics adventure modules is a very high percentage. This proves that the students agree that teaching and learning using this adventure based learning can provide and enhance their Statistics knowledge, Statistics understanding, Statistics skills and Statistics achievement. Therefore, it is proposed that the module is implemented in a more comprehensive and thorough. This module also need to be tested effectiveness through experimental methods. This must be done so that the modules able to proves whether having a positive impact or not. These modules also need to be use at school.

The first step to be taken by the Ministry of Education is to train qualified coach systematically. If this can be done, it will certainly contribute massively to process the knowledge and skills. This is seen to contribute towards achieving the aspirations and mission of the lay TIMSS mathematics achievement of a third position among the countries participating. It is also will assist the nation in the formation of human capital from a low level to high level.

In addition, this module should be multiplied and distributed to all of the Malaysia Teacher Training Institute and other higher institutions in order to be used for teaching and learning purposes. This is because one of the compulsory courses for the Bachelor of Teaching Preparation is the Basic Statistics course. The IPG lecturers are encouraged to use this module during the process of teaching and learning. It thus responds to the call of the Malaysian Education Blueprint (Higher Education) (2015) so that the lecturers able to practice experiential based approach and student-centered strategy. Implementation of the IPG is a bull preparing to produce teachers capable of teaching and learning 21st century. It thus reducing the cost of government in training them in the future when they were becoming a teacher.

7. SUMMARY

Usability of testing process for this Statistics adventure module has been done systematically and in accordance with the right process. It involves a scientific process. Experimental methods with one group with posttest only design have been used. The results of this study, students were given a very good response and positive impact on the usability of the module. Therefore, this module should be tested for its effectiveness.

8. REFERENCES

List and number all bibliographical references in 10-point Times New Roman, single-spaced, at the end of your paper. For example, [1] is for a journal paper, [2] is for a book and [3] is for a conference (symposium) paper.

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