

e-SampTec II (e-Sampling Techniques II)

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Abstract

The e-SampTec II is a new interactive statistical tool to identify the right sampling techniques to be used in a research project. The tool used for this project is designed in combination of Microsoft Power Point and Excel as a promising medium to help lecturers in teaching and learning process. Based on previous records, most of the students score the lowest marks for this topic using conventional learning method. e-SampTec II is designed to improve student's understanding about sampling techniques, which is eventually may help students in identifying the best techniques easily. Besides that, this tool creates the excitement in learning, specifically in the topic of sampling, and generally in the statistical course. Furthermore, e-SampTec II is in accordance with the university scheme of work with some added value to make it more effective in the process of teaching and learning. The data has been collected and analyzed to compare which group has consistent mark scores either experimental group or control group by using coefficient of variation analysis. With this user-friendly tool, experimental group of students were obtained higher marks for this topic. The mark scores obtained by experimental group who used e-SampTec II is more consistent compare to control group. Thus, e-SampTec II is suggested to be a better technique compared to conventional method in improving students' performance. The e-SampTec II can be proposed to be used by all lecturers in teaching the sampling techniques in all UiTM campuses. The learning materials can be uploaded for online learning. Therefore, postgrads students and researchers should also use this application to choose the best sampling techniques for their research works.

Keywords: sampling techniques, interactive tool, statistics, performance

Introduction

Statistics is one of the most important courses for all programs include science, technology, and social sciences. Sampling techniques is one of the most challenging topic in statistics since it is a crucial part before one's can start doing a research. Conventional teaching make used of markers and whiteboards, is unable to increase the mastery of students particularly on the topic of sampling techniques. Based on previous teaching experience, most of students score the lowest marks for this topic compared to other topics. There are a few factors contributed to the poor performance of students in the examination such as poor motivation, mental block, dependent learning, low interactive learning, poor communication skill, very wide scope of the subject, dry and boring subject, the conservative

style of teaching approach by the educator and language barrier. Further, the statistics lecturers have find out that the confusion has led to the methodological mistakes upon the selection of best sampling techniques in a research done by science technology and social science lecturers.

The development of technologies makes the hybrid nature of human knowing and learning. Student perceive to use technology positively based on the attractive interface and the mobility of technologies as foundations when attempting to understand and improve learning. Technology has impact on the content, pedagogy, and even format of introductory statistics courses [1]. The technology is used to produce more accurate results much more quickly based on the right concept and ideas in enhancing student learning. More appropriate uses of technology are accessing, analysing and interpreting large real data sets. The role

of technology in the statistics classroom need to use practical guidelines for selecting and using technology for teaching statistics. Thus, educators should continuously be seeking ways to enhance classroom experience in attempt to facilitate student learning such as interactive notes and game-based learning. The interactive tool was perceived to increase learning satisfaction and the mobility of learning mathematics [2].

Furthermore, students involved in mathematics games perceived mathematics lessons to be more enjoyable [3]. A study by was demonstrated that game-based learning is effective in engaging students to learning because the game can trigger the interest of the students [4,5,6]. By using the element of competition and eliminating the “boring” feeling among the students, the game-based learning offers more excitement in the knowledge application.

The excitement of learning when doing in group have more advantages and improve their social skill, leadership skill and communication skill [7]. The performance of student in mathematics has significantly improve by using PALS techniques.

Therefore, to overcome the problem of constant lowest score rate for this topic in the Introduction of Statistics course, a combination of interactive notes and game-based learning (known as e-SampTec II) was introduced to be more effective learning and teaching method as one of the best alternatives.

Therefore, this paper focused on investigating the effectiveness of e-SampTec II on student’s academic performance through an empirical study.

Method

This study took a total sample of 92 diploma students in applied science courses at UiTM Pahang. The students were coming from four classes, then they divided into two groups, experimental and control groups where each group consisted of 50 and 42 students, respectively. Total of students for experimental and control groups were different since it varied according to the number of student for each class. The experimental and control group is chosen due to time constraint to finish the syllabus in the time range of a semester.

Topic of sampling techniques is the first topic taught within two weeks in a semester to all students. The control group was taught using conventional learning by “chalk and talk” while the experimental group was taught using interactive notes and game-based learning known as e-SampTec II. E-SampTec II consists of interactive notes using i-Spring link to sampling techniques games designed with excel. Students taught sampling techniques using interactive notes for a week such as interactive slide, videos,

quizzes built in i-Spring. Then students form a group of three to five person in group for sampling techniques games in the following week. e-SampTec II is user friendly tool with clear instruction given for independent learners while lecturers will always offer help to guide them to use it. Students need to identify the best sampling techniques for 10 case studies using the tool given and present to the class. Students must follow the step by step process as show in Figure 1. Any groups who made mistakes were given penalties such as frog jumping, star jumping, singing a song and act of crying for fun learning. The highest score would be the winner with some present given by the lecturer.

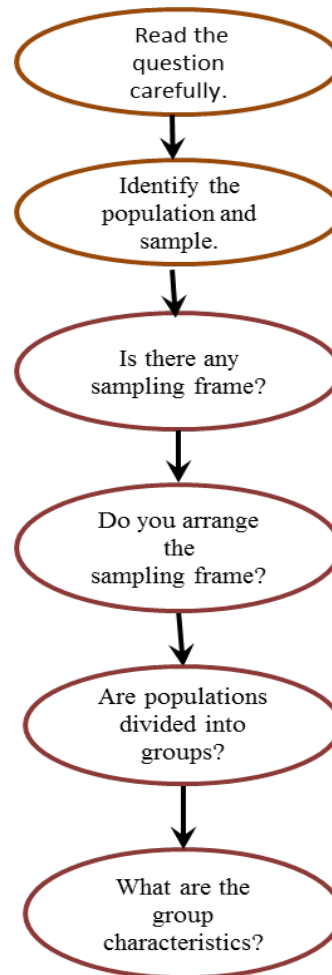


Figure 1: Steps to choose the best sampling techniques.

At the end of the lesson, a common test was given to both groups on the topic of sampling techniques. The test scores for the topic were recorded and analyzed using descriptive statistics and coefficient of variation. Coefficient of variation used to compare which distribution less dispersion of marks distribution and

more consistent marks between two group. Therefore, the analysis gives the best technique to choose either conventional learning or interactive notes and game-based learning.

Results and discussion

Respondents are categorized into two groups namely Control Group and Experimental Group. Control group are those respondents which are not exposed to e-SampTec II while experimental group consists of sample which are exposed to e-SampTec II in their learning for topic sampling technique. 45.7% of the respondents are from control group and the rest are experimental group (54.3%). The mean marks score for experimental group (10.95) higher than the mean marks score for control group (7.89).

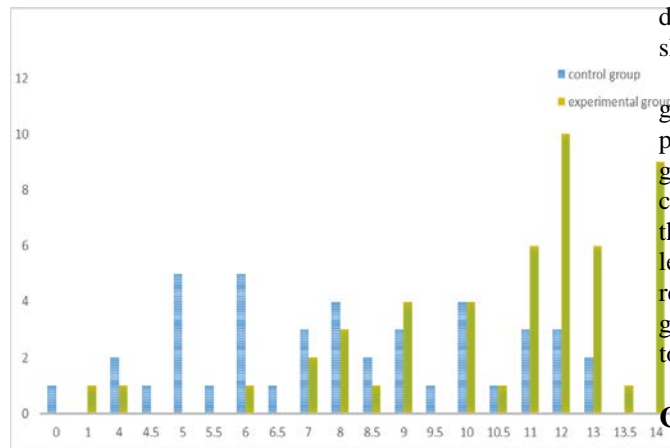


Figure 2: The distribution marks score for control group and experimental group.

Table 1: descriptive analysis for control group and experimental group

	Control Group	Experimental Group
N	42	50
Mean	7.89	10.95
Median	8	10
Mode	5, 6	12
Standard deviation	2.87	2.79
Min	0	1
Max	13	14
Coefficient of variation (%)	36.38	25.48

Refer to Figure 2 and Table 1, the analysis showed the distribution of mark scores and descriptive study for control group and experimental group. The total mark

scores for topic sampling techniques is fourteen (14). Based on forty-two (42) students sample for control group, the average marks are 7.89 with small standard deviation of 2.87. The value of mean and median were approximately equal which showed that the average marks was not affected by extreme value of min (0) and max (13) since median (8) was robust in measuring extreme values. Most of students for control group score 5 and 6 marks as bimodal values. Therefore, the distribution of marks score easily can be concluded as slightly skewed to the right using the graph in Figure 2.

Besides, the average marks for experimental group is 10.95 with small standard deviation (2.79). The value of mean and median were approximately equal show that average marks was not affected by extreme value of min (1) and max (14) since median (10) was robust in measuring extreme values. Most of students for experimental group score 12 marks. Therefore, the distribution of marks score easily can be concluded as skewed to the left using the graph in Figure 2.

The coefficient of variation for experimental group is 25.48 percent less than control group (36.38) percent. The distribution of marks for experimental group is less dispersion and more consistent compare to control group. Therefore, it concludes e-SampTec II is the better learning techniques compare to conventional learning in improving students' performance. The results are consistent with interactive tool [2] and game-like teaching tool [5,6] gave students opportunity to learn more effectively.

Conclusion

e-SampTec II can be used by all lecturers in teaching the sampling techniques in all UiTM campuses. This learning material can be easily download from i-learn UiTM LMS system that are available for all lecturers and students. It can also be contributed in the development project of learning materials in Massive Open Online Course (MOOC) for course Introduction to Statistics. The learning materials also can be uploaded for online learning option. In addition, postgraduate students and researchers also can use this application to choose the best sampling techniques for their research works.

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