

PERCEIVING STATISTICAL KNOWLEDGE THROUGH DIGITAL APPS: AN EXPLORATORY STUDY

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Abstract

Statistics plays a vital role in various spheres of life. Choosing the right statistical analysis is one of the most crucial aspects in statistics. Some researchers especially those who have minimal statistical background, are often having difficulties in choosing the right statistical analysis for their study. Inappropriate analysis may produce misleading results at the end of the study. Hence, mySTATS Tracker was created as an alternative tool to assist the researcher in determining the right statistical analysis. The aim of this study was to gauge the effectiveness of using mySTATS Tracker in identifying the most appropriate statistical analysis based on the supplied input. In addition, this study intended to determine whether there was significant difference in score based on gender and faculties. The difference in the perception towards the usefulness and effectiveness of this application based on faculties was also investigated. A sample of 55 undergraduate students with various background have participated in this study. The sample of students were asked to answer a set of questions with (post-test) and without (pre-test) using mySTATS Tracker. Then, the score obtained was recorded and analysed. Gap analysis and Independent t-test were applied in achieving the objectives of the study. The results showed that there was a significant difference in scores between pre-test and post-test, $p < 0.05$. It could be concluded that the users scored significantly higher and answered the questions in a significantly shorter time using mySTATS Tracker compared to without using it. The study also found that there was a significant difference in score based on gender and faculties, $p < 0.05$. Furthermore, there was a significant difference in the perception of the usefulness and effectiveness of this application based on respective faculties. In overall, mySTATS Tracker has received a positive feedback from the potential users. This study has proven that mySTATS Tracker is a good alternative solution in suggesting the right statistical analysis to the users.

Keywords: mySTATS Tracker, statistical flowchart, guidelines

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Introduction

Statistics plays a vital role in various spheres of life. Statistics is defined as a science of conducting studies to collect, organize, summarize, analyze, and draw conclusions from data (Bluman, 2014). Statistics are widely used by researchers in various fields at any level especially those who are persistently dealing with raw data. Raw data without further addendum of analysis can be a waste.

Statistics can be categorized into two parts; descriptive and inferential statistics. Descriptive statistics involves describing the data by using graphical presentations and numerical descriptive measures such as bar graph, pie chart, mean, median, mode and others. Occasionally, naive researchers who are prone to minimal statistics background can easily identify the most appropriate descriptive statistics in analyzing their data. Inferential statistics, on the other hand, involves predicting and generalizing the population based on the sample selected. Inferential statistics can be produced by statistical analysis such as one sample t-test, independent t-test and others.

Choosing the right statistical analysis is one of the most crucial aspects in statistics. Some researchers especially those with minimal statistical background, are often having difficulties in choosing the right statistical analysis for their study. This scenario happens often among the students in a tertiary level. Majority of the programs offered in local or private university in Malaysia require the final year students to prepare the final year project by employing statistical analysis in their project. Due to the lack of statistical knowledge, sometimes the students hire inappropriate analysis that may produce misleading results at the end of their study.

This situation has led to numerous basic open sources published by the statistics practitioners, educators or those who have expertise in statistics. The existing open sources such as YouTube, Wikipedia, articles or related journals and other mediums may provide information to the researchers especially the final year students in determining the right statistical analysis. However, some of the sources are not interactive and fun enough to attract the users, especially the students. Nowadays, the Y Generation are more attracted to the interactive mobile application. A lot of research agreed that Gen Y is the largest mobile application users (Trivedi et al., 2014). The use of smartphone has also been increasing daily. In 2017, smartphone shipments came to 1.46 billion units worldwide. According to Statistica (2018), 1.24 billion of smartphones shipped were using the Android operating system in 2017. Due to this scenario, an Android based mobile statistical analysis application is gradually increasing. This scenario is triggered by the demand from young researchers and students to access this information briskly and precisely.

Realizing this situation, mySTATS Tracker has been created as an effort to assist this target group in choosing the right statistical analysis for their study. MySTATS Tracker is an interactive decision tree mobile application that requires the users to input some information related to their study such as the purpose of analysis, type of variables, sample size and so on. This app will conveniently suggest the most appropriate statistical analysis based on the supplied input. Short notes will also be displayed along with the suggested method. The aim of this study was to gauge the effectiveness of using mySTATS Tracker in identifying the most appropriate statistical analysis based on the supplied input. In addition, this study intended to determine whether there was a significant difference in score based on gender and faculties. The difference in the perception of the usefulness and effectiveness of this application based on faculties was also investigated.

Methods

The target users of mySTATS Tracker are undergraduates, postgraduates, young researchers and even statistics practitioners. Due to the time constraint, this study was conducted on the undergraduate students from one of the universities in Negeri Sembilan only. A random sample of 55 undergraduate students with various background have participated in this study. These students were classified to Science or Non-Science category. This study used a questionnaire designed by the researchers. There are three sections included; Part A, Part B and Part C. Part A and Part B entailed the participants to identify the most appropriate statistical analysis without and with the assistance of mySTATS Tracker. Part C is to gauge the opinion of the participants on the usefulness and effectiveness of mySTATS Tracker. Gap analysis and Independent t-test were applied in achieving the objective of the study. Some interfaces of the software are shown in Figure 1 and 2.

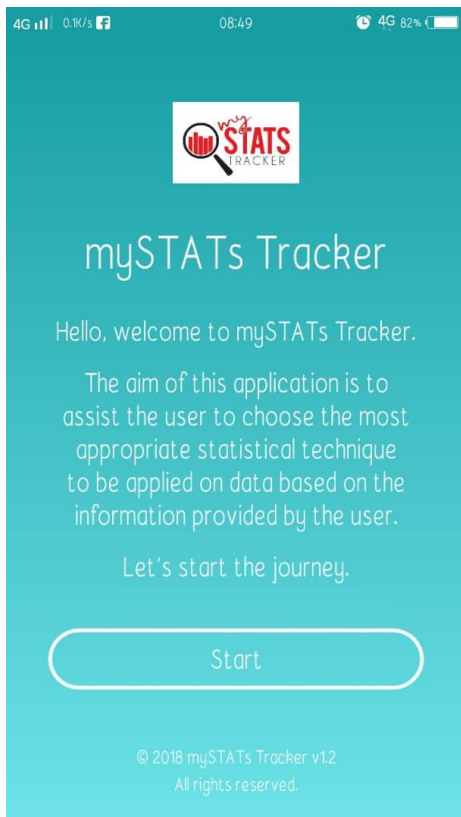


Figure 1 Snapshot of the mySTATS Tracker Welcoming Interface

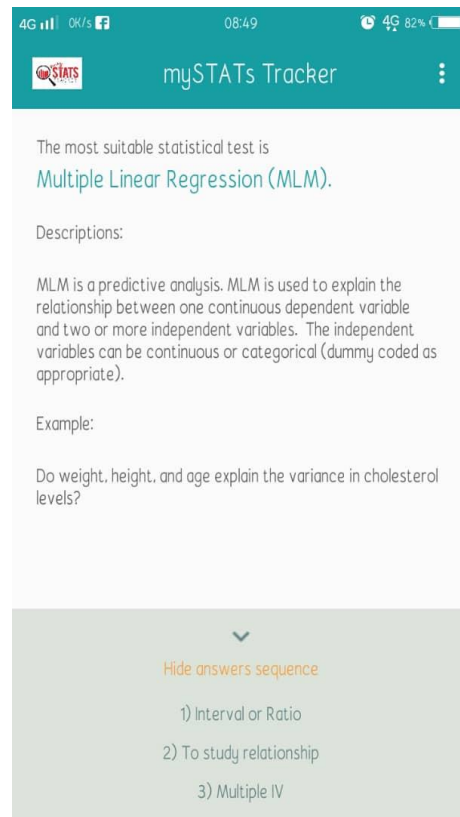


Figure 2 Snapshot of the mySTATS Tracker Contents Interface

Result and Discussion

Preliminary Analysis

Based on the results in Table 1, the users scored higher, on the average, when using mySTATS Tracker to answer the questions given by the researcher. In addition, the users managed to answer all the questions in a shorter time when using mySTATS Tracker.

Table 1 Pre-Test versus Post-Test

| | Average Score | Average Time (minutes) |
|-----------------------------------|---------------|------------------------|
| Pre-Test: Without mySTATS Tracker | 1.15 | 7.20 |
| Post-Test: With mySTATS Tracker | 4.09 | 5.31 |

Gap Analysis

Based on the results in Table 2, the gap analysis showed that there was a significant difference in scores between pre-test and post-test, $p < 0.05$. It can be concluded that the users scored significantly higher and answered the questions in a significantly shorter time using mySTATS Tracker.

Table 2 Gap Analysis

| | Score | Time (minutes) |
|---------|-------|----------------|
| p-value | 0.000 | 0.001 |

Independent t-test

Based on the results in Table 3, the analysis showed that there was a significant difference in scores between gender, $p < 0.05$. It could be concluded that the female users scored significantly higher than male using mySTATS Tracker. In addition, the analysis indicated that the students from Faculty B

(Non-Science students) scored significantly lower than Faculty A (Science students). This result has proven that mySTATS Tracker was able to assist those who have minimal statistics background.

Table 3 Difference in scores between gender and faculty

| | p-value |
|---------|---------|
| Gender | 0.022 |
| Faculty | 0.019 |

Based on the results in Table 4, the analysis depicted that there was a significant difference in the perception of the usefulness and effectiveness of using mySTATS Tracker between the faculties, $p < 0.05$. It could be concluded that the students from Faculty B (Non-Science students) were strongly agreed that the application was useful and effective in assisting them in identifying the most appropriate statistical inference.

Table 4 Difference in the usefulness and effectiveness between faculties

| | p-value | |
|---------|------------|---------------|
| | Usefulness | Effectiveness |
| Faculty | 0.000 | 0.000 |

Effectiveness and Usefulness of mySTATS Tracker

The aim of this study was to gauge the effectiveness of using mySTATS Tracker in identifying the most appropriate statistical analysis based on the supplied input. Majority of the users (98.2%) agreed that mySTATS Tracker was an easy-to-understand application. Only 1.8 % (1 out of 55 users) disagreed with this statement. In term of identifying the correct analysis, all users agreed or strongly agreed that mySTATS Tracker was effective in identifying the right statistical analysis. The analysis showed that none of the users disagreed with the statement that using mySTATS Tracker was faster than other learning mediums. Furthermore, all users agreed or strongly agreed that learning Statistics through mySTATS Tracker was fun and less stressful. From the analysis it was found that all of the users would love to have mySTATS Tracker on their mobile phone. In addition, 78.9% of the users claimed that they would buy mySTATS Tracker at a reasonable price. The rest (11.1%) would love to have it at no cost.

Conclusion

Based on the findings obtained, mySTATS Tracker has received a positive feedback from the potential users. The users managed to identify the statistical analysis correctly and faster using mySTATS Tracker. This has proven that mySTATS Tracker is a good alternative solution in suggesting the right statistical analysis to the users. This interactive medium could attract the researchers to use it. In addition, it is a simple decision-making apps, easy-to-use and user friendly. This apps will greatly assist researchers with minimal statistics background. An enhancement for this innovative project would be to add more advanced statistical analysis which comes with explanation. This apps have been published in Google Play Store and it is accessible worldwide.

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