

## A QUALITATIVE STUDY ON THE EFFECT OF GAME BOARD STRATEGY ON THE STUDENT'S MOTIVATION OF LEARNING STATISTICS COURSE

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### Abstract

An interactive teaching tool that utilizes a game board strategy to facilitate the learning of statistics has been developed and employed. This study aims to determine the impact of the board game on the motivation of diploma students towards learning statistics. Data are collected from 7 respondents using a face-to-face interview. Responses are qualitatively analysed. Results show that respondents are generally positive about the effectiveness of the board game as a teaching tool to enhance learning and understanding. More importantly, respondents have shown a change in attitude towards statistics and are more motivated to learn statistics under this innovative learning environment. Some suggestions for future research are outlined.

**Keywords:** Learning Tool, XRACE game board, Qualitative Study, Motivation

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### Introduction

An essential part of statistical education is to develop both the cognitive abilities and affective domain of the students. Learning statistics goes beyond purely doing computation but students must be seen to develop statistical thinking and a positive attitude towards statistics. Educators had realized that cognitive abilities do not explain totally the wide disparity in statistical performance among their students. In the face of this lingering issue, educators need to look at another cluster of factors in the affective domain that also influence this performance.

Mathematics and Statistics are subject that creates anxiety and fear among students. They tend to think that the subject to be unpleasant and difficult. Usually this subject has been taught in ways that make the information uninteresting, irrelevant and disconnected to the students' experiences leading to students with mathematical anxiety (Costu et al. 2009) Attitudes toward learning statistics include anxiety, cynicism, fear and contempt (Onwuegbuzie and Dale 1999). It is very important to rectify this attitude as they may influence their learning process of statistics. Undoubtedly attitude towards the subject matter, statistical anxiety, aversion and motivation variables are among some of the factors to investigate.

Motivation is an important 'ingredient' to succeed. When students have fun and study in an engaging learning environment, they will be motivated to explore more than what is being taught. The motivation affects critical thinking and self-regulation while attitudes affect learning and performance (Bijker et al. 2006). Studied done by Cagiltay et al. (2015) highlighted that by added the element of competition to game based learning environment, the participant motivation and post-test score of learning improved.

Literature has shown that board game can be an effective means of communicating understanding and motivation. According to Chiarello and Castellano (2016) Board Games have proved to be effective

motivational and learning tools, in particular for Science and for STEM in general (Science, Technology, Engineering and Mathematics). Elofsson et al (2016) shown that the children playing the linear number board game showed a substantial enhancement of their calculation performance. The positive effects concerning calculation provides support to the assumption that a linear representation is important for early arithmetical learning.

Thus, this study aims to determine the impact of the board game on the motivation of Diploma students in learning statistics. The game board is hypothesized to create an enjoyable learning environment to provide opportunity to learners to experience a higher level of success in doing statistics similar to the sense of success they would have experienced when participating in sports, social games or indulging in fine art. Playing board game can provide the lively environment to encourage students to learn statistics in a fun way. As a results student are motivated and ultimately have a higher chance of succeeding in the subject.

### **Methods**

Data were collected by using face-to-face interview. Seven students were involved in the interviews. They were randomly chosen from Diploma in Business Management program in UiTM Negeri Sembilan December –April 2011 semester. These interviews were repeated 3 times for each respondent and the interviews were transcribed a day after the interview. Interviews were done after the students finished playing the board game. The questions cover areas about the effectiveness of board game, their understanding of concepts in statistics, their confidence level, attitudinal changes and motivation to learn statistics. Analysis of the data follows a procedure recommended by Creswell (2005). Firstly, the transcripts were read a few times to familiarize the researchers with the content and context. This is to help the researchers to gain an overall understanding. Next relevant keywords were listed out, encoded and categorized according to issues and themes that can be used to answer the research questions. Subsequently within and cross-case analysis were carried out. Based on the established themes and subthemes, findings were then abstracted. The next section describes the results of the study.

### **Result and Discussion**

All responses from the interview transcripts obtained were categorized based on the different motivation variables.

#### **Cognitive variable: Implicit Belief on Ability**

The following response highlights the positive impact the game board had on the motivation of the students to learn statistics. The students perceived that the game can help to increase their belief or confidence in doing statistics. It is assumed that the game can encourage the players to develop confidence in their own abilities and consequently improve one's implicit belief in his or her ability.

*Adibah: "Playing this game, one must have high level of confidence as one cannot be influenced easily by others...."*

*Syafiqah: "For the time being, I think that my greatest success, ...answering the questions that I didn't get to answer before. ....such as I get to recognize the relation between the inference and the graph..."*

In fact, Adibah's response seems to portray one of the social learning variables with task that has attainment value as each student competed with one another to score points.

#### **Social learning variable - Task value: Utility value**

It is also interesting to note that another tangible effect of the activity is a change in attitude towards statistical concept. Changing one's mindset in normal classroom is not an easy task especially for students' who have negative attitudes towards statistics. In fact, this is one of the learning outcomes of this activity where learning goes beyond mere calculations to problem solving skills using various contexts. The students seem to broaden their insights of statistics concepts. Thus, this game can be considered as an activity with learning goal orientation which has utility value that can increase motivation.

*Rashid: "Actually we have learnt chapter one and two when we were in the secondary school. My attitude on these chapters have changed slightly....that is don't just think of calculation but understanding the concept is a priority".*

*Araf: "Yes because when we do it in class (hesitates), actually we know mean just as the average. But when we play the game, we apply that on questions and it's really good. When we apply in questions, and then we argue. We have so many different views of that... particular concept.*

*Syafiqah: " It is effective in reinforcing the basic concepts of statistics, helps in the memorization, familiarization and understanding of statistical terms and applications in our daily lives*

### **Social learning variable - Task Value: Interest value**

Motivation is needed to initiate and sustain learning activities. The activity seemed to enhance motivation by stimulating a conducive environment by engaging the students in active learning. The following excerpts illustrate the perceptions of the students in this respect:

*Adibah: "The benefits of playing this game is in terms of motivation and understanding basic statistics"*

*Izzat: "Fun...we learnt while playing. It's different from normal classes as we are more... formal in classes."*

*Atikah: "Yes, it's like a study group but in a fun way."*

*Rashid : "And we do the questions together and argue at the same time and that's the fun part. Yes, it's like a study group but in a fun way."*

*Atikah: "When we play the game, we do not really think it is learning. So it's not ... It's not stressful much lah ..."*

How are they motivated? The interactive environment which blends fun, learning and friendship was created while they play the game.

*Syafiqah: "In terms of teamwork in answering the questions...while playing ...then studying in groups."*

*Adibah : "The most that influence the fun is friends...in company. Because with friends, we enjoy fun competition"*

*Atikah: "Yeah, you can joke at the same time and you can actually learn from your friends ..."*

*Adibah : "I think it encourages discussions. If answered wrongly, then we will discuss ..."*

This stimulating environment was enhanced further with the establishment of social interaction between the students. They are connected to each other in a very conducive environment through the learning and playing activity without realizing that it actually served as a study group. This stimulating environment can hardly be created in formal classes. In fact, the spirit of team work was also observed among the team mates.

An active participation with student-student interaction was found to be reinforced. Self-directed learning where open discussion with exchange of statistics knowledge that leads to simultaneous teaching and learning activities among the team mates were promoted.

### **Conclusion and Recommendation**

Qualitative evidence to support the claim on the effect of the board game on the respondents' motivation has been discussed in the previous section. The results confirm the importance of motivation in encouraging students to learn statistics. Perceived utility value of statistics and interest value go a long way to sustain the students' interest. The findings also highlighted an important component in learning i.e. a conducive learning environment. What is clear from this study is that students' beliefs, goal orientations, values and expectations are powerful indicators of the motivation level he/she possesses. Designing a good learning environment is absolutely mandatory in the teaching and learning of statistics. It helps to provide more room for the students to develop a firm belief in their own ability to solve statistical problems, orientate their goals towards attaining good grades, sees that statistics is not merely numbers but something that is useful in their everyday life and place value in all that they had learnt in the statistics class. In this respect, the researchers found that the board game fulfils these criteria in helping to create a good learning environment for the teaching and learning of statistics.

Even though our objective was answered, there is much that remains to be done as our research findings must also be shown to be replicable. Further research into the board game is highly recommended to realize and document its full potential in terms of motivating students to learn statistics among Diploma students

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