# Using FATHOM2-based Tasks in Developing Informal Inferential Reasoning in Statistics

Mr. Norjoharuddeen Mohd Nor
Mathematics and Science Education Department,
Faculty of Education, University of Malaya
50603 Kuala Lumpur
norjo@um.edu.my

**Abstract:**

Students learning statistics at the university level usually learn formal inferential statistics to enable them to make inference about the population from data collected from a sample. However, a number of students have difficulty understanding the reasoning underlying the statistical inference process. Students do not understand the importance of ideas such as resampling, sampling distribution and hypothesis testing used in inferential statistics. In this workshop students will undergo through two tasks that will provide them with opportunities to experience informally ideas like resampling, sampling distribution and hypothesis testing through the use of a dynamic statistical software known as Fathom2.

**Three learning objectives:**

At the end of the workshop, participants will be able:

1. to use the Fathom2 software to draw informal inference from comparison of two box plots,
2. to understand the role of statistical ideas such as resampling, sampling distribution and hypothesis testing in inferential statistics, and
3. to appreciate the power and limitation of statistical inference in research.

**A detailed outline of workshop content:**

In this workshop each student will use the dynamic statistical software, Fathom2, to explore data collected from a hypothetical research. They will use the software to generate two box plots and draw inference about the population from where the data was taken from. They will then use the software to simulate the resampling of the data and see the implication on the inference they had made. They will then be made to simulate the sampling distribution of the data using the software and discuss the implication on the inference they had made earlier on. Finally, they will simulate the sampling distribution of the data if they were to come from the population based on the null hypothesis. This will be followed by a discussion on the implication on the inference they had made. To appreciate the power and limitation of statistical inference, they will be made to look at the data from the whole population and compare it with their earlier inference.