UNIVERSITI TEKNOLOGI MARA
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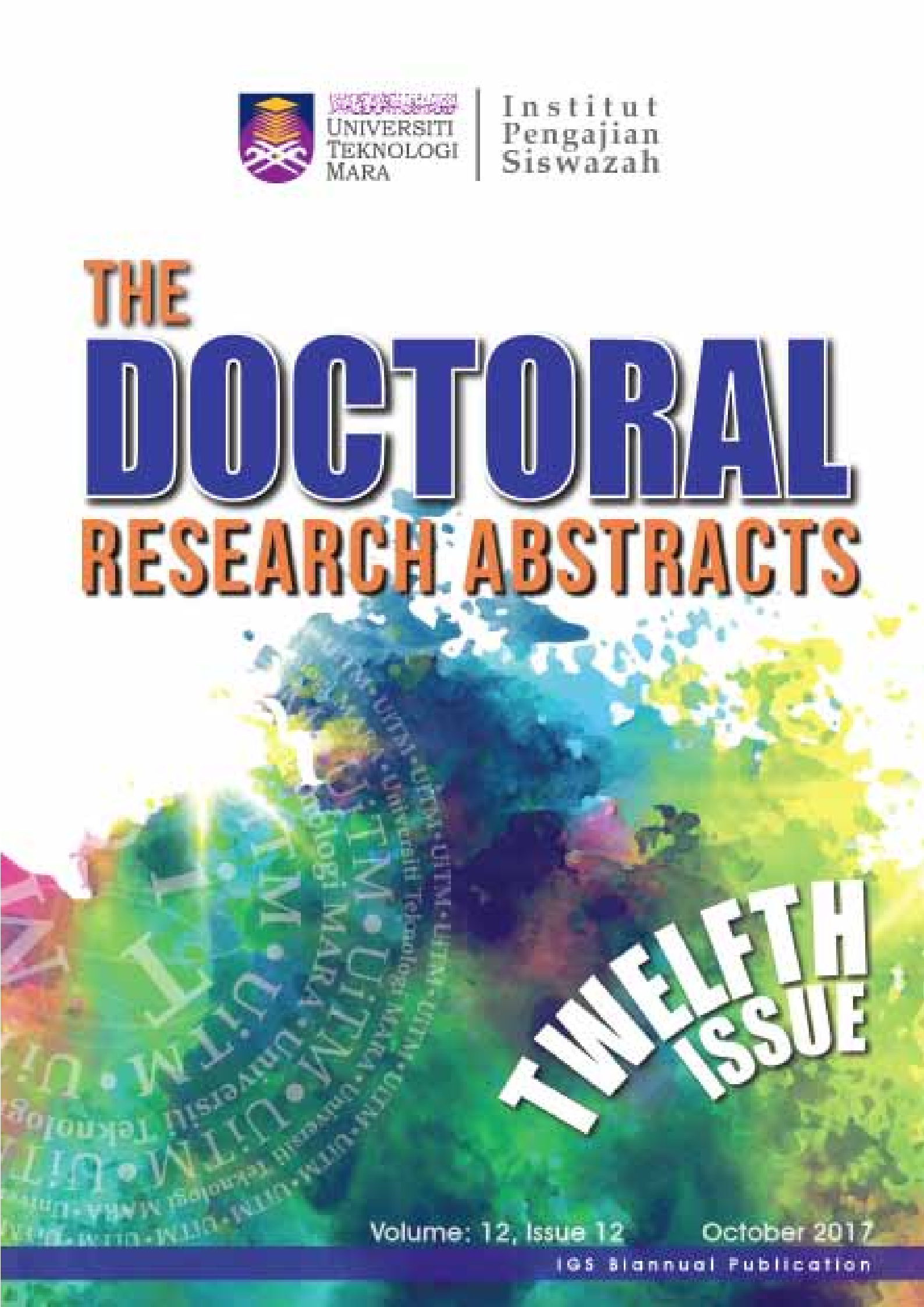
THE DOCTORAL RESEARCH ABSTRACTS



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Title : ENHANCEMENT OF SYSTEMATIC SAMPLING FOR CLINICAL SURVEY: SYSTEMATIC SAMPLING WITH CONSECUTIVE APPROACH

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Survey is a one of the common primary data collection approaches in research in various fields including the clinical field. Findings from clinical surveys are important because recommendations from the findings will have a direct impact towards public's health. Data collection process in clinical survey usually involves an ordered sampling frame and has become very challenging for clinical researchers, who need to handle multiple tasks in their clinical service whereby the clinical service is their top priority. Therefore, due to time constraints, the general practice of data collection in clinical survey is to adopt non-probability sampling such as consecutive sampling. The consequence of this kind of practice would produce results that can be invalid since the results could be influenced by sampling bias. In order to reduce sampling bias and to obtain more precise results is to promote the use of probability sampling technique in a clinical survey. The motivation behind this study is to introduce a modification on systematic sampling. The existing approach in selecting sample based on systematic sampling is to take only one unit sample in each interval selection. So far, none of the researchers have attempted to investigate the possibility of selecting more than one unit sample in each interval selection with respect to modified systematic sampling. Therefore, the purpose of this study is to explore the possibility of recruiting more than one unit sample in each interval selection with respect to modified systematic sampling. The main objective of this study is to develop a newly modified systematic sampling that allows more than one unit sample to be collected in each interval, and to prove such selection is able to derive an unbiased estimator for the population mean. Comparisons in terms of sampling efficiency and consistency of the estimator were made between the newly modified systematic sampling and systematic sampling based on simulation analysis and real-life datasets. This study has successfully developed the terms and condition for selection of the newly modified systematic sampling and most importantly, the estimator that is derived from this sampling technique has been proved to be unbiased, efficient and also consistent. This modified systematic sampling is named as "Systematic Sampling with Consecutive Approach" or in short SSC. Preliminary evaluation for relative efficiency from two simulated datasets have produced relative efficiency between 1.26 and 2.06 which indicates SSC is more efficient. Testing relative efficiency on focusing data with normal distribution showed that SSC is more efficient with 12 out of 15 different datasets with relative efficiency ranges from 1.030 to 19.563. Simulation analysis with iteration of 1000 times was conducted from 25 different populations has also showed SSC is more efficient with 20 out of 25 different data. Other evidences were derived from testing 2 published datasets and 2 real-life clinical datasets. Results shown SSC is more efficient for at least 1 from published dataset and 1 from real life dataset. Besides efficiency, SSC is also consistent where the sample statistic is similar to the parameter when testing from small to large sample size. This newly modified systematic sampling in indeed an innovation in sampling by the virtue of combining two sampling techniques, consecutive sampling and systematic sampling. The main contribution through the outcome of this study is to enable clinical researchers to utilize SSC to ensure the acquisition of valid results in clinical survey in an ordered sampling frame. .