This thesis presents the work on modelling road accident count in Malaysia through the development panel count model. This research is motivated by several factors. The first is the alarming phenomenon pertaining to the high rates of road accidents which has generated interest among researchers and policy makers to find ways and means to overcome this global issue. Secondly, the effect of adverse weather condition is known to affect road safety and although various intervention measures have been implemented, significant results have yet to be achieved. Hence, a better understanding of such phenomenon is essential to allow necessary measures to be taken to improve road safety. An extensive literature review was made to gain a better understanding on road accidents phenomenon and evolution of statistical model for count data. Through an extensive literature review, the gap was identified in the development of road accident models in Malaysian which overlooked the panel count models. Additionally, there is also the issue of potential bias in the panel count model estimator particularly with the issues of fixed effects estimator. Thus, the first research objective is to develop panel count model for road accidents data in Malaysia. The second objective is to evaluate the effect of panel size and time dimension on the estimator of panel count model using Monte Carlo simulation. This research involved two phases which are statistical modelling and simulation study. In the first phase of the research, the panel data models based on the fixed and random effects Poisson and Negative Binomial models were developed. Several estimation methods such as conditional and unconditional approaches were used to model road accident data for 12 states in Malaysia. The results revealed that precipitation in the form of rainfall, dry spell and number of rainy days has significant effect on road accidents in Malaysia. The risk of road accident occurrence significantly increases during the rainy months with shorter dry spell period of gap between rain and no-rain. On the other hand the risk is lessen with the rainfall in the months of longer spell period. In the second phase, the Monte Carlo simulation method using SAS programming was used to evaluate the effect of the changes of sample (panel) size as well as number of time periods on the alternative conditional fixed-effects Negative Binomial (FENB) and the Projected Score Method (PSM) estimators. For small sample size and when the number of panel wave/time periods is fixed, the results of the estimation of the unconditional FENB (with correction for standard error) are less satisfactory. This is evidence from the large sampling variability, large SE and RMSE generated. Additionally, the unconditional fixed effects perform better than the PSM method at different level of individual size. The main contribution of this study in the field of road accidents is the fundamental knowledge of new evidence-based research finding of road accident occurrence relating to weather condition. As one of the tropical countries, the considerable amount of precipitation in a form of rainfall and dry spell in Malaysia are found to be a significant contributor to road accidents in the country. This study also provides a framework for Monte-Carlo simulation methodology in evaluating the alternative fixed effects panel model estimator. For future research, the advantage of bootstrapping technique for panel count data involving small sample size and time period can be investigated.

In-service training programs have emerged as an ideal training platform for lecturers in various universities to enhance their professional competencies. This becomes a necessity owing to the rapid advances that prompt the acquisition of knowledge to improve the lecturers’ competencies especially in sports science. The purpose of this study lies in investigating the relationship between participation in in-service training programs and academic competencies among Sport Science Lecturers in Libya and Malaysia. The need for in-service training among lecturers based on their participation in in-service activities was based on participation in planning (PPL), participation in implementation (PIM) and participation in evaluation (PEV). The competencies of Lecturers place focus on the competencies in planning instruction (CPI), competencies in conducting instruction (CCI), competencies evaluating instruction (CEI) and competencies in facilitating student’s growth (CFS). Previous studies were reviewed to support the arguments presented in this study using prominent theories such as the Perceptual Psychology Theory, Innovation Theory of planned behaviour (ITPB) and Contingency Theory. To achieve the objectives of this study, a quantitative study based on the survey questionnaire was used to collect primary data from 320 sports science lecturers within 11 Universities in Libya and Malaysia. Non-probability (purposive sampling) was used in this study for sampling selection. The results and findings were analysed using the Statistical Package Social Sciences (SPSS) and Analysis of Moment Structure (AMOS) Software. The final model goodness fit satisfactory explained the value of χ² = 498.637. The NFI, TLI and GFI were above 0.90. The eleven (11) major hypothetical statements have some direct effects on selected variables such as CPI, CCI, CEI and CFS tested and they were significant at 0.00 level. Theoretically, this study inferred two mediating variables. Firstly, CCI fully mediated the relationship between CPI and CEI. Secondly, CEI partially mediated the relationship between CCI and CFS. The current study has indicated that the integration of in-service training programs among the sports science lecturers improved the levels of competency to facilitate student’s growth. The results obtained in this study depict the increasing need that relates to planning, implementation and evaluation of in-service training programs as an ideal improvement pathway of lecturers’ competency at various universities. This suggests that the sports science lecturers should pay more attention towards the participation in in-service training programs that aim at upgrading their respective professional competencies. The implementation of the results of this study in universities in Libya and Malaysia is set to enhance competencies of lecturers as well as student growth which are at the forefront of government educational policies.