Assessment of conceptual knowledge of G.C.E. Advanced level students using the Force Motion Concept Inventory

A PROJECT REPORT PRESENTED BY

NAGARAJAH JEGANMOHAN

to the Board of Study in Science Education of the
POSTGRADUATE INSTITUTE OF SCIENCE

In partial fulfillment of the requirement
for the award of the degree of

MASTER OF SCIENCE IN SCIENCE EDUCATION

of the

UNIVERSITY OF PERADENIYA
SRI LANKA
2004

Assessment of conceptual knowledge of G.C.E. Advanced level students using the Force Motion Concept Inventory

N.Jeganmohan

When students starts to follow a physics course they bring with them their personal experience and common sense beliefs some of them are misconception " deep seated" and traditional instruction fail to unseat them. Physics teachers need an instrument to measure these misconceptions and produces and accurate and reproducible results. The Force Motion Concept Inventory is one such instrument. The main aim of this project was to use the FMCI to identify the students' misconceptions in physics.

For this purpose four schools were selected two from Kandy and two from Trincomalee. The sample was Grade 12 science students who have completed the mechanics section in schools. For the FMCI examinations conducted in March 2004, sixty questions were given covering 12 topics.

Although selected students had completed the mechanics section in schools and also additional class (tuition) a large number of students still had their common misconceptions such as;

(1) A constant force is necessary to maintained constant velocity, (2) The Force should increase to maintain a constant acceleration, (3) When the velocity is zero the acceleration should be zero. (4) At the highest point of a projectile path the acceleration is zero.

Out of 12 topics covered students had obtained above 40% only for two topics. Data were analyzed by schoolwise, disdrictwise and gender wise were marginal. The traditional method of teaching couldn't change the students' misconceptions. Students did not know how to analyzed a given physical the situation. If they analyzed the situation or used the free body diagram to solve the problems they would have easily found the correct responses.

Students were taught, to memorize the definition and use the equation for numerical problem solving. Teachers should use concept map for understanding the physics concepts. They should use conceptual questions for examination or in the classroom teaching. Teachers should use free body diagram to solve mechanics problems.

Finally every physics teachers should use the Force Motion Concept Inventory, to identify the student's misconceptions in mechanics and try to eliminate these misconceptions by using interactive method.