Methodology and Research Design:
Key Research Questions:

Effect of Microcomputer-based interface tools and in understanding of following Mechanics concepts carried out for

1. Kinematics
   a) Displacement-time graph
   b) Velocity-time graph
   c) Acceleration-time graph
2. Dynamics.
   a) Newton’s second and third law of motion
   b) Spring force

Research will be carried out among undergraduate students of Pune University using pre and post exposure to the MBL methods. Analysis at 90% and 95% level of Confidence (0.05 and 0.1 level of significance) to test the null hypothesis, student’s attitudes and feedback regarding the effectiveness of these experiments will be tested using the Likert 5 point scale.

The Questions and problems used in the survey will test the qualitative and quantitative understanding of various principles of above mentioned Mechanics topics.

The survey will be followed by large number of in-depth interviews.

MBL tool and Simulation package

The Interactive microcomputer-based interface tools and simulation packages will be developed using microcontroller and Excel. These MBL tools and simulation packages and tutorials will be used to test the hypothesis.

Statistical Analysis

The data on students’ conceptual understanding about experiments will be statistically analyzed. T-test will be administered at a 0.05 level of significance to test the null hypothesis. If the null hypothesis is true, the alternate hypothesis will be rejected and there is no significance in achievement of learning experiments using computer based experiments. If the null hypothesis is rejected, the alternate hypothesis will be accepted and there is significance in achievement of learning experiments using computer based experiments.

Students’ attitude towards these experiments will be tested using 5-point Likert scale.

Expected outcomes of the study:
Present literature and the author’s experience of teaching Mechanics suggest that microcomputer based laboratory tools could significantly improve understanding of the subject matter. The study will aim to establish if this hypothesis is true.