

# MODELLING WAVES: INTEGRATING TECHNOLOGY AND MODEL BASED INQUIRY IN UNDERGRADUATE PHYSICS EXPERIMENT

Vidya Kota, Manjula Sharma

Presenting Author: Vidya Kota (skot2539@uni.sydney.edu.au)  
The University of Sydney, NSW, Australia

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Waves is a standard topic in first-year undergraduate physics courses with laboratory experiments to aid student understanding of waves. Here, we examine if the inclusion of technologies was successful in engaging students in modelling waves. An experiment was designed using design-based research (DBR) methodology. It had three features: qualitative description and kinesthetic feel of waves being created on ropes, taking measurements using video analysis software, and comparison of experimental and theoretical values using a pre-designed EXCEL spreadsheet. The experiment was trialled in a tutor training session to obtain feedback. The near-final version was run with tutors to obtain final feedback but also to familiarise them with the notion of modelling in this experiment. The sample included 501 students and 24 tutors. Data were collected via observational notes, survey responses from 206 students in the Regular unit and 200 students in the Fundamentals unit, logbooks & interviews. Preliminary results indicate that the experiment fostered teamwork, video analysis was interesting and required appropriate investment of mental effort demonstrating that the experiment did engage students in a meaningful manner. The integration of digital technologies with modelling standing waves resulted in higher overall enjoyment of the experiment and increased student engagement.

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