

Probing understanding of Physics Concepts

Joan BORG MARKS

University of Malta, University of Malta Junior College, Guze Debono Square, Msida, MSD 1252, Malta.

Abstract. Mental modelling has been given importance in educational research by a number of prominent researchers (see for example [1], [2], [3], [4], [5], [6]) who have claimed that models and modelling are central to understanding key concepts in science. Asking, however, by how far the several research studies conducted on mental modelling and the consequent recommendations presented thereof are being applied by teachers in the classrooms to help in the teaching and learning process, remains a relevant question that needs to be addressed. Students at all levels studying science/physics are expected to learn the basic concepts of physics and teachers are expected to teach these to students in the most effective of ways. This is a primary objective especially with students in primary schools who need to have a good basis of science ideas and concepts on which to build further ideas for the understanding of physics. Teaching that looks at the mental models held by students, trying to help in the evolution of students' ideas and visualizations of a concept, offers one way of making teaching more effective and learning more meaningful. This presentation will look at different strategies that have been used through scientific research conducted by the author to probe students' mental models of concepts related to electric circuits. Moreover, since mental models are closely related to analogies, some analogies will be presented to show how these can help students visualize concepts they learn, as they move along the path towards the scientific understanding of a topic. It will be argued that including mental modelling in teacher preparation programs offers a better chance for teachers to be better informed about how scientific reasoning and understanding develop. Thus, teachers can be better prepared to probe students' ideas and to better address problems with students' learning, thus making it more possible to improve the quality of their teaching.

References

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