



## Editorial. An international review of school science practical work

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## INTRODUCTION

This special edition of *Eurasia Journal of Mathematics, Science and Technology Education* presents a snapshot from around the world of the current state of affairs regarding the utilization of school science practical work. The prominence of practical work in schools has developed globally over the years, and it appears there is a tendency for it to be given an increased presence in contemporary science curricula. This is often due to perceived advantages such as facilitating the learning of scientific theories, becoming familiar with the scientific method, allowing pupils to practice apparatus handling skills, and the fact that pupils frequently have a preference for hands-on learning.

This prominence is offset by the continued marginalisation of practical work in the classroom in developing countries, sometimes for good reasons such as a lack of funding to provide for apparatus. More traditional curricula rely mainly on the teaching of theory as 'bookwork', or teacher demonstrations of physical science phenomena. We take the position that the inclusion of practical work into curricula is invaluable, and only serves to enhance learning, with the outcome being a more scientifically-literate populace who have an understanding of science issues that affect their lives. We define 'practical work' as any hands-on activity where learners are actively involved in their own experiments and observe physical phenomena.

In this special edition, contributors from six quite different countries each give a potted history of the changing emphases that have been given to practical work in their own science curricula over time. In addition, they offer the different rationales for its inclusion, and also make comment on how they see the future of school science practical work.

Toplis and Allen's article starts with the reasons why practical work, which is an expensive pursuit, has been included in school science curricula in the United Kingdom and elsewhere. The historical perspective is then discussed, focusing particularly on recent curricular innovations since the 1960s in England and Wales. Critics of the true value of practical work have their voice in the next part of the article, which ends with

some speculative comments regarding the potential future for science practicals in the UK school system.

Šorgo and Špernjak offer a detailed, descriptive analysis and comparison of current science curricula in Slovenia. They compare and contrast the different school-level curricula with respect to content, and focus specifically on the different nature of practical work in biology, physics and chemistry as laid down in curriculum documents, with surprising results.

Kennedy gives a history of the development of science education in Ireland, and reports that practical work has been given an increasingly important emphasis in Irish school science curricula. He explains the rationales behind differing approaches to the assessment of practical work before arriving at the innovative model of the employment of external assessors who visit schools and mark pupils' practical abilities. He finishes with the description of an interesting study that investigated the correlation between pupils' written examination scores and their externally-assessed practical grades.

Kidman describes how the Australian science curriculum in general has developed since WWII, and goes into detail with the genesis of scientific inquiry. In order to illustrate these points she provides details of three recent science initiatives implemented in Australian schools. She goes on to give an outline of the then-upcoming Australian National Curriculum that is to be introduced into schools – as a prominent contributor to the design of the new science curriculum, she is well placed to make comment. The second part of the paper describes a research study that focused on the viewpoints of pre-service and in-service teachers regarding the nature and purposes of different forms of practical work. The participants were also asked whether they felt ready to teach scientific inquiry as part of the new curriculum.

Mamlok-Naaman and Barnea summarize several studies that have focused on practical work in Israel. Much of this research has been conducted to investigate the educational effectiveness of laboratory work in science education in facilitating the attainment of cognitive, affective, and practical outcomes. In 2000, reacting to a needs assessment survey the Israeli

chemical education committee recommended that the new syllabus include a whole unit of inquiry-based laboratory work as part of the learning sequence. The reform highlighted the laboratory unit as the central component in the new curriculum.

In the final article di Fuccia and others give an account of the development of science practical work in German schools, and discussing the most prominent trends in secondary science education which have taken place in recent years.