

INVIGORATING SCIENCE PRACTICALS USING AN INQUIRY ORIENTATED PEDAGOGICAL TOOL

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BACKGROUND

Learning science by 'doing experiments' features in the Australian Curriculum: Science as well as university settings. The nature of the experimentation varies immensely, from open-ended to recipe based practical activities. While 'doing experiments' attempts to capture the notion of scientific inquiry, it is a challenge to share understandings of what constitutes inquiry, since there is no universal or concrete definition of science inquiry. Consequently, there has been "confusion about what teaching science as inquiry means" (Trowbridge, Bybee and Powell, 2008) and as such teachers may have difficulties understanding how to design, implement and evaluate inquiry-based activities that best engage their students and help them learn scientific concepts. Instead, practitioners tend to create their own working definition of inquiry based on their needs (Buck, Bretz, and Towns, 2008).

According to the National Research Council (NRC, 1996), "Scientific inquiry refers to ...the activities of students in which they develop knowledge and understanding of scientific ideas, as well as an understanding of how scientists study the natural world." Based on this articulation and further research, a framework has been developed and trialled by practitioners (National Research Council, 2000; Asay & Orgil, 2010). Using this framework, we have developed a tool that can be used to integrate inquiry into practical activities. This presentation will describe this tool and its utility in curriculum.

APPROACH

The Advancing Science by Enhancing Learning in the Laboratory (ASELL) project has and continues to run workshops, which engage teachers and students from High Schools across Australia. In the workshops teachers evaluate the level of inquiry of the experiments using the ASELL Inquiry Scaffolding Instrument (AISI) tool based on the framework discussed above. An exemplar inquiry experiment is used to benchmark an open-ended inquiry while most teachers are familiar with recipe experiments.

RESULTS

Our results show that teachers find the multitude of definitions of inquiry teachers challenging. Further, quite often the definitions are of limited use in the classroom. Despite this confusion, when utilising the AISI, teachers have fairly consistent understandings of inquiry, as shown by statistics. Teachers found the tool useful and would use the tool in their curriculum. Many also said it was a simple tool to use to help them modify their existing experiments and develop them into more inquiry-based experiments.

CONCLUSIONS

A concerted effort is needed to provide sound and practical tools to help teachers incorporate scientific inquiry in their experiments. The AISI is one such tool that has been found to be useful for increasing the level of inquiry in practical activities.