

Investigating and evaluating inquiry-based approach to laboratory experiments

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The science education research literature confirms that traditional style of laboratory experiences does not normally stimulate students' intellectual thought processes due to the passive nature of recipe based laboratory activities. As a result, students become disengaged while performing laboratory activities and often find it a meaningless and boring exercise. In an attempt to provide more stimulating and engaging learning experiences, we have introduced inquiry based laboratory activities. Inquiry based activities promote critical thinking, conceptual and higher order learning and scientific literacy. This action-learning project supported by SaMnet (Science & Mathematics network of Australian university educators) was implemented at Flinders and Curtin universities in 2012. Four different topics related to radioactivity measurements were posted on the university learning management system. First year non-physics major students were asked to select one of these topics for designing an inquiry based laboratory activity. Students were required to search background information from various sources. Critically evaluate and synthesise the gathered information, design and undertake experiment in a safe manner to test the hypothesis. This approach also falls within the domains of the Threshold Learning Outcomes (TLOs) for science recently published by the Australian Learning and Teaching Council 2011, which is expected to introduce major curriculum reforms at Australian universities. A survey instrument was developed to gather students' feedback. In general the survey results for both universities indicate positive responses. However, there are some variations in students' responses between the two cohorts which require further investigation. This presentation will discuss challenges and the results of the project.