

# THE *IDEA EXPERIMENTS*: ENABLING GENUINE INQUIRY AND DESIGN SKILLS IN THE UNDERGRADUATE CHEMISTRY LABORATORY

Christopher D. Thompson, Mary-Rose Carroll, Florence Laibe

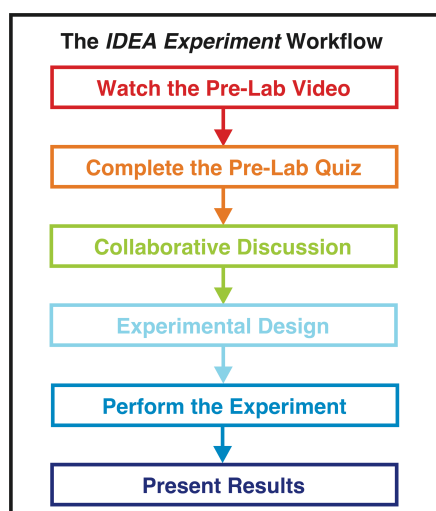
Presenting Author: Chris Thompson ([chris.thompson@monash.edu](mailto:chris.thompson@monash.edu))  
School of Chemistry, Monash University, Clayton VIC 3800, Australia.

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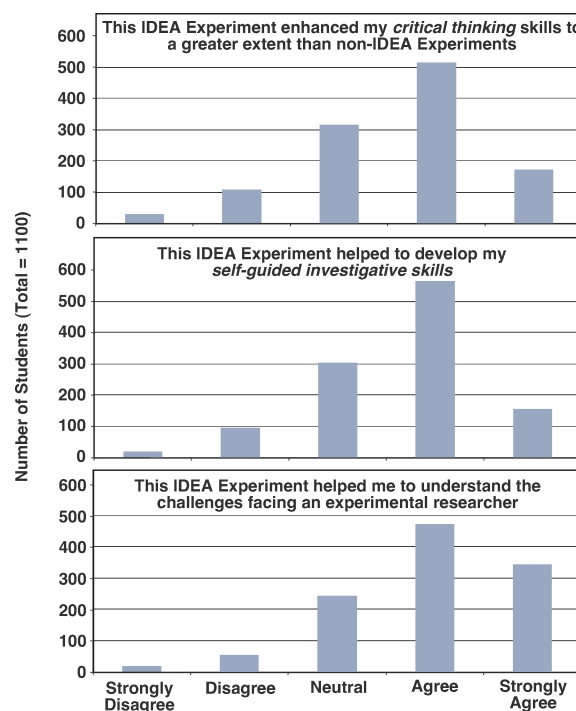
## ABSTRACT

A six-step approach for implementing inquiry-based undergraduate laboratory activities (the IDEA Experiments) was developed to overcome some of the inherent challenges faced by first year chemistry students, and to better reflect how chemistry is tackled by authentic researchers. Firstly, a combination of online pre-lab activities including multimedia content and quizzes were integrated to enhance student preparation, and ensure they are in a better position to ask the right questions when faced with the task at hand. Secondly, an initial forum of collaborative discussion was implemented, enabling students to exchange ideas before settling on the design on the experiment. Finally, the traditional lab script was removed, and students were given the responsibility for designing how the experiment should be conducted, including how task delegation and time should be managed in a group of three or four students.

Several preliminary findings are presented here, revealing students' perceived differences between performing a traditionally scripted experiment and an IDEA Experiment. Clear distinctions between the two formats were observed, in particular with respect to student perceptions of how it impacted their critical thinking and investigative skills, and the kinds of challenges faced by real research chemists.



**Figure 1:** The six-step “IDEA Experiment” workflow.



**Figure 2:** Student perceptions of IDEA Experiments with respect to the enhancement of critical thinking and investigative skills and how they correlate to authentic experimental research.

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