The 23rd Australian Conference for Science and Mathematics Education

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PROCEEDINGS OF THE AUSTRALIAN CONFERENCE ON SCIENCE AND MATHEMATICS EDUCATION 2017
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MONASH UNIVERSITY

SCIENCE AND MATHEMATICS TEACHING AND LEARNING FOR THE 21ST CENTURY
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EDITORIAL

The 23rd Australian Conference of Science and Mathematics Education (ACSME 2017) is held at Monash University, Clayton campus. This is the second time this conference made it to Melbourne, and also the second conference held under the management of the Australian Council of Deans of Science.

We have a rich program of talks in the form of orals, bites and poster bites, as well as poster displays. The keynotes are presented by Karen Burke DaSilva and Paul Francis, both recipients of a 2016 Australian Award for University Teaching, who will inspire us with tips and insights on how to best engage students in science learning and prepare them for their futures. Together, ACSME 2017 presentations represent the challenges faced by academics and professional staff today in their daily lives as science educators, and their innovative ways to address these. The variety of technologies available to us, the many types of assessment, what to do online and what not, the use of e-resources, the different approaches to teaching; all these provide many possibilities and hence there are many important decisions for those of us teaching science and mathematics. The passion, enthusiasm, creativity and expertise of the many ACSME presenters can only help to improve our knowledge, and assist us to make good decisions and to improve science teaching and learning at undergraduate level.

These proceedings contain abstracts and full papers presented at ACSME 2017. All contributions were reviewed by at least two reviewers. Each full paper submission was double blind reviewed.

We give our heartfelt thanks to all those who made ACSME 2017 happen, to the program committee, and to our many colleagues who working in the background took care of every little detail to make this conference a success.

We hope that you find ACSME 2017 enjoyable and stimulating, and that you take home new ideas to implement within your context.

Cristina Varsavsky, Tina Overton, Christopher Thompson
Local organising committee, Australian Conference for Science and Mathematics Education 2017
The Proceedings of the Australian Conference on Science and Mathematics Education contains three types of papers:

- **Full Refereed Papers** which have been peer reviewed by two independent experts and satisfy the Australian DEST E1 category.
- **Full Written Papers (non-refereed)** which have been subject to editorial assessment and satisfy the Australian DEST E2 category.
- **Abstracts** (extract of paper) which have been subject to editorial assessment and satisfy the Australian DEST E3 category.

We look forward to seeing you at the Australian Conference on Science and Mathematics Education (23rd Annual UniServe Science Conference).
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REMOVING THE CLOAK OF INVISIBILITY: DEVELOPING SCIENTIFIC WRITING PRACTICES FOR COMMENCING SCIENCE STUDENTS

Yvonne C. Davila\textsuperscript{a}, Neela Griffiths\textsuperscript{b}

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KEYWORDS: academic writing, blended learning, communication skills, first year, scientific report

PROBLEM
First year (FY) students are expected to write scientific reports to demonstrate their understanding of the scientific method and are also assessed on their communication of the results, writing style, and adherence to scientific writing formats. Although students are taught how to conduct experiments, they are not explicitly taught scientific writing conventions and often have limited exposure to what is expected in a university report. Numerous guides on scientific writing are available but these are not tailored to FY novice writers. Not surprisingly, FY students’ unpreparedness can lead to low confidence and many students continue to find scientific writing challenging.

PLAN
The ability to communicate research findings is fundamental to scientific practice. Our aim is to support FY science students in building their capacity and confidence around writing, through analysing the structure of a scientific report. We have designed online interactive modules and workshops focusing on:
1. Introducing the conventions of scientific writing,
2. Developing the students’ scientific report writing practices, and
3. Building students’ confidence in their scientific writing.

ACTION
Since mid-2016, we have embedded our scientific writing resources into a core FY first semester inquiry-oriented science subject. This work builds on reading strategies modules and workshop that develop students’ critical reading practices (Davila & Griffiths, 2016). We use a scaffolded, blended learning approach; students complete interactive online modules prior to applying their scientific writing practices in workshops, in preparation for their report assessment task. Our learning design incorporates recommendations for flipped and active learning approaches supporting an authentic task in science education (Overton & Johnson, 2016).

We evaluated our intervention over two semesters through tracking online module completions, a paired comparison survey to gauge students’ levels of confidence in their writing practices in weeks 1 and 12, and an anonymous survey evaluating students’ experiences and perceived value of the learning activities.

REFLECTION
The majority of students completed the online modules in preparation for the workshop. Students commented on how useful it was to have modules dedicated to unpacking each report section and identifying the language used. Their confidence increased in several areas particularly around their understanding of the structure and correct placement of information into each section of a scientific report. They also indicated that they had a clearer understanding of the university’s expectations and of the conventions of academic scientific writing. Students commented that the workshop enabled them to receive timely actionable feedback to improve their writing for the task and helped them learn to write collaboratively. Our blended learning approach to scientific writing and presenting skills in an authentic context means students see these skills as an integral part of their learning and careers.

REFERENCES
