

AMOS Climate Classrooms Workshop 2021: An Evaluation

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Summary

On Friday 5th February 2021, 30 educators and 12 climate scientists came together at a Climate Classrooms workshop with the aim of developing teaching resources that can be used to simultaneously teach the secondary school curriculum and educate students about climate science. The half-day workshop was delivered over Zoom by the ARC Centre of Excellence for Climate Extremes (CLEX) in partnership with the Monash Climate Change Communication Research Hub (MCCCRH) and Australian Meteorological and Oceanographic Society (AMOS).

The workshop was a great success, with 100% of educators reporting that they learned about currently available resources and 95% of educators reporting they benefitted from working with the climate scientists. Using evaluations before and after the workshop, educators reported an increase from 45% to 100% agreeing they were confident they could find climate related materials, a rise from 65% to 100% agreeing that they could prepare their own climate science related materials, and an increase from 65% to 100% agreeing that they felt confident talking about climate science with their students. The positive feedback comments from both scientists and educators reflect the energy felt by the organisers during the workshop.

The Climate Classrooms workshop was mapped to the Australian Professional Teacher Standards, and was endorsed by NESA. It contributed 3 hours of NESA registered professional development and addresses 3.1.3, 3.2.3 and 3.6.3 from the Australian Professional Teacher Standards towards maintaining Highly Accomplished Teacher Accreditation in NSW.

Workshop Aims

- ▶ To enable educators involved in the secondary school curriculum to work closely with climate scientists and each other on planning and developing new teaching resources that integrate climate science into the Australian curriculum.
- ▶ To expose secondary school teachers to existing digital climate science materials that can be used in teaching the Australian curriculum.
- ▶ To enable climate scientists to make their science accessible to secondary teachers and students, helping to increase 'climate science literacy' of the upcoming generation.
- ▶ To contribute teaching resources aligned to the Australian curriculum to the Climate Classrooms collection at <https://www.monash.edu/mcccrh/projects/climate-classrooms>.
- ▶ To contribute teaching resources for international use to the TROPICSU (Trans-disciplinary Research Oriented Pedagogy for Improving Climate Studies and Understanding) collection at <https://tropicsu.org/>.

Method

The workshop was held online as part of the AMOS Conference in February 2021.

Attendees were:

- ▶ 30 educators, including teachers at all career stages, school leaders, curriculum managers, STEAM learning specialists, and education managers, from New South Wales, Queensland, Victoria and Western Australia. All the educators were in the secondary school system, with just over half teaching across multiple year level groups. 25% of educators taught into Year 11 and 12.
- ▶ 12 climate scientists and climate science knowledge brokers from UNSW Sydney, CSIRO, Bureau of Meteorology (BOM), University of Melbourne, Monash University, Monash Climate Change Communication Research Hub (MCCCRH) ranging in seniority from PhD students to professors.

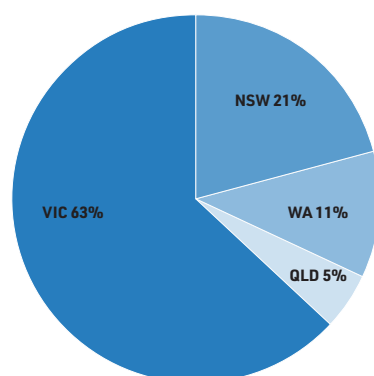


Chart 1:
Teaching location
of participants

Before the workshop, attendees were carefully grouped with one scientist to three educators, and a mix of perspectives and some common interests. Information on educators' roles, interests and expertise was shared with scientists before the workshop to help them prepare. The smaller group size worked well in Zoom format.

Most of the workshop was devoted to the participants working in their groups in separate zoom breakout rooms. During the first part of the group work, educators and climate scientists worked together to find links between climate science topics and a unit of work from the Australian curriculum. During the second part of the group work, teachers and climate scientists fleshed out the new teaching resource. Teams had access to a google drive folder that contains a lesson plan template, a list of climate science based digital resources, that include interactive maps, climate model simulators, Interactive visualisations, animations, and videos.

Each group developed a draft resource that teaches a specific unit of work from the Australian curriculum using diverse climate topics. For example, one group developed a Maths lesson on bivariate data, in which students use technology and sea level data from a set of water level measuring stations around the world to investigate how sea level has been changing. One of the science groups developed a lesson that addresses misconceptions on climate using data science linked to the Earth and Space unit of Year 10 Science. Another science group developed a data analysis unit linked to understanding seasons and climate variability, year 7, that investigates natural climate variability and man-made climate variability. Educators incorporated many climate-based digital assets in the developed teaching resources and adapted them to meet learning goals across the curriculum. The most developed of the draft resources will be developed further by CLEX and MCCRHR.

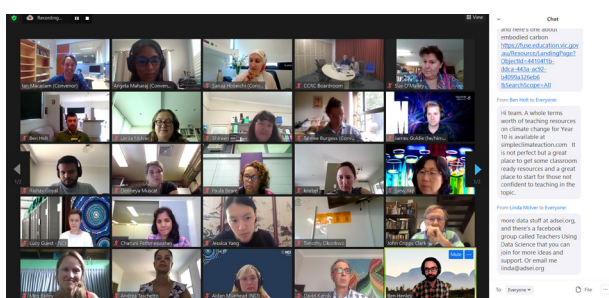


Figure 1: Workshop participants on Zoom

Results

The educators reported (during the application process) a variety of reasons for attending the workshop, including wanting to establish relationships with scientists, development of resources, link curriculum with resources, and be able to motivate and engage students through including climate science within teaching and practice.

Prior to the workshop, the educators were surveyed about their confidence in locating and preparing climate related resources. In relation to materials for the classroom, 5% strongly agreed and 40% somewhat agreed that they could find suitable climate related materials. After the workshop, there was a rise in educators feeling confident with finding climate related materials for students, as 64% strongly agreed and 36% somewhat agreed they could source these materials.

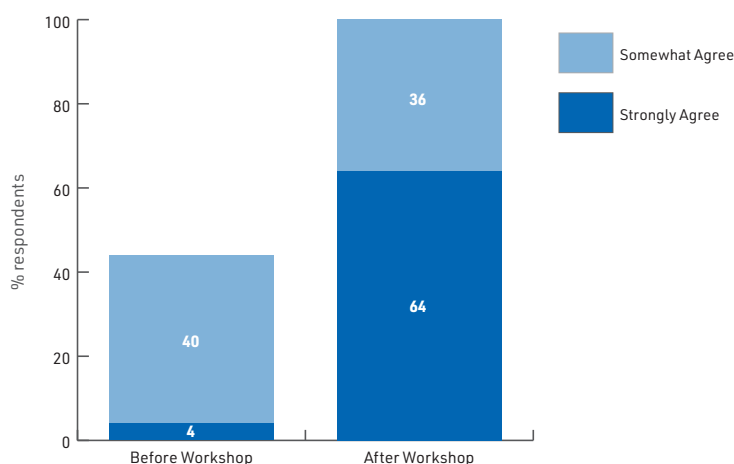


Chart 2: Teacher response to 'I can find climate related materials'

Before the workshop, 15% of educators strongly agreed and 50% somewhat agreed that they could prepare climate related resources for their students. Following the workshop, the educators reported a big increase in confidence in relation to preparing their own materials with 41% strongly agreeing and 59% somewhat agreeing that they could prepare their own climate related resources for their students. This was a rise from 65% strongly or somewhat agreeing, to 100%.

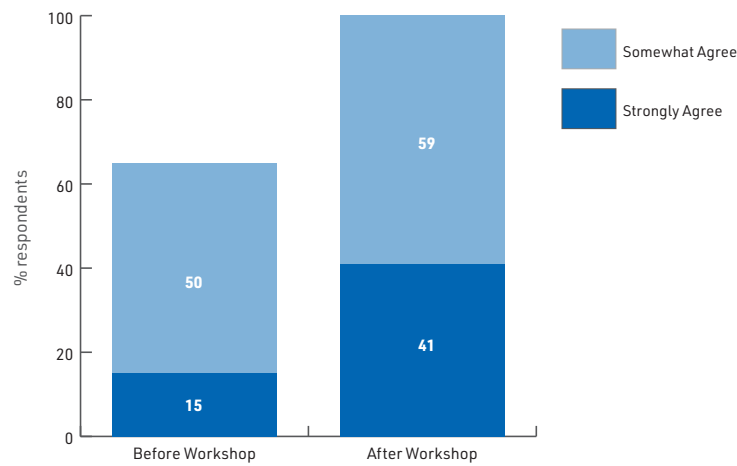


Chart 3: Teacher response to ***'I can prepare climate related materials'***

Before the workshop, 20% of educators strongly agreed and 45% somewhat agreed that they felt confident talking about climate related issues with students. Following the workshop, educators also reported a rise in feeling confident being able to talk about climate science with students with 50% strongly agreeing and 50% somewhat agreeing that they could. This was up from 65% prior to the workshop.

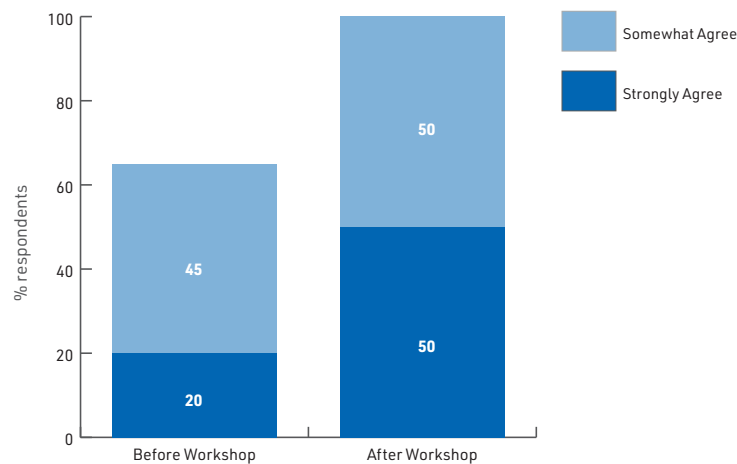


Chart 4: Teacher response to ***'I feel confident talking about climate related issues with students'***

All participating educators reported that they had learned about resources during the workshop and were able to develop resources they could use in their classrooms.

Following the workshop, 95% of participants agreed that they benefitted from working with the climate experts. The workshop was well received with 95% of participants reporting that they enjoyed the workshop.

Teachers reported that the best part of the workshop included:

- ▶ Working directly with a scientist
- ▶ Learning about existing and developing new resources
- ▶ Getting inspired and learning from other teachers
- ▶ Focused collaboration in breakout rooms and opportunity to work in small groups
- ▶ Working across disciplines
- ▶ Breadth of climate science-based resources

The educators were very complimentary about the workshop, using comments such as the workshop being 'invaluable' and 'so good' which matched the energy in the room during the sessions. Full quotes from educators are available in *Appendix 1*.

The scientists also reported the workshops being valuable, with increased understanding of what teachers need, enjoying the flow of ideas and information, and appreciating the passion and commitment of the educators to present climate science to their students. Full quotes from scientists can be found in *Appendix 2*.

Appendix 1 – Educator Feedback

Collaborating with practicing scientists and other Earth and Environmental Science teachers - it is a small subject in Senior Secondary in all states so it is a rare opportunity to work with others!

It was so good!!! Having a chance to work with real climate scientists, to use/have access to authentic data and get insights into their areas of study, to develop resources to help support the understanding of both EES content and skills outcomes.

Being able to draw knowledge from various people that I otherwise would not have been in contact with

Getting some really useful resources

The amount of resources provided as well as the focus on many subject areas.

Being part of a team, hearing about the same challenges we face, bouncing ideas.

I found the Climate Classroom workshop invaluable. As a Science teacher, I know how important it is for students to gain an understanding of both the mechanisms of climate change and implications of this on their own future. Working with other teachers as well as experts in the field allowed me not only to collaborate in making a useful lesson plan but also opened my eyes to a range of resources already available. I was able to take knowledge of these resources back to my science teaching colleagues who are already using them in lessons (Katrina Holewa, Geography and Science teacher)

Collaboration across sectors and jointly creating a teaching resource (Cecile van der Burgh, Geography teacher)

Getting an awareness of the resources and data actually available for use, and some of the language that is being used in climate change research (Paula Beare, Maths teacher)

Discussion on the topics that intrigued interest, curiosity and passion - all related to 'THE PRESENT', away from the old fashioned textbook structure. It was great to know that what teachers are doing and how I could take that to make changes to the curriculum delivery in my school. (Deepa Jain, Science teacher)

Talking to the other teachers in the breakout room. It makes you feel like you are working as part of a bigger team. (Ben Holt, Geography teacher)

Working with Greg, from Mount Waverly, only teaching three years, but formerly an engineer. His innovation in the classroom was inspirational. I was exposed to so many resources and ideas, with my group, the presenters and Maurice our 'science professional'. This is a brilliant format for PD. So rare to have time to talk and learn from each other. (Sue O'Malley, Science teacher).

For me, the best part of the workshop was the chance to learn about some great climate resources already available that I could use with my classes. (Katrina Holewa, Geography and Science teacher)

Climate Classrooms is such a great initiative, connecting teachers, researchers, and authentic data to create lessons that effectively engage students with climate science. It's exactly the sort of work that the Australian Data Science Education Institute supports and encourages, so it was wonderful to be involved. (Linda McLver, Founder and executive director of Australian Data Science Education Institute)

Appendix 2 – Scientist Feedback

The teachers I worked with showed a lot of enthusiasm and interest to incorporate climate science into the school curriculum and that made the experience all the more rewarding for me. I am very happy that I participated in this workshop and was able to contribute in some way. (Charuni Pathmeswaran, PhD student UNSW)

It was so great to meet these equally passionate secondary teachers and to facilitate the passing on of some knowledge directly using real-world scientific data and tools. We have great mutual respect for each other's expertise, and I hope this is a blueprint for future collaborations between professional scientists and school teachers. This is an important way for us to continue to break down the barriers which separate facts and data from deep knowledge and understanding. (Dr Ben Henley, University of Melbourne)

Teachers are a great group, and a great resource for Australia. It is so nice to be able to help them even a little bit. Having participated in both the Perth and virtual workshops, I think they have lots of ideas and finding the best resources to support their ideas is something we can help with. (Mary Voice, Cumulus Consulting and University of Melbourne)