



Proceedings for the
3rd Shaw-IAU Workshop
on Astronomy for Education

**What Everybody Should Know
about Astronomy Education**

12 – 15 October, 2021



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The following is a summary of the 3rd Shaw-IAU workshop on Astronomy for Education held 12 – 15 October, 2021 as a virtual event. The workshop was organised by the IAU Office of Astronomy for Education. More details can be found on: <https://astro4edu.org/shaw-iau/3rd-shaw-iau-workshop/>.

The Office of Astronomy for Education (OAE) is hosted by the Haus der Astronomie on the campus of the Max Planck Institute for Astronomy in Heidelberg. The OAE's mission is to support and coordinate astronomy education by astronomy researchers and educators, aimed at primary or secondary schools worldwide. The OAE is an office of the International Astronomical Union, with substantial funding from the Klaus Tschira Foundation and the Carl Zeiss Foundation. The Shaw-IAU Workshops on Astronomy for Education are funded by the Shaw Prize Foundation.



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3rd Shaw-IAU Workshop on Astronomy for Education

Teaching astronomy takes both solid knowledge of the subject itself as well as educational skills, such as knowing appropriate methods and techniques for teaching. To this, specific sub-fields of astronomy education add their own specialized skill sets: knowing how to operate remote telescopes, for instance, or the ins and outs of daytime observations. Last but not least, there are the skills needed in order to make our teaching fair, equitable, and inclusive.

In practice, most of us who are active in astronomy education have only been taught a subset of those skills in our academic training. Those who come from professional astronomy and have branched out into education and outreach typically have advanced training in astronomy, but not in the relevant areas of pedagogy. Most teachers, on the other hand, have pedagogical training as well as training in the subjects they teach, but often that does not include formal training in astronomy and astronomy education.

If this description includes you, and if in consequence you have ever felt motivated to expand your astronomy education skill set, then this workshop was, and is, meant for you. It is the third in a series organised as a collaborative venture between the Shaw Prize Foundation and the International Astronomical Union, and with 89 talks and 50 posters in a total of 18 sessions, it provides a fairly comprehensive “Astronomy Education 101”.

For those who were unable to attend, or did not manage to attend all of the sessions they were interested in, we present these proceedings, and the associated talk videos from the workshop. While they lack the interactivity that the 580 workshop participants enjoyed as they posed their questions to the speakers, or interacted in the chat, we do believe that they are valuable in their own right — and we asked speakers to include in their write-ups helpful pointers to additional resources, so you have the opportunity to delve deeper. If you find these resources useful, and I hope they will be useful to many, please share them widely.

The workshop was made possible by funding from the Shaw Prize Foundation, for which we are very grateful. You can find the names of the individuals and institutions who organised the workshop on p. 6 — a big “Thank you!” to all of you!

For us at the International Astronomical Union’s Office of Astronomy for Education (IAU OAE), this is just the start. Helping those who are active in astronomy education to grow their skills, and to become more professional in their activities, is one of our main objectives. Stay in touch if you want to make sure not to miss what is next — from additional events to more resources. On the web, you can find us at <http://astro4edu.org>, and on that page, you can also find your country’s National Astronomy Education Coordinator Team. We are also on Twitter and on Facebook as @astro4edu.

Markus Pössel
Director, IAU Office of Astronomy for Education
Heidelberg, November 16, 2021

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Organizing Committees

Local Organizing Committee:

Asmita Bhandare, Suresh Bhattarai, Niall Deacon, Theo Dimitrakopoulos, Natalie Fischer, Giuliana Giobbi, Celine Greis, Esther Kolar, Colm Larkin, Tshiamiso Makwela, Carmen Müllerthann, Markus Nielbock, Eduardo Penteado, Markus Pössel, Saeed Salimpour, Gwen Sanderson, Rebecca Sanderson, Anna Sippel

Organizing Committee:

Asmita Bhandare, Silvia Casu, Niall Deacon, Dario del Moro, Samir Dhurde, Giuliana Giobbi, Edward Gomez, Renate Hubele, Tshiamiso Makwela, Sivuyile Manxoyi, Markus Nielbock, Eduardo Penteado, Markus Pössel (Chair), Sara Ricciardi, Rosa M. Ros, Saeed Salimpour, Stefano Sandrelli, Anna Sippel, Aniket Sule, Stefania Varano, Alessandra Zanazzi

Scientific Advisory Committee:

Asmita Bhandare, Silvia Casu, Niall Deacon, Dario del Moro, Samir Dhurde, Urban Eriksson, Michael Fitzgerald, Giuliana Giobbi, Edward Gomez, Andrej Guštin, Marietta Gyulzadyan, Renate Hubele, Fraser Lewis, Carolin Liefke, Tshiamiso Makwela, Hakim Luthfi Malasan, Sivuyile Manxoyi, Surhud More, Markus Nielbock, Arvind Paranjpye, Eduardo Penteado, Markus Pössel, Carmelo Presicce, Travis Rector, Sara Ricciardi, Nayra Rodríguez Eugenio, Gustavo Rojas, Rosa M. Ros, Saeed Salimpour, Stefano Sandrelli, Anna Sippel, Aniket Sule, Rachele Toniolo, Rosa Valiante, Stefania Varano, Sarita Vig, Alessandra Zanazzi, Anita Zanella

In addition to the efforts from the OAE office in Heidelberg, Germany, the following OAE Centers and Node made key contributions to organizing this event:



The OAE Center India was not formally established at the time of this workshop but also made significant contributions.



astroEDU: Improving Educational Activities through Peer-review

Session organisers: Edward Gomez, Las Cumbres Observatory, California & Cardiff University, UK and Michael Fitzgerald, Las Cumbres Observatory, California & Deakin University, Australia



AstroEDU is a peer-review platform that aims to improve astronomy education activities. It was created in 2013[1]. It seeks to address the disparity between quality and quantity of astronomy education activities. A simple web search for an astronomy education activity will yield many results, yet the quality of, relevance and how current the results are is unclear. astroEDU uses peer-review to improve astronomy education activities, and then publishes the activities on its website. Each activity receives a review from a professional educator and professional scientist, to review the educational and scientific content in a constructive manner. The published activities are syndicated to online repositories, so the activities can achieve the maximum reach. As of 2021, astroEDU has 2 language editions (English and Italian) each with their own editor in chief and editorial board. The English language edition has published 84 activities and the Italian language edition has published 40 activities. Some of these activities are translated versions from one of the language editions.

The aim of this workshop was to encourage the community to create activities or amend existing activities to fit into the astroEDU activity template, and to give guidance about reviewing astroEDU activities.



Link for the talk by Edward Gomez:
<https://youtu.be/nAOGZ6XbB8A>



Link for the talk by Michael Fitzgerald:
<https://youtu.be/vcKK0c6boAU>





Figure 1: A word cloud of the qualities of a good review as suggested by the workshop audience.

Writing an article

The astroEDU activity template may have fields which are unfamiliar to you as a content creator. The aim with this template is not only to provide a guide to reproduce the activity but to provide extra information to the educator and meta-data for the astroEDU (to assist with searching and sorting). Some information you may not already include in your activity is:

Background information: This is important for non-specialists to be comfortable with the content and subject area. Try to make this a quick primer on the topic and include text, images and videos, as appropriate

Goals: These should be short and general. You should aim to have 2-3 for a short activity. Your audience should be able to achieve all your goals. An example of a goal is "Students should have an appreciation that gravity pulls objects towards Earth".

Learning objectives: These should be specific. You would like your audience to achieve the majority of these but there should be room to differentiate between abilities. An example of a learning objective would be "Students will demonstrate that objects of different mass fall to Earth at the same rate".

Evaluation: This is your opportunity to check that the students have learnt what you intend them to. You can do this in many different ways from asking your students questions as part of the activity, completing a survey at the end or something creative like drawing or making a poster. If your evaluation is part of your activity it is more likely the students will do it and you can learn from it.

Attachments: You can also attach extra documents that are useful for your activity. These may be in the form of printable documents the educator will need, videos for the students to watch or web resources.

Becoming a reviewer

During the workshop we asked the audience to describe, based on their experience and from the information given at the workshop, what makes a good review. The results can be seen in Figure 1.

The biggest suggestion is for reviews to be constructive. This is at the core of the astroEDU review process. astroEDU is aiming to improve the quality of astronomy education activities. We would rather not and have not, to date, rejected any activities. We would rather work with authors to make their activities as strong as possible, so they have the widest reach and widest impact possible.

astroEDU is currently seeking reviewers to assist with the peer-review process. We also encourage anyone who has written an astronomy education activity to submit it to astroEDU.

References:

1. Peer-review platform for astronomy education activities, P Russo, E Gomez, T Heenatigala, L Strubbe <https://arxiv.org/abs/1501.07116>

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