A Community Discussion about Sharing and Publishing Space Science Education Research and Evaluation

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Abstract. There is ongoing concern in the community about the small number of space science education research articles being published. Additionally, there is a need to share evaluation results of our projects. This special interest group discussion brought together those interested in sharing results of their space science education and public outreach projects with those who actively publish in a variety of settings. The session introduced a set of concerns, generated during the previous ASP meeting including the lack of a central place to publish astronomy education research articles and the lack of resources that are readily available to the community of education and outreach professionals, for discussion. This session focused on sharing solutions to concerns and providing resources and opportunities to community members.

1. Introduction

The annual meeting of the Astronomical Society of the Pacific brings together education and outreach professionals deeply committed to space science education. Each year, a variety of professionals including those who work in museums, schools, universities, and federally funded outreach programs come together to share best practices, lessons learned, barriers, and program results. During the 2013 Cosmos in the Classroom meeting, part of the annual ASP meeting, a group of 40 individuals held a Special Interest Group session to discuss the current status of publishing research in the field of space science education. At the time, the American Astronomical Society had announced that the online journal *Astronomy Education Review* would be discontinued at the end of 2013. This announcement and other circumstances, including increased scrutiny from federal funding agencies, created a need for new outlets for sharing results and scholarship specific to space science education.
Specific concerns that were expressed at that meeting included:

1. The lack of a central place to publish and to read studies specifically in space science education.
2. The increasing need for a place to share evaluation results related to space science programs.
3. The need to make available a synthesis of research for non-education experts who work in space science education and public outreach.
4. The lack of access to relevant articles for individuals without institutional subscriptions.

The Special Interest Group session at the 2014 meeting brought together about 20 individuals interested in discussing and providing solutions to the issues that had been brought up previously. Participants included education and public outreach professionals, museum educators, professors, graduate students, professional evaluators, and scientists who all had an interest in sharing existing and providing new avenues for sharing results with the wider community.

2. New and Existing Journals

One issue that has been consistently part of the discussion is the need for a central place for articles related to space science education. Currently, in addition to those that were published in *Astronomy Education Review*, articles relevant to the community have been published in a variety of journals including the *Journal of Research on Science Teaching, Science Education*, and the *International Journal of Science Education*. The problem is that many of the people actively involved in astronomy and space science education do not read or have easy access to the journals for general science education research. And the journals that astronomy educators do read rarely, if ever, publish papers on astronomy education research.

In late 2014, at time of writing of this proceeding, two new journals in our field have begun publication and some existing journals provide opportunities for publishing papers or articles related to space science education and outreach. Let us survey the landscape...

2.1. Journal and Review of Astronomy Education and Outreach

Started in 2014, the *Journal and Review of Astronomy Education Outreach* (JRAEO) is an online journal that is published online three times per year. Published by Hermograph Press LLC, it is supported through individual subscriptions, with no cost for article submissions as long as authors are current subscribers. The journal solicits articles related to educating students and the general public about astronomy, including topics from related fields such as physics, geoscience, math or history education. The journal solicits articles from contributors anywhere in the world whose research is of interest to those who work in astronomy education and outreach at any level and any setting.¹

¹http://jraeo.com/
2.2. Journal of Astronomy & Earth Sciences Education

*The Journal of Astronomy & Earth Sciences Education (JAEE)* is an online journal that will publish its first issue starting at the end of 2014. Published by the Clute Institute, it is a peer-reviewed journal dedicated to publishing cutting edge research that addresses issues across science education. It is an open access journal with no subscription fee for readers but does have a submission fee for authors, similar to science research journals. The journal solicits submissions that address systematic education research and teaching innovations across earth & space sciences education, including the disciplines of astronomy, climatology, energy resource science, environmental science, geology, meteorology, planetary sciences, and oceanography.²

2.3. Communicating Astronomy with the Public

*Communicating Astronomy with the Public (CAPjournal)* is a free peer-reviewed journal for astronomy communicators available both online and in print. Published by the IAU DIVISION XII Commission 55, issues are released quarterly and include research articles, reviews, news, announcements, letters to the editor, resources, innovations, best practices, opinions, and columns. The “Research & Applications” section is for peer-reviewed science communication research articles. The journal encourages active involvement from the astronomy outreach community.³

2.4. Planetarian

*The Planetarian* is the professional journal of the International Planetarium Society. It is published quarterly and is a membership benefit to IPS members. The journal solicits articles that relate to the philosophy, management, technical aspects, educational aspects, or history of planetariums, as well as ideas that can readily be incorporated into planetarium shows, research, or operation. Education research articles related to planetariums will be peer reviewed if desired by author(s).⁴

2.5. Spark Newsletter

*Spark* is an educational newsletter published by the American Astronomical Society. It contains short articles about or related to the education programs and activities of the American Astronomical Society and its members. It includes editorial columns, articles, and letters to the editor. It was previously published twice a year from 2006 to 2011 and is scheduled to be published again in 2015. It encourages submissions from anyone who is part of the AAS community.⁵

²[http://jaese.org](http://jaese.org)
⁴[http://www.ips-planetarium.org](http://www.ips-planetarium.org)
⁵[http://aas.org/teach/spark-aas-education-newsletter](http://aas.org/teach/spark-aas-education-newsletter)
3. Other Resources

In addition to these formal journals and newsletters, there are several other outlets and resources that exist to share and read about research and results from space science educational programs.

3.1. STEMDex

STEMDex is a new resource for Education and Public Outreach (EPO) professionals working in the astronomy education community, designed to improve the community’s knowledge and understanding of the educational research papers relevant to their work. The site hosts a searchable database of summaries of peer-reviewed education papers, written by astronomy educators and posted for the entire community to use. The site is supported by volunteers and is being further developed.6

3.2. NASA SMD Community Workspace

The NASA Science Mission Directorate (SMD) workspace is designed to help community members learn about Science Mission Directorate (SMD) Education and Public Outreach (EPO) efforts and to exchange ideas and collaborate on projects. The site includes profiles of educational projects and teams including information about expertise and how scientists are involved; evaluation plans and key evaluation results; impacts and significant results; partnerships; awards and recognition.7

3.3. Informalscience.org

Informalscience.org is an online community and collection of informal STEM learning projects, evaluation, and research resources, run by the Center for Advancing Informal Science Education. Relevant projects can include their evaluation results and reports in their searchable database. The site also seeks submissions of links to high-quality informal learning references and reports that support the development of a comprehensive interdisciplinary knowledge base related to informal learning and education.8

4. Discussion

The discussion included a number of issues related to sharing research and evaluation results as well as avenues for sharing best practices and teaching resources. One important set of issues brought up related to any new research journals:

1. We need to make sure that all journals have a robust plan for archiving materials to ensure the longevity of access to the articles (for example, Astronomy Education Review is being archived by the AAS,9 and,

6http://stemdex.ipac.caltech.edu/
7http://smdepo.org/
8http://informalscience.org
9http://www.portico.org/Portico/#!journalLOVIView/cs=ISSN_15391515?ct=E-JournalContent
2. Any new journals would greatly benefit from the backing by a professional society.

Both of these were seen as essential qualities that authors and readers would use to judge the quality of the journals.

Additionally, there was a continued discussion about the best place to publish pedagogical articles and curriculum in space science. Currently, several choices exist include Universe in the Classroom\textsuperscript{10} and the Classroom Astronomer Magazine.\textsuperscript{11} Ongoing concerns discussed were making sure that articles, innovations, and ideas are available to those who would benefit. There was a sense that, given the budgets of most of us working in education, it would be very good if resources could be either free or very low cost. All of these issues will frame the ongoing discussion and evolution of future publications in the field.

\textsuperscript{10}https://www.astrosociety.org/publications/universe-in-the-classroom/

\textsuperscript{11}http://www.classroomastronomer.com/