

White Paper on *Experiments In Engagement*, a new journal on the science of outreach, informal science education, and public engagement.

Draft date: October 15, 2013

Journal Organizing Committee:

Jamie Bell, CAISE

Julian Bobroff, Universite Paris - Sud

Beth Cunningham, AAPT

Laura Greene, UIUC

Bo Hammer, AIP

Mary Kirchhoff, ACS

Tiffany Lohwater, AAAS

David Pines, UC Davis

Martin Storksdieck, NAS

Becky Thompson, APS

Advisors

Margaret Glass, ASTC

Trevor Nesbit, CAISE

Kalie Sacco, CAISE

Background

There is a growing need within the science community to advance the scholarly profile and communicate the effectiveness of informal science education, outreach, and public engagement, sometimes referred to as ISE (museum community), informal STEM learning (NSF), EPO (NASA and NOAA outreach), or science communication (media). For the purpose of this White Paper we will use the term, “Engagement” to capture the broad spectrum of such programs. To this end, for example, there is a new APS membership unit called the Forum on Outreach and Engaging the Public and a growing network of individuals and institutions called, “Global Partnership on Science Education through Engagement,” (GSEE). AAPT has had a committee on Science Education for the Public for a number of years with the mission to convey physics to the public in formal and informal settings. The AAAS Center for Public Engagement with Science and

Engineering seeks to encourage direct scientist participation in public engagement activities, including recognition awards for active researchers who are also actively engaged in successful public engagement and outreach. The American Chemical Society has partnered with the Alan Alda Center for Communicating Science to train select members to more effectively communicate scientific issues to the public. And when the Center for Advancement of Informal Science Education (CAISE) launched an "evidence wiki" on its website in 2012, the contributed article on Public Engagement became the most viewed and cited of all article categories (<http://www.informalscience.org/research/wiki/Public-Engagement>). These groups are forming in response to a recognition that not only is there an international need for scientists to become more personally engaged with the public, but there is also a growing community of scientists in academia, non-profits, and museums, for example, whose secondary or primary professional activity, as scientists, is Engagement.

These scientists need a respected peer-reviewed journal within which to publish accounts of their "Experiments in Engagement" that inform engaged colleagues and the greater outreach community about their work. We will refer to a scientist as "engaged" for the purpose of this White Paper when he or she is actively involved in efforts to reach a non-expert audience directly or indirectly in order to convey their work, and/or is conducting empirical research on the effectiveness of such efforts. Doing so will also gain the broad professional recognition that a high-quality, peer-reviewed and indexed journal affords. This journal (working title: *Experiments in Engagement*) would significantly advance the Engagement field and provide a scholarly basis for scientists doing Engagement to advance professionally. It will also provide a significant resource for empirical researchers studying the effectiveness of various forms of engagement that involve active research and science-based professionals as key interfaces with students, the public, media or decision-makers. This community is currently lacking a professional journal and an effective interface for scholarly exchange with research scientists who conduct work in this field.

The science and funding communities would also benefit in numerous ways. For example, many scientists struggle to come up with meaningful broader

impact ideas in their proposals to NSF, while at the same time NSF is requiring increasing rigor in assessing its broader impacts investments. This new journal would contribute to strengthening the broader impacts focus of proposals and the outcomes of NSF's funding by responding to the recommendation of the National Science Board (November 2011), which asked that not every small outreach effort be evaluated, but that resources be pooled for more meaningful research and evaluation on the effectiveness of outreach models that underlie common strategies used to fulfill broader impact requirements by NSF. Similarly, there is a growing push from Congress and the Executive Branch to improve the accountability and impact of federal funding for outreach and informal science education. This proposed journal would improve program evaluation and accountability to the taxpayers by creating a scholarly platform for viewing and assessing "Experiments in Engagement" that have been funded by NASA, NOAA, EPA, NIH and other federal agencies, and by providing a basis for evaluation studies and research that focuses on empirically validating effective or best practices in Engagement.

Like science, engagement is a global effort, and the proposed journal will provide a way for engaged scientists across borders and disciplines to communicate, and to learn about some of the many best practices that underlie scalable and sustainable initiatives. For these practical reasons, *Experiments in Engagement* would naturally attract a broad international audience of contributors, referees, readers, and practitioners.

### A Model for a New Community of Scholars

One model that is useful for thinking about how Engagement can grow scientifically and professionally – and one that can give hope for the future in these very early days of Engagement as a legitimate scholarly endeavor within the scientific disciplines – is the evolution that has occurred over the past few decades in the area of physics education research (PER). From the beginning, the founders of PER were "traditional" physics researchers who then began doing research, as physicists, on the teaching and learning of physics. The physics community made a conscious decision that physicists doing rigorous research in physics education should rightly be housed in physics departments and their scholarship should be published in physics

journals, for the simple reason that research-based improvements and reforms to physics education should come from within the community in order to have scientific credibility and the best chances for acceptance and success in physics departments. The result is that physics is a leader among the science disciplines in research-based education reform, because the physics education research journals are written by and read by physicists, and physicists are the ones who are also the ones applying the results. Also, after several decades of maturing as a field and multiple generations of scholars descended from the founders, one now finds tenure track positions in PER at leading research universities, as well as smaller institutions. Physicists now become Fellows of APS for their work in PER and APS now gives awards for historically important work in PER. AAPT has been giving awards such as the Klopsteg Award and Oersted Medal to physicists for their work in informal science education and communicating physics to the public. Similar developments have occurred in other scientific disciplines, notably engineering and chemistry, and these developments have been synthesized in a recent consensus study by the National Research Council of the US National Academy of Sciences. The report by the NRC stresses that research on learning and teaching in the science and engineering disciplines at the undergraduate level does not require that a discipline-based scholar do this alone. In fact, collaboration between discipline-based researchers and learning and education researchers are helping to professionalize the field and provide a model for the Engagement community as well: The new field will advance much faster if such collaboration and cooperation is being pursued and enacted early. AAAS recognizes public engagement efforts by scientists with its Public Engagement with Science Award (lifetime achievement) and its Early Career Award for Public Engagement with Science (focused on early-career scientists). The American Chemical Society annually presents the Grady-Stack Award for Interpreting Chemistry for the Public, which recognizes outstanding efforts that increase the public's knowledge of chemistry and related fields.

### *A New Journal: Experiments in Engagement*

The same model of professionalizing PER can apply to scientists for whom Engagement is a major emphasis in their professional scholarly activities,

and one can easily imagine a similar trajectory for Engagement over the next decades as there was for PER, CER or EER. If this vision is to be realized, a major step is for scholars of Engagement and those who implement research-validated Engagement methods to have a new scientific journal dedicated to work in this important field. It should be noted that there are journals that accept empirical research articles on informal science education and outreach, amongst them *Public Understanding of Science*, *Visitor Studies*, *Science Communication*, *Astronomy Education Review* and *Curator*. Unfortunately, these journals are not widely read by natural or physical scientists, and their main area of scholarship tends to lie outside the proposed focus of *Experiments in Engagement*.

*Experiments in Engagement* will be a scholarly, peer-reviewed, online, probably open access, publication that will publish articles on informal science education, outreach, and public engagement written by scientists for an audience of their peers. The goal of the journal will be to establish a scholarly record of successful Engagement programs, in which evidence of success is documented as objectives achieved, lessons learned, dos and don'ts, and most importantly, how the authors know what they know from these experiments. In other words, emphasis will be placed not only on what was tried, but also on evaluation and assessment, and referencing relevant prior work. This will be a journal primarily by and for scientists housed in the disciplinary departments, and will fill the need for a repository of scholarly articles about outreach and public engagement written by scientists involved in these activities. Secondly, this journal will provide an essential platform for scholarly work and discussions for those individuals and institutions who craft, evaluate, and research opportunities for scientists who wish to become involved in Engagement.

Importantly, and one of the journal's major innovations as a locus around which the growing Engagement community can organize, is that the journal will also be a *professional networking hub* that would serve a registry of sorts for scientists and others involved in Engagement. As such, it would be a way for people to connect, collaborate, and share resources and ideas. The hub would be operated independently of the journal, but its activities and features would be linked to the journal. The hub would provide

opportunities for featuring and linking to relevant professional organizations, social media sites and projects, and it might include or link to a vibrant community of practice, which can feed into and critically discuss and reflect on the journal's content.

*Experiments in Engagement* will also be part magazine, in which authors can publish essays and short accounts of interesting programs and ideas that have not yet risen to the level of scholarship that would be found in the peer-reviewed section of the journal. Essays and program descriptions that are not yet linked to empirical evidence might be paired with, or commented on by, researchers and evaluators who may reflect on ways in which those ideas might be investigated empirically.

By having these three components – peer-reviewed journal, communication hub, and magazine – *Experiments in Engagement* will form a nucleus for growing this young community of engaged scientists.

#### Models for launching *Experiments in Engagement*

We have considered three. Option One is that the journal would be hosted and owned by an existing publication and would be built out as a new section of this journal. Option Two is that a publisher would host the new journal but it would have an independent identity, including governance and editorial. Finally, under Option Three, the journal could be completely independent and establish its own technical infrastructure, and independent governance and editorial boards.

Option Three seems the least viable, given the financial and reputation hurdles that are barriers to starting up a new enterprise such as this. Option One could be viable, but we would need to promote the cross-disciplinary nature of the journal if it was, for example, a new section of an existing disciplinary journal. Attaching to a focused disciplinary journal could also limit the audience of the new journal to those already inclined to read the existing journal, and who are part of a disciplinary professional network.

This leaves Option Two as the most likely route for success, since it would minimize the start-up costs associated with building a web-based manuscript submission system and technical platform for hosting the journal. We would need to raise funds to offset the host's costs for accommodating *Experiments in Engagement*, and for costs associated with building a branded publication, convening the editorial board, soliciting manuscripts, attending conferences, and promoting the journal to potential readers. The journal may also want to sponsor its own conferences, such as a conference on assessing the outcomes of outreach and public engagement programs, papers from which could form the basis for a special issue on this topic. Ultimately, once the start-up period has ended, *Experiments in Engagement* will need a sustainability model whereby there is a steady stream of manuscripts, a reliable corps of referees and editors, and an open access funding model that does not rely on external support for the long-term financial viability of the journal. The journal might be linked to an independent membership organization that could use new models of funding and governance now afforded by social media capabilities and crowdfunding, though new models for community building would have to be balanced against established mechanisms that are, at least for now, known to lead to reasonable success. Finally, while seed funding from public and private foundations and individual sponsors is possible, a model for sustainability might include ongoing support by a wide range of disciplinary societies in the US and elsewhere.

#### Appendix I

[existing engagement communities – list to be developed]

#### Appendix II

[list of individuals who have agreed to write, edit, and/or referee – in development and will be added soon]

#### NOTES & ISSUES TO BE RESOLVED:

- We need to resolve our vision for this journal, including purpose and primary audience of authors, readers, etc.
- We need to come up with a better title.

- The terms “engaged,” “engagement,” etc., may be confusing and have different meanings to different groups. Our use of this needs careful thought and definition.
- Who will be our partner & host for the journal?