Science Live: A concept in reaction to the Science Learning+ solicitation

The United States and United Kingdom both enjoy relatively robust ecosystems that support learning outside of the classroom. The many players in this ecosystem—after school programs, science center exhibitions and programs, television and film, print and new media, to name just a few—all make important contributions specific to their particular format. Included in this ecosystem is a broad range of initiatives that bring science experiences into the public sphere with live events. Within the past decade such events have proliferated in both number and diversity of form to the point that they have come to occupy a significant niche. The overall goal of this proposal is to create the conditions needed to allow a distinct professional sector to flourish based on the practice of these live public science events.

What constitutes a public science event?

Public science events are already taking place on a grand scale: many thousands of live events now involve millions of participants every year in the UK and US. The category encompasses a remarkable diversity of forms: stage shows, storytelling, and multi-modal performances; science cafes and other dialogue events; science festivals and other massively collaborative events; initiatives that incorporate science activity into existing non-science events; science busking and similar “street level” interventions; and much other activity, some of which purposely defies categorization.

These forms share much in common, though they overlap with each other in different ways. They are all in-person programs that are designed to engage the general public with science in a social setting that is often—though not always—situated outside of traditional learning environments. Live events deliver an experience that can only be enjoyed fully while the event is taking place, and draw much of their power from this special aspect: the uniqueness of the experience draws people—often strangers—together at the same time and situates them in a shared liminal space. Importantly, these various forms all face similar practical challenges related to managing the many variables involved in the organization of a live public event. Similarly, research and evaluation related to one of these forms often has very direct implications for others.

Does the notion of a public science events sector present a watertight category that delineates a unified community? Reality is likely messier than that. But a deliverable of Phase One of this project is to articulate the common threads that do unite this work, and define the sector in such a way that it creates a meaningful but open, flexible, and accessible call to action for practice, research, and external support.

Developing an apparatus for networking practitioners and researchers

More often than not, the inspiration for public science event activity comes from learning about what other practitioners are doing. Despite this, the public science event sector is not well networked. Among the exceptions, two—science cafes and science festivals—hint at what could be possible if this were to change.

Science cafes emerged in the UK in the mid-90s, and began to proliferate with networking support funded by the Wellcome Trust. Following the UK example, a few practitioners began to experiment with science cafes in the US in the early-aughts, but it was funding for general network support from the National Science Foundation that triggered a surge in such activity. There are now hundreds of cafe series taking place throughout the two countries, and they are regularly acknowledged as a unique and viable form of outreach.

Similarly, the modern science festival concept is often traced to origins in the UK in the mid-90s. In fact, a handful of disconnected science festivals in the US have also celebrated for decades (one is preparing for its 25th anniversary this year). However, it was funding for systematic networking support from the National Science Foundation that touched off a five-fold increase in the number of science festivals in the US in just the past four years (with more than four-dozen ongoing initiatives now underway). Most US science festivals now see themselves as part of an international movement, their practice is informed to an extent by evaluation, and they are even finding ways to voluntarily initiate collective action.

When initiatives arise within the context of such networks the individuals involved have a natural tendency to share inspiration and learning with their peers while challenging each other to continually improve. Although each cafe and festival is independent and unique, the networks signal that these initiatives are part of a legitimate community, and this draws the interest and involvement of administrations, collaborators, funders, and researchers. In the same way, an interconnected public science events sector will lead to a groundswell of new activity, new event forms, new professional relationships, and new understandings that inform the entire field of informal science education.

A networking apparatus is needed that honors existing relationships (this is not a proposal to supplant existing networks) and embraces the sector's enormous diversity (some practitioners may not even consider themselves to be informal science educators). Such a mechanism must also effectively integrate researchers to the point that research and practice are engaged in an ongoing, mutually informing dialogue. The solution may be similar to a centralized network, it may be a coalition of multiple networks, or it may involve another approach. A deliverable of Phase One of this project is a set of recommendations that will guide the development of the most appropriate apparatus for networking together this nascent sector.

Assessing the public science events landscape

Several evaluation-based studies have affirmed some of the distinct effects of public science events, but the rapid proliferation of this activity has largely outpaced research. It is therefore a deliverable of Phase One of this project to undertake a landscape study of the sector to determine areas of interest for future investigation. This landscape study will survey what is already known about the unique contributions of events, and suggest future research questions that will be both of interest to researchers, and of use to practitioners.

The final contents of such a landscape study cannot be known ahead of time, but initial consultations with those familiar with the sector have indicated some potential areas of interest. In most cases these areas of interest overlap with dynamics and impacts that may also be found in other settings, but are made particularly visible and explicit by live events. Some potential areas of future research, networking effort, and experimental practice may include:

<u>The importance of setting</u>
Events can be planned for any venue, and existing evaluation has shown that these bespoke offerings resonate strongly with specific target audiences. Is setting so important that it produces impacts that cannot be replicated in other places? What qualities of a venue will change the outcomes of an event?

<u>The importance of age</u>
Events can be calibrated with relative ease to serve families, a narrow or broad age range, or multiple specific age groups (high school students and graduate students, for example). Are there combinations that are particularly potent?

<u>Activation of community gatekeepers</u>
From the spontaneous enthusiasm of a bartender during a science cafe, to the deliberate inclusion of a community leader in planning for a neighborhood celebration, events often prompt gatekeepers to take on a role as science allies. In what scenarios is this effect most meaningful? What are the most effective ways to make use of this dynamic for younger audiences?

<u>The potential of collaboration</u>
Many events, and particularly science festivals, rely upon collaboration with a wide range of partners. Evaluation shows that science festival collaborators not only receive follow ups from public audiences, but gain enduring new professional relationships as well. How deeply can this spirit of collaboration be embedded into other event forms? How can events serve as a lever for sustained involvement by organizations not normally associated with science, or for sparking entirely new activity? To what degree can events that normally take place outside of schools serve as a matchmaker that integrates external support into school time activity?

Understanding how events integrate into overall science education
Evaluations show that a proportion of audiences in certain science events go on to pursue other learning opportunities as a result of their participation. What practices are the most likely to encourage such follow up behavior? What can we uncover from studies of long-term outcomes in audience members? Is it enough to simply have a memorable event, or are there specific types of messages—and message delivery—that are most effective in producing long term impact?

Involving STEM practitioners directly in public outreach.
The time-limited nature of events makes them relatively easy for STEM practitioners to commit to. When designed to foster dialogue, events are also a particularly direct form of public engagement. Findings suggest that event involvement raises STEM practitioner enthusiasm for and confidence with conveying their work to general audiences, and, importantly, that interaction with a STEM practitioner is the most important predictor of positive learning outcomes for audiences. What aspects of these interactions are the most powerful?

Importing knowledge and practice
Practitioners are often motivated to initiate events for reasons that fall outside of conventional science education impacts. For some, cultural change is a goal, while others are primarily seeking to create a social experience. Have we missed something by focusing research too strongly on science outreach driven by explicit learning objectives? What other domains of knowledge and forms of measurement can inform our understanding? Are there approaches to practice, or even specific event types, that can be adapted from other fields?

The implications of institutional backing
This sector ranges from multi-million dollar initiatives involving prestigious institutions to zero-budget activity run entirely by volunteers with limited science credentials. Not much is known about the impact institutional backing has on outcomes. Is it possible that in some scenarios activity originating from independent volunteers is actually more effective? What standards should be applied to event organizers operating without institutional support?

Incentives for connecting research and practice
Only a handful of funding sources demand that practitioners justify activity with research. What are reasonable expectations for intertwining research and practice in this sector, and what mechanisms will incentivize such connections?

What indicates a healthy public science events sector?
Is there activity produced by the sector, especially beyond simple head counts, that can be tracked over time to convey the collective impact of public science events? Are there key indicators that best convey the role that live public science events play in an informal science education ecosystem? To what extent will professionalism result in the best results for the sector, and what mechanisms are appropriate for general quality control?

Who is involved in this project and what can you do?

Staff associated with the Science Festival Alliance at the MIT Museum plan to submit a proposal based on this concept to the National Science Foundation in response to the Science Learning + solicitation. Phase One grants in the Science Learning + program only provide enough funding for a limited amount of staff time to be dedicated to the project. It is expected that the proposal will include small budgets for staff at the MIT Museum and staff at Cambridge University currently associated with the Cambridge Science Festival (UK). Funding will also be requested to provide for as much travel as possible for participants, limited supplies, and possibly the time of one researcher each in the US and UK.

Although there is only enough funding to involve a small number of administrative staff, this project will obviously not be possible without participation from as large as possible of a range of public science event practitioners and interested researchers. We are currently seeking additional participants to take part in shaping the deliverables described in this concept paper, including mechanisms for networking together a public science events sector, and future agendas for research.

All participants will be consulted throughout the one-year duration of Phase One. During that time we plan to convene the public science events community in the US and UK in a number of ways. We plan to gather in person as many as possible from the US and UK communities, likely in June of 2015 at the next meeting of the International Public Science Events Conference. It is also likely that we will hold regional Phase One meetings at other existing professional conferences in the UK and US. There will not be sufficient travel funding in Phase One for all participants, but there will be ample opportunities to participate in shaping the project via online communication.

Participants in this project are asked to submit a letter of support for the project to MIT Museum staff prior to June 20th.

To consider becoming a participant in this project, please contact Ben as soon as possible. Reactions to this concept paper, including specific suggestions for networking efforts, research questions, and other potential participants—either practitioners or researchers—are encouraged.

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