XSEAD: A Community Platform For Art-Science Integration

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The complexity of the problems facing society today, such as sustainability, population balance, and conflict resolution, require a multidisciplinary approach that integrates diverse perspectives, methods, and values. Increasing research evidence[1,2] and industrial innovations (mobile computing, social media, and so on) point to the success of collaborations across sciences and the arts in stimulating creativity and purposeful innovation. This emerging hybrid community of scientists, artists, engineers, and designers are producing novel and entrepreneurial research across multiple sites of inquiry including health, education, and environmental change. Key challenges facing this diverse network include establishing a cohesive and dynamic view of the field, rapidly disseminating research outcomes, and creating open and self-organizing collaborative structures supporting curricula, career, and research development.

The past 40 years has witnessed the emergence of a growing, but disconnected, critical mass of researchers, practitioners, and educators producing a rich portfolio of impactful hybrid work. These art-science contributions have been incorporated into an expanding number of tracks in key ACM events (SIGGRAPH, SIGMM, SIGCHI) as well as at other international venues, including the International Symposium on Electronic Art (ISEA, www.isea-web.org) and Ars Electronica (AE, www.aec.at). Earlier and continuing efforts—notably, Leonardo (www.leonardo.info), Rhizome (rhizome.org), the Daniel Langois Foundation (www.fondation-langlois.org)—and multiple initiatives led by the late Stephen Wilson[3] have created various archives and databases cataloguing work across science, art, and technology. Issues of maintenance, audience outreach, speed of dissemination, scale, reach and engagement, multimodality, and community inclusiveness provide considerable food for thought in how to best address the pressing needs of the interdisciplinary art-science community.

XSEAD

Building upon lessons learned from previous efforts, coupled with the identification of opportunities for creating benefit both to the art-science community and the broader public, we have developed XSEAD (http://xsead.org), an online platform supporting networks of creativity and innovation across science, engineering, art, and design. Discussed in more detail in the video accompanying this article (see http://xsead.cmu.edu/about), XSEAD aims to expand traditional academic approaches to documenting and disseminating work by offering diverse ways to participate and present richly mediated integrative works at multiple stages of development. The platform combines key characteristics of social media networking applications to help incentivize participation, strengthen engagement, and support dynamic community organization. To respond to the needs of the interdisciplinary art-science community, the XSEAD initiative has three key goals:

∎ enrich the understanding of the nature and foundation of deeply integrated arts-science work through interdisciplinary communication and engagement;

∎ create a comprehensive, cohesive, and accessible archive of work in the field; and

Editor's Note

The relation between media researchers, engineers, and artists has been a topic of discussion since the introduction of multimedia. The authors present the social-media-oriented XSEAD platform that is designed to foster interdisciplinary collaboration between the members of different groups, speed the dissemination of findings, and establish an educational environment that helps to better understand the intellectual grounds of integrative multimedia work.

- support the multimodal documentation and rapid dissemination of current and ongoing innovative research outcomes.

In so doing, XSEAD enables research exchange and in-depth discussion between leading and emerging researchers and practitioners, while introducing general nonexpert audiences to the evolution and potential of collaborative research across science and the arts. To achieve this, XSEAD integrates several key social media networking characteristics to foster and maintain participation across four independent but highly integrated layers: community, showcase, resource, and knowledge.

Community

The community layer provides a venue for contributors to share and discuss current and ongoing work. This evolving catalog of contemporary integrative projects serves to chart the emergence of interdisciplinary collaborative activity over time. Presented works in this reference space are richly documented (for example, with text, images, video, and code) and include both completed projects and works in progress. For completed projects, contributors are invited to build annotated multimedia narratives exploring the process and outcomes of their work. For new and ongoing work, the community layer emulates arts-based studio practice by providing an environment for contributors to seek early-stage and continuous feedback from a community of peers and experts.

Beyond housing all the expected functionality of a social networking application, the community layer additionally serves to coordinate active users around the diverse contributions found in the layers of this platform. For example, Figure 1 gives an example of recent activity within the platform on the dashboard display.

Showcase

The showcase layer provides an entry point where examples of effective collaborations and outcomes are curated in an accessible format (see Figure 2a). It is intended to convey the broad impact and successes of an emergent interdisciplinary community from the past to the present day. This layer is aimed toward a general audience, allowing them to quickly assess the scope and viability of the field while also discovering pointers to more targeted areas of interest. Leading organizations with a distinguished history of showcasing innovative
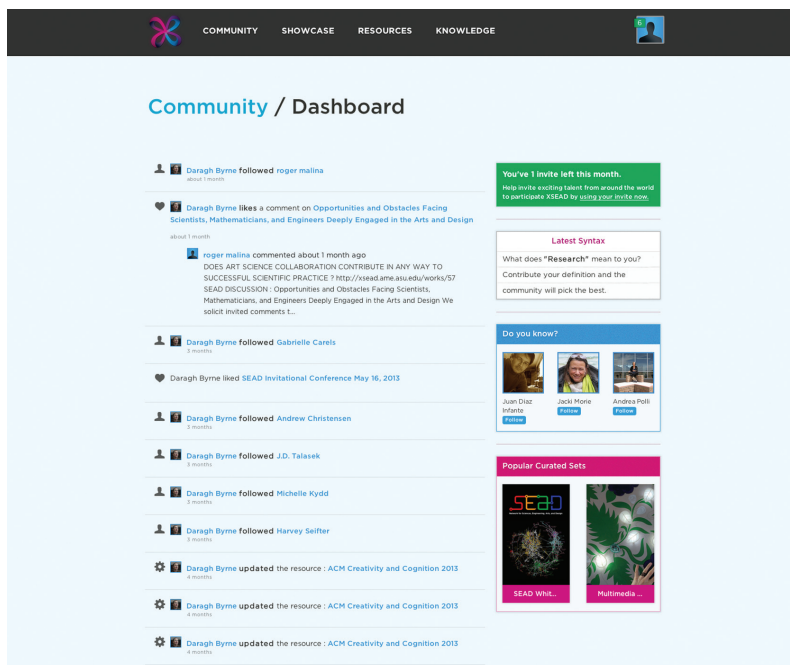

Figure 1. The XSEAD Community Dashboard displays the latest activity on the site.

cross-cutting collaborations are working with us to present outstanding exemplars from their archives. ACM Siggraph, ACM SIGMM, ISEA, and the National Academy of Sciences have already provided content for the showcase layer, with upcoming contributions from Leonardo and developing partnerships with *IEEE MultiMedia* and ACM SIGCHI. To date, 50 exemplar outcomes have been documented and prepared as part of the curation effort.

Led by Donna J. Cox, participants in the curatorial effort include Meredith Tromble (Leonardo), David A. Shamma (coeditor of *Arts & Digital Culture,* ACM SIGMM), Juan Diaz Infante (founder of the Mexican Space Collective), Andrea Polli (artistic director, ISEA 2012), Jacki Morie (ACM Siggraph's executive council), AJ Christensen (chair of ACM Siggraph's student chapters), Lucinda Presley (NSEAD, Learning and Education Working Group coordinator), Roger Malina (coordinator of the SEAD White Paper Initiative), Carol Strohecker (NSEAD PI), Pamela Jennings (founder of Noblewire, representing the National Academy of Sciences), and Ed Finn (director of the Center for Science and the Imagination at Arizona State University). The initial presented works have drawn from the realms of multimedia, interactive art, and data visualization, highlighting collaborative contributions such as

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Telepresence in Dance, Lumibots (see Figures 2b and 2c), Living Wall, and Thinking Machine 4.

Of particular interest in this layer is a set of white papers curated by our SEAD partner network, which introduces and contextualizes a select group of position statements from arts-science community advocates. Conceived as a discussion catalyst, this set of selected works is thoughtfully foregrounded with summary statements soliciting additional community input.

Resource

The resource layer consists of a dynamic collection of annotated links representing the multiple components evident in art-science collaborations. Coordinated by Aisling Kelliher, this is curated by community leaders in tandem with additional recommendations offered through open contribution. Through this collective action, events and information relevant to the community can be collated and maintained in a single living repository. This content spans festivals, conferences, workshops, publication venues, seminal talks and presentations, recommended texts/media, leading programs, institutions and forums, as well as tools, technologies, and datasets.

Additionally, in partnership with the Mellon-funded Alliance for the Arts in Research Universities (http://a2ru.org) at ArtsEngine, University of Michigan, XSEAD has developed a shared lexicon of definitions for key descriptors used within the community (see Figure 3). Drawing on the results and outcomes from site visits and interviews conducted by a^2ru, this

(a)

(b)

(c)

Figure 2. XSEAD showcase. (a) This layer provides a general overview of example collaborations and outcomes as well as access to specific projects such as (b) Lumibots featured in David A. Shamma's curated (c) ACM MM set "Multimedia Representation."

section presents a broad selection of the assembled definitions demonstrating the wealth and diversity of perspectives in the community

Knowledge

This final section (currently under development) will offer a forum for multimodal scholarship on themes of relevance to integrative works across science, art, and technology. Online tools will enable both the reporting of completed outcomes and reflections on interdisciplinary collaborations through novel multimodal forms and rich interactive descriptions integrating contributed content from across all platform layers.

Participation and Partnership

Building community participation and sustained growth in the user base of XSEAD is critical to its success. We have already established synergistic activities with leading organizations (ACM SIGMM, ACM Siggraph, ISEA, Leonardo, and a^{2}ru) and are cultivating additional partnerships and a growing community of users. But of course, we want more! We are excited to invite the multimedia community to join us in growing an inclusive network of active participants. We welcome your input and recommendations across all layers of the platform and particularly look forward to learning more about your own work and ongoing research in this area. To find out more and join the community, please visit http://xsead.org or contact any of the authors for additional information. **MM**

Acknowledgments

References

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Figure 3. Contributed definitions for interdisciplinary terms build a shared lexicon within the Resource section.

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