Oregon State University
Precollege Programs

ARIS
Advancing Research Impact in Society

Open Source and Online Course:

An Introduction to Successful K-12 broader Impacts Planning and eLearning Pathways

"Just in Time" ARIS 2020 Fellowship Proposal

Prepared by

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An Introduction to Successful K-12 Broader Impacts Planning and eLearning Pathways

1 Overview

This project will develop an open source and online professional development course for researchers (e.g., PIs applying for grants, early career faculty) and broader impacts professionals (e.g., educators, outreach and engagement professionals, precollege programs). As a "just in time" product in response to the current COVID-19 pandemic, this online course and open education resource will be produced in collaboration between ARIS and Precollege Programs at Oregon State University via the 2020 ARIS Fellowship Program. The course will be designed using an eLearning platform such as Articulate software to deliver content in an engaging format and using interactive tools for learning and reflection (see example of a similar platform in a peer-tutoring training module co-authored by ARIS Fellow Dr. Rowe. The project aims to provide researchers and BI professionals with a self-paced learning space for them to reflect on what constitutes successful BI planning for K-12 audiences and, furthermore, what eLearning tools and platforms are being or can be creatively used and accessed for stakeholder engagement, science inquiry and remote/virtual delivery of BI activities.

It is not news that the National Science Foundation (NSF, 2019) and other granting agencies have advanced explicit BI requirements in their requests for proposals, hence the development of NABI's guiding principles for BI (National Alliance for Broader Impacts, 2015) and consolidation of ARIS as a national effort in support of BI broadly defined. As a young field of exploration, we have advanced research, discovery, and models for K-12 STEM collaborations for broader impacts (e.g. Komoroske et. al., 2015). However, the COVID-19 pandemic has made abundantly clear that we also need to direct targeted attention to eLearning platforms and resources that can help K-12 STEM collaborations to have continued engagement and activities in a virtual world. As we expand on this area, perhaps the STEM acronym should be thought of through a different lens such as that proposed in the North Carolina 2013 STEM ScoreCards as "Strategies To Engage Minds" (also see Coble, 2019). I see exploring this nuance even further when we are now encouraged to really think about and develop alternative ways to engage our audiences in virtual learning. It is also not news that technological sciences have been studying the potential learning benefits and user experiences in eLearning platforms, especially as virtual, augmented and mixed reality go mainstream (Flavián et al., 2019; Neto et. al.; 2016). This project seeks to identify and suggest platforms for experimentation, providing an initial toolbox for researchers and BI professionals to develop innovative K-12 engagement in virtual spaces. We are now rethinking and re envisioning the potential learning benefits of new technologies to serve as vehicles for broader impacts and support learning strategies that engage minds.

2 Project Objectives and Scope

Dr. Rowe will be the primary author of the online course (An Introduction to Successful K-12 Broader Impacts Planning and eLearning Pathways) in collaboration with colleagues Dr. SueAnn Bottoms and Jay Well, Director and Assistant Director of OSU Precollege Programs, respectively. A small advisory council will be assembled with guidance from ARIS leadership to review and provide feedback on preliminary content and design. The ARIS Fellowship 2020 cohort will also provide peer-review and extended contributions as applicable. The initial framework shaping course organization and curriculum content is outlined below and organized to achieve the following objectives:

An Introduction to Successful K-12 Broader Impacts Planning and eLearning Pathways

- Inspire and support course participants in recognizing their own BI identity, what it means for their science and for engaging audiences;
- Promote a model of engagement with K-12 audiences and collaborative stakeholders that is reciprocal, mutually beneficial, not hierarchical nor authoritative, and grounded in community needs;
- Engage participants in thinking strategies and activities to master content (assessments will be built in);
- Participants will identify eLearning platforms, tools, and resources for virtual BI planning and remote engagement;
- Participants will explore interdisciplinary insights for innovative use of virtual platforms for K-12 BI planning.

Content and titles may change as a result of project research, content development, guidance of contributors, and stakeholder input. Nonetheless, we anticipate integrating interactive components and reflective activities while providing an overview of the following topics:

Course Introduction

- **Module 1: K-12 Broader Impact Planning as We Knew it**
- BI as a learning landscape of practice (Wenger-Trayner et all., 2015)
- BI definition, history and application
- BI foundational elements, principles, and best practices
- Examples of success as well as failing forward cases

- **Module 2: K-12 Broader Impact Planning as We Need to Know it: Getting Virtual**
- Assessment of basic available eLearning platforms, tools and resources for K-12 engagement;
- Exploring 3D virtual environments and hypermedia for remote K-12 program delivery and ubiquitous learning: Virtual-Reality, Augmented-Reality, and Mixed-Reality technologies;
- Access, equity and inclusion in remote program delivery platforms;Impactful examples and emerging opportunities after the COVID-19 pandemic.

- **Module 3: Virtual Program Engagement Needs High Level Stakeholder Engagement**
- BI and partnership building: drawing from another learning landscape of practice - Engaged Scholarship and the Scholarship of Engagement (e.g. Fitzgerald, 2015);
- OSU Precollege Programs Model of Engagement: an example of success for impactful BI activities and partnership building.

- **Module 4: Building a Knowledge-Building Online Community**
- Typologies and supporting platforms;
- The role of online communities for K-12 BI programing;
- Theoretical frameworks and design principles;
- Social networking tools and practices, Learning and knowledge building through online communities.

- **Module 5: eLearning and Evaluation**

Course Conclusion/Wrap Up

3 Development Process and Timeline

Since this “just in time” project has only recently come to fruition, the original timeline provided by ARIS leadership has been modified as shown on table below. The process design and development will be collaborative. I have allocated 8 weeks for drafting and reviewing each eLearning module in collaboration with contributing authors and reviewers. The introduction and conclusion will be the last elements developed together at the end of the process.

Project Items	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020
Research and compiling resources	X	X	X	X	X	X
Recruit review panel	X					
Module 1 development and review	X	X				
Module 2 development and review			X	X		
Module 3 development and review					X	X
Project Items	**Oct 2020**	**Nov 2020**	**Dec 2020**	**Jan 2021**	**Feb 2021**	**Mar 2021**
Research and compiling resources	X	X	X	X		
Module 4 development and review	X	X				
Module 5 development and review			X	X		
Introduction and conclusion/Final					X	
Full course beta test						X
Final product- course goes live						X

4 Anticipated Challenges

Delayed start in ARIS cohort: as a "just in time" project starting now, following the general timeline of activities provided by ARIS to guide 2020 fellows projects will not be possible as the cohort started in January. However, peer review is built-in throughout the project proposed timeline, and all required elements of this fellowship will be completed.

Recruitment of key reviewers and timely feedback: I will leverage the BI professional network and ARIS leadership recommendations to recruit a core group of 4 reviewers to provide timely feedback on final course module drafts (in addition to opportunities for peer review by ARIS 2020 fellows). Staying on schedule may be a challenge given our current situation with COVID-19 pandemic and the fact that we are all under extreme work pressure to re-imagine what we do. I commit to be supportive of my collaborators and to put structures in place that can facilitate the review process (e.g. an online review platform with clear tasks and targeted dates as well as a supportive online learning community).

Time: considering that I am a full time, 12-month employee, this project has high relevance to my work and program mission, allowing me to allocate a percentage of my time (.05 FTE) to project activities for the proposed year. As this project requires a high level of design for eLearning, I will leverage the fellowship award to finance a professional software program for design and cover the time of a student assistant to design the platform. This will allow me focused time to develop content, compile resources and design interactive learning tools for implementation.

5 Outputs

An open source and online professional development course for researchers and broader impacts professionals as a "just in time" product in response to the current COVID-19 pandemic. An Introduction to Successful K-12 Broader Impacts Planning and eLearning Pathways is an introductory resource to inspire experimentation of BI planning in virtual space. It can be expanded to target specific interdisciplinary toolboxes as we learn and experiment. A comprehensive synthesis of eLearning tools, resources, frameworks, practices and applications is an important output from creating this course.

6 Applicant

Since completing a double degree in biology and education, shifting careers from K12 science teaching to informal science education, and completing a master's degree focused on environmental literacy, I have become a social scientist interested in the learning sciences, science communication and informal STEM education. Having recently received a doctoral degree in Environmental Sciences with a focus on environmental education, I led the completion of the OSU Carnegie Elective Community Engagement Reclassification and initiated my new job as the Research, Grant and Engagement Manager for OSU Precollege programs. I understand the BI learning landscape of practice and possess the network connections, the pedagogical and curriculum building skills, teaching and learning philosophy, and the creative scholarly thinking to generate the proposed outputs navigating across disciplinary fields.As an early career engaged scholar and BI professional, I am bringing skills and vision in engaged scholarship and partnership building in alignment with a deep understanding of BI efforts, guidelines and principles. As an educator, I have worked in numerous curriculum building projects, including online courses. As a scholar in the learning sciences, I have the critical thinking skills, and I am passionate about thinking creatively and interdisciplinarily to advance knowledge and discovery.

7 References

Coble, C., (2019). Redefining STEM: 'Strategies that engage minds' available at https://www.ednc.org/redefining-stem-strategies-that-engage-minds/

Fitzgerald, H. (2015). Achieving Broader Impacts through Community Engagement Scholarship. Available at https://engage.msu.edu/upload/presentations/BROADER-Impact-through-CES.pdf

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Komoroske, L.M., Hameed, S. O., Szoboszlai, A. I., Newsom, A. J., & Williams, S. L. (2015). A Scientist's Guide to Achieving Broader Impacts through K-12 STEM Collaboration. Bioscience 65(3): 313-322. PMID 26955078 DOI: 10.1093/biosci/biu222

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National Science Foundation (2019, September 15). Chapter III - NSF Proposal Processing and Review. Retrieved from https://www.nsf.gov/pubs/policydocs/pappg18_1/pappg_3.jsp#IIIA2b

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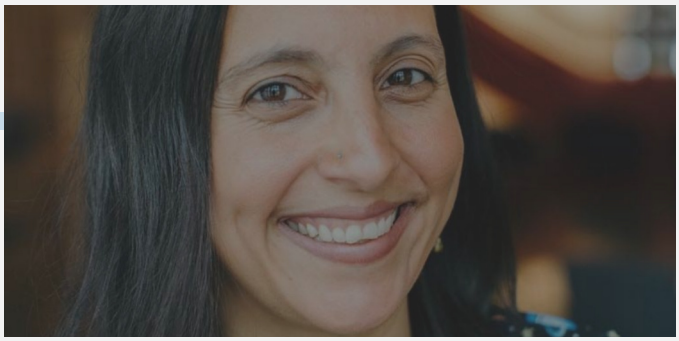
Huston, S., Atkinson, J., Ralls, S., & Ross, T. (Eds). (2013). Strategies That Engage Minds®Empowering North Carolina's Economic Future. North Carolina STEM Education Center: https://www.ncstemcenter.org/wp-content/uploads/2014/03/NCSTEMScorecard.pdf

Wenger-Trayner, E., Fenton-O'Creevy, M., Kubiak, C., Hutchinson, S., & Wenger-Trayner, B. (Eds.) (2015). Learning in Landscapes of Practice: Boundaries, identity, and knowledgeability in practice-based learning. Abingdon: Routledge.



BIOSKETCH - DR. SUSAN ROWE
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EDUCATION

Ph.D. 2019 Oregon State University (OSU), Environmental Sciences/Envr. Education.
M.S. 2007 Iowa State University (ISU), Animal Ecology (Environmental Literacy Focus).
B.S. 2004 Universidade Federal Rural de Pernambuco (UFRPE), Biology/Education.

RECENT PROFESSIONAL EXPERIENCE

Current Research, Grants and Engagement Manager. Precollege Programs, OSU.
2018-19 Manager, OSU Carnegie Elective Community Engagement Reclassification.
2018-19 Research Assistant, Data Doubles Project. OSU Libraries and press.
2018 Project Assistant, Academic Success Center, OSU.
20/17-18 Graduate Writing Center Consultant/Tutor, Oregon State University.
2017 Instructor/Course Developer, College of Education, Oregon State University.
2016-17 Research Assistant, URM Research Project. College of Ag. Sciences, OSU.
2016 Doctoral Program Interim Coordinator, College of Education, OSU.
2015-16 Student Teacher Supervisor, Licensure Program, College of Education, OSU.
2015 Graduate Research Assistant, Cyberlaboratory, Oregon Sea Grant, OSU.

SELECTED CURRICULUM, EXHIBITS AND TOOLS DEVELOPED

2019 Survey instrument, Written guidelines, Process design and documentation, Written application report. OSU Carnegie elective community engagement reclassification.
2018 online course Enhancing Peer Tutor Training at OSU, open source training online module. Academic Success Center, OSU.
2017 online course ED 431/531 Free-choice/Informal learning new pathways in education. College of Education, OSU.
2015 Cyberlab Ignite Challenge Curriculum. National Science Foundation funded,challenge-based researcher professional development program. Hatfield Marine Science Center, OSU.
2014 Wave Challenge Exhibit. National Science Foundation funded interactive exhibits. Hatfield Marine Science Center, OSU.

SELECTED PUBLICATIONS/PRODUCTS

Rowe, S.R.M; Dierking, L. D.; Waldron, R.; Bowling, E.; Davis-White Eyes, A.;Sherman, J.; Bottoms, S.; Thompson, W. (2019). Carnegie elective community engagement reclassification application report for Oregon State University.
Rowe, S.R.M., (2019). Are Families Talking about Conservation at Live Animal Exhibits? Analyzing Family and Professional Conservation Discourse. Doctoral Dissertation.
Rowe, S.M., Sullivan, K., Farley, M., East, J., and Rowe, S.R.M. (2019). The Promiseand Realities of the Use of Cyber Technologies for Promoting Research in Public STEM Museum Experiences. Oregon Sea Grant: Corvallis, OR.
Rowe, S., and **O'Brien, S.** (2016). Pesquisa sobre aprendizagem em museus: umcampo em busca de foco? In L. Mssarani, R. Neves, & L. Amorim (Eds). Divulgaçãocientífica e museus de ciência: O olhar do visitante - Memórias do evento (pp. 9-22).-
Vaske Jr., T.; Lessa, R. P.; Nóbrega, M. F.; Amaral, F. M. D.; Silveira, S. R. M. (Eds.)(2006). Arquipélago de São Pedro e São Paulo: Histórico e Recursos Naturais. Olinda,Livro Rápido-Elógica, 191p.

BIOSKETCH - DR. SUSAN ROWE (Former O'Brien, Maiden Silveira)

SELECTED PRESENTATIONS/WORKSHOPS

(2019) Rowe, S. R. M.; Dierking, L.; Proctor, D.; Foster, R. What does it mean to be an Engaged Institution? Learnings from the Carnegie Reclassification Process. 20thAnnual Conference of the Engagement Scholarship Consortium- Denver, CO.
(2018) Gaebel, K.; Rowe, S. R. M.; Rowe, S.; Harwell, T. Puerto Rico "Se Levanta":Setting coordinates to build service-learning experiences in post-disaster communities. Engaged Scholarship Consortium Conference, Minneapolis, MN.
(2018) Rowe, S. R. M. & Rowe, S. Making the Case for Engaged Scholarship. Center for Teaching and Learning Winter Text Talks, OSU.

SYNERGISTIC ACTIVITIES

2020 Article reviewer for Journal of Higher Education Outreach and Experience
2020 Community Diversity Relations strategic team member, Office of Institutional Diversity, Oregon State University.
2020 Planning Committee Open Classroom Forum: A Community-University Partnership for the Public Good.
2019 Selected participant, National Geographic Grant Writing Workshop. Honolulu, Hi.
2019 Selected participant, Summer intensive- Community-Engaged Scholarship, MSU.
2019 Vice-Provost for Outreach and Engagement Award for transformational learning. Food Security and Nutrition Education: Capacity Building in Puerto Rico. Co-leader,Service-Learning Program Spring 2018, OSU.
2019 Session Proposal Reviewer, Engaged Scholarship Consortium Annual Meeting.
2019 Article Reviewer, Journal of Communication.
2019 Planning committee, Social Impact Lab, OSU.
2018-19 Carnegie Elective Community Engagement Institution Reclassification Project Manager and Committee Leader, OSU.
2018 Selected Participant for the SACNAS Leadership Institute, San Jose, CA.
2018 Event Chair, Engaged Scholarship Symposium, OSU.
2017- Present Planning Committee Chair for the Engaged Scholarship Interdisciplinary Research Cluster, OSU.
2017-2018 Event Chair, Diversity Amazing Race. A collaboration between Global Diversity Initiatives, The Corvallis Maker Fair, OSU Cultural Centers and SACNAS.2017 Emerging Engagement Scholar Fellowship (ESC), Birmingham, AL.
2017 Vice-Provost for Outreach and Engagement Award. Cyberlaboratory, OSU.

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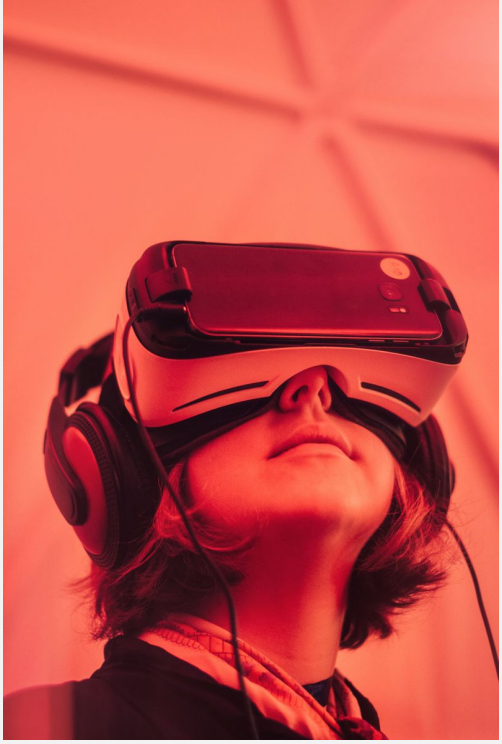

Project Collaborators

Dr. SueAnn Bottoms
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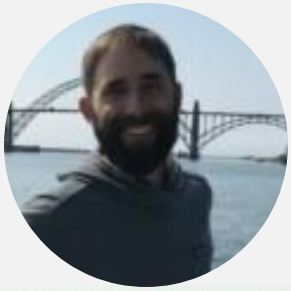

Jay Well
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Science & Math Investigative Learning Experiences
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