Main audiences

K-12 educators, school administrators, university faculty, informal science educators, and program managers and developers found at, but not limited to, schools, districts, universities, NSTA, ASTC, AZA, ACM, NAAEE, the National Girls Collaborative, Boys and Girls Clubs, Girls Scouts, 4-H, KQED, WBGH, Nova, and Discovery.

Logic Model for *STEM Education Practioner Resource* Project

NSTA-ASTC EAGER Project: *STEM Education Practitioner Resource*

Need

To address current challenges and reform efforts in STEM education, there is a need to build a unified community of STEM education practitioners who are informed of current research and understanding in the field.

Audiences

STEM Education Practitioners: 1. Educators in formal, classroom settings 2. Educators in informal, out-of-school settings	**Researchers in STEM education and the Learning Sciences**

Theory of Action

In order to develop a community of STEM education practitioners, there is a need for a resource that connects STEM education practitioners across settings while also providing updates regarding the rapidly growing research and knowledge base in STEM education.

Outputs/Activities

Phase 1: Research Development/Market Needs Assessment • Conduct a landscape assessment to inventory current print and electronic resources to identify gaps in the availability of resources; • Identify target audiences from related professional organizations (e.g., NSTA, ASTC, AZA, ACM, NARST, AERA); • Implement a national survey and conduct focus group discussion to seek input from target audiences (both formal and informal/out-of-school educators).	**Phase 2: Information Dissemination** • Develop, implement, and evaluate two pilot issues of the STEM education resource; • Measure the target audiences' engagement and interest with the content of the pilot issues; • Seek formative feedback from target audiences related to the pilot issues to reiteratively develop and refine the resource.

Outcomes	Impact on the STEM Education Field
• Increased awareness and understanding of research findings and the knowledge base in the STEM education field by practitioners; • Increased dialogue and collaboration between formal and informal/out-of-school STEM educators;	• A sustainable resource that features STEM education research as well as innovative curricula and programs; • A cycle of research informing practice and practice informing research in the STEM education field.

Evaluation Questions

- What print and electronic resources are currently available to practitioners in STEM education that connect educators across settings and to the research and knowledge base?
- How do STEM education practitioners access and use research?
- What gaps are there in the current pool of existing resources in the field for STEM education practitioners?
- What are the interests, needs and expectations of the target audiences to inform the development and design of the proposed resource?

Factors for Resource Selection

What factors influence how you select a resource for reading or to consult for your research/ teaching? (n=1021)

Factor	Very Important	Somewhat Important
1. Ease of Access	76%	21%
2. Article Topics	67%	29%
3. Free Access	63%	27%
4. Scope	57%	32%
5. Available Electronically	49%	34%
6. Impact Factor	18%	38%
7. Format/Layout	9%	34%
8. Available in Print	9%	24%
9. Article Authors	6%	21%

STEM Education Topics of Interest

	High Interest or Some Interest	Neutral	Low Interest or No Interest
Maker education initiative	60.3%	23.4%	16.2%
Environmental education	**80.2%**	12.8%	7.0%
Citizen science	74.5%	18.5%	7.1%
Culturally relevant science education	55.3%	28.4%	16.3%
Curriculum/Program development	**85.6%**	10.3%	4.1%
Aligning program/activities with NGSS	71.1%	18.1%	10.8%
Successful collaborations between formal and informal educators	**82.2%**	13.6%	4.1%
Including informal science education resources in classroom science lessons	**81.1%**	12.8%	6.1%
Research on learning in informal science education contexts	**80.1%**	14.6%	5.3%
Museum-school partnerships	62.4%	25.4%	12.2%
Reaching underserved populations in informal science education	77.6%	16.2%	6.2%
Preparing informal science educators	70.7%	17.1%	12.3%
Formal-informal science education collaborations for professional development	79.8%	13.2%	7.0%

Connected Science Learning

Linking in-school and out-of-school STEM Learning

Project PIs, coPIs, partners, etc.:

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NATIONAL SCIENCE TEACHERS ASSOCIATION

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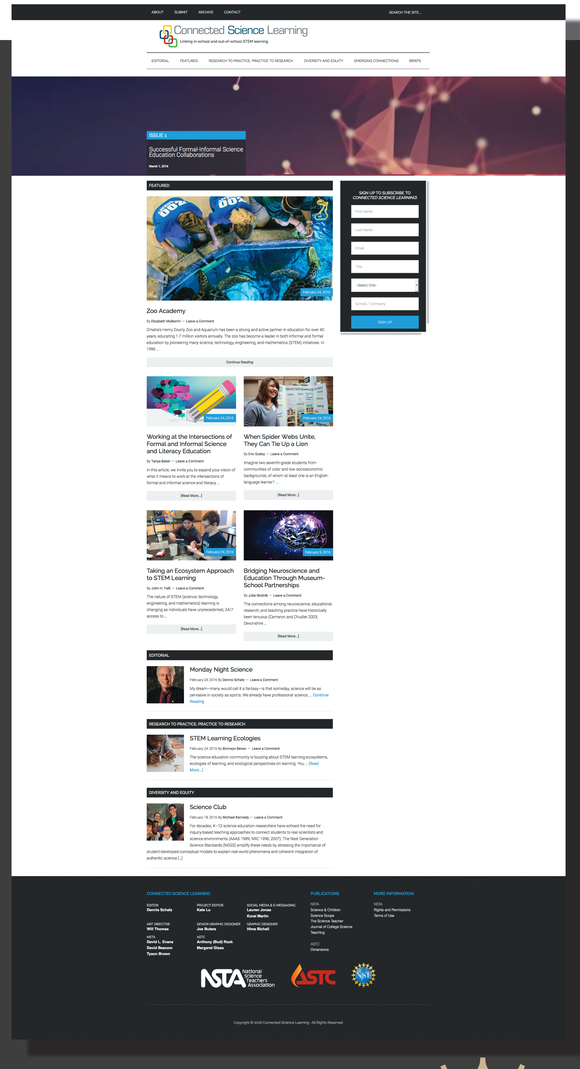
Brief description of the project

Grant funds for this project support research into the needs and preferences of the audiences to assemble content and test two pilot issues of a peer-reviewed journal supporting innovative advances that work at the intersection of formal and informal science, technology, engineering, and math (STEM) education.

The project goals

Connected Science Learning **is an online journal that highlights STEM education experiences that bridge the gap between formal and informal science education settings. It features articles about highly effective programs and shares research that connects preK–12 STEM learning in schools and out-of-school settings, specifically highlighting effective mechanisms for collaboration. Finally—once the project is complete—this sustainable, marketable publication will serve as a resource for policy makers, corporations, foundations, and others seeking to identify, advance, and invest in STEM education in both the formal and informal arenas.**



NSF award number: DRL-1420262

Insights or Challenges

Key Findings

- Identify strategies for making research accessible and applicable to STEM education practitioners;
- Consider how to make the new resource stand out against the landscape of resources already available to STEM education professionals;
- Ensure that the pilot study is of high quality, aesthetically pleasing and features notable professionals from the STEM education field;
- Include articles, features and resources that are inclusive of all STEM educators, including those from small and rural museums as well as informal educators from non-museums settings (e.g., afterschool programs, environmental education center, field stations, science camps, media).

Recommendations

1. The NSTA and ASTC should continue to pursue development of the proposed new resource to connect educators across settings and to the research and knowledge base in STEM learning.
2. To align with current and appropriate terminology, the project leadership at NSTA and ASTC should engage in discussions with the advisory board around definitions and terms associated with informal science education.
3. The NSTA and ASTC should begin identifying and convening editorial board members who have expertise in the STEM education field as well as with the editorial process.
4. The NSTA and ASTC should consider interviewing editors from related STEM education journals and consider important "lessons learned" regarding aspects of publishing such as article submission and the peer review process.
5. The NSTA and ASTC should begin developing protocols for vetting content materials and resources as well as rubrics for the peer review process of articles.
6. The new resource should be designed with the input provided by the target audiences in mind including their suggestions for aspects such as: format, publication factors, topics of interest, recommended authors and contributors, and distribution.
7. The NSTA and ASTC should consider a theme-based approach in which each issue explores a particular topic or issue from a variety of perspectives (e.g., researcher, classroom-based educator, museum educator, other informal/out-of-school educator).
8. The new resource should provide opportunities for researchers and practitioners as well as formal and informal educators to interact with one another.
9. The NSTA and ASTC should consider strategies in order to make the resource accessible to all STEM educators across a range of settings.
10. The NSTA and ASTC should consult related resources to inform the development and features of the proposed resource.

Potential Pilot Issue Themes

1. Examples of Successful Programs/Exhibits (ISE) and Activities/Lessons (Classrooms)
2. Cognitive Sciences & Theories of Learning
3. Assessment & Evaluation
4. Issues of Equity & Science for All
5. Successful Formal-Informal Science Education Partnerships
5. Professional Development Models
5. Addressing Standards
8. Examples of Research to Practice/Implications of Research
8. Misconceptions/Alternative Conceptions
Citizen Science
Making & Tinkering
Teaching Controversial Topics
Nature of Science
Inquiry-Based Science
Citizen Science
Teaching Outdoors/Outdoor Classrooms
Preparing Future Educators of STEM
Digital Learning Tools
Engineering Education

Evaluation information

Overview of Data Collection Strategies

Evaluation Stage	Approach	Methods
Front-end Study	Landscape Assessment	• Web-based research • Review of materials • National survey • Focus group discussions
	Needs Assessment	• National Survey • Focus group discussions