ACRES
Afterschool Coaching for Reflective Educators in STEM
*a project of*
MMSA
Maine Mathematics and Science Alliance

# ACRES Impact Brief
# July 2022

stemnext
OPPORTUNITY FUND

# Table of Contents

# Building capacity in afterschool STEM

This report describes a trajectory of capacity-building in afterschool STEM education. Over a period of 8 years, the Noyce Foundation and STEMNext Opportunity Fund invested $1.3 million in the development and implementation of an award-winning virtual coaching model for afterschool educators to deepen their skills facilitating STEM programming with youth. The program is called Afterschool Coaching for Reflective Educators in STEM (ACRES).

As the program grew, the project team was able to leverage the strategic Noyce and STEMNext investments, resulting in two additional large competitive awards by the National Science Foundation (NSF).

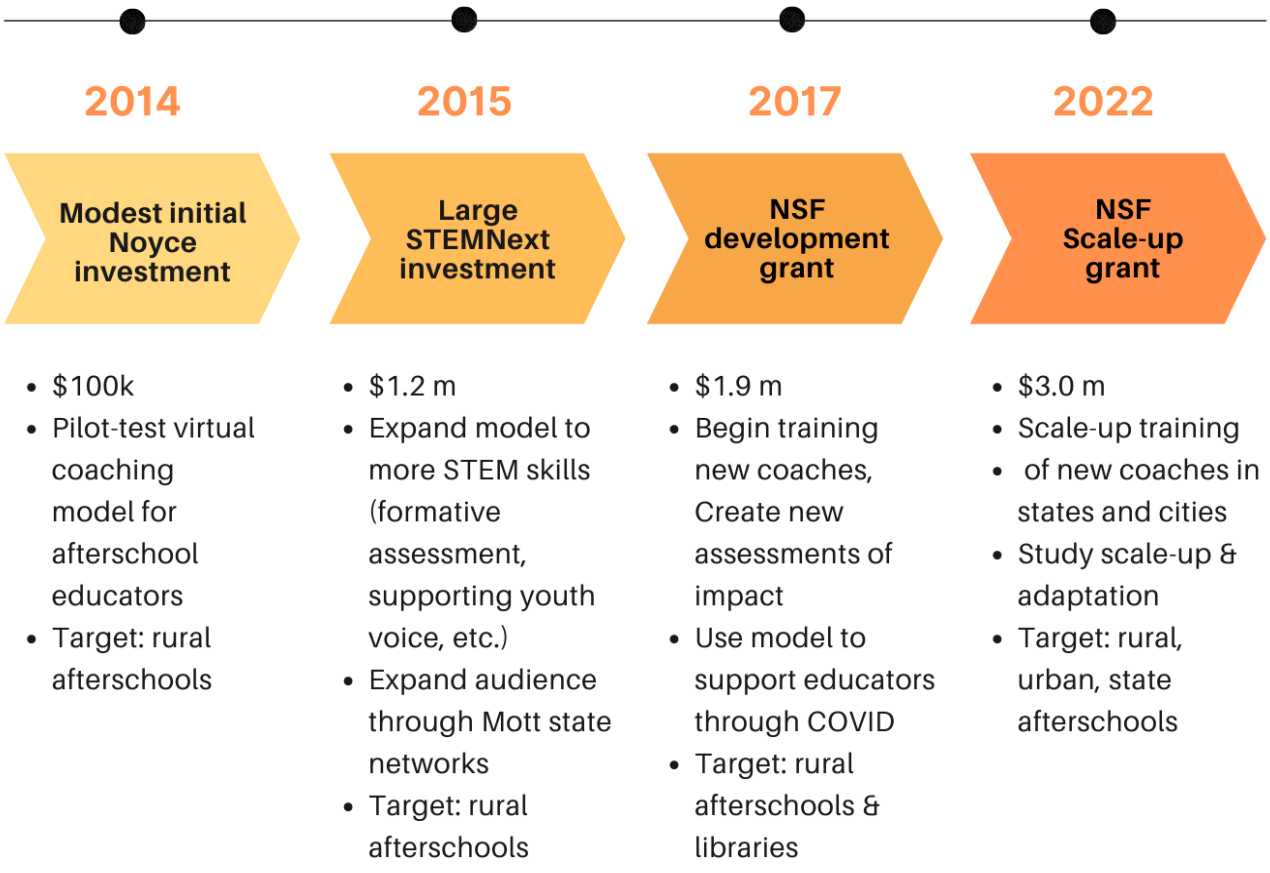



Figure 1: Steps in the national expansion of the ACRES coaching model

By early 2022, the program had engaged 14 of the Mott state afterschool networks and 840 educators across 44 states. Sixteen new coaches had learned to coach afterschool staff in their own programs. By the end of the new scale-up grant in 2025, the program expects to train an additional 40 coaches and 2,000 afterschool educators, impacting an additional 75,000 youth. The reach of the program to date is shown in the map and table below.

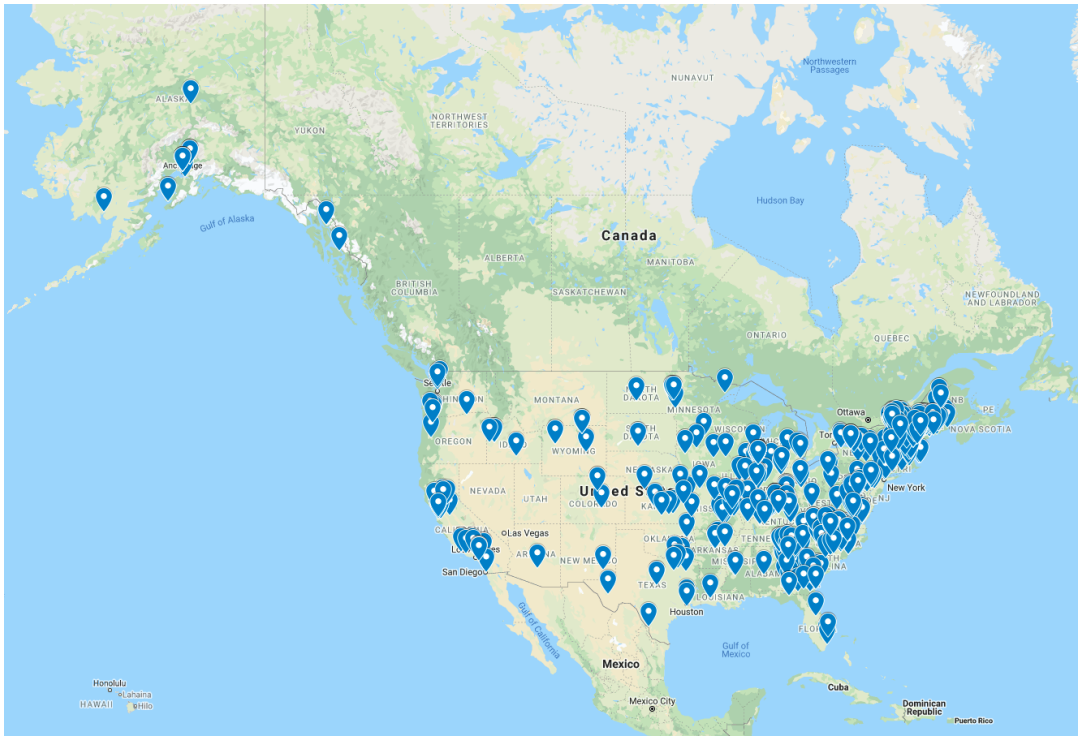



Figure 2: Geographical reach of ACRES over 44 states

| | 2017 | 2018 | 2019 | 2020 | 2021 | Total |
|---|---|---|---|---|---|---|
| STEMNext Cohorts | 12 | 11 | 12 | 21 | 18 | **74** |
| STEMNext Participants | 60 | 47 | 49 | 143 | 196 | **495** |
| STEMNext Taster Workshop Participants | 177 | 250 | 68 | 299 | 103 | **897** |
| | | | | | | |
| NSF Cohorts | 7 | 21 | 20 | 21 | 35 | **104** |
| NSF Participants | 32 | 76 | 57 | 88 | 183 | **436** |
| NSF Taster Workshop Participants | 0 | 47 | 194 | 629 | 33 | **903** |

*Assumes participating educators work with 20 youth per year thereafter.

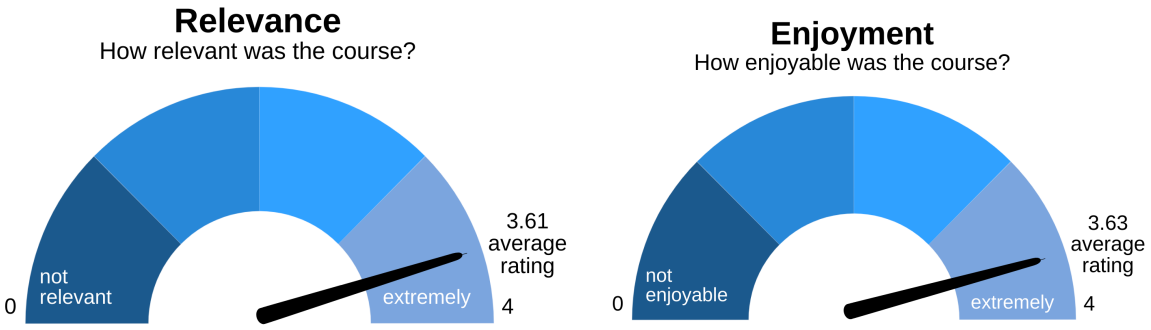
Table 1: Numbers receiving ACRES professional learning, over five years prior to major scale-up.

## The ACRES model

ACRES participants learn by video-recording their own work with youth in afterschool settings, practicing key STEM facilitation skills with those youth, and meeting with their peers to share and discuss their videos over a video-conferencing platform such as Zoom. Instead of emphasizing specific STEM topic areas (which vary widely), ACRES focuses on ways *any* afterschool educator can use questions and actions to deepen youth engagement and learning. Participants also learn to give each other professional feedback in respectful, constructive ways.

## Evidence of success

Studies by the research team and external evaluator showed that:

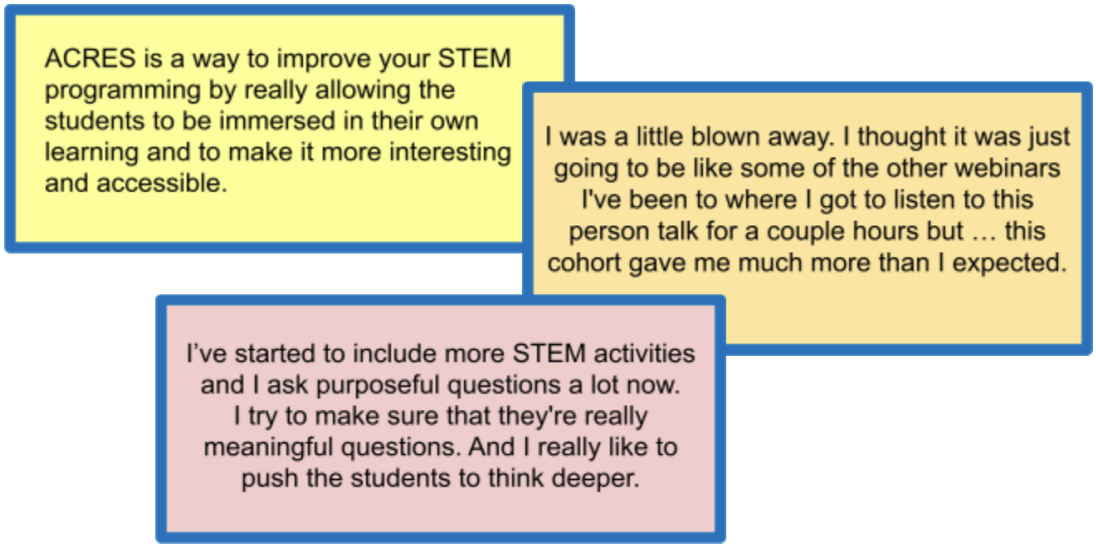



- On a scale from 0=not at all to 4=extremely, participating educators gave the course extremely high ratings in terms of both usefulness and enjoyment.

- Educators significantly increased their ability to notice others' use of the STEM facilitation skills and to suggest improvements based on evidence.
- ACRES participants were far more likely than non-ACRES participants to be awarded performance-based STEM micro-credentials from the National Afterschool Association.
- In follow-up interviews 6-12 months after taking the Purposeful Questions module, 95% of educators could describe, with examples, how the ACRES experience had changed the way they work with youth, and how the youth responded. Most were also using ACRES skills in other topics such as literacy, history, and social-emotional learning.
- Participants experienced ACRES as an active and social professional learning program because of the upbeat, inclusive coaches, the mixed formats of activities, the conversational feel to the sessions, and the opportunity to talk with peers from different programs and share situations and strategies.

- The model, based on generic but powerful professional learning principles, was effective across a surprisingly broad range of settings, educators, youth ages, and topics.

## Sample evaluation quotes from afterschool educators




## Project awards and recognition

- ACRES was named by President Obama as an example of private investment in innovative work to inspire and prepare underrepresented youth to excel in STEM fields.
- The project received four major awards at the annual NSF Video Showcase (see 3-minute videos in 2020 and 2021).
- NSF wrote: “The team has had enormous impacts in building capacity for informal stem educators across a variety of rural communities, while keeping an eye to flexibility and diversity of contexts. Thank you for this important work.” – Dr. Toni Dancstep, May 2022.

## Contributions to the field of informal STEM education

- This work has shown that it is possible to provide effective professional learning experiences for afterschool educators with a commitment of only 6 hours of meetings with a coach and peers.
- ACRES helped to promote the use of professional learning communities (PLC’S) and instructional coaching (IC), which have both become more mainstream in afterschool STEM teaching and learning.
- Video-based peer coaching was shown to be a powerful tool for deepening educational practice. In particular, the giving and receiving of constructive feedback was greatly valued by participants despite many reporting their initial discomfort with these actions.

- The project's focus on virtual systems of professional learning was extremely timely when the COVID-19 pandemic hit. ACRES educators already had key skills for using video-conferencing software (such as Zoom) and for supporting active and socially engaged virtual learning. The experience of connecting with supportive peers helped to mitigate feelings of isolation, confusion, and exhaustion.
- The ACRES team provided high-quality technical assistance to partner organizations attempting to pivot from in-person to hybrid or fully virtual conferences.
- The project resulted in the creation of a set of free resources that are available online for informal STEM educators: coaching scripts and handouts, STEM activity materials, videos of afterschool programs, and literature reviews relevant to out-of-school educators (see www.mmsa.org/acres).
- The opportunity for educators in rural settings, in particular, to participate in high-quality professional development through fully virtual programming contributed to capacity building in these underrepresented communities.

- The project resulted in greater capacity building and connections with various state and national networks (e.g., Mott afterschool state networks, Million Girls Moonshot movement, National Afterschool Association), which are being further developed in the current scale-up grant.
- The program has become a model for professional learning by educators in out-of-school settings, with its combination of supportive coaches and engaged peers. It has shown that online professional development can go well beyond traditional webinars in keeping educators fully involved both socially and intellectually, and ultimately in supporting learning.

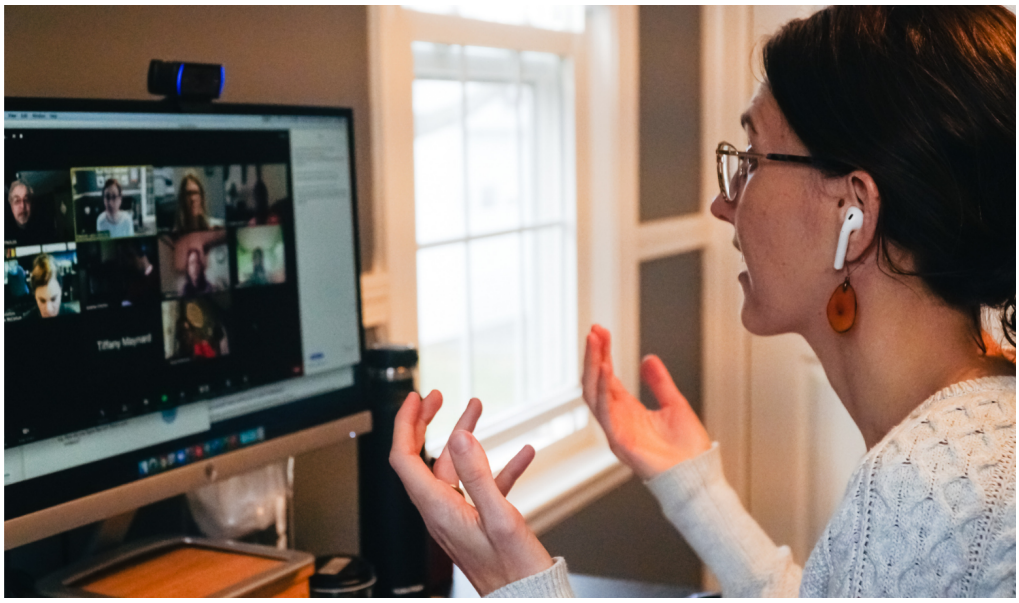
## Lessons learned from this investment

- **Personal relationships are the key drivers in the afterschool field.**
  => To be effective, agents of change need buy-in from senior staff as well as those expected to participate in the professional development.
  => The timeline for building word-of-mouth momentum is longer than one might expect, and may take years.
  => Emerging passionate individuals can be critical change agents and should be supported and allowed flexibility to adapt a program based on their expertise.

- **More than ever, afterschool program staff carry many responsibilities.**
  => To make professional learning a worthwhile time investment, use proven professional learning models and adapt them as needed to be immediately relevant and enjoyable to participants.
  => Expect recruitment to be challenging, even for high-quality STEM professional development. Funding may be needed for the PD as well as for paid time for the educators to take it.

- **Scaling up should be planned from the start.**
  The Noyce Foundation leadership encouraged the project team to design for long-term sustainability and scalability from the early stages. While this limited our use of some cutting-edge technologies (such as high-end recording devices), it paid long-term dividends in terms of access and equity.

- Other features supporting ACRES scalability included:
    - the focus on facilitation skills that can transfer easily across programs
    - clarity on the which elements of the program that are truly essential
    - implementation flexibility rather than strict fidelity
- Funders kept encouraging and supporting the team to reach out to involve other partners, especially other leaders in equity and innovation in afterschool STEM.
    - Co-branding is a powerful way to scale up while retaining brand recognition.
- Scaling to new audiences requires a program to be ready for a very diverse mix of participants from different kinds of organizations.
    - Such diversity requires flexibility, including customization and dynamic responsiveness (rather than a single set of materials).
    - An equity audit of program and marketing materials can help to ensure that programming is inclusive for a broader range of audiences.
- Building an online system for educators to self-register is a huge undertaking.
    - Expect changes in platforms and design for simplicity, modularity, and use off-the-shelf software as much as possible.
- Leveraging materials from other proven programs helps to build partnerships.
    - Encourage flexible open-source copyright approaches if possible (e.g., Creative Commons).
    - Request copyright permissions as early as possible.
- In the face of major disruption or tragedy, prepare to be even more flexible to meet afterschool providers' evolving needs.



- **Research expectations should be realistic.**
    - It is difficult to stabilize assessment instruments of an innovative and dynamic program. Expect quantitative analyses with small samples and possibly a patchwork of impacts.
    - Case studies can provide powerful insights, but it can be hard to know early on which will be the best sites to study in depth.
    - Youth impacts are extremely hard to assess, even with a powerful PD intervention, so rely on literature where possible to breach data gaps.
    - Some of the best assessments are embedded reflections at all scales because they promote metacognition, solidify experiential learning, and give both formative and summative feedback.
    - Since success in implementation requires buy-in from multiple levels of organizational stakeholders, be sure to establish formative feedback loops with those same multiple levels of stakeholders.

# Appendix: ACRES publications and videos


Allen, S., Brasili, A., Byrd, S. Chick, P.C., Ouellette, K., & Lobley, J. (2018, March). *Adapting video-based reflections to afterschool settings.* Paper presented at the annual meeting of the National Association for Research in Science Teaching, Atlanta, GA. https://mmsa.org/adapting-video/

Allen, S. , Byrd, S., Nickerson, B., Brasili, A., Kastelein, K., & Cook, K. (2021). Adapting professional learning communities for use in afterschool STEM programs: A fully virtual instructional coaching model. [Manuscript submitted for publication]

Allen, S. and the ACRES Project Team (2018). Eleven tips for a better advisory board meeting. *Informal Science.* https://www.informalscience.org/news-views/11-tips-better-advisory-board-meeting

Allen, S. & Ouellette, K. (2016). Building coaching relationships over the internet. *AfterSchool Today, 7*(3), 12-13. http://www.mydigipub.com/publication/?i=339602&article_id=2587472&view=articleBrowser&ver=html5#{%22issue_id%22:339602,%22view%22:%22articleBrowser%22,%22article_id%22:%222587472%22}

Brasili, A. & Allen, S. (2019, February). Beyond the webinar: Dynamic STEM professional development for online learners. *Afterschool Matters*. https://www.niost.org/Afterschool-Matters-Spring-2019/beyond-the-webinar?fbclid=IwAR0jJoDlZi39pOQC8FYSTlohjCRLgYQ3-Oi1rWYFT-S-TB2ZsASVC0CKN08

Brasili, A., Allen, S., & Foster, M. (2017). The ACRES project (Afterschool Coaching for Reflective Educators in STEM) Evaluation Report 1: Impacts on afterschool educators. Maine Mathematics and Science Alliance. https://mmsa.org/2018/07/the-acres-project-evaluation-report-1-impacts-on-afterschool-educators

Brasili, A., Allen, S., & Foster, M. (2017). The ACRES project (Afterschool Coaching for Reflective Educators in STEM) Evaluation Report 2: Reflections of the coaches. Maine Mathematics and Science Alliance. https://mmsa.org/2018/07/the-acres-project-evaluation-report-2-reflections-of-the-coaches/

Brasili, A., S.C. Byrd, and H. Lakin (2018). Virtual Coaching and Video Annotation: Skills- based STEM Curriculum for Rural Afterschool Educators, Maine Mathematics and Science Alliance. https://mmsa.org/wp-content/uploads/2022/04/ACRES_-VideoAnnotation_20180215-v2.pdf

Chick, P.C., Allen, S., & Cook, K. (2020). Simple strategies for your blended meetings: When we are apart, we can still be together. *Informal Science.* https://www.informalscience.org/news-views/simple-strategies-your-blended-meetings-when-we-are-apart-we-can-still-be-together

Cook, K., Lakin, H., & Allen, S., Byrd, S., Nickerson, B., & Kastelein, K. (2020). Virtual Coaching PLCs in and out of school. *Connected Science Learning, 3*(1). https://www.nsta.org/connected-science-learning-january-february-2021/virtual-coaching-plcs-and-out-school

Farrin, L. (2020, July). A coach for every educator, *AfterSchool Today, 11*(2), 20-21. https://www.mydigitalpublication.com/publication/?m=24931&i=664309&p=22

Kastelein, K. (2020, December) Case study: LearningWorks Afterschool program in Waterboro, Maine. Maine Mathematics and Science Alliance. https://mmsa.org/wp-content/uploads/2021/10/Case-Study-LearningWorks-Afterschool-program-in-Waterboro-Maine_Final9-7-21.pdf

Lakin H. (2020, October) Finding math learning opportunities outside of homework time. *AfterSchool Today. 11*(3), 20-21. https://mydigitalpublication.com/publication/?i=675565&ver=html5&p=22

Lobley, J. & Ouellette, K.L., (2017) Using videoconferencing to create authentic online learning for volunteers. *Journal of Extension* 55 (5). https://www.joe.org/joe/2017october/tt8.php

Martin, K., Jacobson, L., & Peterman, K. (2020). ACRES Virtualizing STEM: Formative evaluation report. Maine Mathematics and Science Alliance. https://mmsa.org/wp-content/uploads/2021/01/ACRES-Virtualizing-STEM-Formative-Evaluation-Report.pdf

Peterman, K., Robertson Evia, J.,Allen, S., Byrd, S., Nickerson, B., & Kastelein, K. (2021). Sustainability, scale, and shift: Developing a professional learning program for out-of-school educators with scale-up in mind. *Frontiers in Education, Special Issue: Learning Science in Out-of-School Settings, 6,* 225. https://www.frontiersin.org/articles/10.3389/feduc.2021.675233/full

Peterman, K., Evia, J.R., & Allen, S. (2020, July). Lessons learned about virtual coaching through the ACRES project, *Informal Science.* https://www.informalscience.org/news-views/lessons-learned-about-virtual-coaching-through-acres-project-0

Sneider, C. & Allen, S. (2019). Formative assessment of STEM activities in afterschool and summer programs. *Connected Science Learning, 11*(2). https://www.nsta.org/connected-science-learning/connected-science-learning-july-september-2019/formative-assessment-stem

Toomey, S. (2020, May 4). Virtual coaching for afterschool educators in rural settings. 2020 STEM For All Video Showcase. https://stemforall2020.videohall.com/presentations/1681

Toomey, S. & Flanagan, J. (2021, May 10). *Virtual professional development for community educators.* 2021 STEM For All Video Showcase. https://stemforall2021.videohall.com/presentations/1918

Truzansky, T. (2021). Transforming teens: ACRES and workforce development in rural Vermont. *Afterschool Today, 12*(1), 43. https://mydigitalpublication.com/publication/?m=63806&i=697024&p=44