Fanning the SPARCs of SHREWD programs:
Facilitating program outcomes by spotlighting how stakeholder groups conceptualize and actualize collaboration
In multi-partner STEM and healthcare research and education workforce development (SHREWD) programs

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Abstract

When more than one person is needed for task completion, the actors (aka stakeholders) must work together in successful ways (aka collaboration). The **SPARC** framework considers how stakeholder groups conceptualize and actualize collaboration structures and processes in multi-partner STEM and healthcare research and education workforce development (SHREWD) programs. Typically, **S**ponsor requirements for partner collaboration and program management drive what **P**artners consider when planning programs, and thus what **A**dvisors or evaluators assess. The collected data form the basis of **R**esearchers' contributions to the academic literature and the value proposition made to the larger **C**ommunity. Evaluators can facilitate SHREWD program outcomes by spotlighting the conceptualization of collaborative structures and processes across stakeholder groups, providing collaboration data for use as both formative feedback and summative evidence about collaboration's role in improved outcomes. We believe that "fanning the SPARCs" by spotlighting collaboration will allow stakeholders to deliver more effective SHREWD programs.

"A" Conceptualizes Value of Collaboration

SOURCE: Evaluators are guided by understanding sponsor requirements and credible research about collaborative practice in partnerships, including principles of social network analysis.

PLAN: Evaluators and project partners co-create the logic model, which guides evaluation 1) questions and design, 2) data acquisition and analysis, 3) reporting and dissemination of findings. This includes expected collaboration practices.

"A" Actualizes Value of Collaboration

IMPLEMENTATION: Adoption of evidence-based instruments and protocols that provide actionable evidence for characterizing, measuring, and systematically improving partnership collaboration practices and their relationship to project outcomes.

EVIDENCE: Highlight the value of collaborative practice in evaluation findings and recommend and facilitate actions to improve collaboration practices among stakeholders.

A Assessment Evaluation

Percentage of Leadership Team Members Who Selected Each Scale Point on the Levels of Integration Rubric

Summarized scores across Leadership Team members on the Levels of Integration Rubric (LOIR). Each interviewee selected the rubric value (letter A, B, C, D, or E, with A reflecting lowest levels of collaboration and E reflecting highest levels of collaboration in that category) that best reflected the functioning of the Alliance at the end of the academic year. The LOIR provided a resource for the Alliance members to make informed decisions about the TxARM.

"R" Conceptualizes Value of Collaboration

SOURCE: What is researched is not objective. The research base is a product of prevailing scientific paradigms and the existing national and international intellectual climate regarding the value collaborative practices.

PLAN: Stakeholders engage in reciprocal relationships with the research base on collaborative practice, both relying on it to inform their practice and shaping it with the results of that practice—the academic enterprise.

"R" Actualizes Value of Collaboration

IMPLEMENTATION: Adoption of evidence-based strategies to assess and improve partnership collaboration practices like the Collaboration Evaluation Improvement Framework by Woodland and Hutton (2012).

EVIDENCE: Dissemination of specific evidence that expands the research base with new knowledge in the form of conference presentations, journal articles, and other scholarly activities.

R Research Academic

Collaboration Theory

Collaboration development has predictable stages. The Collaboration Evaluation and Improvement Framework (CEIF) was applied to the development of collaborative practice in the TxARM alliance to guide evaluation of the development of collaboration over the five-year multi-institutional project. (Woodland & Hutton, 2012).

The CEIF framework has five entry points used to evaluate the TxARM

- Operationalizing the construct of collaboration
- Identifying and mapping communities of practice
- Monitoring stage(s) of development
- Assessing levels of integration
- Assessing cycles of inquiry

Dissemination Plan

- NRC AGEP 2020
- Research Talk
- Workshop
- AEA 2020 Poster
- TxARM project evaluation team
- SERA 2021 submission
- AERA/AEA 2021 Journal article

The evaluation and project teams worked together to chart a dissemination plan. To communicate findings about the implementation and value of collaboration practices, three confirmed conference presentations, one presentation under review, and a planned journal article are underway. Our venues include **the national AGEP grantee community, the regional education research community, and the national STEM evaluation community. An education research journal** is targeted for the manuscript in preparation.

Annual Meeting – Más Fuertes Juntos

"P" Conceptualizes Value of Collaboration

SOURCE: The PI and project partners are guided by sponsor requirements and influenced by both credible research and evaluator concurrence about the value of collaborative practice.

PLAN: Value of collaborative practice is articulated through inclusion in proposal documents, project models, annual reports, and conceptual interviews.

"P" Actualizes Value of Collaboration

IMPLEMENTATION: Adoption of explicit collaboration practices to facilitate project management and partner equity that evolve over time in response to feedback.

EVIDENCE: Evidence of evolving collaborative practice, specific activities targeted to ensure or increase collaborative practice, and specific attributions of collaborative practice as important to program success.

P PI or Partners

Role Group	Persons Invited	Persons Attended	Percentage Attended	Persons Submitted Chat	Percentage Submitted Chats	Total Number of Chats	Percentage of Total Chats	Average Number of Chats
TxARM AGEP Cohort	9	9	100%	9	100%	141	27%	15.67
PI/Co-PI	15	15	100%	12	80%	94	18%	7.83
Senior Personnel	4	4	100%	4	100%	63	12%	15.75
Support Staff	5	5	100%	5	100%	62	12%	12.40
Evaluator	2	2	100%	2	100%	27	5%	13.50
Graduate Assistant	3	2	67%	1	50%	1	0%	1.00
Postdoc	1	1	100%	1	100%	20	4%	20.00
Advisor/Mentor	17	12	71%	9	75%	69	13%	7.67
Alliance Advisory Board	6	6	100%	4	67%	22	4%	5.50
Social Science Advisory Board	5	4	80%	4	100%	14	3%	3.50
NSF Program Officer	1	1	100%	1	100%	3	1%	3.00
Total	**68**	**61**	**90%**	**52**	**85%**	**516**	**100%**	**9.92**

Due to Covid-19, the planned in-person annual meeting of all TxARM stakeholders was held virtually on June 3, 2020. In order to understand engagement during the 4-hour virtual meeting, attendance and online chats were used as participation measures. Chats were mostly used to offer general thanks and encouragement to other attendees (48%). The 9 cohort members who prepared brief videos about themselves and their professional/personal interests received an average of 22 chats (range 15 to 38) from other attendees during or after their presentations. Some of these messages included offers to connect cohort members with career resources. All attendees received a conference package that was opened as a group at the start of the meeting--25 attendees offered messages of thanks for these. About 8% of chats dealt with technology issues.

A Tale of Two NSF Solicitations

"S" Conceptualizes Value of Collaboration

SOURCE: Both credible research evidence from the academic community and the national and international community context guide the extent to which sponsors value collaborative practice.

PLAN: Valuing of collaborative practice can shape sponsor policy statements, strategic plans, and funding allocations.

"S" Actualizes Value of Collaboration

IMPLEMENT: Sponsor representatives prepare specific funding requests in alignment with policy, plans, and funding allocations, thereby actualizing collaboration requirements for project partners.

EVIDENCE: Proposal review, award negotiations, and reporting requirements for grantees further shape the design and implementation of collaboration practices in funded projects.

S Sponsor or Funder

The sponsors of a project influence its structure and function from conception to completion. If funders require or encourage partnership projects, to what extent do they require detailed plans for equitable collaboration across partners?

Two NSF solicitations from the EHR division illustrate differential attention to partnership and collaboration requirements and guidance in funding requests.

Comparing NSF Solicitations on Collaboration and Partnership Requirements and Guidance

	AGEP	SATC
Partnership Requirement	Yes	No
Collaboration plan requirement	No	Yes (Med/Lge projects)
Evaluation of Collaboration	☒ +	☒
Definition of Partner Roles	☑	☑
Value-Add of Partners to Collaboration	☑	☑
Structures for Regular Communication	☒	☑
Resources Allocated to Collaboration	☒	☑ +
Dissemination to Research Community	☑	☑

■=absent (◆barely) ■=present (◆highly)

Note: As part of an AGEP alliance, authors note substantial post-review negotiation with sponsor program officer on the partnership design, including decisions about collaboration arrangements and guidance for evaluating collaboration which substantially changed the structure and function of the alliance.
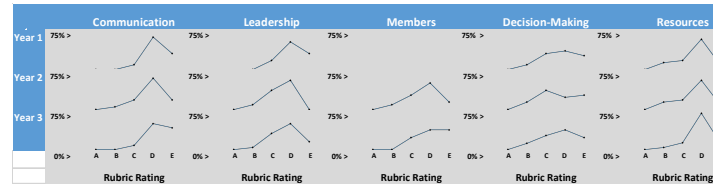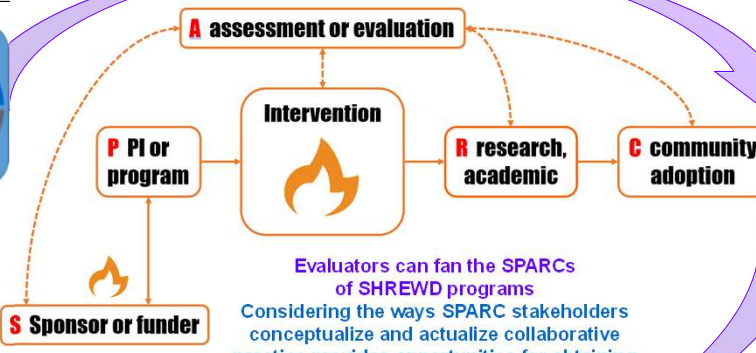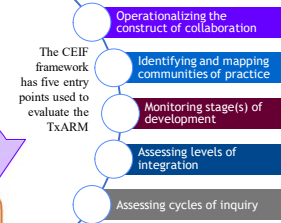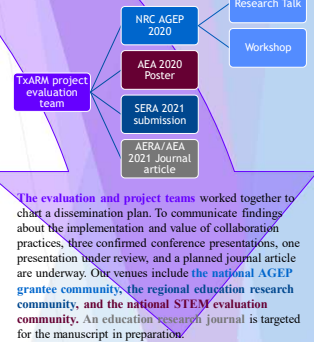
SPARC Framework Diagram

- **A** assessment or evaluation
- **Intervention**
- **P** PI or program
- **R** research, academic
- **C** community adoption
- **S** Sponsor or funder

Evaluators can fan the SPARCs of SHREWD programs Considering the ways SPARC stakeholders conceptualize and actualize collaborative practice provides opportunities for obtaining and leveraging evidence that links partnership collaboration to successful program outcomes.

Collaboration is Essential

"C" Conceptualizes Value of Collaboration

SOURCE: Stakeholders reside within a national and international community context, which determines what is valued and by whom. The value of collaborative practice is dictated by community context.

PLAN: While stakeholder beliefs and behaviors are shaped by this context, stakeholders have power to influence their context—to use available avenues of expression to support the value of collaborative practice.

"C" Actualizes Value of Collaboration

IMPLEMENTATION: Stakeholders disseminate evidence outside traditional scholarly venues to broaden community awareness of the value of collaborative practice, such as social media or online interfaces.

EVIDENCE: Evidence for increased value of collaborative practice is reflected in stakeholder perceptions of the positive impact of collaboration on project outcomes and by popular "demand" or adoption by others.

C Community Adoption

Mentoring Practices are collaborative models used in many fields, academic, business, service, and technical. There is often no better way to accomplish something than with the assistance of a skilled mentor.

Peer mentoring groups are collaborative models that have been used successfully in many fields. For example, writing groups have demonstrated potential in increasing academic productivity.

Project management models are collaborative models directed at producing a deliverable for a customer, which typically requires a team working together to accomplish project goals.

Schools are by definition collaborative learning models where students learn most things together.

Scouts and other youth organizations are based on team activity models and learning goals.

Sport teams are fitness activities that require collaboration among teammates and with other teams.

Collaboration: *A mechanism which provides benefits for leveraging resources, dealing with scarcities, eliminating duplication, capitalizing on individual strengths, and building internal capacities* (Taylor-Powell, Rossing, & Geran, 1998)

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