AHSIE Invited Speaker

Resources, Strategies, and Funding Opportunities for HSIs at NSF

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PI, KickStarter Program (HRD#1450661)

Science Foundation Arizona

March 26, 2018

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Overview

- KickStarter Overview
  - Addresses NSF goals to support HSIs
  - Five-component process and highlights
  - Results to date

- NSF HSI Program
  - Designed to further expand NSF's goals for HSIs
  - Results of HSI program solicitation
  - Status and contributions of HSI Conferences to the HSI Program
  - Next steps

Science Foundation Arizona

Provide services for maximizing the educational and economic impact of STEM

- Non-profit founded in 2006 by industry leaders and state government to diversify the economy through investments in state-based research and education.
- An affiliate of ASU's Innovation Center (SkySong), home to a diverse community that links technology, research, education and entrepreneurship.
- Developed and tested a comprehensive *KickStarter* process that is proving effective in assisting CC-HSIs

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KickStarter Program

- NSF-funded Pilot program (Grant #1450661) to learn from community college HSIs
- Proposed to assist colleges with STEM planning, concept development, proposal preparation and submission
- Desired outcomes:
  - More CC-HSIs compete successfully on NSF projects
  - CC-HSIs strengthen their STEM infrastructure
  - Key partnerships are established that improve competitiveness
  - KickStarter process is sustainable

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KickStarter Hypothesis

1. Proposals developed on college-wide STEM Plans show potential for sustainability, and thus a wiser investment of funds, leading to possibility of fewer one-off grants.

2. Technical assistance that incorporates NSF principles in the process offers colleges the experience needed to develop competitive proposals.

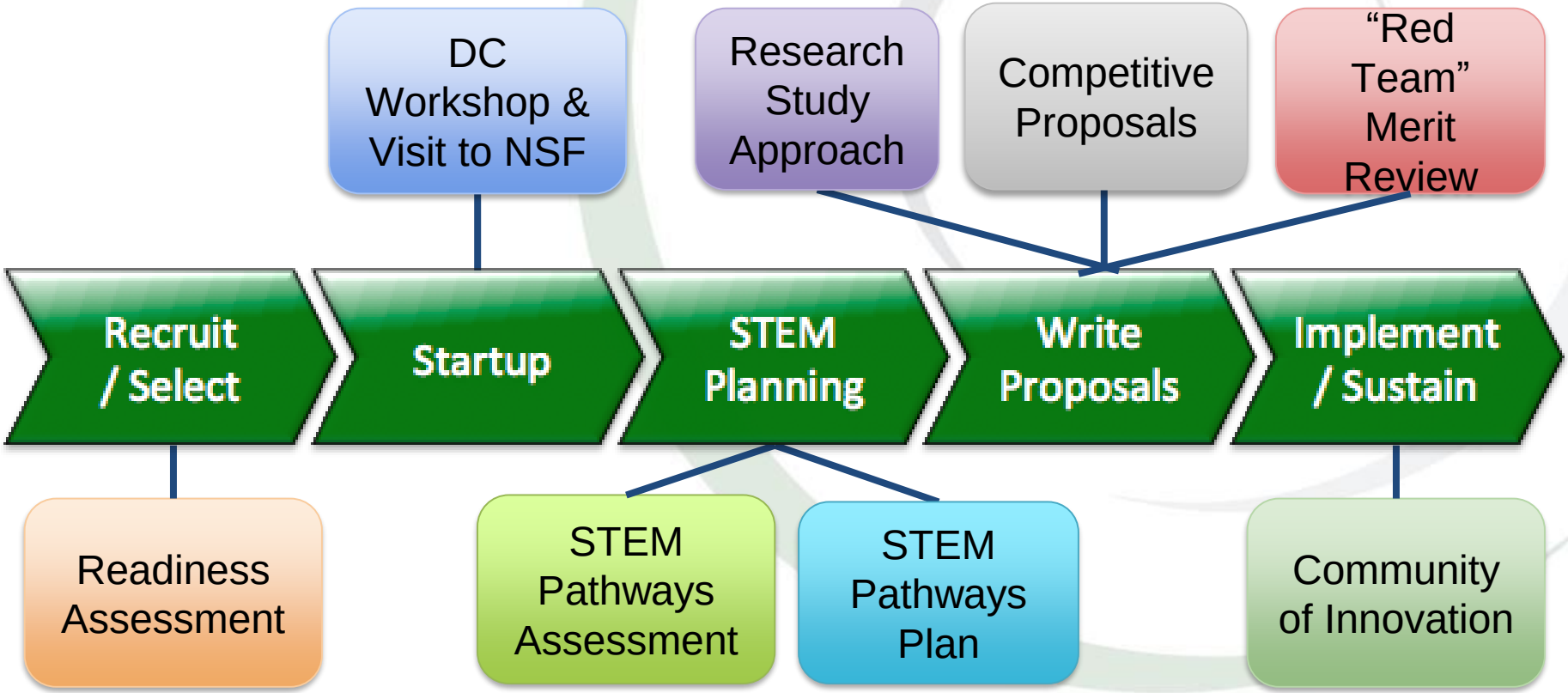
KickStarter Approach

- Serve as a partner to champion the internal college team and its administration
- Use STEM Pathways Guide and self-assessment tool to identify and prioritize program areas needing attention
- Identify and develop sustainable proposal development capabilities and infrastructure
- Guide colleges in writing competitive proposals

Impact for KickStarter Colleges

- Strengthen and sustain internal capability to develop competitive proposals
- Increase competitiveness for funding from a broad range of NSF program areas, not just HSI Program
- Demonstrate impact of funding that can be leveraged within a college-wide STEM Pathways plan
- Increase number of Hispanic students completing STEM degree programs

Repeatable KickStarter Process



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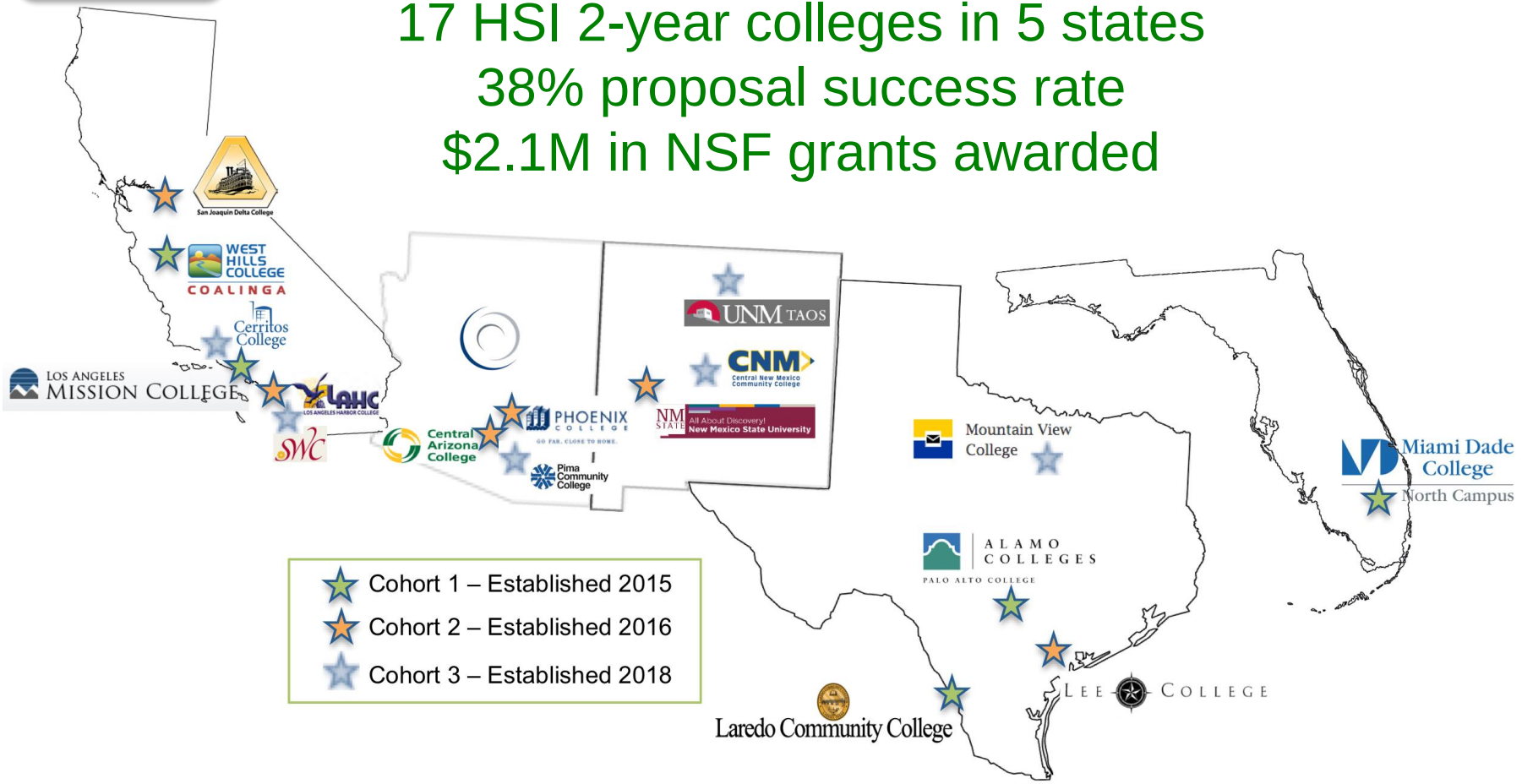
Recruit / Select

Readiness Assessment

KickStarter Colleges

17 HSI 2-year colleges in 5 states
38% proposal success rate
$2.1M in NSF grants awarded



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Startup

DC Workshop & Visit to NSF

Two Cohorts in DC

KickStarter Cohort 2

KickStarter Cohort 1

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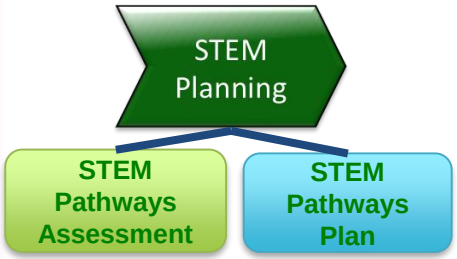
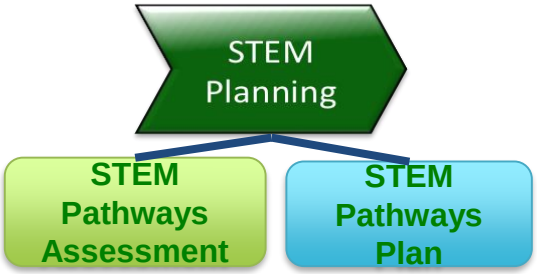


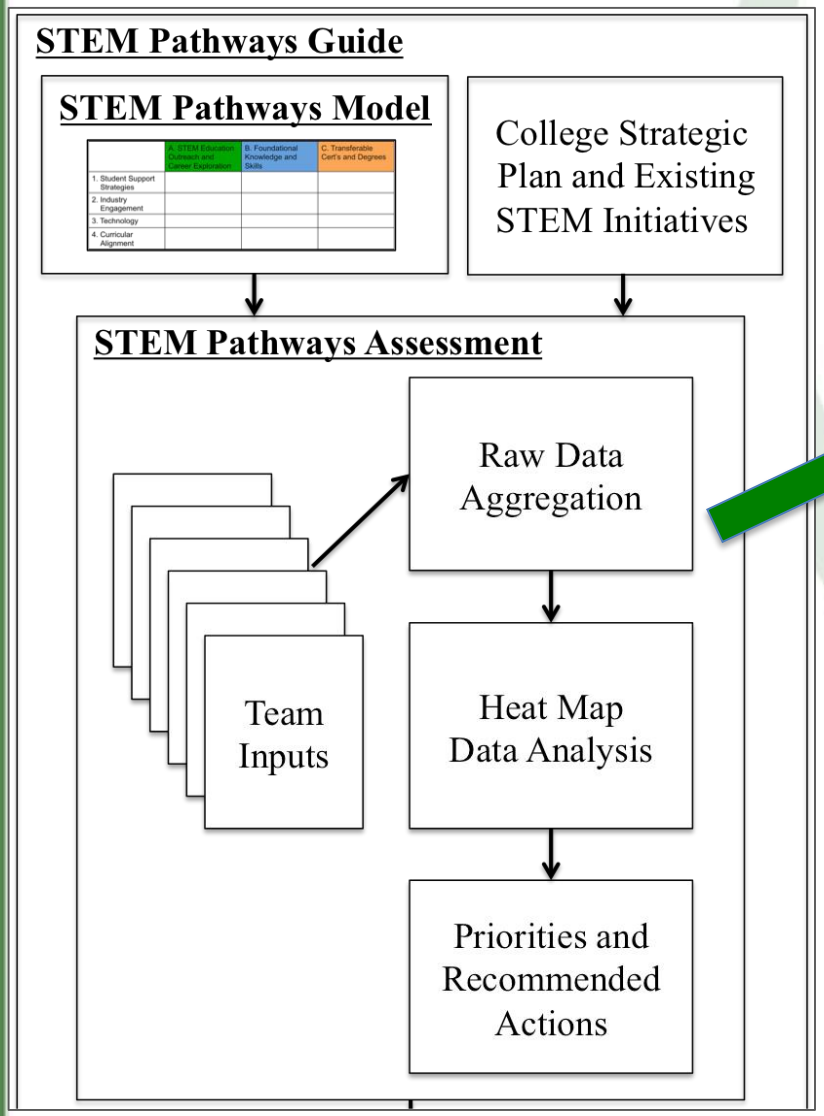
STEM Assessment & Planning

http://stem.sfaz.org

STEM PATHWAYS MODEL Science Foundation Arizona - The Arizona STEM Network			
PATHWAY COMPONENTS	**A. STEM EDUCATION OUTREACH AND CAREER EXPLORATION (Recruitment) - *Community college-led activities and events that generate enthusiasm and engage student interest in STEM career fields.***	**B. FOUNDATIONAL KNOWLEDGE AND SKILLS (Retention) - *Education programs and strategies that improve college students' foundational STEM knowledge and skills.***	**C. TRANSFERABLE CERTIFICATIONS AND DEGREES (Workforce) - *Job and research experiences and competency-based programs with industry that align to industry-recognized credentials.***
1. STUDENT SUPPORT STRATEGIES-*Resources, processes and strategies that encourage student success.*	*A1. Student-success strategies are incorporated in outreach activities and events that promote STEM career exploration.*	*B1. Student-support strategies lead students to achieving foundational STEM knowledge and skills.*	*C1. Student-support strategies help students optimize course selection and credits earned toward a stackable credential or degree.*
2. INDUSTRY ENGAGEMENT-*Vital to keeping schools current, providing teachers with resources, and capturing student interest in STEM careers.*	*A2. Industry plays a supporting role in outreach activities, tours and events, capturing student interest in real-world STEM opportunities.*	*B2. Industry contributes to program development and mentors students in real-world experiences.*	*C2. Industry offers internships, apprenticeships, and job-shadowing experiences that guide students to earning industry-recognized certifications and degrees.*
3. TECHNOLOGY-*Integrated across the Pathway to provide better access to education resources, virtual tours, internships and mentorship.*	*A3. College outreach activities have access to technology labs and technical equipment that generate student interest and awareness of STEM careers.*	*B3. Technology programs offer students hands-on learning experiences; technology is utilized to access instruction and student learning opportunities between institutions.*	*C3. Technical equipment is available at industry for students to gain the appropriate experience and prepare for competency-based testing and certifications.*
4. CURRICULAR ALIGNMENT-*Ensures all course credits count toward a credential.*	*A4. College Outreach activities and events inform parents and students about curricular alignment to STEM career programs.*	*B4. Dual enrollment or early college STEM academies, including intrusive advisement that lead to student success.*	*C4. Colleges and industry align curriculum with industry-recognized certifications and include credits that transfer toward stackable degree programs.*

STEM Pathways Assessment





SCALE: 0=NONE, 1=MINIMAL, 2=ADEQUATE, 3=COMPREHENSIVE

SUMMARY OF ALL RESPONSES MAPPED TO HIGH LEVEL PATHWAYS MODEL COMPONENTS			
	A STEM Education Outreach and Career Exploration	B Foundational Knowledge and Skills	C Transferable Certifications and Degrees
1 Student Support Strategies	1.4	1.5	1.8
2 Industry Engagement	0.7	0.5	0.8
3 Technology Integration	0.7	1.2	0.8
4 Curricular Alignment	0.8	1.9	1.6

Team discusses and interprets results, recommends priorities and actions

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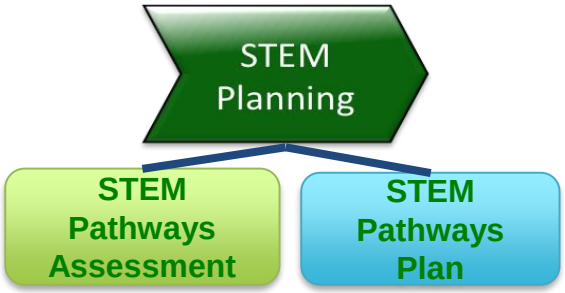


Success Stories

"The facilitated discussion with SFAz about the Assessment results **made us more aware of the unique strengths and weaknesses on our campus**. **We felt empowered** to move forward with a STEM plan and eager to leverage the experiences of other STEM faculty on campus."

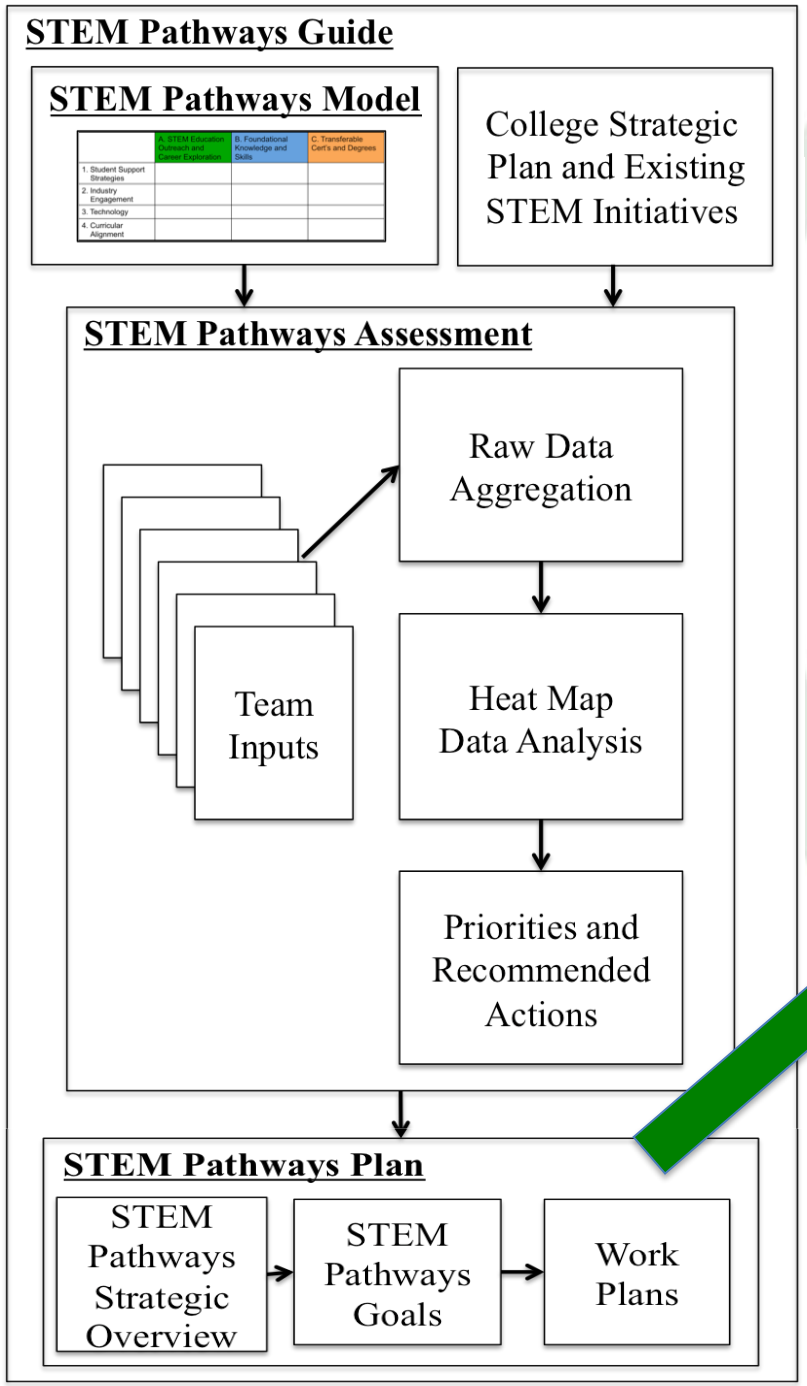
- Anil Kapoor, Biology Faculty, Phoenix College

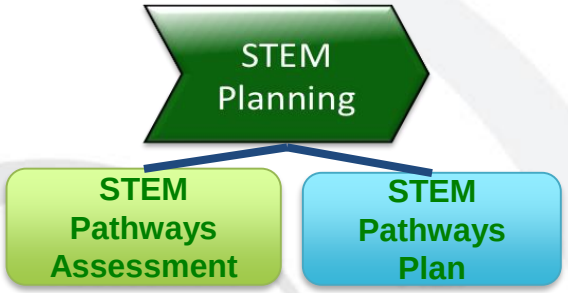
PHOENIX COLLEGE

"The Heatmap visual sparked insightful conversation about our gaps and strengths. We finished our STEM plan in one week, because **the entire group was focused in one direction. Good advice and tools organized us along a common path**."

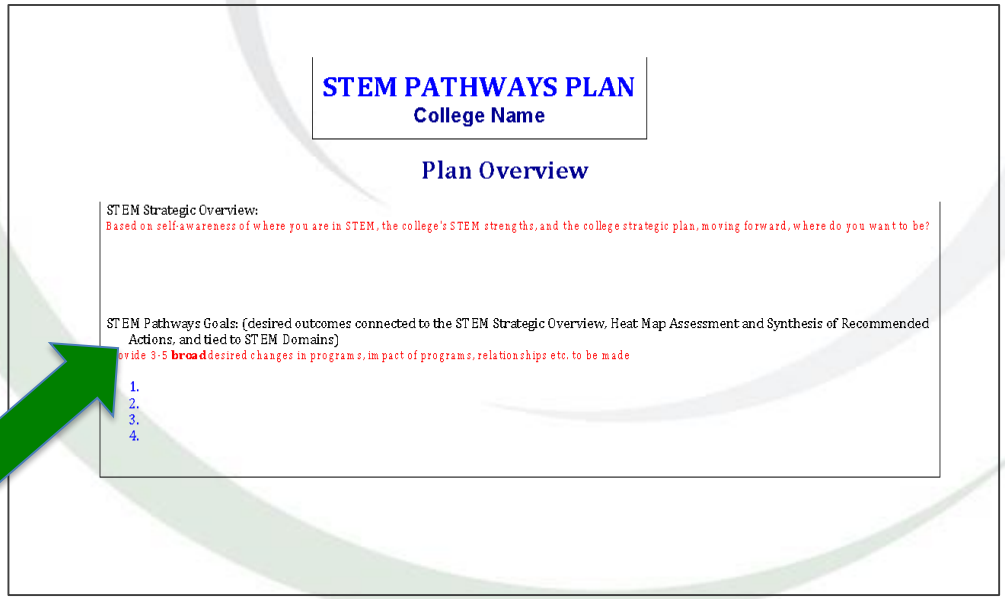
- Zac Smith, IT, NMSU Grants

NM STATE UNIVERSITY GRANTS CAMPUS





STEM Planning



STEM PATHWAYS PLAN
College Name

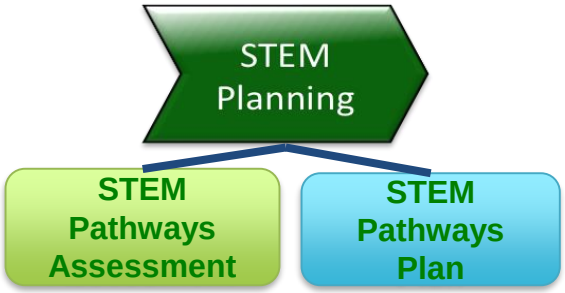
Plan Overview

STEM Strategic Overview:
Based on self-awareness of where you are in STEM, the college's STEM strengths, and the college strategic plan, moving forward, where do you want to be?

STEM Pathways Goals: (desired outcomes connected to the STEM Strategic Overview, Heat Map Assessment and Synthesis of Recommended Actions, and tied to STEM Domains)
Provide 3-5 **broad** desired changes in programs, impact of programs, relationships etc. to be made

1.
2.
3.
4.

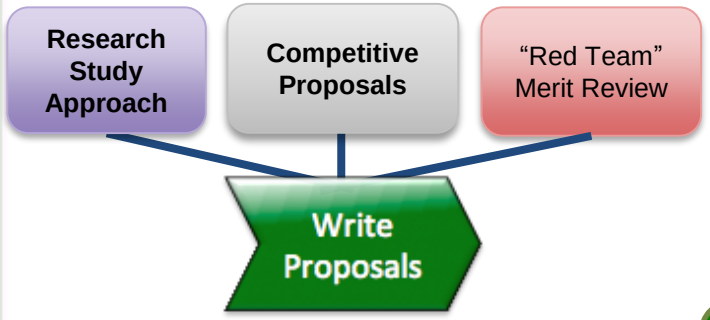
Team converts priorities to goals and work items in STEM Pathways Plan



Success Story

San Joaquin Delta College

"When we completed KickStarter's STEM Pathway Assessment and Planning activities, we came together as a College-wide team and identified our strengths and top areas for improvement related to student success in STEM. This helped us to understand our current infrastructure for STEM student recruitment, retention, and transfer and heightened our readiness to make changes to increase student support, industry engagement, curricular alignment, and technology integration**. KickStarter's STEM Pathways Model aligns with the pillars of Guided Pathways, and we anticipate that our STEM pathways plan with prioritized initiatives may be implemented within a STEM pathway**. We envision that Guided Pathways will serve as an umbrella framework for other institutional plans, including the STEM Pathways Plan. In addition to helping inform our guided pathways work, we can use the assessment results and STEM Pathways Plan to prepare for federal grant opportunities. **The KickStarter team has provided ongoing mentorship and assistance throughout the STEM planning process which supports our College in applying for federal STEM grants and developing a sustainable capacity for writing more competitive grant proposals in the future**."
– Tina Merlino, Acting Director Institutional Research & Effectiveness



Proposal Concept Development

College and STEM Strategic Plan / Focus Areas

STEM Pathways Assessment and Plan

Research Question / Prior Work / Intellectual Merit

Proposal Concepts

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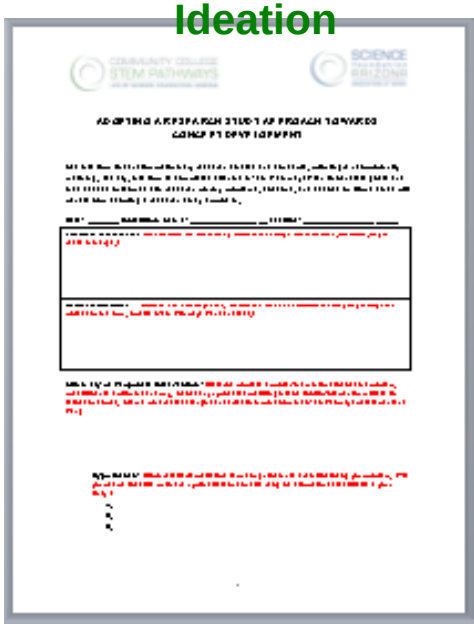
Research Study Approach

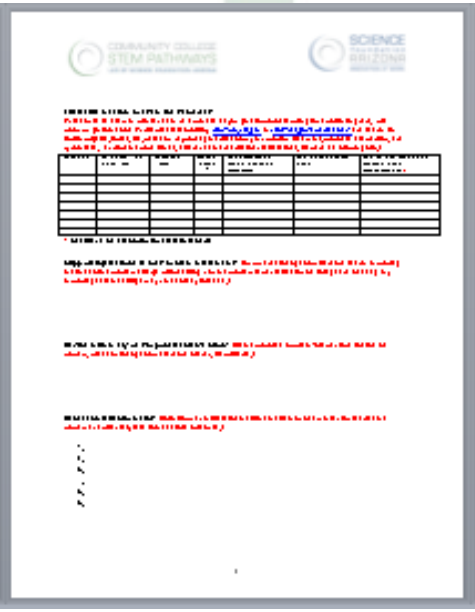
RSA Phases and Template

1. Initial Concept Ideation



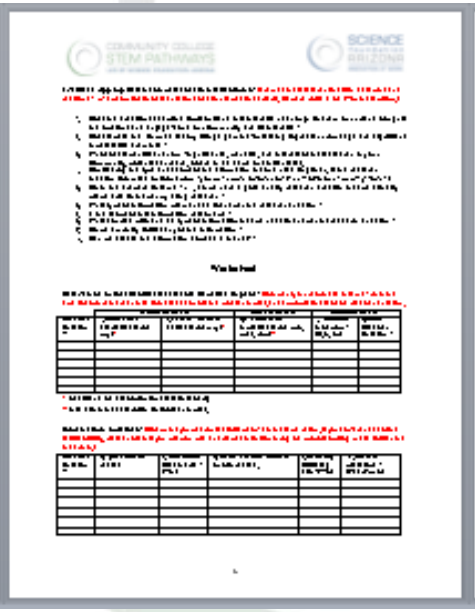
Initial Problem, Intervention, Outcome

2. Literature Search/ Review of Prior Art



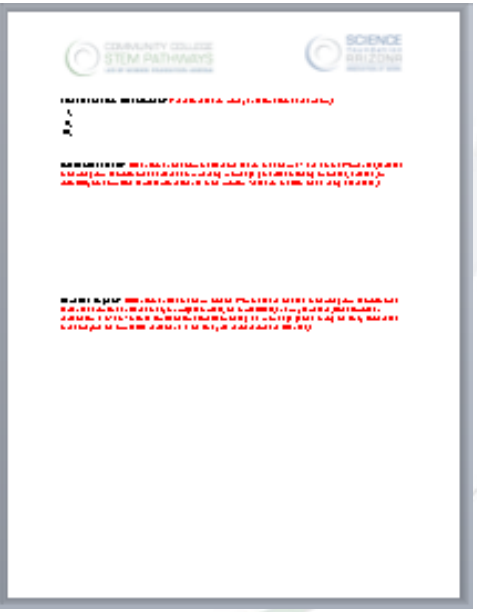
Prior Art, Partners, Unique Contributions

3. Research Question Development



Create and Qualify Research Questions

4. Intellectual Merit Broader Impact



Advance Knowledge and Benefit Society

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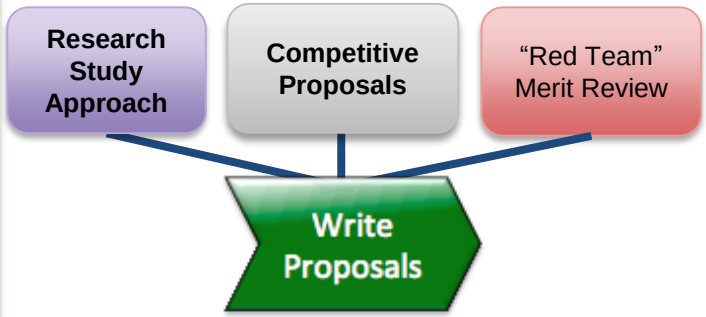
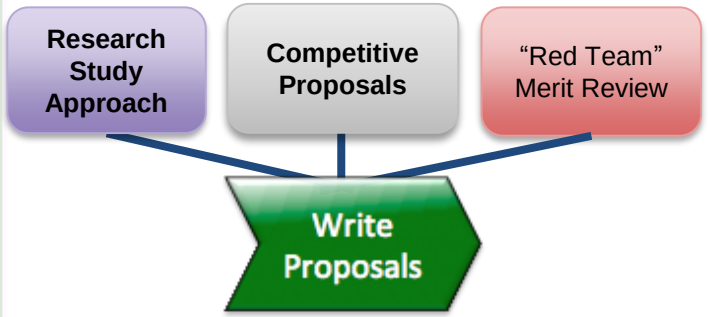


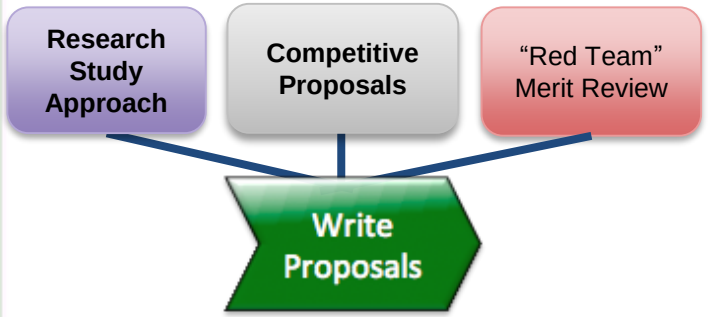
Building Proposals on a STEM Plan

- Increased Industry Engagement, Buy-in, and Sponsorship
- Sustained networking among Colleges
- Efficiencies from working together
- Stability in the face of Attrition
- More Federal Funding:
  - Competitive STEM Research Proposals
  - Aligned to District/College STEM Strategic Plan
  - Backed by Industry Partners



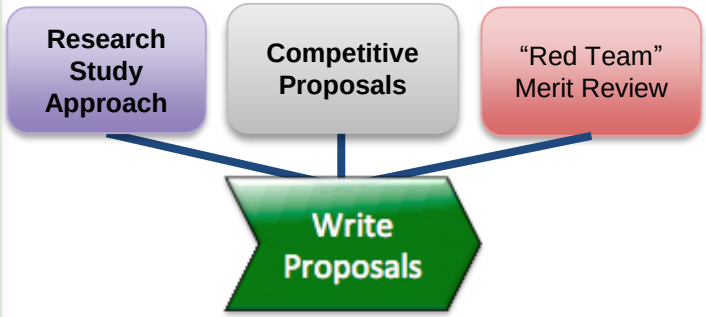
Observations

- Sharing ideas with NSF Program Officer increases confidence in proposal development team
- "Research Study Approach" (RSA) helps CC-HSIs embrace education research methods, address recognized weaknesses in prior proposals, and increase experience of faculty and grant writers. Using a phased approach in a living RSA document aids concept/proposal development.
- "Red Team Review" emulates NSF Merit Review one month prior to due date and provides valuable feedback to team



Observations/cont d.

- Workbook designed to help track proposal activities/components
- Multiple regular meetings with STEM Planning Team serves as Technical Assistance opportunities for proposals
- Prior Cohort serves as role models to newer Cohort by sharing ideas and new concepts during monthly meetings
- Proposal writing improves in subsequent attempts



Success Stories

West Hills Coalinga Community College, a Hispanic Serving Institution (HSI) in California, was recently awarded a $200K Advanced Technological Education (ATE) grant from NSF. The award funds a program called "Welding Education Distance Community Outreach" (WELDCO) that is designed to meet the needs for a growing sector of advanced welding technicians in the west side of the Central Valley area in California.

- Timothy Ellsworth, Agriculture Science and Technology

WEST HILLS COMMUNITY COLLEGE DISTRICT

Los Angeles Mission College has recently received a $200,000 grant from the National Science Foundation (NSF) to help expand its biotechnology program. The three-year award will be instrumental in helping the college increase the number of students pursuing careers in the biotech industry, according to Dr. Par Mohammadian, Director of the college's biotechnology program.

LOS ANGELES MISSION COLLEGE

Impacts and Data

Participants reported increases in the following types of Partnerships

- Two-year and four-year colleges
  - Articulation discussions (42.86%)
  - Joint proposals (14.29%)
  - Joint events (57.14%)
- Industry engagement
  - Increased internships (85.71%)
  - Industry volunteers in outreach activities (14.29%)
  - Advisory Boards (28.57%)

Institutional Level Changes foster Community of Innovation

- "KickStarter has helped the administration (of my college) recognize the importance of developing partnerships and so I feel they are now placing more of an emphasis on allowing staff and faculty to engage with our 4-year institutions."
- "KickStarter has helped the faculty and staff recognize that industry partnerships are critical for our students and that we must proactively work toward developing connections that will help our students receive internships."

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Success Stories: Reassign institutional resources to support infrastructure changes aligned to STEM Plan

1. Los Angeles Mission hired a STEM Counselor and STEM Career Center Coordinator and is planning to bring in a dedicated Grants Writer instead of using the District Grants Writer Pool.
2. San Joaquin Delta promoted their Research Analyst to interim Director of Institutional Research.
3. Palo Alto College promoted Grants Writer to Director - College Grants Development; hired new Grants Writer from a 4yr-institution.
4. Lee College is creating a STEM Center and hiring STEM staff using Title V funds. They promoted their Title V Director to Exec. Director for the STEM Center and all HSI initiatives (Title III, V, KS).
5. West Hills Coalinga hires Workplace Learning Liaison Coordinator.

Observations

- Organic Communities of Innovation emerged at CC-HSIs.
- Preliminary results suggest KS relationship embeds a contextually relevant recipe for CC-HSIs to innovate.
- This is often accompanied by a change in faculty / staff mindset to embrace more strategic systems thinking as they realize the value of a STEM plan, industry partnering, and institutional alliances.
- Increased interactions within the college, particularly between ‘academic’ and ‘CTE’, leads to additional collaborations.

Discussion & Next Steps

- Cohort 3 - Leverage Momentum and Prescriptive Guidance / KickStarter Processes
- Partnerships with AHSIE and ATE's Mentor-Connect
- Continue to collect and analyze data (quantitative and qualitative) to inform the process
- Provide insights, data, and learnings to NSF HSI initiative - Best practices for success, barriers to success

THANK YOU!!

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EXTRA SLIDES

Session Objective

A representative from Science Foundation Arizona (SFAz) will present an overview of the KickStarter program at SFAz, describe how it is

- designed to address NSF's goals for supporting HSIs,
- and what the results have been for a cohort of 17 community college HSIs and their engagement with NSF.

Then, a representative from the National Science Foundation (NSF) will discuss the new HSI Program at NSF, including how it is

- designed to further expand NSF’s goals,
- how well their first HSI program solicitation was received,
- what the status is of the NSF-funded HSI Conferences and
- their contributions to the development of the HSI Program.

NSF's overall HSI Program vision for providing the resources, strategies and funding to enhance HSI participation, and next steps, will also be shared.

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Recruit/Select

- Sets the stage for colleges to begin thinking about NSF expectations for competitive proposals
- Selection by an external panel allows SFAz to subsequently champion colleges and provide guidance
- Explicit expectations are emphasized in the KickStarter Application
- Colleges not selected are advised as to weak areas of readiness

Repeatable KickStarter Process

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Startup – DC Workshop

- Meet other college participants in person and network with each other
- Accelerate preparation for College Site Visits
- Introduce participants to NSF program officers:
  - Roundtable Conversations
  - NSF Grant Workshop including “Mock Review”
  - Colleges presented elevator pitches emphasizing their unique STEM attributes

Observations

- Bringing participants to DC and NSF is a great way to kickoff the program
- Participants learned a great deal about NSF programs/expectations
- Participants valued the opportunity to meet/converse with the NSF POs and learned that they can follow up directly with NSF staff
- Pushing the program training slides into virtual sessions in advance of meetings optimized face to face time for interactions and work sessions.

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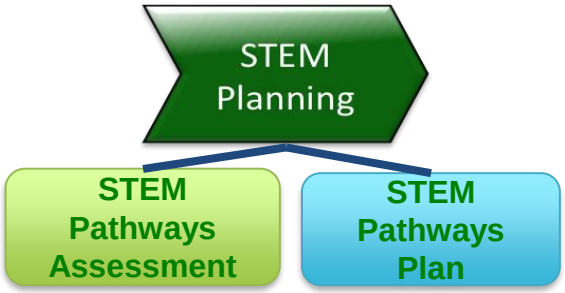

Pathways Assessment

- Aggregated view of STEM Current Status by Department, College-wide, across Colleges
- Cross-institution Collaboration
- Raised Awareness & Sharing among Departments and between Colleges
- Agreement on Priorities / Inputs to STEM Plan

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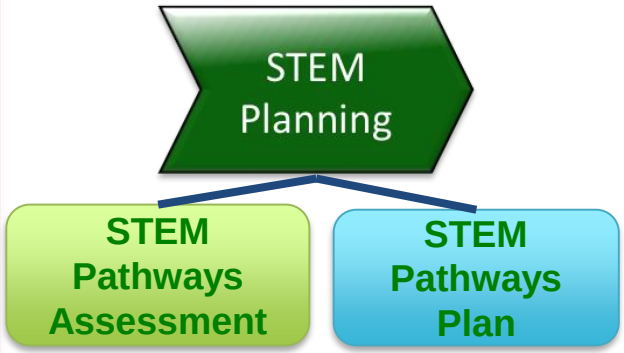
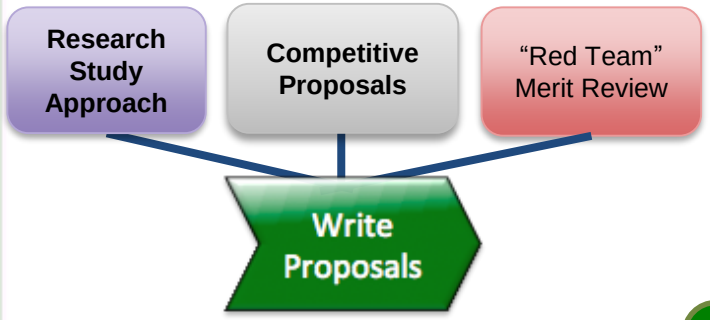


STEM Planning

Faculty & staff engaged, willing to own & develop STEM programming, proposal development

- Functional units well-represented on planning teams; Academic and CTE faculty learned a lot from each other re industry connections, outreach and college activities
- Identified positive activities that need to be implemented college-wide
- CC-HSIs strengthened infrastructure to help sustain their ongoing implementation of college-wide STEM plans (to improve the recruitment and retention of LatinX students in STEM fields and careers)



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Implement / Sustain

- STEM Program Implementation Guidance and Facilitation
- Measure Implementation Impacts and Outcomes (partner with IR)
- Network and Partner within and between Colleges
- Share Best Practices
- Persist in aligning to College Strategy and Institution-wide STEM Plan / Roadmap

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