

Strands Report-Out

Local Context & Cultural Relevance

Question 1: Aspects/categories of strands within projects	<ul style="list-style-type: none">• Must be culturally competent and know the community• Identify leaders in the community• Enter the community role as a resource and not as a leader• Use a bottom-up instead of top-down approach. The community voice/viewpoint should be folded into the project design at the early stage• Use differentiated, phased approaches across stakeholders
Question 2: Strategies	<ul style="list-style-type: none">• Know your community: include community members as teachers/educators; work with local needs and interests; meet people where they are; view the community with an asset-based perspective• Include youth as the center; engage students as experts so they represent their communities; allow student voice/choice• Expand the notion of STEM careers to include a broader context—e.g. urban planning.



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Local Context & Cultural Relevance

Question 3: Measures	<ul style="list-style-type: none">• Study research literature and identify existing valid instruments• Incorporate to anthropological and sociological fields and adapt them for STEM education field• Develop quantitative measures of students' perceptions on whether their work changes the community• Use, model, and adapt pedagogical work of scholars in multicultural education and anti-racist education
Question 4: Best Practices	<ul style="list-style-type: none">• Develop relationships and relationship building structures• Have parents contribute their knowledge educating their children (both ways)• Restorative avenues – social emotional strategies (CASEL is an org. that has research on the approach strategies)• Be flexible• Be rigorous – have kids work hard on projects of high interest• Continuous documentation of best practices• Utilize multiple teaching strategies



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Local Context & Cultural Relevance

Question 5: Findings	<ul style="list-style-type: none">• If you use cultural context effectively, you can do longitudinal research• Developing relationships with youth in a holistic context <u>from the beginning</u> facilitates longitudinal research processes• Multi-literacy, multi-lingual capacities contribute to effective practices• Interdisciplinary approaches contribute to effective practices
Question 6: Differences with current school environment	<ul style="list-style-type: none">• Recruit students with low GPAs → move the needle on achievement• FUN• Less restrictive• Problem-based/local issues• Offer choice• Target audience is students who opt out



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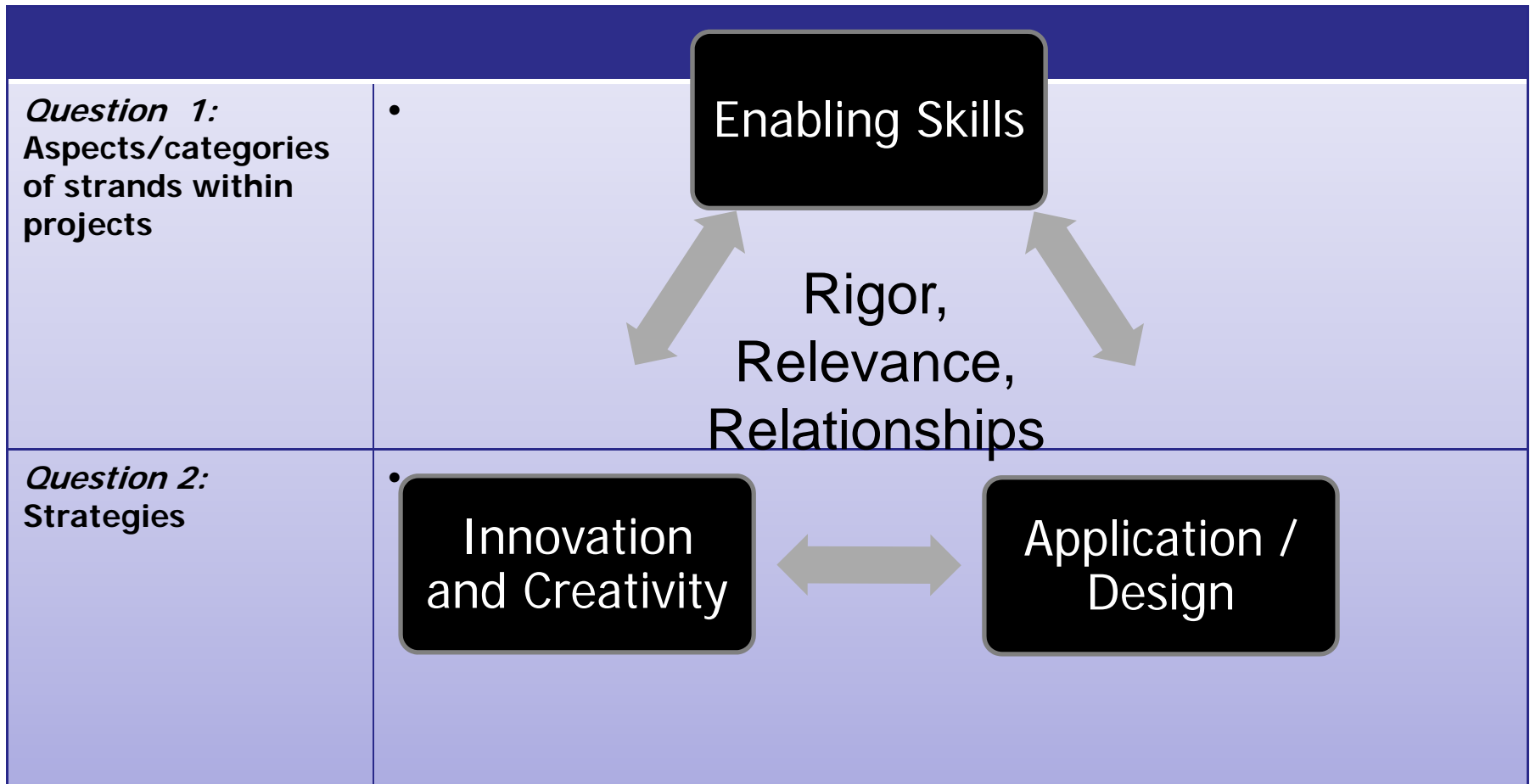
Local Context & Cultural Relevance

<i>Question 7: Theoretical frameworks</i>	<ul style="list-style-type: none">• Anthropologically informed understanding of culture-applied cultural anthropology• Culturally relevant pedagogical strategies• Multicultural education• Anti-racist education
<i>Other important considerations</i>	<ul style="list-style-type: none">• To do this work, project staff and evaluators need the capacity to synthesize multiple domains of knowledge and research methodologies-there is a need to draw on cross disciplinary knowledge and to contribute to varying bodies of research.



Strands Report-Out

STEM Skills and Knowledge



Strands Report-Out

Partnerships

<p>Question 1: Partnership types & criteria</p>	<p>Types:</p> <ul style="list-style-type: none"> • Higher education and K-12 (university-based programs, mentors, educators, counselors) • Business and industry • Research institutions <p>Criteria:</p> <ul style="list-style-type: none"> • Demonstrate a willingness to participate, be helpful, able to execute a role as expected, and be flexible • Synergy and similar goals/interests/needs • Supply resources (financial resources, internships, mentors, equipment, facilities, research experience, technology development, etc) • Able to identify other useful partners, help with recruitment, leverage their own networks for project's benefit
<p>Question 2, 4, 5: Strategies/best practices/findings</p>	<ul style="list-style-type: none"> • Well thought out criteria is important – have clear expectations, roles and responsibilities, MOUs. These may need to be adapted/changed (so be flexible). • Regular contact, on-going relationship building, frequent meetings • Have both extrinsic and intrinsic rewards for partners (and participants) • Have support and buy-in from partner's leadership • Understand partners' organizational culture, language, decision-making process • Help partners find funding/sustainability on their own



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Partnerships

Question 3: Measures	<ul style="list-style-type: none">• Partner evaluation/surveys (based on project outcomes, partnership agreements and objectives, partners satisfaction, reciprocal benefits)• Number of returning participants (teachers, mentors, etc)• Do partnerships continue after a project ends• Doing case studies would be helpful, collecting data via the MIS
Question 4: Challenges	<ul style="list-style-type: none">• Some partners cannot contribute as much as expected (or anything)• Time constraints• Ample, clear, timely communication



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Partnerships

<i>Question 7: Theoretical frameworks</i>	<ul style="list-style-type: none">• Frameworks for student outcomes – e.g., Eccles, Brophy, 21st century skills framework• Develop a logic model of partners, what they provide, and how they will benefit• Models/frameworks exist in the business world and could inform this work
<i>Other important considerations</i>	



Strands Report-Out

Career Pathways

Question 1: Aspects/categories of strands within projects	<ul style="list-style-type: none">• Focus on local career opportunities<ul style="list-style-type: none">• Shipbuilding• Using career pathways as the context to teach STEM content<ul style="list-style-type: none">• Flight simulation for mathematical concepts
Question 2: Strategies	<ul style="list-style-type: none">• Hands-on, experiential, project-based, field trips• Mentoring (parents, academics, others)• Role-playing (videos)



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Career Pathways

Question 3: Measures	<ul style="list-style-type: none">• Measures of effectiveness of pathways vs. measures of student outcomes and movement on the pathways• We measure what we can measure (attitudes) vs. measuring what we want to measure (actual pathway choices)• Everyone understands that student outcomes are critical, but we don't have ways to measure longer-term career choice outcomes
Question 4: Challenges	<ul style="list-style-type: none">• Careers are not well-addressed in standards• Hard for teachers to be creative given the need to meet standards• Changing role of counselors• Preconceptions/misconceptions of STEM by society, teachers, students



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Career Pathways

Question 5: Findings

- Diversity of findings across projects
 - No statistically significant change in attitudes toward careers on the part of students (intervention with teachers, not students) (EYE-POD)
 - Significant change in STEM career interest after student participation in career days (Marine Tech)
 - Significant change in STEM career interest and 21st century skills (direct work with students in afterschool clubs) (Science Journalism)
 - Longer term use of STEM literacy skills irrespective of career paths/decisions (EnvironMentors)
- Findings focused on students, teachers, and also the career pathway model
- Long term outcomes are missing (pathway choices of students)
- Larger issue: STEM careers vs. STEM literacy as project focus and outcomes



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Career Pathways

Question 7: Theoretical frameworks

- Experiential and project-based learning
- Social cognitive career theory (possible self, changing student narrative of what careers are possible)
- Vygotsky, scaffolding, zone of proximal development
- Motivational theory
- Personality theory



Strands Report-Out

Youth Development

<p>Question 1: Aspects/categories of strands within projects</p>	<ul style="list-style-type: none"> • Motivation <ul style="list-style-type: none"> • Self-Efficacy • Interest • Identity/Values • Purpose/Goal • Engagement <ul style="list-style-type: none"> • Relevance • Flow • Social Relevance
<p>Question 2: Strategies</p>	<ul style="list-style-type: none"> • Mentoring <ul style="list-style-type: none"> • Peer learning • Professionals • Role models • Technology • Authentic Learning <ul style="list-style-type: none"> • Local Relevance <ul style="list-style-type: none"> • Community involvement (EVERYONE) • Connections between STEM and real-world applications • Collaboration <ul style="list-style-type: none"> • Peer • Organization • Student choice • Setting In/Out of school



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Youth Development

Question 3: Measures	<ul style="list-style-type: none">• Artifact analysis• Pre/Post survey• Focus groups• Student reflections• Interviews• Assessing team v. assessing individuals• Limited due to time
Question 4: Best Practices	<ul style="list-style-type: none">• Best practices<ul style="list-style-type: none">• Informal• Mentoring• Embedded assessment• School liaison• Strong relationship with professionals• Challenges<ul style="list-style-type: none">• Parent engagement• Student attrition• Organization of schools• Diffusing environmental and cultural issues• Preparing staff to deal with these challenges• Integration of partnerships• Sustainability of the program• Responding to cultural needs of groups and keeping integrity of intervention• Fidelity



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Youth Development

Question 5: Findings	<ul style="list-style-type: none">• Mentorship/ role models are important aspects• Involvement of community• Social aspects (opportunities to socialize with like-minded peers) are primary motivation• Peer-to-peer relationships• Cultural relevance is key
Question 6: Differences with current school environment	<ul style="list-style-type: none">• Informal technology-rich environments• Opportunities for student collaboration• Shift of power relationships• Alternative assessment• Extended time• Student products socially valued• Collaboration with STEM professionals



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Youth Development

<i>Question 7: Theoretical frameworks</i>	<ul style="list-style-type: none">• Elements from Social Cognitive Theory• Constructivism
<i>Other important considerations</i>	<ul style="list-style-type: none">• Liberation Theory• Student technology ownership



PROFESSIONAL DEVELOPMENT

Three words that capture why professional development in the ITEST program is valuable (position paper)



Three words that capture why professional development in the ITEST program contributes to STEM workforce development



Strands Report-Out

Teacher Professional Development

**Question 2:
Strategies
&
Question 1:
Aspects/categories
of strands within
projects**

- Increasing content knowledge
- focus on pedagogy
- technology as a tool
- Lab and field-based activities
- Working in teams
- Teachers as learners
- Customizable learning materials
- Project-based learning
- Assessment



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Teacher Professional Development

Question 3: Measures

- Focus groups
- Teacher observation
- 21st Century Skills Assessment
- Daily end of day teacher survey
- Lesson documenter – e.g. was technology useful?
- Look at interactions on online blog
- Tracking student data for participating teachers
- Pre- and post- surveys
- Case studies/exemplars

Note: sometimes it takes a while to show impact



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Teacher Professional Development

Question 4 & 5: Practices/Findings	<ul style="list-style-type: none">• Transferability of the professional development to other projects/work/settings• Online support during the year helps to sustain the learning experiences• Success of professional development is tied to<ul style="list-style-type: none">• deliberate and mindful recruiting• nurturing a learning community• teachers as learners
Question 6: Differences with current school environment	<ul style="list-style-type: none">• Online support during the year helps to sustain the learning experiences• Provide skills and support that schools don't offer• Affect change at school level



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Teacher Professional Development

Question 7: Theoretical frameworks	<ul style="list-style-type: none">• 5E• project based learning• learning communities/teams• hybrid• universal design learning• multiple stakeholder involvement in program design and implementation• place-based learning
Other important considerations	<ul style="list-style-type: none">•

