VirginiaTech. Institute for Creativity, Arts, and Technology | Center for Research in SEAD Education

Moving Beyond Boundaries to Optimize Impacts

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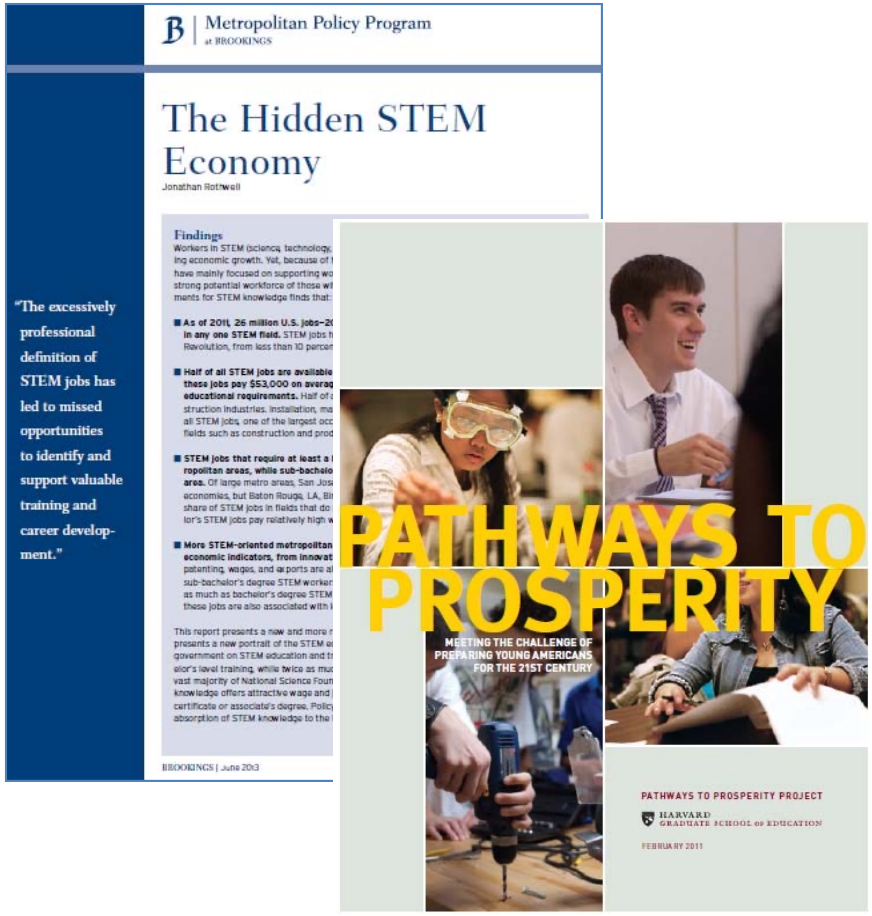
Objectives:

- Explain the vision, mission, activities, and plan for the new CRSE
- Engage you in an ideation to demonstrate our process
- Lead an open forum on participants' related activities, problems, and solutions
- Solicit your input into a national study of STEM education networks
- Open the discussion for networking among the participants

Why STEM?

- Economy
- Innovation
- Opportunity
- Engagement
- Informed Citizenry

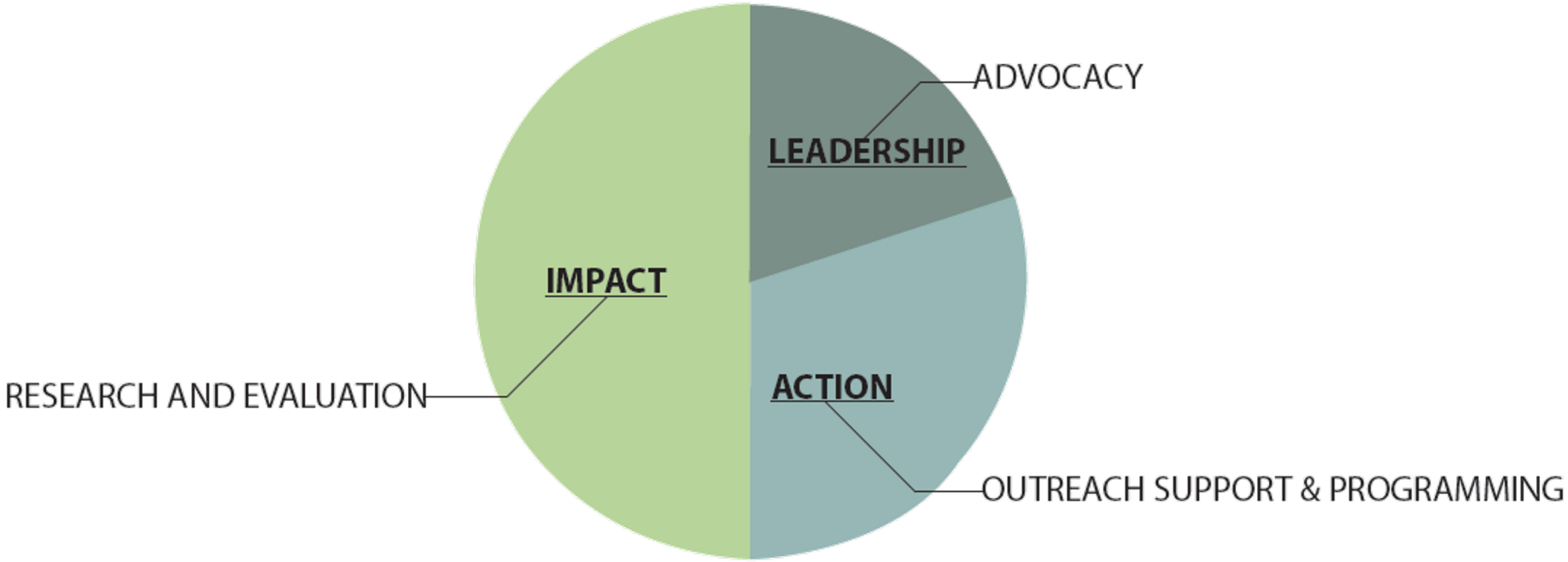


History of CRSE

- 2002: Launched as VT-STEM by the College of Human Resources and Education and the Office for Outreach and International Affairs
  - Mission: Visibility, Partnerships, Faculty Support
  - School-University focused
- 2010: Shifted to a regional initiative
- 2012: Engaged economic development sector
- 2015: Shifted to a university center, based in an institute
  - Catalyst for expanded research on impacts on P-20 education
  - Engaged in national networks to advance STEM ecosystems
  - Serving as the university's "go-to" office for organizing P-12 activities for maximize impact on STEM education

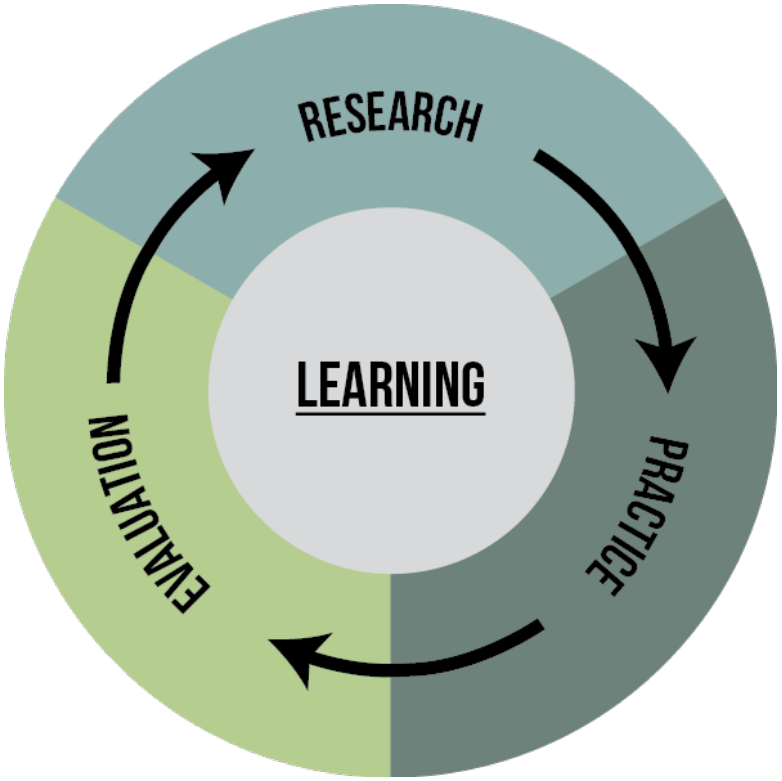
Vision

The university's mechanism for research of formal and informal PK-12 STEM education.



Impact

To produce evidence-based contributions through a cycle of research, practice and evaluation.



Action

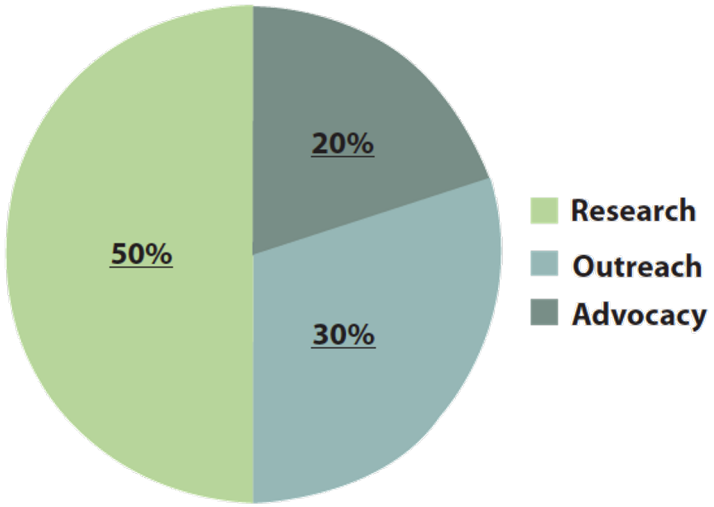
- ***Research and evaluation*** support, coordination, and dissemination
- Broker ***partnerships*** among stakeholders to advance broader impacts
- Bring ***visibility and access*** to high quality STEM PK-12 learning experiences, innovations, and opportunities across the Commonwealth
- STEM-network ***leadership*** for policies, practices, programs, and people.
- ***Outreach*** programs (i.e., *Virginia Tech Week of Science*, *Kindergarten-to-College*, *ICAT Day*)

Advocacy

- National
  - National Alliance for Broader Impacts (NSF)
  - STEM Centers Network (APLU)
  - Statewide STEM Networks Inventory (NSEC)
  - FabLab for Early Childhood Learning
- State
  - Secretary of Education
  - VA DOE Strategic Review of CTE Programming
  - Governor's Standards of Learning Innovation Committee

Staff/Funding

- Staff
  - Director
  - Research team
  - Outreach coordinator
  - Evaluation coordinator
  - Students
  - Teacher in residence, MCPS
- Funding sources
  - Base operating – univ.
  - Contracts
  - Grants



Stakeholders

- Institute for Creativity, Arts, and Technology
- VT colleges and institutes
- Virginia's PK-12 schools
- Community colleges
- Roanoke-Blacksburg Technology Council
- Chambers of Commerce
- Governmental agencies
- Community organizations

5-Year Strategic Plan

- Key features of first 3 years…
  - Create an inventory of past 5 years of VT P-12 STEM programs
  - Create messaging and marketing plans
  - Meet face-to-face with all key stakeholders
  - Create the beta version of the data base (impact)
  - Formalize P-12 and industry/agency partnerships
  - Create a plan to attract affiliates
  - Diversify revenue streams
  - Develop an advancement plan
  - Continue engagement with government offices, etc.

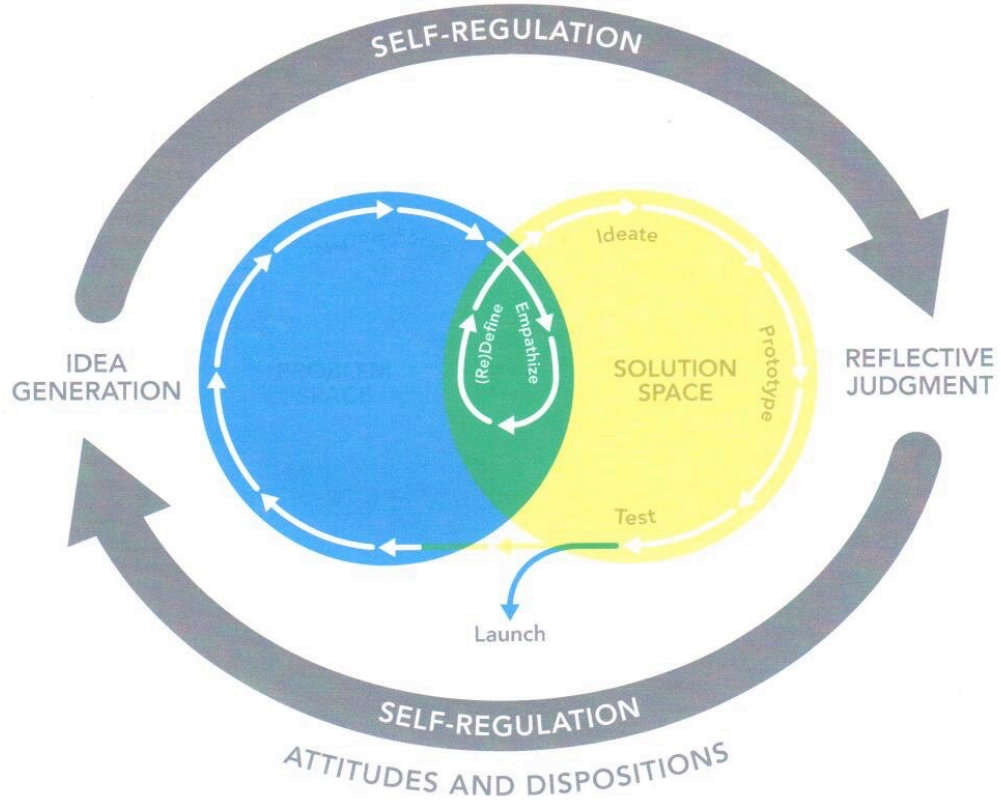
By the 5th Year…

- Develop the infrastructure and capacity (personnel and budget) to function up to 50% on earned income
- Finalize data system
- Conduct longitudinal analyses
- Emerge as national leader
- Maintain partnerships

Critical and Creative Thinking by Design

Courtesy of IDEA Studio, Institute for Creativity, Arts, and Design

The Relationship between Critical and Creative Thinking



Process Elements

- Idea Generation
- Reflective Judgment
- Self-Regulation
- Attitudes and Dispositions
- Problem Space
- Solution Space

Design Thinking

- Narrow the focus: Conceptualize, analyze, hypothesize, recognize challenge and relevance
- Empathize: Examine new ways, question, judge value/worth; embrace multiple viewpoints
- Define: analogical and metaphorical thinking, elaborate, summarize, just resources and logic
- Ideate: brainstorm, understand ability and consequences; tolerate ambiguity
- Prototype and test: Explore, allocate resources, revise, take risks, exhibit courage
- Launch: Evaluate process and product, judge value/worth, take risks

Sample Activity

- Design a STEM Education network for your region; goal to promote access to high quality STEM education for all citizens
  - Narrow the focus
  - Examine new ways
  - Define what it would look like (optimally)
  - Ideate: play out how it would work, who would be a part of it, what folks would do, how it would be sustainable, etc.
  - Develop a draft plan; share it with stakeholders; revise, etc.
  - Launch with a STEM summit/conference

Data System

- Purpose: To assess impact of VT P-12 education/outreach programs
- Input from VT and partner offices to determine baseline
- Input from VT and partner offices to determine their data and reporting needs
- Meeting with VT IT personnel to determine capacity and security needs
- Identifying first set of elements/variables to assess

Partnership Development

- Identification: Inclusive, open events, self-selection
- Needs assessment
- Determination of mutual benefits
- Determination of commitment/capacity
- Identification of key individuals in organization
- Development of communication system
- Development of short- and long-term plan
- Celebrate small victories

MOU Development

- Need for memoranda of understanding
- Who
- What
- Where
- How
- When
- Who pays
- Who supplies what data, how, etc.
- Who accesses the data, when, etc.

Evaluation Plans

- Purpose/Goals of event
- Creation of logic model: details capacity and outcome/expectations
- Share with stakeholders
- Agree on how results are shared and with whom
- Develop evaluation tools
- Conduct event or program
- Collect information
- Analyze/evaluate results

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Logic Model

Inputs	Activities	Outputs	Outcomes (Near-term)	Impacts (Mid- to Long term)
Human, financial, organizational, and community resources needed to achieve the program's objectives	*Things the program does with the resources to meet its objectives (specificity!)*	*Direct products of the program's activities; evidence that the program was actually implemented*	*Immediate changes in participants as a result of the program; may include knowledge, skills, behavior, status, and level of functioning*	*Mid- or long- term changes in participants as a result of the program; may include knowledge, skills, behavior, status, and level of functioning* *Intended or unintended changes that occur in the organization or community as a result of program activities later*

Outreach Programs

- Week of Science:
  - School Preview Day
  - Maker Festival
  - Art Venture Day
  - STEM Summit
  - VT Science Festival
- ICAT Day
- Maker Camp
- Partnership with Science Museum of Western VA
- Others based on grant partnerships

Time to Reflect

- Take a moment to identify questions, comments, suggestions, concerns, etc.
- Open discussion
- Problem solve with session participants
- Next steps?

Statewide STEM Networks

- Shine a light on your networks
- Please write down any networks in which you engage
  - Nature of your engagement/role
  - Nature of the outcomes, successes, challenges
  - Your next steps

Final Thoughts?

- Questions?
- Comments?
- Suggestions?
- Next Steps?

Thank you!

Enjoy the Conference!