Broadening the STEM Pipeline for Rural Students

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Rural Summit
College of William and Mary
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Introduction of Panelists & Discussants

Elizabeth Crowther, President of Rappahannock Community College

Melinda Davis, Director, STEM Education, University of Idaho

Meredith Kier, Assistant Professor, College of William and Mary

Robert Martinez, Assistant Professor, University of North Carolina at Chapel Hill

Steve Parker, Superintendent, Lancaster County (VA) Public Schools

Finbarr [Barry] Sloane, Program Director, The National Science Foundation

STEM Career Readiness and Preparedness

- Preparedness = academic knowledge and skills levels in reading & math
- College Eligible = understanding of admission requirements
- Career and College Ready
  - Key Cognitive Strategies
    - Problem formulation, research, interpretation, communication, precision & accuracy
  - Key Content Knowledge
    - Key foundational content & “big ideas” from core subjects
  - Academic Behaviors
    - Self-management skills: time management, study skills, goal setting, self-awareness, and persistence
  - Contextual skills & Awareness
    - Admissions requirements, college types and missions, affording college, college culture, and relations with professors

Questions for Discussants and Audience Members

- How are you defining S.T.E.M. Readiness?
- How do we facilitate S.T.E.M. development?
- How are we creating a multicultural S.T.E.M.-focused pathway for our rural communities?
- How are we investigating and responding to cultural or system barriers to S.T.E.M. development?
- How do we expose, inform, and motivate students to pursue S.T.E.M.?
- How are we familiarizing our staff to S.T.E.M. education and job growth?
- How are we preparing our students to face challenges related to stereotypes and power inequities that they will likely encounter in college and the real world?

Issues and Access in STEM Education

- Performance on S.T.E.M. related NAEP tests in Rural Communities (2005 - 2015)
  - Reading
  - Math
  - Science
  - Technology and Engineering Literacy

- Access to AP coursework (2001-2015)
  - Rural
  - Urban
  - Suburban

Questions for Discussants and Audience Members

- Increasing opportunities to learn:
  - What is the role of technology in the service of learning?
  - What is the role of informal learning settings for STEM (e.g., libraries, etc.)?
- How might we improve performance in STEM content for all rural students?
  - Online university programs (UIUC in the 1990's)
- How might we increase access for those students with an interest in STEM content?
  - EDX/Coursera/FutureLearn/University programs:
    - MOOCS
    - Online certification courses

Cultural Relevance in STEM Learning Opportunities

- Culturally relevant pedagogy = “effective teaching in culturally diverse classrooms”
- Underrepresented students are an untapped resource, especially in rural communities
- Underrepresented students are often 1st generation college students- facing common challenges
- Culturally relevant pedagogy has been shown to be a key factor for student success in STEM.
- Successful programs seem to share these characteristics:
    - Incorporate problem solving, communication, reasoning, and social action
    - Incorporate what is known about a student’s knowledge of their cultures
    - Incorporate student’s prior experiences including current living situation
    - Account for multiple learning styles, and
    - Use multi sensory instructions.

Questions for Discussants and Audience Members

- What does a culturally responsive classroom look like?
- What are some examples of successful programs? Are they adaptable to rural schools?
- What are the key barriers to teachers that want to be culturally responsive?
- How can we address those challenges, especially in rural and under resourced schools?
- How do we build “science identity” or “STEM identity” when role models are lacking?