

WEBINAR

November

17

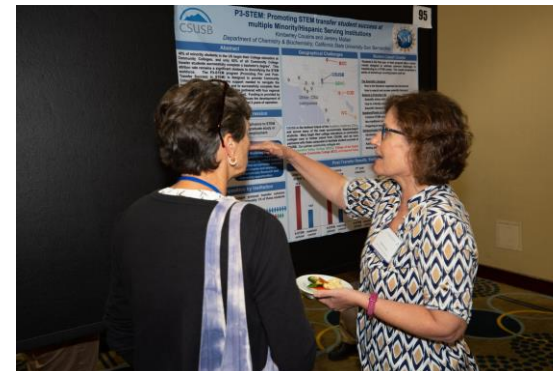
3:30 – 5:00 PM EST

REIMAGINING S-STEM PROJECT ASSESSMENT & KNOWLEDGE GENERATION: 2020 LESSONS LEARNED & FUTURE IMPLICATIONS



AAAS S-STEM Initiative

- Developing an Evidence-Based Best-Practices Community for Supporting Low-Income High-Achieving Students in STEM Education and the Workforce, NSF Grant No. 1832942
- Goals and Objectives:
 - Share effective STEM undergraduate education and workforce preparation strategies
 - Facilitate collaboration/networking across projects
 - Generate a sense of community among those seeking to expand academic opportunities for low-income STEM students
- AAAS S-STEM Initiative Website
<https://www.sstem.aaas.org/>



Project Team



Iris R. Wagstaff
S-STEM Initiative Lead
AAAS STEM Program Director



Allison Gonzalez
AAAS Program Associate



Kate Winter
External Evaluator



Gabbi Haynes
External Evaluator

Advisory Board Members:

Karen Wosczyzna-Birch - *State Director, CT College of Technology*

David Brown - *Professor of Chemistry, Southwestern College*

Kelly Mack - *VP for Undergraduate STEM Education and Executive Director of Project Kaleidoscope, AAC&U*

Yvette Pearson - *Associate Dean for Accreditation, Assessment, and Strategic Initiatives, Rice University*

Ivory Toldson - *President & CEO, Quality Education for Minorities (QEM)*

NSF Staff



Dr. Alexandra Medina-Borja
Program Director, NSF DUE



Dr. Michael J Ferrara,
Program Director, NSF DUE



Dr. Thomas D Kim,
Program Director, NSF DUE



Glenda Valdez, *Science Assistant, NSF DUE*

Speakers:



Kavita Mittapalli, *CEO,*
MN Associates



Carol Cutler White,
Assistant Professor,
Mississippi State University



WEBINAR

**REIMAGINING S-STEM
PROJECT ASSESSMENT &
KNOWLEDGE GENERATION:
2020 LESSONS LEARNED &
FUTURE IMPLICATIONS**

NOVEMBER 17, 2020 3:30 - 5:00 PM EST

Reimagining S-STEM Project Assessment & Knowledge Generation: 2020 Lessons Learned & Future Implications

Kavita Mittapalli, Ph.D.

MN Associates, Inc.

November 17, 3.30-5PM EST

Part I

Agenda (30 minutes)

- S-STEM grants
- Polls
- Assessment, Research, and Evaluation at the time of Covid-19
- Pivoting
- Study findings
- Lessons learned
- Some questions remain
- Share and care activity
- Qs and As

S-STEM Projects (Evaluator)

- **Broward College** - Scholarship Targeting Recruitment of Individuals for Degrees in Environmental Sciences (STRIDES) Program (2016-2021) (Award No. 1564652) Track 1
- **Pellissippi State Community College** - Student Scholarships in Science Technology Engineering Mathematics (SuCCESS in STEM) (2017-2020) (Award No. 1564619) Track 1
- **University of South Florida & Polk State College** - Transfer Undergraduate Rural/Non-traditional Student Pathways through Identity, Knowledge & Engagement (TURNPIKE) (2020-2025) (Award No. 2030861) Track 2
- **University of Louisville, KY** - Boosting Low-Income Students for Success in Computer Science and Engineering (BLISS-CSE) (2020-2025) Track 1

Acknowledgements (Clients)

- Dr. David Serrano (PI) and Christine Sammon (Co-PI) – Broward College (FL)
- Dr. Christopher Milne (PI) and Kane Baker (Co-PI) – Pellissippi State College (TN)
- Drs. Sanjukta Bhanja (PI) and Will Tyson (Co-PI) – University of South Florida and project team at Polk State College (FL)
- Dr. Wei Zhang (PI) – University of Louisville (KY)

Acknowledgments (MNA team)

- David Keyes, Ph.D. (Associate)
- Helen Levy Myers, MBA (Associate)
- Neha Pankow, Ph.D. (Associate)*
- Dia Adams, M.A. (Associate)
- Nina de las Alas (M.A.) (Senior Associate)

*AAAS Science Policy Fellow



Poll_1

Who is:

- An evaluator of an NSF grant(s) (e.g., S-STEM, IUSE, INCLUDES, Noyce, other)
- An educational Researcher
- A PI
- A Co-PI
- Other (e.g., advisory, steering, industry partner, instructor, staff)

Poll_2

If S-STEM, what's your Track?

- Track 1 (Institutional Capacity Building)
- Track 2 (Design and Development: Single Institution)
- Track 3 (Design and Development: Multi-Institutional Consortia)
- Other (Conference, Supplementary funds, etc)

Poll_3

Are you:

- In a 2-year college
- In a 4-year institution
- A consultant/R & E firm

When COVID Hit

- Campus closures in March-April
- Switch to online teaching and learning
- Pause in data collection
- Pause in communication/meetings

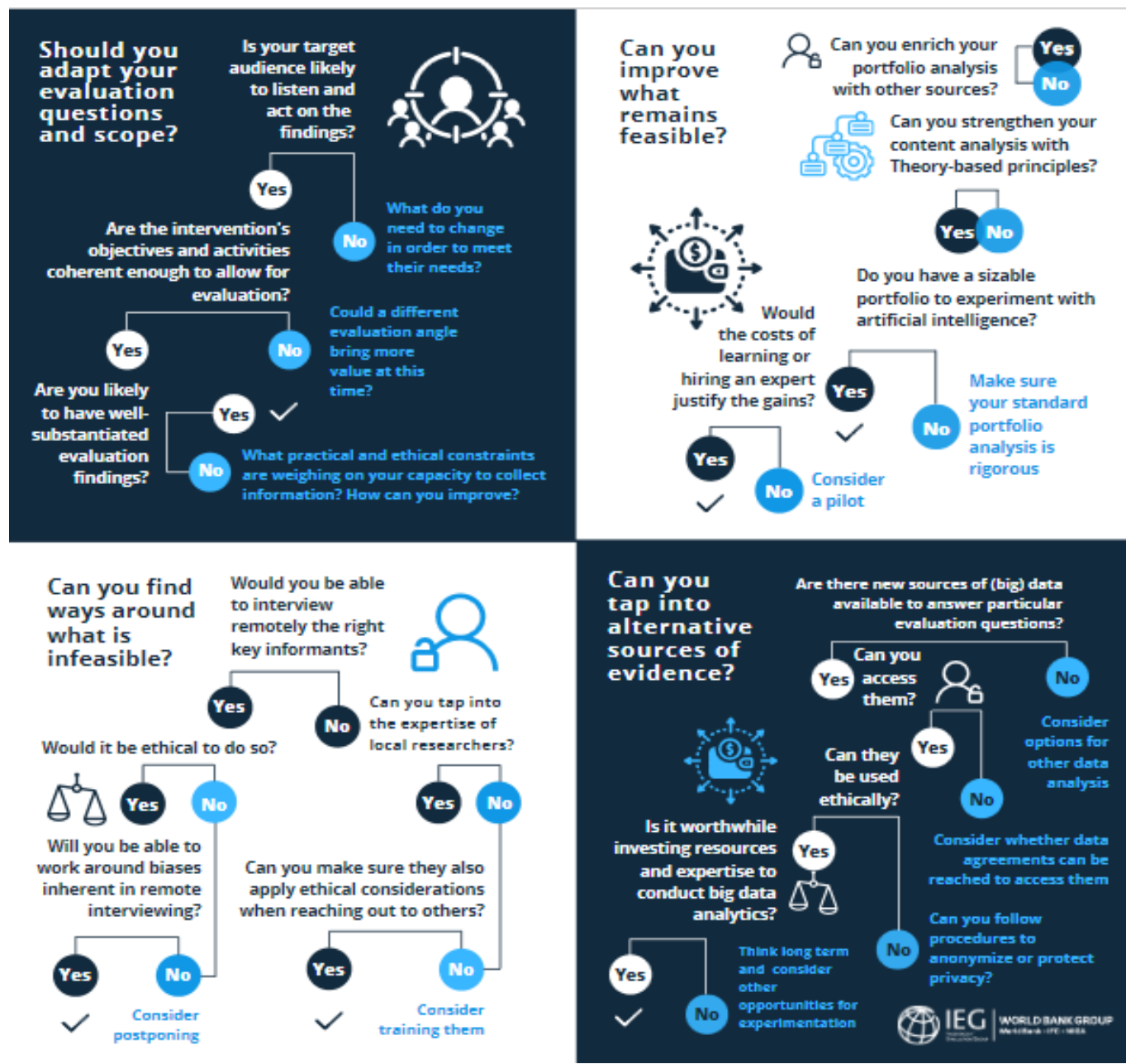
- Re-group (with team and clients)
 - Communication (internal and external)
 - (Re-) Strategize (internal and external)
 - Colleges went virtual and so did evaluation
- **PIVOTING BECAME THE NEW BUZZWORD**

Planning/Re-grouping

Asking critical questions (Source: IEG World Bank)

- Should we adapt our evaluation questions, scope of work, and deliverables?
- How can we improve what remains/seems feasible?
- How, if at all, can we find ways around what is not feasible?
- How, if at all, can we tap into alternative sources of collecting data / evidence?
- How do we still meet the deadlines with the data we have/collected that respond to the evaluation questions?

Adapting evaluation design in times of COVID-19: A Decision Tree



Challenges in Evaluation

- Unclear timelines for spring data collection when campuses closed (March-April)
- Spring data collection changes (e.g., site visits, focus groups, interviews, on site observations, Advisory/Steering committee meetings)
- Data access and timelines for July / August end reporting
- Tracking student data (Institutional Research), Drop outs, Scholarships
- Mentoring and advising logs (in virtual teaching and learning)
- Unclear general evaluation needs and expectations

Things (still) got done!

- Covid impact survey just before and after classes went online
- Virtual professional development, summer PD across campuses
- Virtual STEM conference(s)
- IRB approval (or amendment) for new data tools & instruments
- Online surveys (timeline adjustments)
- Virtual advisory and steering committee meeting(s)
- Drive-by student success advisors (on campus)
- Open and regular communication with PI, Co-PIs.
- (Re-) Setting expectations
- Clarity on reporting deadlines

Covid Impact Survey (Before and After)

- On a Likert-scale (*Very unconcerned, Somewhat unconcerned, Neutral, Somewhat concerned, Very concerned*) students (N=12) were asked about their comfort level with different aspects of taking online classes **before** and **after** the pause due to COVID-19.

Before (Very concerned)

- Time management 42%
- Learning asynchronously 25%
- Social isolation 25%

Comfort Level of Online Classes After COVID Forced the Move to Online Classes

Even though all students said COVID-19 significantly or somewhat increased their stress levels, only one student dropped a class after the move to online and only one student did not pass all of their classes.

75 percent of the students studied the same amount of time or more time as before virtual learning.

At the end of the semester, about 42 percent were very comfortable or somewhat comfortable with online classes.

The only issue about which an increased number of students responded that they were very concerned about with online classes was social isolation (30%).

Student Comments

- *Most of my instructors were incredible.*
- *I believe everyone (faculty and staff) did the very best they could given the severity and suddenness of the situation. Overall, the platform used for remote learning exceeded my expectations.*
- *I think a few of my professors got stressed too! Other professors flawlessly transitioned and I did well in those courses.*

Faculty Survey – COVID Impact

Faculty members were asked how they “provided academic support to students given that everything shifted to online teaching due to COVID-19?” (n=7)

- *I give students my cell phone and allow them to call/text me 24/7.*
- *Times to take tests were lengthened.*
- *I made multiple videos to help explain difficult concepts in class.*
- *The lectures were recorded and posted in the course shells. Virtual office hours were conducted. Students are encouraged to form groups and discuss the course content.*
- *Virtual meetings through Black Board Collaborate or Zoom.*
- *I recorded all my lectures and met with them via Blackboard Collaborate to go over questions and quantitative problems.*

Faculty Survey – COVID Impact...Contd.

They were also asked what worked well when moving online and what were the challenges.

- *The most difficult issue is to keep students from cheating while completing online tests and assignments.*
- *Virtual office hours were attended by all the students to share their concerns. Students indicated they miss the peer-to-peer interactions.*
- *Seem to work well. But, I wish we had part-time options.*
- *Recording lectures in advanced worked really well. The challenges were to be able to assess them while keeping the integrity of my exams.*

(Many) Evaluation Lessons Learned....Ongoing

- Ask questions, seek clarity
- Regular check-ins (bi-monthly calls), emails
- Communicate data collection challenges and changes, needs
- Plan data collection without over burdening students, faculty/instructors, others
- Document as much as you can/able
- Communicate clearly and regularly
- Cooperate, Collaborate
- Be flexible

What does the future hold for evaluation / research....moving forward

- What if the “new normal” continues?
- Online/hybrid teaching and learning
- Ways to curb social isolation issues
- Online mentoring, advisement, and academic services
- Internships
- Research and lab opportunities
- Wrap-around services – on and off campus

Share and Care Activity



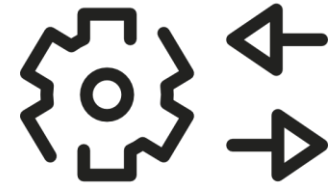
Creativity
&
Flexibility



Mindful of
Different
Perspectives and
Contexts



Focus on
the Future



Change is
Constant

Poll_4 (2 minutes)

- **What is the current state of your grant project's implementation?**
 - Objectives/Activities/Tasks

STATUS

- **In progress**, on track for completion on time (1)
- **In progress**, on track with some evaluation modifications (2)
- **Behind schedule** (3)
- **Not yet started** (0)

Troubleshooting Exercise (8-10 mins.)

- **Technical** = Relating to a technological problem/online teaching and learning and/or data collection
- **Process** = Relating to institutional / campus policies and processes
- **Health and Environment** = Relating to colleges/universities or state policy or changes to community or participant demographics, DEI, and civic unrest
- **Resource** = Relating to equipment, material, and/ or personnel/staff
- **Other(s)**



THANK YOU!

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Useful Resources

- *Kavita Mittapalli, Ph.D.*
Writing the Research (Knowledge Generation) and Program Assessment/ Evaluation portions in NSF grants
<https://hsistemhub.org/portfolio-item/august-2020-newsletter/>
- *Kirk Knestis, Ph.D.*
<https://aea365.org/blog/kirk-knestis-on-innovation-research-and-development-rd-vs-program-evaluation/>
- *Patricia Rogers, Ph.D.*
[https://www.betterevaluation.org/en/blog/framing the difference between research and evaluation](https://www.betterevaluation.org/en/blog/framing_the_difference_between_research_and_evaluation)



REIMAGINING S-STEM PROJECT ASSESSMENT & KNOWLEDGE GENERATION

2020 Lessons Learned & Future Implications

STEM Evaluation Background

- Practitioner/Scholar
- National Science Foundation, U.S. Department of Labor, U.S. Department of Education, private foundation grants



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Knowledge Generation

Principal Investigator

Gaining Early
Awareness and
Readiness for
Undergraduate
Programs (GEAR UP)

- U.S. Department of Education discretionary grant program focused on low-income and first-generation college students
- STEM and technology priorities
- Direct service, research and evaluation

- University of North Carolina System
 - 2013-2018
 - \$28.4 million
- Mississippi State University
 - 2019-2026
 - \$27.9 million



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Knowledge Generation

Principal Investigator

Gaining Early
Awareness and
Readiness for
Undergraduate
Programs (GEAR UP)

- University of North Carolina System
 - All funds allocated to direct services to 42 middle and 21 high schools in rural areas
- Mississippi State University
 - 50% of funds allocated to scholarships for students in three direct service high schools
 - Over 90% of students served are African American
 - Bottom quintile of income in the U.S.
 - Talented students



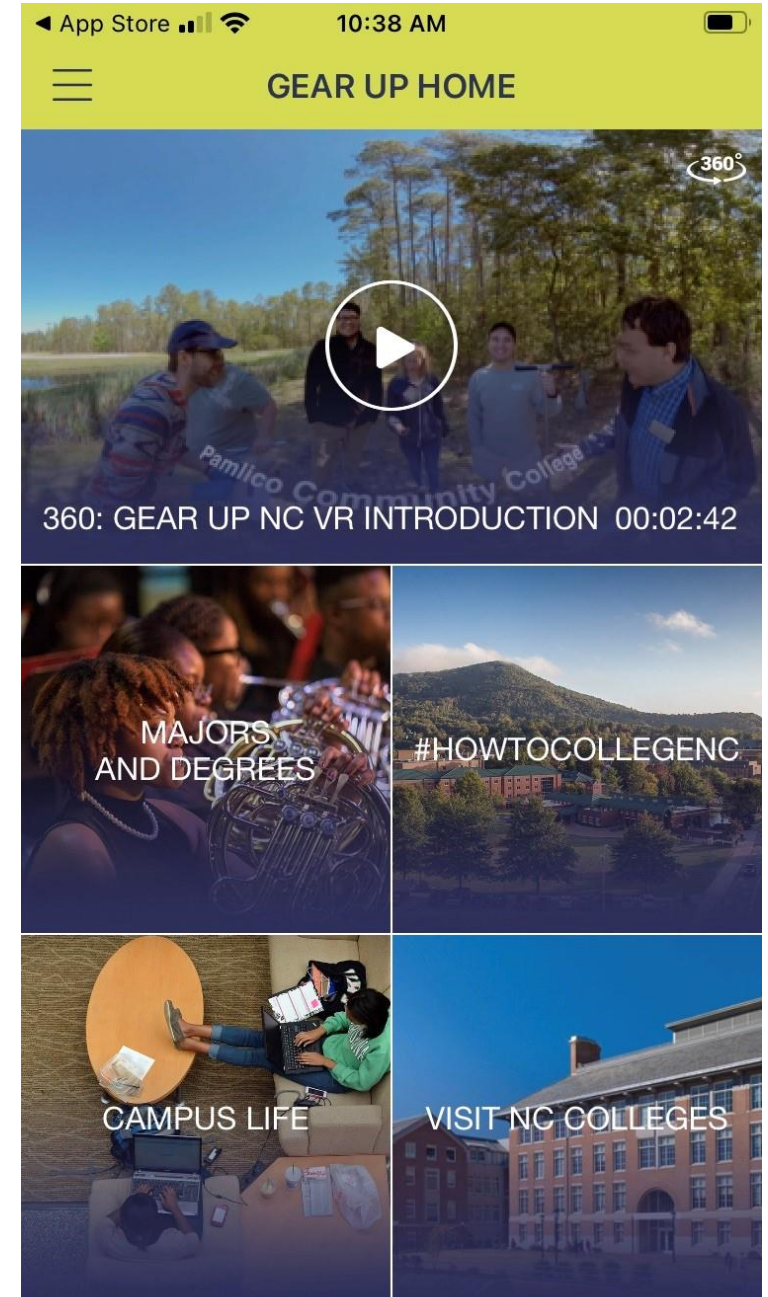
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GEAR UP MS Research agenda

- Virtual reality and artificial intelligence for college decision making and transition support
 - Quantitative (RCT/multilevel modeling) and qualitative research design
 - Motivation and malleable factors in college decision making
- GEAR UP Scholarship and college decision making
 - Quantitative (PSM) and qualitative research design
- Community engagement and college decision making
 - Action research design



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Knowledge
Generation

Principal
Investigator

Community
Conversations
Research

- Corporation for National and Community Service
- Participatory Action Research
 - Photovoice/Q methodology/survey
- Investigating how to engage community members to improve college going among traditionally underrepresented students in the Mississippi Delta
- Three years, \$260,000



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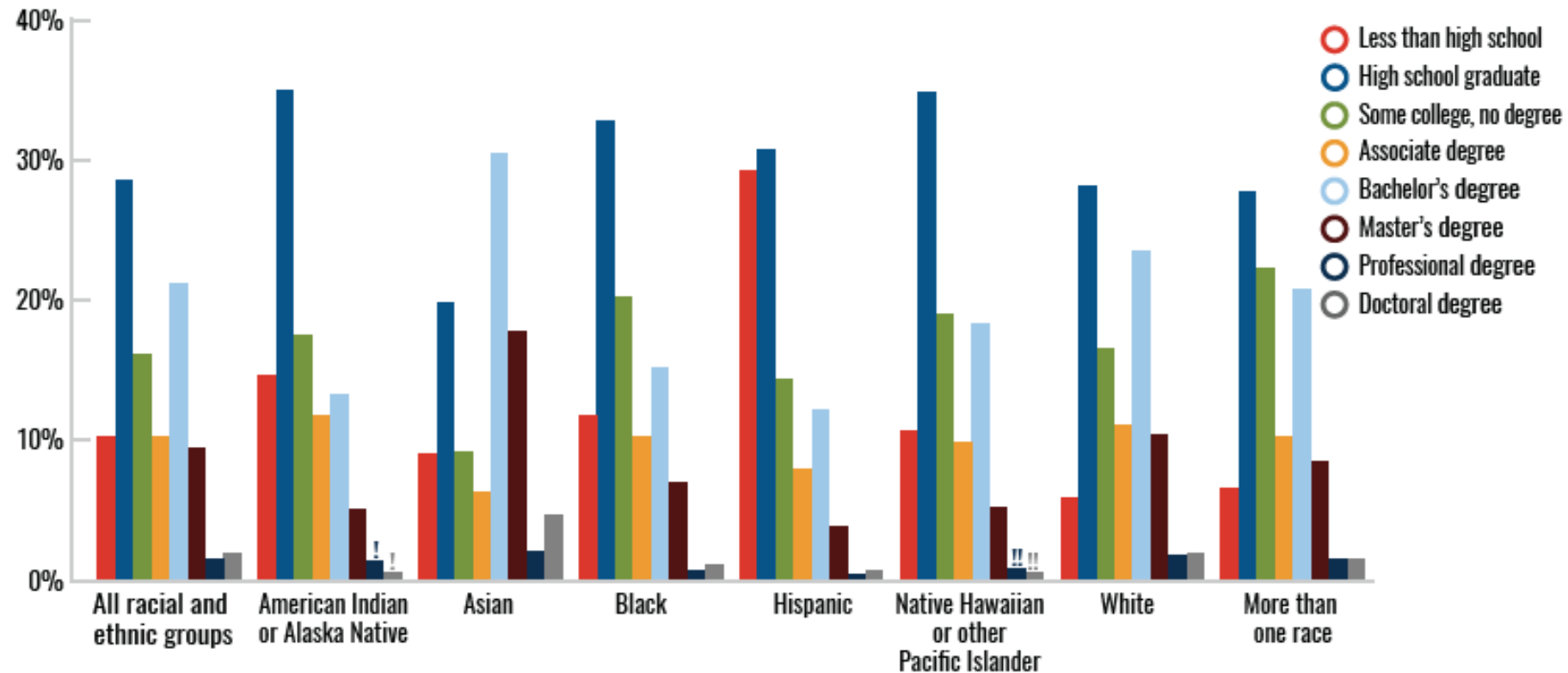
S-STEM KNOWLEDGE GENERATION IN THE AGE OF COVID-19 AND SOCIAL UNREST

What do we know about the STEM pipeline?

- Bachelor degree seeking students concentrated in wealthier districts
- Low-income associated with multiple challenges and barriers
- High school opportunity not equitable
- Low representation of minority students in STEM
- Transfer pathways difficult (Xueli Wang)



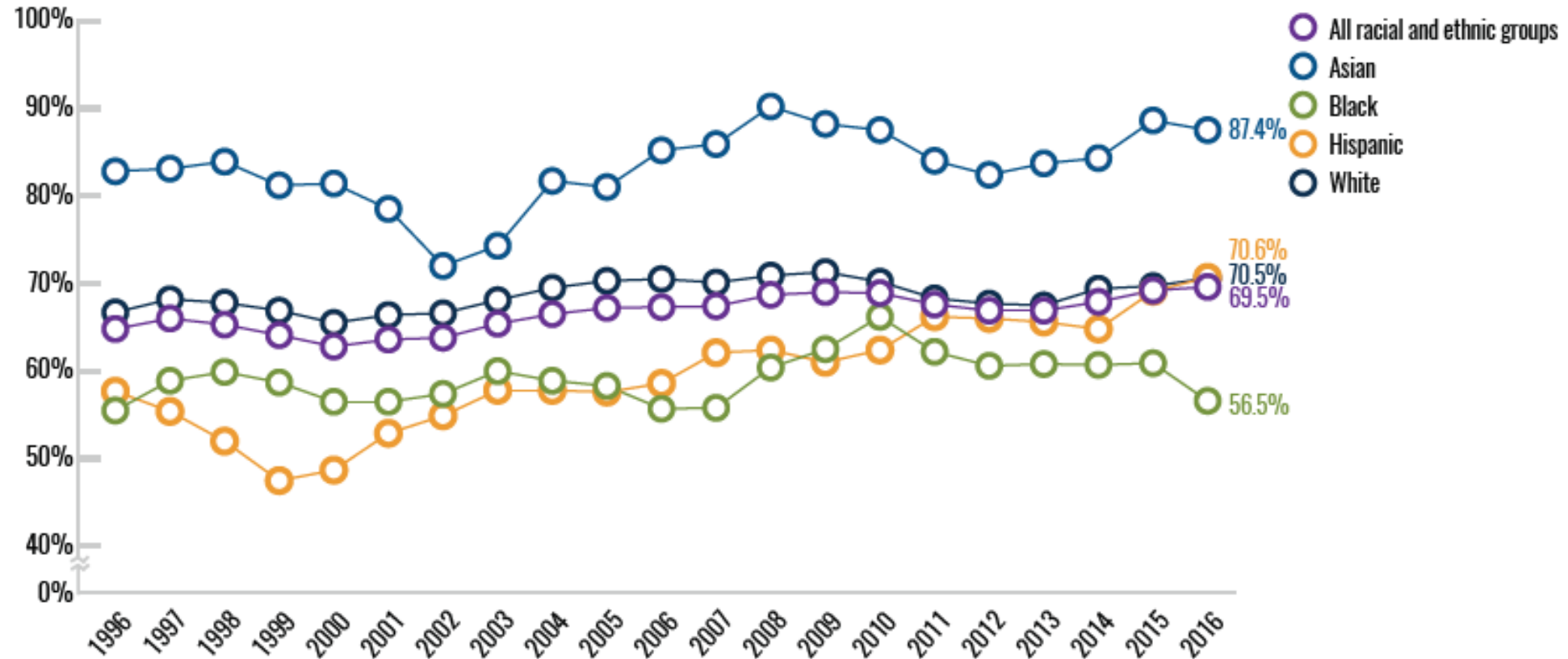
Figure 3: Educational Attainment of Adults Ages 25 and Older, by Race and Ethnicity: 2017



Source: U.S. Census Bureau, Current Population Survey, 2017. Notes: ! Interpret with caution. Ratio of standard error to estimate >30% but <50%. !! Interpret with caution. Ratio of standard error is >50%.

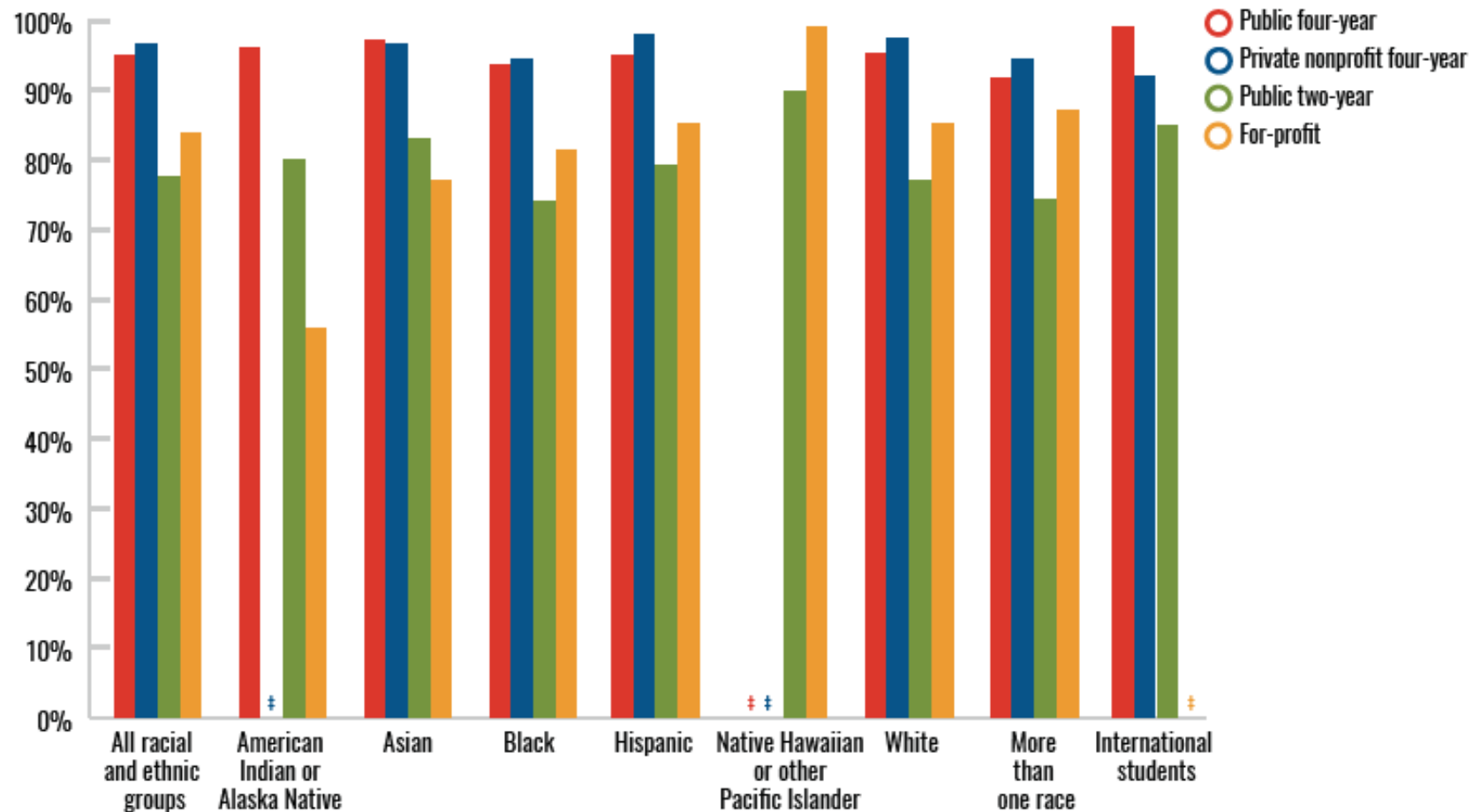
- African American,¹ American Indian or Alaska Native, and Native Hawaiian or other Pacific Islander populations each exhibited low college enrollment rates among secondary school completers of traditional college-going age (see Figure 4) and were a disproportionately older population of undergraduates.

Figure 4: Immediate College Enrollment of Recent High School or Equivalent Graduates Ages 16 to 24, by Race and Ethnicity: 1996 to 2016



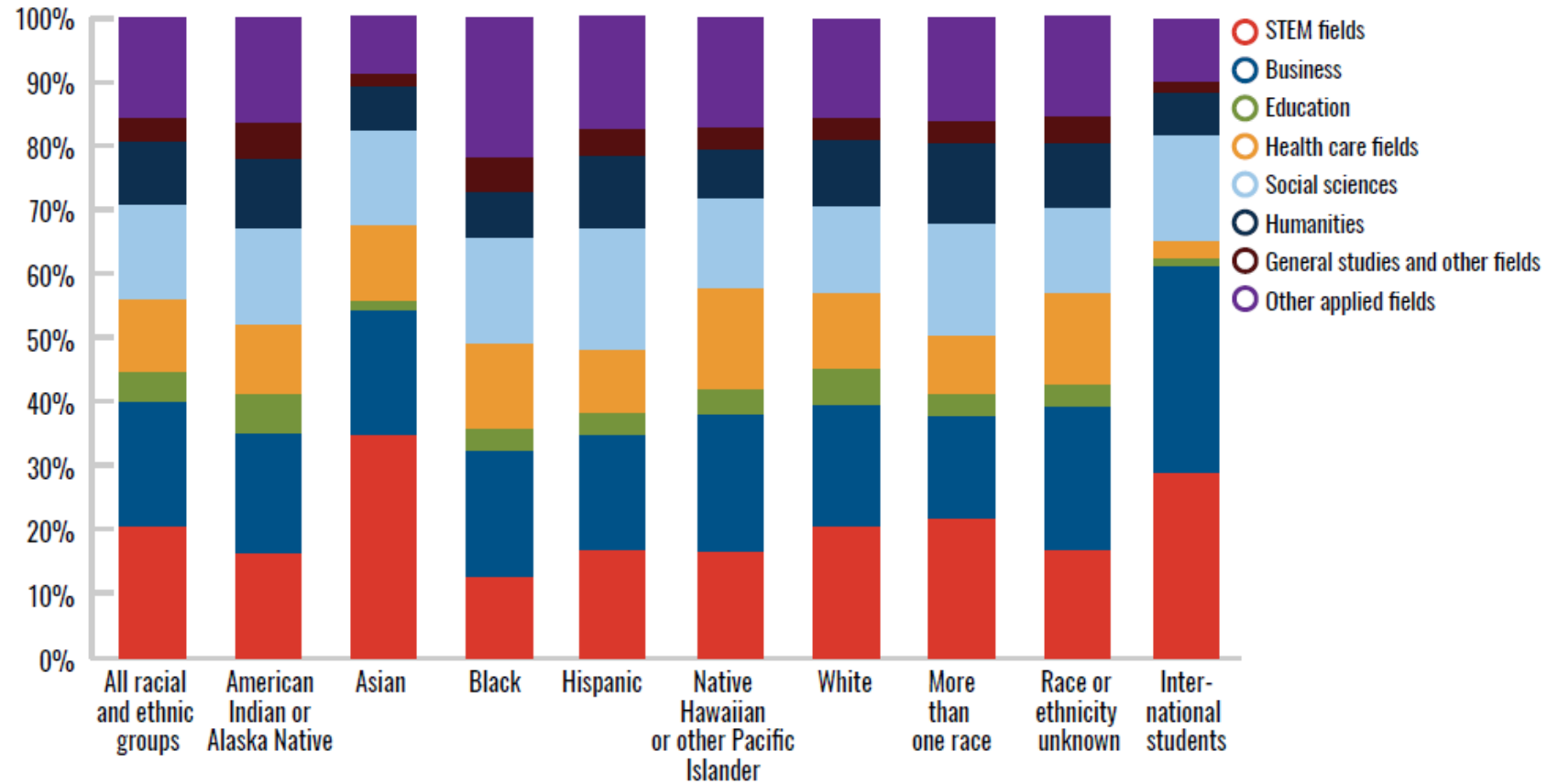
Source: U.S. Department of Education, Digest of Education Statistics, 2017, Table 302.20. Notes: This figure uses a three-year moving average, which is a weighted average of the year indicated, the year immediately preceding, and the year immediately following. For the final year, a two-year moving average is used. Moving averages are used to produce more stable estimates. | "All racial and ethnic groups" includes persons of other racial and ethnic groups not separately shown. | Prior to 2003, Asian included Pacific Islanders. | After 2002, White, Black, and Asian data exclude persons of more than one race.

Figure 5: First-Year Persistence Rates of Bachelor's Degree-Seeking Students, by Sector and Race and Ethnicity: Fall 2011 Cohort



Source: U.S. Department of Education, Beginning Postsecondary Students Longitudinal Study, BPS-12/14. Notes: Institutions were categorized into sectors based upon control of the institution and the length of the predominant award granted. | † Estimate suppressed. Reporting standards not met.

Figure 9: Field of Study for Bachelor's Degree Recipients, by Race and Ethnicity: 2016



Source: U.S. Department of Education, Integrated Postsecondary Education Data System, 2016. Notes: STEM fields include computer and information sciences, engineering and engineering technology, biological and physical sciences, science technology, math, and agriculture. | General studies and other programs include fields such as liberal arts and sciences, interpersonal and social skills, personal awareness and self-improvement, and multi- or interdisciplinary studies, among others. | Other applied fields for bachelor's degrees include personal and consumer services; manufacturing, construction, repair, and transportation; military technology and protective services; architecture; communications; public administration and human services; design and applied arts; law and legal studies; library sciences; and theology and religious vocations.



COVID IMPACTS

- Lower income and minority communities hit hardest
- Inequities of broadband access exposed
- Housing and food insecurity exposed
- Online learning supports sometimes lacking

CURRENT STUDENTS

What do we know about the impacts of COVID 19 on **current** STEM students?



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- Enrollment drop on college campuses
 - Declines for underrepresented minority enrollment range from 19 to 23 percent
 - Declines for white and Asian American students are at about 15 percent.
 - Degree and major information not available

- <https://www.insidehighered.com/news/2020/11/12/enrollment-declines-continue-national-student-clearinghouse-finds>

CURRENT STUDENTS

What do we know about the impacts of COVID 19 on **current STEM** students?



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- Low-income students who are enrolled experience out of classroom challenges
- Hungry to Learn
 - <https://soledadobrienproductions.com/hungerfilm>
- S-STEM students may receive a scholarship, but may still have unmet need

CURRENT STUDENTS

What do we know about the impacts of COVID 19 on **current** STEM students?



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- Current K-12 learning impacted
- Potentially smaller pool of STEM students, especially underrepresented groups
- “Shake out” of higher education threatens low-income students
- S-STEM scholarship more important than ever
- Crisis creates opportunity

FUTURE STUDENTS

What do we know about the impacts of COVID 19 on **future** STEM students?



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- Impact of COVID on STEM jobs and pipeline demand
- Time to degree completion
- Disparities in outcomes for underrepresented populations
- Cultural contexts
- High school to college transitions
 - Reducing summer melt

COVID driving
change in
knowledge
generation
strategy

FUTURE
RESEARCH



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- Effect of COVID on college decision making
- Implications for transfer
- The role of technology in access and success
- Virtual support systems
- Leverage social media

COVID driving
change in
knowledge
generation
strategy

FUTURE
RESEARCH



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- Secondary data sources
- Virtual data collection strategies

COVID driving
change in
knowledge
generation
strategy

Data collection



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RACIAL INEQUITIES AND 2020 SOCIAL UNREST

"This is my 40th year in higher education," she said. "I didn't imagine that 40 years later we would still be having these same conversations ..."

Lori White, President, DePauw University

<https://www.insidehighered.com/news/2020/11/12/liberal-arts-college-presidents-create-diversity-and-inclusion-alliance>

Race and higher education



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HOME | NEWS

Systemic Racism in the Sciences Requires Structural Solutions



21 October 2020

by: Andrea Korte



To meet these challenges, science
needs to be accessible to all...

Sudip Parikh, Executive Officer, AAAS

<https://www.aaas.org/news/systemic-racism-sciences-requires-structural-solutions>



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- Sensitized majority populations to systemic bias
- Focused attention on uneven distribution of funding across institutions serving minority populations
- Exposed and reinforced lack of faculty diversity especially in STEM fields

How did the social unrest of 2020 impact STEM education?



Knowledge generation

(Yvette E. Pearson)

- Retention and student success
- Transfer from two to four-year colleges (if applicable)
- Academic and career pathways
- Degree attainment
- Workforce development
- Low income students in STEM



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Knowledge Generation (S- STEM and general)

Pipeline questions

Structural questions

Process and methodologies of
knowledge generation

Student characteristics

Student supports

- In what ways can the K-12/community college/university STEM pipeline better collaborate?
- To what extent do transfer and articulation agreements propel or constrain student movement through degree programs?
- To what extent did COVID impact student progression?
- In what ways do admissions policies limit STEM enrollment?

Collaboration
across the STEM
pipeline and
programs



- What institutional policies hinder S-STEM students?
- To what extent do technologies such as artificially intelligent chatbots increase retention of STEM students?
- In what ways can institutions leverage technology in recruitment and support of STEM students?
- To what extent do virtual communities and PLCs support S-STEM students?
- What types of virtual internships are most effective?

Foundational,
Early Stage or
Exploratory
Research
Knowledge
Generation



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The time is now

To pursue such research, it is essential that research universities and others receiving federal grant funds explicitly speak to their understanding of the ways that racism pervades our social institutions and their appreciation for research that seeks redress.

*Adam Gamoran
President of the William T. Grant Foundation*



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http://wtgrantfoundation.org/presidents-comment-anti-racist-education-is-essential-for-research-universities?utm_source=WilliamTGrant+Website+Signup&utm_campaign=9aee1c0069-2020guides_COPY_02&utm_medium=email&utm_term=0_a590baf297-9aee1c0069-1204802581

- How can NSF increase the diversity of review panels?
- Do reviewers understand racial issues and the students S-STEM is intended to serve?
- Is there equitable representation on review panels with knowledge of two- and four-year institutions?
 - Open access
 - Moderately selective/regional universities
- Are standards of evidence standing in the way of access to funding for less than highly selective institutions?

Structural Soul Searching

Research focused on change in the S-STEM (and other NSF programs) grant review process



- The PI and co-PI do not have prior NSF support; therefore, they have not demonstrated that they can actually execute the objectives of the proposal. The PI and Co-PI do not have any active grant(s).

Structural Soul
Searching

Reviewers
institutionalizing
the status quo?

2019 application
reviewer
comments



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- The relatively low GPA expected of the scholars is very concerning since a GPA this low may prevent their enrollment in selective programs after transfer. Such a low GPA does not suggest that the NSF expectation of “academically talented” is being met. It is suggested that a revised plan require a higher GPA.

Structural Soul Searching

Reviewers
institutionalizing the
status quo?

2019 application
reviewer comments

Methods for consideration

- Critical methods
- Action Research
- Q Methodology
- Others



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- The Evidence Act makes changes to the way the government generates and integrates information into its various policy processes including regulation.
- Learning agenda and collaborative programs
 - Education and NSF programs in interdisciplinary research
- <https://www.brookings.edu/research/agency-learning-agendas-regulatory-research/>

Evidence-Based Policy Act

Opportunity for Cross-Agency Collaboration



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Invitation

- Knowledge Generation Collaborators
 - VR/AI
 - Community engagement
 - STEM education
 - Scholarship
 - carol.cutler.white@msstate.edu



Hope and Change

Removing barriers to STEM progress

Part III

OPEN CHAT

Open chat (30 mins)

Q1: How are you **pivoting** (or have pivoted) your education research and/or evaluation?

Q2: What (new) knowledge generation questions have you developed?

Q3: What have been some good practices and unexpected outputs or even outcomes for your project?

Q4: What are some of the challenges that you have encountered as a researcher and / or evaluator?

Q5: What does future of research/evaluation looks like for 2021 and beyond?

Open chat (6 mins)

Q1: How are you **pivoting** (or have pivoted) your education research and/or evaluation?

Open chat (6 mins)

Q2: What (**new**) knowledge generation questions have you developed?

Open chat (6 mins)

Q3: What have been some **good practices** and **unexpected outputs** or even outcomes for your project?

Open chat (6 mins)

Q4: What are some of the **challenges** that you have encountered as a researcher and / or evaluator?

Open chat (6 mins)

Q5: What does **future of research/evaluation** looks like for 2021 and beyond?