

FY23 MINORITY UNIVERSITY RESEARCH AND EDUCATION PROJECT (MUREP) OUTCOME ASSESSMENT REPORT BRIEF

CALL TO ACTION: UNDERSTANDING OUTCOMES OF MUREP ACTIVITIES

This report brief presents the results of the full-scale administration of the [Minority University Research and Education Project \(MUREP\)](#) Outcome Assessment. The overarching purpose of this outcome assessment was to help NASA understand the outcomes the MUREP activities are achieving. This current study builds upon the evidence-based foundations of Phase I and II MUREP Portfolio Evaluation ([Figure 1](#)).

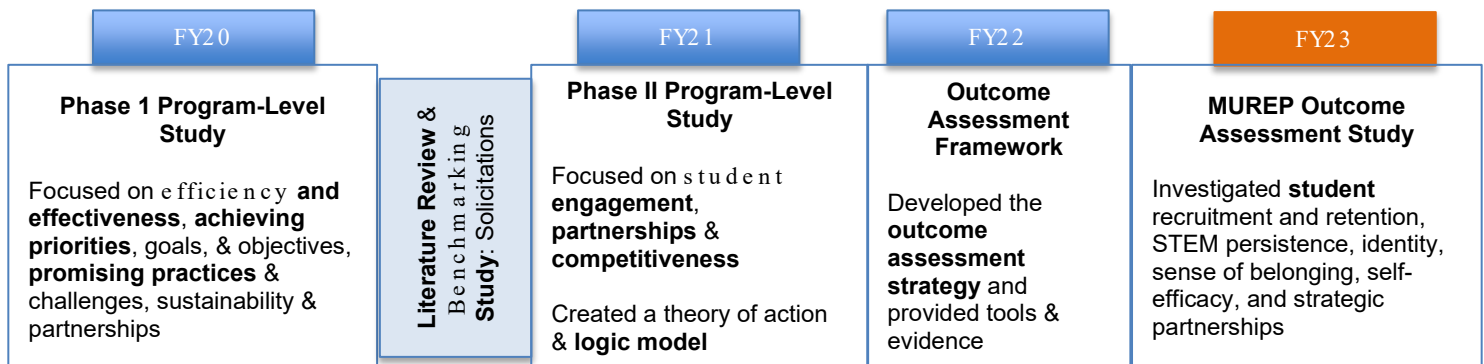


Figure 1. Evidence-Based Foundations for the FY23 Outcome Assessment

Specifically, the FY23 Outcome Assessment was designed to address the following guiding questions:

1. How and to what extent are MUREP-funded activities recruiting student participants?
2. How has participating in a MUREP-funded activity supported student STEM identity?
3. How has participating in a MUREP-funded activity supported student sense of belonging?
4. How has participating in a MUREP-funded activity supported student academic self-efficacy?
5. How and to what extent are MUREP-funded activities retaining student participants?
6. How and to what extent are MUREP-funded activities supporting student conversion to the STEM workforce?
7. How and to what extent are strategic partnerships helping to broaden participation of Minority Serving Institutions?
8. How and to what extent are strategic partnerships helping to broaden participation of students from historically underrepresented and underserved communities?
9. How are MUREP strategic partnerships helping to increase the STEM workforce?

METHODOLOGY

The study used a convergent mixed-methods design, including both quantitative and qualitative data (see [Figure 2](#)) to provide a more complete understanding of the evidence (Creswell & Plano Clark, 2018). Current MUREP-funded activities and awardees were included in this study if they had been in operation



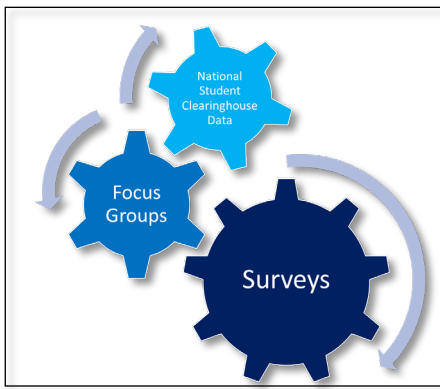


Figure 1. Mixed-method approach participated in focus groups.

for at least one full year and the MUREP Leadership team approved their inclusion. The activities included in the outcome assessment represent the four pillars of MUREP and study participants included MUREP activity managers (AMs), awardee principal investigators (PIs), and student participants.

MUREP AMs, PIs, and student participants from the selected MUREP activities were recruited to participate voluntarily in surveys and focus groups. The sample consisted of 7 AMs, 34 PIs, and 332 students who responded to surveys. From those who participated in the survey, a total of 2 AMs, 11 PIs, and 31 students

STEM Identity
Do students see themselves as someone who can be a STEM professional?

The survey instruments used in this study were created based on the evaluation questions of this study. Survey questions were focused on student recruitment and retention, STEM identity, student sense of belonging, academic self-efficacy, and STEM persistence. Focus group and interview questions allowed for deeper understanding of responses received to survey questions.

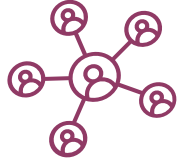
Persistence
Do students continue in a STEM major? Do students graduate with a STEM degree?

Additional data were collected from the [National Student Clearinghouse \(NSC\)](#) to compute persistence and graduation rates for students who participated in MUREP-funded activities. The NSC is an educational nonprofit organization that provides enrollment and degree verifications as well as educational outcome research services to education and

workforce communities. The NSC data collection efforts track college enrollment including class level (e.g., first year, second year, etc.), enrollment intensity (full-time, half-time, etc.), major, graduation status, and other student-level data. The data sample from the NSC included 3,251 students.

FINDINGS & RECOMMENDATIONS

The findings and recommendations from this study have been organized into five constructs: recruitment, student measures, college persistence and graduation rates, STEM workforce, and strategic partnerships. Below is the presentation of the findings and recommendations as well as the implications for practice.

<p align="center">RECRUITMENT (FINDINGS)</p> <ul style="list-style-type: none"> • Networks, personal relationships, communication, and connections with professors strengthen recruitment and students’ sense of belonging 	<p align="center">RECRUITMENT (RECOMMENDATIONS)</p> <ul style="list-style-type: none"> • Prioritize recruitment of diverse students Minority students are underrepresented among MUREP participants • Highlight to mentors the importance of mentor recruitment to engage student participants • Communicate to mentors and students the benefits of participating in MUREP-funded activities
<p align="center">Recruitment</p> 	



STUDENT MEASURES (FINDINGS)

- Students felt respected, welcomed, and valued in the STEM and NASA communities
- Peer and educator collaborations increased student self-efficacy and perceptions of future success in chosen field
- Consistent participation (i.e., three or more semesters) in authentic hands-on MUREP learning activities was associated with increased STEM identity, sense of community in NASA, and desire to pursue a STEM career
- No differences were evident based on student gender, race, and class levels (e.g., first year, second year) on STEM identity, sense of belonging, or self-efficacy. Results suggest that participating in MUREP-funded activities supports positive socio-emotional outcomes regardless of gender or race



Student Measures (Recommendations)

- Sustain the welcoming, positive, and respectful environments that are evident across MUREP activities
- Continue to create hands-on, authentic, collaborative learning opportunities
- Encourage students to participate across multiple semesters



Student Measures

COLLEGE PERSISTENCE AND GRADUATION RATES (FINDINGS)

- First-time, full-time, first-year students who initially enrolled at 4-year institutions and participated in MUREP-funded activities persisted to their second academic year (AY) at higher rates compared to the national persistence rates across all seven cohorts examined in this evaluation study beginning with 2015-16 AY to 2021-22 AY cohorts
- Six-year graduation rates for first-time, full-time Freshmen who initially enrolled at 4-year institutions and participated in MUREP-funded activities were higher than the national six-year graduation rates for 2015-16 AY and 2016-17 AY cohorts

COLLEGE PERSISTENCE AND GRADUATION RATES (Recommendations)

- Continue encouraging positive mentor/student relationships
- Encourage students to continue MUREP participation across multiple semesters



College Retention & Graduation Rates

STEM WORKFORCE (FINDINGS)

- MUREP-funded activities encourage students to continue in the STEM pathway
- Collaboration with STEM professionals through MUREP increases student desire to pursue STEM careers
- MUREP activities support student STEM identity and alignment with STEM professionals

STEM WORKFORCE (RECOMMENDATIONS)

- Use the NASA STEM Gateway system to collect longitudinal data within MUREP activities
- Consider how to use the NASA STEM Gateway to register students of all ages to support longitudinal tracking across activities
- Consider collecting multiple email addresses (school and personal) for possible future communications and studies regarding STEM pathway journey
- Consider incentivizing participation in longitudinal studies

STEM Workforce



STRATEGIC PARTNERSHIPS (FINDINGS)

- Partnerships were reported with government entities, institutions, community organizations, and business/industry
- Partnerships support MUREP outcomes including:
 - Broadening participation of MSI institutions
 - Broaden participation of students from communities underrepresented and underserved in STEM
 - Providing pathways for STEM workforce entry

STRATEGIC PARTNERSHIPS (RECOMMENDATIONS)

- Continue to engage in and pursue strategic partnerships.
- Consider providing recognition for successful partners.
- Offer technical assistance to help with challenges associated with strategic partnerships



Strategic Partnerships

Additionally, an Expert Review Panel (ERP) was convened. Experts in the field were invited to provide their thoughts and feedback on the findings and recommendations from the study during a live, virtual discussion. The ERP was asked to provide input and discussion of their own experience with utilization and implementation of similar types of recommendations.

Enlisting input from these experts facilitated additional validation and rigor to the findings and recommendations. Feedback from the ERP facilitated further refinements and substantiation to the generated list of recommendations. The ERP also offered one additional notable recommendation that aligns with OSTEM P&E's next steps for evidence-building activities, including this outcome assessment; the panelists suggested the development and implementation of a robust communication plan for dissemination of the results from this study (see [Figure 3](#)).



Figure 3. Communication Plan Components Proposed by the ERP

CONCLUSIONS

Evaluation findings highlight the importance of personal networks to recruit students into MUREP-funded activities. Creating meaningful relationships and welcoming environments encourages student participation across multiple semesters, strengthens psycho-social outcomes, and strengthens relationships with potential STEM employers. MUREP students persist to second semester studies and have higher six-year graduation success than national comparisons.

MUREP-funded activities help students pursue STEM education and increase confidence about continuing to the STEM workforce. Partnerships with professionals in the STEM ecosystem support student opportunities to join the STEM workforce and impact NASA missions.

REFERENCES

Creswell, J. W. & Plano Clark, V. L. (2018). Designing and conducting mixed methods research (3rd ed.). Los Angeles: SAGE Publications.

