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Accelerating Systemic Change Network (ASCN): Demonstrating Impact

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Goals of Today's Presentation

- Learn about ASCN, why it is important, what it can do for you, and how you can get involved.

- Learn about work done by ASCN on demonstrating impact and how measurement and communication can be used to promote change.

- Learn about areas where educational research is needed and you can contribute.

What Is ASCN?

- Interdisciplinary professional network bringing together practitioners and educational researchers working towards positive change in higher education.

- Goal - accelerate discovery of research-based knowledge, its dissemination and implementation

- ASCN is open to all and includes network members, working groups, a steering committee and a network hub. For more information see:
- https://ascnhighered.org/index.html

Why is ASCN Needed?

- Significant change requires a strong rationale, guiding theories for program development, implementation and assessment plans, effective leadership with an effective strategy to build consensus and support.

- ASCN provides support through web-based materials, workshops and conferences in all aspects of successful change.

How Can ASCN Help You?

- Working Group 1: **Guiding Theories.** ***How might we better support people's use of theories, models, and scholarship in their planned systemic change efforts?***
- Working Group 2: **Costs and Benefits.** ***What are the costs and benefits of change?***
- Working Group 3: **Change Leaders.** ***Who leads change and how?***
- Working Group 4: **Demonstrating Impact.** ***How can measurement and communication be used to promote change?***
- Working Group 5: **Equity and Inclusion.**
- Working Group 6: **Aligning Faculty Work with Systemic Change.**

Work on Resources for Demonstrating Impact?

Solicited and evaluated feedback from ASCN members on the National Academies, "Indicators for Monitoring Undergraduate STEM Education," which is focused on indicators in three areas:

1. Use of evidence-based practices;
2. Practices that promote equity, diversity, and inclusion; and
3. Practices that encourage and enable students to enter STEM professions.

What has ASCN Working Group 4 accomplished on demonstrating impact?

Respondents were asked:

1. which of these indicators they need to measure
2. which have existing measurement tools (and what those are), and
3. which need measurement tools to be developed.

Out of the 11 indicators, survey results suggest:

3 where there is a critical need for the development of assessment tools and

5 where tools exist but there is a strong need for improved means of measurement

Summary of Findings

TABLE 1 Goals, Objectives, and Indicators to Monitor Progress in Undergraduate STEM Education

Measurement Tools suggested by WG 4 survey results for the National Academies indicators.

Note: orange font indicates additional tools needed and red font indicates a critical need for development of assessment tools

Conceptual Framework	Objective	Indicator	Measurement Tools
Goal 1: Increase Students' Mastery of STEM Concepts and Skills by Engaging Them in Evidence-Based STEM Educational			
Process	1.1 Use of evidence-based STEM educational practices both in and outside of classrooms	1.1.1 Use of evidence-based STEM educational practices in course development and delivery 1.1.2 Use of evidence-based STEM educational practices outside the classroom	1.1.1 Postsecondary Instructional Practices Survey (PIPS), Classroom Observation Protocol for Undergraduate STEM (COPUS), Teaching Practices Inventory (TPI); AAAS 2013 report; AAAU report; Partnership for Undergraduate Life Sciences Education (PULSE), Williams et al paper
Environment	1.2 Existence and use of supports that help STEM instructors use evidence- based educational practices	1.2.1 Extent of instructors' involvement in professional development 1.2.2 Availability of support or incentives for evidence-based course development or course redesign	1.2 Hauk et al conference paper
Environment	1.3 An institutional culture that values undergraduate STEM instruction	1.3.1 Use of valid measures of teaching effectiveness 1.3.2 Consideration of evidence-based teaching in personnel decisions by departments and institutions	1.3 Survey of Climate for Instructional Improvement (SCII), Berk paper 1.3.2 Physics Teacher Education Program Analysis (PTEPA) rubric

Process	1.4 Continuous improvement in STEM teaching and learning	No indicators: see "Challenges of Measuring Continuous Improvement" in Chapter 2.	1.4 Physics Teacher Education Program Analysis (PTEPA) rubric, Partnership for Undergraduate Life Sciences Education (PULSE),
Goal 2: Strive for Equity, Diversity, and Inclusion of STEM Students and Instructors by Providing Equitable			
Input	2.1 Equity of access to high-quality undergraduate STEM educational programs and experiences	2.1.1 Institutional structures, policies, and practices that strengthen STEM readiness for entering and enrolled college students 2.1.2 Entrance to and persistence in STEM academic programs 2.1.3 Equitable student participation in evidence-based STEM educational	2.1.1Complete College America Momentum Year, Physics Teacher Education Program Analysis (PTEPA) rubric 2.1.2 Institutional IPEDS 2.1.3 Behavioral Engagement Related to Instruction Protocol (BERI), Student Response to Instructional Practices (StRIP)
Outcome	2.2 Representational diversity among STEM credential earners	2.2.1 Diversity of STEM degree and certificate earners in comparison with diversity of degree and certificate earners in all fields 2.2.2 Diversity of students who transfer from 2- to 4-year STEM programs in comparison with diversity of students in 2-year STEM programs 2.2.3 Time to degree for students in STEM academic programs	2.2.1, 2.2.2 Institutional data reported to IPEDS for accrediting agencies includes demographics and persistence information and can be compared to national statistics such as those provided by the NSF. 2.2.3 Physics Teacher Education Program Analysis (PTEPA) rubric

Environment	2.3 Representational diversity among STEM instructors	2.3.1 Diversity of STEM instructors in comparison with diversity of STEM graduate degree holders 2.3.2 Diversity of STEM graduate student instructors in comparison with diversity of STEM graduate students	2.3.1, 2,3.2 Institutional annual diversity reports. Research by Joyce Main at Purdue University
Environment	2.4 Inclusive environments in institutions and STEM departments	2.4.1 Students pursuing STEM credentials feel included and supported in their academic programs and departments 2.4.2 Instructors teaching courses in STEM disciplines feel supported and included in their departments 2.4.3 Institutional practices are culturally responsive, inclusive, and consistent across the institution	2.4.1 National Survey of Student Engagement (NSSE) 2.4.2 Survey of Climate for Instructional Improvement (SCII), Walter et al paper 1 and paper 2 2.4.3 Metropolitan Center for Urban Education paper Colleges that administer the COACHE survey have the faculty perspective
Goal 3: Ensure Adequate Numbers			
Process	3.1 Foundational preparation for STEM for all students	3.1.1 Completion of foundational courses, including developmental education courses, to ensure STEM program readiness	Institutional Offices of Assessment and Research likely compiles this information
Process	3.2 Successful navigation into and through STEM programs of study	3.2.1 Retention in STEM programs, course to course and year to year 3.2.2 Transfers from 2- to 4-year STEM programs in comparison with transfers to all 4-year programs	Institutional Offices of Assessment and Research likely compiles this information Matthew W. Orland, Purdue University

Outcome	3.3 STEM credential attainment	3.3.1 Number of students who attain STEM credentials over time, disaggregated by institution type , transfer status, and demographic characteristics	IPEDS Matthew W. Orland, Purdue University NSF STEM Educational data

Summary

- You can join ASCN, contribute and utilize resources at: https://ascnhighered.org/index.html “Get Involved“
- Survey results presented here provide information on measurement tools for the NAS indicators recommended to monitor STEM undergraduate education
- Areas where additional measurement tools are needed and you can contribute are highlighted.