

The Roles of Data in Promoting Institutional Commitment to Undergraduate STEM Reform: The AAU STEM Initiative Experience

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Data: Differences in Audience and Intended Use

- Micro-level Focus on Faculty Members and their Classrooms
- The Decision-makers and their Interests
 - Did the program work?
 - Was it worth the cost?
 - How does it compare with other programs?

The Challenge

- How to combine locally-relevant information with data required to make meaningful statements about the overall project
- Managing the tension between measurement and politics

Combination Data Collection Strategy

- Qualitative site visits
- Quantitative surveys

Site-specific Data

- Site visits (project implementation)
- Locally-measured student retention and learning outcomes
- Locally-measured detailed measures of faculty instructional practices and attitudes
- Meta-analysis

Site Visit Protocol

- **PROJECT TEAM LEADERSHIP**
- We wish to understand the project at a deeper level, help situate and align local activities with the national initiative, demonstrate AAU's support, and address questions.
- What is the plan for implementation?
- What is the current progress toward implementing the project?
- With the launch, have they confronted unanticipated challenges or opportunities? Have changes occurred to the plan / scope of work? Why? How are they adapting?
- What activities, types of support, and the like are the institution, college, and department providing to help the project succeed?
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- **INTERVIEW PROTOCOL FOR RELEVANT DEPARTMENT CHAIRS AND DEANS**
- Please tell us about yourself and about your role and responsibilities in the AAU STEM Initiative. Looking to understand
 - What is their personal belief about the importance of reforms in undergraduate STEM educational reform?
 - What is their buy-in/commitment to their campus project?
- How do they perceive faculty attitudes toward using evidence-based instructional practices?
- Has the AAU STEM Initiative provided a new forum for conversations about teaching and learning?
- What is their sense of broad-based faculty support within the departments for the project?
- Can you tell us about any changes in the department's program and in how courses are taught?
- What kind of data does the department have/gather about the teaching practice of individual faculty members? How does that relate to promotion/tenure?
- What is the status of teaching and learning infrastructure (e.g., facilities, technology) in terms of facilitating the use of evidence-based teaching practices?
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- **INTERVIEW PROTOCOL FOR PROVOSTS**
- What is the current campus climate for change in undergraduate STEM teaching and learning?
- Considering departments are the locus for change, what are institutional efforts to support changes to teaching within the STEM departments?

Survey Parameters

- Building a consensus
- Selecting the measures
- Mapping Items to AAU Framework

Guidelines for Selecting Survey Items: Aligning Items with AAU Framework

- **Pedagogy**—*Pedagogy refers to the method and practice of teaching. Much, but certainly not all, of pedagogy occurs in the classroom, and the main actors in changing pedagogical practices are faculty and students.*
- What level of instructional staff and faculty teach STEM courses, and at which level? How large are those courses?
- What instructional practices are the faculty members who teach STEM courses using in the classroom? And how many students are exposed to these practices?
- What are faculty attitudes toward using evidence-based instructional practices?
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- **Scaffolding**—*The notion of scaffolding refers to the supports, including a sense of community, necessary to first incubate and then sustain evidence-based teaching.*
- What opportunities for professional development related to instruction are open to faculty, and to what extent are they taking advantage of these opportunities?
- What departmental and campus resources exist to support faculty in efforts to improve their instruction, and to what extent are faculty utilizing these resources?
- What are administrators' (department chairs, Deans, senior administrators) attitudes towards use of evidence-based instructional practices and the importance of teaching?
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- **Cultural Change**—*Sustainable change requires cultural change, and faculty members live in at least two cultures: an institutional culture and a disciplinary culture.*
- What role does teaching play in promotion and tenure decisions in the relevant departments or schools at the university? What are perceptions of this?
- What is the status of teaching and learning infrastructure (e.g., facilities, technology) in terms of facilitating the use of evidence-based teaching practices?

Student Outcomes

- **Student Outcomes**—*While not a section of the Framework, we are interested in the effects of projects on student outcomes like learning, progress, and retention. While changes in student outcomes can be attributed to multiple factors, it is important to consider, to the extent possible, the role of faculty teaching practices. AAU considers these data specific to individual project sites and important to local evaluation of the reform efforts.*
- How are students doing in STEM courses in terms of progression/retention/completion?
- How are students doing in STEM courses in terms of learning?
- What are student attitudes toward the use of evidence-based instructional practices?

Instructor Survey

- **Instructor information:** such as institution, department, rank.
- **Classroom practices:** instructors were asked to rate how descriptive various statements were of their own practice, such as whether they connect class activities to course learning goals, structure class so that students regularly talk with one another about course concepts, and require students to work together in small groups.
- **Attitudes towards teaching:** instructors were asked to indicate their level of agreement with statements like: “It is important to provide relevant, real-life examples of the concept you are teaching” and “Learning can be facilitated through the use of social interaction among students.”
- **Professional development related to teaching:** instructors were asked to rate the availability of, and their participation in, various types of on- and off-campus professional development activities.
- **Institutional environment for teaching:** instructors were asked to indicate their level of agreement with statements about the attitudes of other instructors, department chairs, and campus administrators toward teaching, as well as their perception of how important a role teaching played in annual and salary reviews and promotion and tenure.

Addressing Local Concerns about the Faculty Survey