Critical Resources for Aligning Faculty Work with Systemic Change

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American Association for the Advancement of Science. (2013). *Describing and Measuring Undergraduate STEM Teaching Practices.* Washington, D.C.

> Report from the National Meeting on the Measurement of Undergraduate STEM Teaching, 17-19 Dec. 2012. In order to improve undergraduate STEM teaching, it is necessary to first assess the current state of STEM teaching, which requires effective tools and techniques for both describing and measuring teaching practices. This report provides an overview of methods for describing and measuring undergraduate STEM teaching practices, including surveys, interviews, teaching observations, and teaching portfolios. In each section the authors outline each method's strengths and weaknesses and provide examples of existing tools and methods for implementation. Finally, the report considers mixed-methods approaches and how measuring STEM education can encourage future improvement. The authors recommend using multiple techniques in order to achieve better descriptions of STEM teaching practices. They call for large scale studies of STEM teaching practices and encourage STEM researchers and faculty to speak the same language in order to work together to improve teaching.

Association of American Universities. (2017). *Essential Questions & Data Sources for Continuous Improvement of Undergraduate STEM Teaching and Learning*. Washington, D.C.

> This resource complements AAU's *Framework for Systemic Change in Undergraduate STEM Teaching and Learning.* It provides a set of questions designed to assess progress along the institutional elements identified in that document. The questions target pedagogical, scaffolding, and cultural elements at each organizational level in an institution. This resource also provides data sources and existing tools that can be used to answer these questions. Types of documented tools and data sources include: institutional data and visualizations; observation protocols; rubrics; frameworks; student learning assessments; and surveys. The questions and tools presented can support institutional initiatives that target evidence-based teaching and learning, measuring teaching effectiveness, equity and inclusion, and designing learning spaces. Finally, this resource provides some guidance on navigating the differing terminology, methods of data collection and organization, research frameworks, and levels of research oversight across institutions.

Association of American Universities. (2013). *Framework for Systemic Change in Undergraduate STEM Teaching and Learning*. Washington, D.C.

> This resource, part of the AAU Undergraduate STEM Education Initiative, provides a set of key elements for institutions to address in order to bring about sustainable change in higher education. These elements fall into three categories: pedagogy, scaffolding, and cultural change. The purpose of this framework is to guide institutions in adopting and supporting evidence-based teaching practices in STEM. This resources provides an overview of the framework and institutional examples mapped to each of the three elements

Association of American Universities. (2017). *Progress Toward Achieving Systemic Change: A Five-Year Status Report on the AAU Undergraduate STEM Education Initiative.* Washington, D.C.

This is a status report on the AAU Undergraduate STEM Initiative; it draws from instructor surveys (administered twice), department chair narratives on policy and practice, and campus and department level assessments of learning spaces from the project sites. For example, from the survey data, the report indicates that, despite some improvement, there is still a gap between how instructors perceive teaching practices and whether they actually implement those practices in their own classrooms. Also, only two of the eight sites explicitly proposed plans to realign their faculty rewards structures with new expectations related to evidence-based instruction, which, the authors note, has proven to be the most difficult aspect of the STEM initiative's goals.

Association of American Universities. (2018, November 8). AAU Undergraduate STEM Education Initiative: Matrix of Summative Evaluation of Teaching Strategies. Washington, DC: AAU. Retrieved from https://www.aau.edu/sites/default/files/AAU-Files/STEM-Education-Initiative/P&T-Matrix.pdf

This developing resource maps the landscape of policies and practices that evaluate and reward teaching, scholarship, and service from a variety of institutions in higher ed. The matrix is intended to capture strategies being advanced at institutions in order to incorporate evidence beyond student course evaluations in the evaluation of teaching.

Commission on the Future of Undergraduate Education. (2017). *The Future of Undergraduate Education: The Future of America.* Retrieved from: https://www.amacad.org/cfue

This report provides a comprehensive national strategy, based on three practical and actionable recommendations, for supporting student success in the 21st century. It presents three national priorities with recommendations for each: strengthening the student educational experience; increasing completion and reducing inequities; and controlling costs and increasing affordability. It provides insight into determining knowledge needed by college graduates and measuring project outcomes. Finally, the future of education is considered.

Dennin, M., Schultz, Z. D., Feig, A., Finkelstein, N., Greenhoot, A. F., Hildreth, M., Leibovich, A. K., Martin, J.D., Moldwin, M. B., O'Dowd, D. K., Posey, L. A., Smith, T. L., & Miller, E. R. (2017). Aligning practice to policies: changing the culture to recognize and reward teaching at research universities. *CBE—Life Sciences Education*, *16*(4), p. 1-8.

The authors highlight the gap between existing policies at many research institutions, which explicitly value teaching, and the tenure and promotion practices that often do not. They review evidence from the literature and from other data, including an analysis of 51 institutions' promotion and tenure policies, interviews with department chairs from the AAU Undergraduate STEM Initiative, and an AAU survey of about 1000 instructional staff. Overall, this evidence supports their assertion that, while teaching is often labeled as important in formal university policies, it is not treated as important in practice. The authors present four guiding principles for aligning practice with formal policies and three examples of existing initiatives on university campuses.

Dolan, E. L., Elliott, S. L., Henderson, C., Curran-Everett, D., St. John, K., & Ortiz, P. A. (2018). Evaluating Discipline-Based Education Research for Promotion and Tenure. *Innovative Higher Education*, *43*(1), 31–39. https://doi.org/10.1007/s10755-017-9406-y

As the number of DBER faculty members in STEM departments grows, the purpose of this essay is to facilitate the evaluation of scholarly accomplishments of DBER faculty for purposes of tenure and promotion. The authors seek to provide guidance on how such accomplishments should be measured. They provide an overview of DBER faculty positions and approaches to evaluating faculty performance within non-DBER contexts. The recommend evaluating where DBER scholarship is published, how it is used, and how it contributes to the field.

Flaherty, C. (2018). Teaching Eval Shake-Up. *Inside Higher Ed.* Retrieved from: https://www.insidehighered.com/news/2018/05/22/most-institutions-say-they-value-teaching-how-they-assess-it-tells-different-story

Flaherty describes recent changes in the tenure and promotion processes at two institutions, the University of Southern California and the University of Oregon, involving discontinuing the use of student evaluations of teaching (SETs) as part of these decisions. For example, at USC, they have decided to remove SETs from the tenure and promotion decision process, following the publication of a study showing that SETs disadvantage faculty members of certain backgrounds, largely minorities. Instead, SETs have been redesigned and are incorporated into faculty reflections on their teaching. Overall, Flaherty describes changes being adopted at these two institutions and how they plan to replace SETs and update the tenure and promotion process.

Gillman, R. A., Hensel, N. H., Salomon, D. A., & Wilhite, S. C. (2018). *Refining the Paradigm: Holistic Evaluation of Faculty to Support Faculty and Student Learning*. Retrieved from: http://newamericancolleges.org/wp-content/uploads/2018/06/NACU_REFINING-THE-PARADIGM_READER.pdf

The authors present a holistic approach to evaluating faculty work that includes an integrated perspective on teaching, scholarship, service, and professional development. They provide a review of recent literature on teaching evaluation (and existing models of evaluation) and report results from a survey of faculty regarding how faculty work has changed over the last twenty years. As the definition of faculty work has expanded, blurring the boundaries of teaching/scholarship/service, faculty evaluation has not expanded in a similar way. They recommend a holistic approach, which is both qualitative and integrated, and provide guidance for how to implement such an approach. Aspects include self-narratives, mentoring, and reflection.

Kezar, Adrianna. (2019). *Scaling Improvement in STEM Learning Environments: The Strategic Role of a National Organization*. Washington, D.C., Association of American Universities.

This report summarizes the initial observations and assessment of the first years of AAU's Undergraduate STEM Education Initiative. It provides key lessons for scaling change in STEM teaching and learning. They explored two issues – how the AAU initiative achieves scale, and what the role is of the national organization in undergraduate STEM reform. Kezar concludes there are lessons about the role of national organizations that others could learn from, regarding optimizing networks, maximizing learning, utilizing influence, and mapping strengths. The report provides recommendations for those interested in scaling change.

Miller, E. R., Fairweather, J. S., Slakey, L., Smith, T., & King, T. (2017). Catalyzing Institutional Transformation: Insights from the AAU STEM Initiative. *Change: The Magazine of Higher Learning*, *49*(5), 36–45. https://doi.org/10.1080/00091383.2017.1366810

The authors describe the development of and motivation for AAU's Undergraduate STEM Education Initiative, the approach AAU took to building this network, and the results of the Initiative thus far. They argue that working from a systems perspective to promote change requires a corresponding understanding of the many varied contexts in which STEM education occurs and a commitment to building a network. This report includes a roadmap of the development of the Initiative and components developed thus far (e.g., assessment materials). They also provide recommendations for undergraduate STEM education reforms and change project management based on the work of the Initiative.

Royal Academy of Engineering. (2018). *Career Framework for University Teaching: Background and Overview.* London.

This report provides a template for universities to guide and measure faculty members' teaching successes and achievements, with the goal of encouraging institutions to appropriately reward effective teaching. The findings draw on empirical research, teaching practices, surveys and interviews, and stakeholder feedback. They review current practices and knowledge about rewarding teaching achievement and present their structured framework for academic career progression. They also provide examples of how the framework can be used in practice with case studies.

Royal Academy of Engineering. (2016). [Table: Examples of evidence that could be included in a promotion case for each level of teaching achievement, structured within four evidence domains]. Taken from *Does teaching advance your academic career?* London.

This table, taken from a report on treatment of teaching in promotion decisions, provides a practical list of assessments, reliable sources of information, and actionable examples of evidence regarding teaching that could be used in promotion decisions in higher ed.

Taber, K. S. (2013). Three levels of chemistry educational research. *Chemistry Education. Research and Practice*, *14*(2), 151–155. https://doi.org/10.1039/C3RP90003G

In this editorial, the author provides a three-category typology of submissions received by the journal, based on the extent to which the submission is specifically concerned with teaching and learning in chemistry. The editor recommends that researchers consider the context of their work as they design new projects, particularly how their work fits into educational contexts, teaching and learning contexts, and specific, field-based teaching and learning contexts.

Wieman, C. (2015). A Better Way to Evaluate Undergraduate Teaching. *Change: The Magazine of Higher Learning*, *47*(1), 6–15. https://doi.org/10.1080/00091383.2015.996077

In this article, the author considers current methods of evaluating teaching at research universities and proposes a new method for evaluation based on effective teaching methods, the Teaching Practices Inventory. This Inventory provides a detailed picture of how a course is taught, while at the same time requiring little time or subjective judgement. The Inventory relies on a measure of teaching that relates to student outcomes and provides information that could be useful to faculty, departments, and institutions as a whole.