

PROCEEDINGS FROM 2017 SMTI/ASCN  
**WORKSHOP ON  
DIVERSITY AND INCLUSION**

Planning and Institutionalizing Change



ASSOCIATION OF  
PUBLIC  
LAND-GRANT  
UNIVERSITIES



# Planning and Institutionalizing Change

## Proceedings from 2017 SMTI/ASCN Workshop on Diversity and Inclusion

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## Introduction

This summer, ASCN partnered with the Association of Public and Land-Grant Universities (APLU) to organize the 2017 SMTI/ASCN Workshop on Diversity and Inclusion. The APLU Science and Mathematics Teaching Imperative (SMTI) is a community of faculty, department chairs, deans, and provosts who are engaged in improving STEM teaching and teacher preparation.

## Workshop Goals

Inclusion and diversity must be at the heart of systemic change efforts and included in the broader goals of the undergraduate STEM reform. It is impossible to transform institutions without addressing underlying issues of inequality that are deeply rooted in history. The goal of the 2017 SMTI/ASCN Workshop on Diversity and Inclusion was to advance a dialogue on diversity and inclusion in undergraduate STEM education between practitioners transforming institutions and researchers who are studying systemic change at higher education institutions. Ideally, workshop participants would then return to their institutions with new ideas to foster an inclusive campus environment, and share the dialogue with colleagues. More specifically the workshop aimed to provide participants with opportunities to:

- Share and reflect on best practices and lessons learned about facilitating change initiatives around diversity;
- Learn about different change theories, ways to measure success, and other topics to aid in advancing systemic institutional change;
- Participate in discussions on potential solutions to common challenges in creating and implementing diversity initiatives.

## Case Studies

The workshop featured five case studies of institutions that are making progress on increasing diversity and inclusion on their campuses. Texas A&M University's case on "Creating an Institutional Culture of Accountability to Ensure Diversity and Inclusion in STEM Fields" was presented by Dr. Timothy Scott, Assistant Provost for Undergraduate Studies to illustrative institutional level change efforts at TAMU.

The remaining case studies were used to stimulate discussion amongst all participants on what is working or not on their campuses, and are included in this publication. These cases covered a variety of STEM interventions from focusing on successful recruitment, retention, progression and graduation of diverse first-time-in-college and transfer students; to developing strategies for recruiting and engaging students with disabilities in undergraduate research; and multi-institutional efforts to recruit and retain women scientists. These cases collectively highlight the complexity of systemic change efforts to advance excellence in undergraduate STEM education.

## In Preparation for the Workshop

APLU institutions were invited to submit a case study proposal focused on initiatives on their campuses that build more diverse and inclusive STEM learning environments. Five of the submitted proposals were chosen to write full case studies for the workshop. Prior to the workshop these full case studies were shared with ASCN Working Group members who reviewed them and provided written feedback on the written narrative and further questions on the projects themselves. Case study institutions were given the opportunity to address this feedback prior to the workshop. Case narratives were made available online to all workshop participants.

## The Workshop Outline

The workshop began with a plenary session, where Dr. Timothy Scott presented institutional level change efforts (Dr. Christine A. Stanley, Vice President and Associate Provost, who was originally set to present, was not able to attend). The plenary session was followed first by a short presentation of each of the other four cases, and then by sixty minutes of small group discussion. Each of four small group discussions was led by an experienced facilitator and focused on an individual case. Workshop participants were invited to join the discussion group of their choice. During these discussions, each group was tasked with keeping a list of takeaways that was shared with the larger group in a plenary session following the small group discussion.

In the afternoon, new discussion groups formed based around ASCN working group topics, which all related to large-scale change; theories of change, costs and benefits, leadership, and measurement and communication. At the end of this second discussion session, takeaways were shared in a plenary session. Following the workshop, the case studies and discussion notes from all the sessions were made available online to workshop participants.

## Shared Learning Experiences

This case analysis allowed for individual and group reflections and facilitated discussions. It also led to collective aggregation of ideas in small groups, which in turn revealed some overarching issues and questions with regard to diversity and inclusion. One overarching issue that arose through synthesis of ideas was that defining excellence in traditional ways excludes diversity, which led to the question, “how do we change the conversation around diversity and excellence?” Discussion also brought up the issue of student voices missing in the case studies, which in turn led to the question, “how can students contribute to change?” Moving questions from implicit on participants’ minds to the floor for vocalization and discussion created the opportunity to examine how issues impact practice.



## New Understandings

This workshop created opportunities for institutional leaders and faculty to have dialogue around challenging issues, allowed them to learn about different perspectives on the same issues, and to reflect on their own perspectives and assumptions and develop new understandings.

Case participants had the opportunity to learn and to reflect on their projects through (1) the feedback received from ASCN Working Group members, many of whom are experienced change leaders and scholars and (2) the small group case discussions during the workshop.

ASCN working group members had the opportunity to contribute to practice by reviewing the case studies and through small group discussions consider where the disconnects between theory and practice, especially regarding issues of diversity and inclusion, and ways to address them.

To continue and expand the conversation on how to advance evidence-based systemic change in undergraduate education, we have summarized some of the shared learning and new understandings. We hope that this will be of interest to both practitioners and scholars.

## Planning for Systemic Change

Creating successful change requires an understanding of, and strategic work at multiple parts of the entire system. The workshop did not provide solutions to addressing diversity and inclusion issues in for the change leaders, however, it provided opportunity to discuss and reflect on many key questions that need to be addressed in order to achieve the cultural change necessary to address these kinds of issues.

The tables below are organized by focus areas of ASCN Working groups and shows key practices, purpose or rationale for using them, as well as questions developed by ASCN working groups. The framework provided in these tables offer one way to understand the complexity of systemic change, and can be used as a guide for planning and organizing change interventions, from early conceptual phases through implementation of activities, to ensure progress toward cultural change and institutionalization of practices. The listed practices and questions are not an exclusive list, but are there to help change leaders to preserve focus on key aspects of institutional change.

### Key Approaches, Rationale and Questions by Working Group

#### Working Group 1: Guiding Theories

##### Key Approaches

- Identify and select theory of change
- Develop a logic model

##### Rationale/Purpose

- To question our implicit assumptions
- To make embedded assumptions explicit
- To understand change at individual, local, and institutional levels
- To inform and guide reflective actions
- To move toward a more comprehensive change effort
- To demonstrate connections among inputs, activities, and outcomes

##### Questions to Consider

- Is there a guiding theory that informs some or all of the initiatives in this project?
- What change theories and/or studies have focus on creating an inclusive higher education environment?
- Are there models for supporting faculty decision making and adoption of evidence-based teaching that align with your project goals?
- What frameworks or change theories have been used in similar projects?
- How have strategies been modified over the course of the grant?

## Working Group 2: Costs and Benefits

### Key Approaches

- Determine short and long term benefits of your project, and costs associated with achieving them.
- Identify stakeholders at your institution who would be interested in economic analysis and create a strategy to communicate with them

### Rationale/Purpose

- To identify who are the main beneficiaries of the project
- To create awareness regarding perceptions vs. reality of costs and benefits
- To identify up-front costs vs. ongoing costs
- To recognize easily quantifiable benefits vs. those that are not (soft benefits); hard costs vs. soft benefits
- To know what will it cost to continue your program after initial funding runs out
- To provide leadership with evidence of your project's success

### Questions to Consider

- What are the financial benefits to institutions of improved student learning and persistence?
- How could you measure the impact of your project in terms of costs and benefits?
- What organizational levels are influenced by specific costs and benefits?
- What is the time cost involved of individual faculty and/or institution to implement a sustainable change initiative?

## Working Group 3: Change Leaders

### Key Approaches

- Develop relationships with institutional stakeholders and leaders at different levels at your institution
- Identify allies for your project
- When assembling current project team, consider who is at the table and who is not.
- Assess current project leadership strength and identify what types of leaders, grassroots vs top down, are on your team. Both need to be involved to make lasting change

### Rationale/Purpose

- Relationships play role in decision making and in resource allocation.
- Cheerleaders and allies can help to make your work more visible, to gain buy-in from various campus stakeholders.
- Diverse voices bring different opinions and perspectives
- Distributing leadership (including advisory boards) can help bridge gaps and reduce impact of when someone leaves

### Questions to Consider

- What strategies are being considered to extend the engagement and to create more partnerships with offices on campus?
- What institutional structures will be needed to support the new culture you are creating?
- What strategies will be used to begin to put these structures in place?

## Working Group 4: Measurement and Communication

### Key Approaches

- Identify who your stakeholders are
- Recognize students as stakeholders
- Develop different types of communication for different audiences
- Consider using in your inquiry intersectionality approaches
- Consider creative ways to have difficult conversations (e.g. videos, vignettes, role playing)

### Rationale/Purpose

- Knowing your audience, will help you to choose what story you want to tell and what metrics you want to share.
- To tell important story of current culture and climate and change efforts

### Questions to Consider

- How will you know if your project has been successful?
- How will you measure change?
- How will you communicate project's success to stakeholders?

## Institutionalizing Systemic Change

The case studies highlighted what change scholars and practitioners have long recognized - that (1) in order to achieve excellence in undergraduate STEM education for all students, it is not enough to focus just on classroom pedagogical change and/or curricular change at the department level, but that project leaders need to extend their change efforts to cultural change at institutional level and (2) institutional culture and structures shape both challenges and solutions.

First, we present common challenges and offer some tactics from the practices of the case participants, as well as workshop participants, to overcome them. Then we highlight four strategic themes that emerged from the discussions during the workshop and were seen by workshop participants at essential to advance their work towards the goal of achieving excellence in undergraduate STEM education for all students.

## Common Challenges

### Faculty Perceptions

Faculty play an important role in systemic change efforts. They play an essential role not only in implementing change, but also in advocating for change. Addressing faculty perceptions about their roles and about students is one of the challenges that change leaders encounter in their attempts to widen the reach of their interventions. Often project teams struggle to involve additional faculty beyond early adopters. There are numerous reasons for lack of faculty involvement. It can include, for example, faculty not being on board with the vision and goals of the project, or perception that instructional change is time





consuming and faculty focusing on other aspects of their work believing that they not having time. It also could be related to faculty believing that they do not need to change their teaching or that they are supportive of their students.

Conversations about diversity and inclusion are often difficult. The BSU PERSIST project leadership has found that it is easier to talk with faculty about economic differences rather than demographic differences, partly due to low racial/ethnic diversity in Idaho. The institution has a lot of commuter students, many of whom work full-time. Commuter students may not be available for outside classroom group work so for them to succeed there is a need for more to be happening in the classroom. The project leaders are working on ways not only to help faculty to recognize the diversity of their students, but also help them to identify ways they can help their students to succeed.

Another example is the case at OSU where the team works to recruit students with disabilities for the Research Experiences for Undergraduates (REUs) program at OSU. Some faculty initially had reservations about incorporating students with disabilities into their research groups; there were safety concerns, as well as a fear that students would not be able to move around the lab or operate lab equipment. The project leaders have been able to minimize this by providing faculty with learning opportunities and resources needed for student to participate in their labs. These professional opportunities include learning about common issues, misconceptions, and resources. In addition, project leaders have follow-up meetings with faculty after students have been in their labs for several weeks, allowing them to address specific questions faculty may have.

It is important to recognize that faculty resistance may be not only due to their perceptions of students and cultures, but also as a result of other factors, such as institutional practices that do not put enough value on the teaching role of faculty, systems where reforms are imposed to faculty by top-down methods, or physical infrastructure.

### Physical Infrastructure

The stereotyped layout of lecture auditoriums with tables aligned in rows, a podium upfront, and a chalk- or whiteboard far from students is still a reality at many universities, especially in large introductory STEM classrooms. This set up limits student engagement and collaboration, and makes it difficult for faculty to adapt active learning strategies. There is a need to change physical infrastructure, to change classrooms from fixed to flexible layout to ensure that faculty can adapt teaching and learning methods that support success for all students.

The SFU project leadership team recognized the need for flexible classroom spaces to be in place in order for faculty to adapt best evidence based teaching practices, and is working with the vice president for the Office of Student Success to renovate classrooms. Renovation of several classrooms has been completed.

The OSU project struggled with a different type of infrastructure problem, research labs in older buildings were not able to accommodate the needs of students with disabilities. Although the project leaders were not able to change the infrastructure, they were able to identify labs on campus that can accommodate the needs of students with disabilities and matched students with faculty whose labs could accommodate the needs of students.

These two examples highlight the important role that the physical classroom environments play in assuring that all students can be successful.

### Institutional Practices

The structure, policies, and culture of the institution all play a role in successful implementation of new practices. This includes having institutional policies in place that support faculty activities – teaching,

scholarship, and service. In addition, the tenure policies often affect how much emphasis faculty place on teaching, hence their willingness to adapt new practices. Case participants and workshop participants recognized that it is important to change how teaching effectiveness is evaluated and measured. There was agreement that student satisfaction surveys are not the right tool, and that there is a need to find different ways to measure teaching effectiveness, as well as how to communicate teaching evaluations. The BSU project team is working with the faculty senate to implement better approaches university wide.

Department culture and practices also play an important role. Buy-in and support from administration were identified as an essential factors impacting project success. Workshop participants agreed that the support of department chairs is especially critical to getting faculty to try new practices, as well as in sustaining institutional changes. For example, USM Gulf Coast ADVANCE project leaders are working on curbing the isolation that many women STEM faculty experience in their departments by offering seminars, fellowships and brown bag lunches around issues for women in STEM. They are working on new grant that would allow them to expand their project to address the institutional policies and professional support for academic leaders.

### Sustainability

Most interventions start with grant funding that provides project teams with an average of three to five years to implement their plans. Institutionalization of new practices at higher education institutions takes much longer, hence, one of the common concerns of change leaders is how to gain institutional support to sustain interventions after initial funding runs out. A related concern of change leaders is how to scale-up their efforts to institution-wide adaption of new practices.

Case and workshop participants identified two imperatives to achieve institution-wide adaptation-- (1) the need to align project goals with university priorities and (2) create high-quality practices that are scalable.

The USF STEER team has identified how they can leverage both state and institutional level priorities to advance their work. They have determined that of the 12 criteria that the State Board of Governors



established to chart each university's strengths and progress towards a common goal, three emphasize production of graduates in the STEM areas and therefore align with the goals of the STEER. In addition, USF's plan of a Responsibility Centered Management (RCM) model for budget allocations will include a reward system aimed to encourage departments to focus on student success. The STEER leadership sees this as potential benefit that will help them to partner with more departments and reach a larger number of faculty.

In addition, science focused professional development activities currently supported by STEER after the grant will be continued by the

Academy for Teaching and Learning Excellence (ATLE) and will be funded by the university. The ATLE Director is a member of the STEER leadership team and his involvement will help the transition process.

The USM Gulf Coast ADVANCE project leadership has recognized the ways they can continue their initiatives with limited funding available. These include continuing organizing brown-bag seminars and guest lectures.

As for the other common challenges – faculty perceptions, institutional practices, and infrastructure - all contribute to project success and can either hinder or enable sustainability of reform efforts undertaken by change leaders. Sustainability can be seen not only as a more complex challenge, but also as a goal. Through this lens the other challenges can be seen as building blocks for achieving sustainability.

## Strategic Themes

As a response to the common challenges, four strategic themes emerged as key elements that are essential to institutionalizing systemic change initiatives and can aid change leaders to reach their goals.

### Create and support diversity and excellence for all

The conversation around diversity and excellence needs to change to exclude deficit mindsets and practices that enact them. The vision of excellence has to include diversity, only then can excellence for all be achieved.

Excellence for all means that every student is provided with high quality learning experiences. Change leaders need to persistently create and support evidence-based practices that promote equity, diversity, and academic excellence for all students.

### Increase student engagement

Although students are seen as the major beneficiaries of academic reforms, which makes them important change project stakeholders, their voices are often missing not only on project teams, but also in project evaluations. Collecting and using data about students, is not the same as having student voices at the table.

It is important that change leaders increase student engagement in reform efforts and empower students to become advocates for high quality educational practices.

### Build connections and relationships

Relationships matter, therefore change leaders ought to take the time to build and maintain relationships across their own institution, at peer institutions, and with community partners. The key is to find others who have similar goals and values, and who recognize the importance of reforms being undertaken, and can be supporters and advocates of them.

It takes time to build trust with key stakeholders and partners. Trust can lead not only to more lasting change outcomes, but also to new opportunities to advance the reform efforts.

### Create Change Stories

There is a need to translate data into meaningful and authentic stories about change. Stories that communicate project goals and illustrate both challenges and successes to broader audiences, and facilitate difficult conversations about issues of cultural change.

Authentic stories create an emotional connection, they allow people to relate and connect to messages embedded in these stories. They can inspire reflections and actions. Stories can help to create change.



## Conclusion

There is no doubt that inclusion and diversity must be at the heart of systemic change efforts and included in the broader goals of the undergraduate STEM reform. The 2017 SMTI/ASCN Workshop on Diversity and Inclusion created opportunities for institutional leaders and faculty to have dialogue around challenging issues, allowed them to learn about different perspectives on the same issues, and to reflect on their own perspectives and assumptions and develop new understandings with regard to diversity and inclusion and the complexity of systemic change efforts to advance excellence in undergraduate STEM education. We hope that the dialogues started at the workshop will be continued with colleagues at home institutions and will lead to new ideas on how to foster an inclusive campus environment.

## Resources

### Guiding Theories

Henderson, C., Finkelstein, N., & Beach, A. (2010). Beyond dissemination in college science teaching: An introduction to four core change strategies. *Journal of College Science Teaching*, 39(5), 18.

The authors state the need to expand focus of change initiatives to include more emphasis on faculty involvement and on the institutional structures. They present four change strategies to scale and sustain change efforts: (1) disseminate curriculum and pedagogy, (2) develop reflective teachers, (3) develop policy, and (4) develop shared vision.

AAU Framework for systemic change in undergraduate STEM teaching and learning (Brochure, 2016). <https://www.aau.edu/education-service/undergraduate-education/undergraduate-stem-education-initiative>

Outlines framework developed by AAU to guide institutional commitment to teaching and learning, including cultural change, scaffolding, and pedagogy.

### Costs and Benefits Resources

Report by American Council on Education: Instructional Quality, Student Outcomes, and Institutional Finances <http://www.acenet.edu/news-room/Documents/Instructional-Quality-Student-Outcomes-and-Institutional-Finances.pdf>

There are not many resources available that look at instruction, student outcomes and institutional finances. This paper looks at impact of improved instruction on student outcomes such as postsecondary degree attainment, engagement, and satisfaction on institutional revenue. It includes several cases.

### Change Agents and Leaders

Eckel, P.D. & M. Hartley. 2008. Developing academic strategic alliances: Reconciling multiple institutional cultures, policies, and practices. *The Journal of Higher Education* 79(6): 613-637

The authors show the importance of developing and maintaining partnerships in implementing educational initiative.

### Measurement and Communication

Wieman, C., & Gilbert, S. (2014). The Teaching Practices Inventory: a new tool for characterizing college and university teaching in mathematics and science. *CBE-Life Sciences Education*, 13(3), 552-569.

This inventory can be used by departments and institutions to look at teaching practices used in science and mathematics courses. It can also be used by faculty to help them reflect on their teaching.

Survey of Undergraduate Research Experiences (SURE) (Survey).  
<https://www.grinnell.edu/academics/areas/psychology/assessments/sure-iii-survey>

This is a survey for undergraduates who have recently completed a summer undergraduate research experience. SURE, and the related tool, the Classroom Undergraduate Research

Experiences (CURE). The CURE may be used as a pretest-posttest or posttest-only survey to measure student experiences in "research-like" or other science courses.

Armstrong, M. A., & Jovanovic, J. (2015). Starting at the crossroads: Intersectional approaches to institutionally supporting underrepresented minority women STEM faculty. *Journal of Women and Minorities in Science and Engineering*, 21(2).

The authors of this paper explore opportunities and challenges of using intersectional approach to achieving equity through institutional change and discuss how intersectional approaches might be applied to institutional reforms aimed at advancing success of underrepresented minority women.

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