2010 Math and Science Partnership Learning Network Conference

MSP: An Intergenerational Learning Network

January 25-26, 2010 · Washington, DC

PAPER SESSION

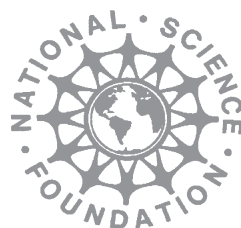### Faculty Rewards and Structures for STEM Teacher Preparation

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T E R C

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*Cover graphic: Presenters Jennifer Presley
(left) and Kacy Redd*

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Conference Documentation
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About This Summary

This documentation of the 2010 Math and
Science Partnership Learning Network
Conference offers a brief summary of the
presentation that took place during one
conference breakout session and focuses on
questions, answers and discussions during the
session.

Readers interested in pursuing information
about the project discussed in this breakout
session are encouraged to visit MSPnet to access
the full PowerPoint presentation.

The abstract for this presentation is posted
on MSPnet at the following URL:

**http://hub.mspnet.org/media/
data/24_Presley.pdf?media_
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FACULTY REWARDS AND STRUCTURES FOR STEM TEACHER PREPARATION
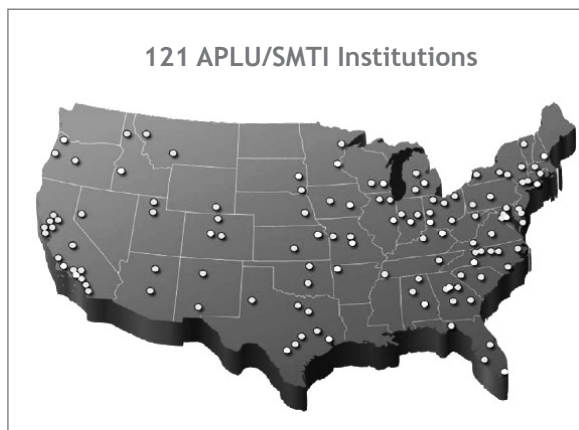
Project Overview

Jennifer Presley precedes this presentation with the explanation that the National Association of State University Land Grant Colleges, the oldest higher education association in the country with 186 institutional members, is now the Association for Public and Land-grant Universities (APLU).

About three years ago APLU started talking about the Science and Math Teaching Imperative (SMTI). It began when Peter McPherson became president and members were thinking about how to reenergize the work of the association. Richard Herman, Chancellor at the University of Illinois at Champaign said, "Institutions like mine have stood aside for too long on the important endeavor of science teaching." That took fire within the leadership of the association, Presley relates.

A year-and-a-half ago presidents from the land-grant universities and major research universities were invited to sign on to what is called the "SMTI Commitment," and that opportunity remains open to other presidents. What is exciting about this project, Presley observes, is galvanizing the energy of institutions that are often opinion leaders among universities. "We see this as really becoming a game changer in

terms of how producing math and science teachers is recognized in general and in this instance at research universities," she states.

The 121 institutions on the map below are those whose presidents have signed this commitment. A year-and-a-half ago NSF funded the RETA MSP called Promoting Institutional Change to Strengthen Science Teacher Preparation.

121 APLU/SMTI Institutions

Promoting Institutional Change to Strengthen Science Teacher Preparation

An NSF RETA grant to APLU

Specific Objectives of the Grant:

1. Create and support a national leadership network of presidents, chancellors, provosts and their designees who are active at their institutions in improving mathematics and science education and especially teacher education

2. Increase the number of disciplinary faculty who are contributing towards teacher preparation and who assume increased responsibility for mentoring and induction of beginning teachers and the professional development of career teachers

3. Address and make demonstrable progress toward overcoming the challenges that impede the ability of universities to strengthen their science teacher preparation programs

4. Widely disseminate the results and lessons learned from this and other related projects

5. Facilitate communication across national networks of science and mathematics education programs.

The objectives of this MSP RETA are outlined at left. Institutions who have made this commitment were invited to be one of the institutions in The Leadership Collaborative (TLC). Twenty-six were chosen.

26 APLU institutions were selected into The Leadership Collaborative

- Auburn University
- Boise State University
- California State University-Fullerton
- Florida International University
- Georgia State University
- Indiana University-Purdue University Indianapolis
- Lincoln University
- Michigan State University
- Portland State University
- South Dakota State University
- State University of New York at Stony Brook
- University of Arkansas, Fayetteville
- University of California-Santa Barbara
- University of Cincinnati
- University of Colorado at Boulder
- University of Houston
- University of Illinois at Urbana-Champaign
- University of Iowa
- University of Kansas
- University of Kentucky
- University of Maryland College Park
- University of Minnesota-Twin Cities
- University of New Hampshire
- University of North Carolina at Charlotte
- University of Texas at San Antonio
- University of Wisconsin-Milwaukee

Presley outlines the nature of the commitments made by members of The Leadership Collaborative.

The Leadership Collaborative Commitment

- Make the SMTI commitment to increase the quantity, quality and diversity of science & mathematics teachers they produce.

+

- Commit to working intensively and transparently to strengthen their science teacher preparation programs.

- Commit to being part of a research project that seeks to understand the necessary and optimal conditions for institutional change to strengthen science teacher preparation.

She then proceeds to describe The Leadership Collaborative's theory of action.

Theory of Action

- Institutional change to strengthen science teacher preparation occurs when representatives from across the institutional hierarchy are active participants in the process.

- A prestigious national higher education organization with Presidential and Provostial membership (APLU), working in concert with disciplinary societies, can create a network of collaborating institutions that collectively move the dial on science and mathematics teacher preparation.

- Partnering with the American Physical Society—and developing a partnership with the American Chemical Society.

The members' commitment to The Leadership

Collaborative became very public on January 6, Presley notes, when this project, represented by APLU Vice-President Howard Gobstein and four university presidents were part of President Obama's celebration of Teacher of the Year awards.

One piece of this effort that has proved extremely helpful, Presley notes, is the analytic framework. While this won't be discussed in-depth during this session, interested participants are encouraged to explore it further.

**The Analytic Framework..
A tool for planning and analysis**

Developed by Charles Coble, Lizanne DeStefano, Nancy Shapiro and Jennifer Frank

- Comprehensive taxonomy of strategies and success indicators of leading approaches to recruit, prepare, induct and develop science and math teachers

- Allows institutions to analyze their current practice and benchmark against successful programs

- Creates a common framework for communication on the specific attributes of promising models and the supporting evidence

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The analytic framework includes five goals (*see below*). While Goal V was the big goal initially, as the framework was used out in the community, Goal I was identified as the goal warranting the most attention, and that will be the focus of today's session. Goals II through V can be seen as part of the pipeline, Presley observes.

The Five Goals of the AF

- GOAL I: Promote and sustain institutional progress in mathematics and science preparation and development programs

* Goal II: Recruit more mathematics and science teachers, especially from underrepresented groups, to meet state/district needs.

* GOAL III: Prepare high quality mathematics and science teachers

* GOAL IV: Support teacher education graduates to increase retention and effectiveness

* GOAL V: Provide continuing learning opportunities and advanced degrees for program graduates and others

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She offers a brief overview of what The Leadership Collaborative has been doing. Most participants have used the analytic framework to develop their action plans and it has proved to be a very helpful tool, offering a common way for the twenty-six different institutions to create their own network while also getting an idea of what some of the others are doing.

During the recent TLC Retreat in Miami, 24 of the 26 team leaders attended as well as 15 provosts. Presley notes that she was firm in not allowing any substitutions. Feedback on the session indicates that both the team leaders and the provosts found it a very powerful experience.

One subject of interest was not only how institutions reward faculty but how they recognize faculty work in terms of the appointment structure. Presley reports hearing a range of

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What We Are Doing

- TLC participants are developing action plans with particular attention to Goals I, II and III.

- Held a TLC Retreat in early January with 24 Team Leaders and 15 Provosts.

  - Panel on faculty appointments:
    - Stony Brook – No college of education
    - U. Colorado Boulder – No joint appointments
    - U. Maryland – Joint appointments
    - U. Kentucky – Appointments in part in a STEM Center

- Developing Surveys to TLC Provosts and Team Leaders – our focus today (with Jennifer Frank and Nancy Shapiro).

strong opinions on this subject as she worked with team leaders over the past nine months, and those disparate opinions are reflected in the wide variety of approaches among the 26 member institutions. A panel on faculty appointments held during the retreat represented some of these approaches. There was Stony Brook University, which has no college of education and yet they produce both elementary and secondary teachers.

The University of Colorado in Boulder, which is at the forefront of physics teachers in particular, does not have joint appointments. Their disciplinary science education faculty are either in the disciplinary department or in the school of education and they have the resources to do both. That led to some interesting dialog, Presley relates, including the notion that it is helpful to have two faculty working together rather than one working in isolation.

At the University of Kentucky, part of the faculty member's appointment is right in the STEM Center and reports to the Provost. They have handled that sort of cross-college issue at a much higher level, notes Presley.

Survey for Provosts and Team Leaders

The project is developing a survey for The Leadership Collaborative provosts and team leaders, and that is the focus for today's session, Presley states. There are two reasons why this survey is being developed, she explains. First,

the institutions and members of The Leadership Collaborative would like to know how it is being done at the twenty-six participating institutions. Second, to identify if lessons can be gleaned from this survey that suggest there are best practices, though those practices may be conditional depending on the type of institution. This entails drilling down into Goal I, Presley observes (*see sidebar*).

Presley then turns the session over to Nancy Shapiro and Jennifer Frank.

Survey Review Instructions
See Page 10 for Complete Survey

Nancy Shapiro explains that there is a two-fold purpose for this survey. One is to raise the profile of these Math and Science Partnership activities to the provost level. The second is to figure out whether provosts have a handle on what MSPs are doing in their institutions. Presley notes that the survey goes beyond seeking information about the MSP projects to seeking a greater understanding of how math ad science instruction is viewed and how preparation of preservice teachers is viewed.

Shapiro guides participants through a review of the survey for provosts, asking participants to first work individually and imagine that they are provosts at their own institutions and respond to the survey as they think their provosts would.

"If you think your provost would hand a particular question off to someone else to answer,

such as a dean of education or associate provost for STEM education, jot down who would be the most likely person to answer the question," Shapiro instructs.

Question 4: Accountability for Teacher Preparation Goals

• I'm curious about question number four. If you're the provost at your institution, who do you hold accountable for meeting your institution's STEM teacher preparation goals? [*Shapiro takes a hand count of responses to question 4.*] We're sitting here in a room with "provosts" who would go directly to the education dean for information about STEM teacher goals. That may be the right person to go to, but part of what we are trying to do is expand the sources of information that a provost has or that an education dean has. Would it matter if there were other positions, such as an associate provost position? For example, I know the provost appointed someone to be the "STEM guru" on the College Park campus, but that person is not a STEM or education faculty member. • **Nancy Shapiro**

• As you know very well there is a chain of command at every institution. The provost would go to the dean of education, who would then probably go to an associate dean and may go to other deans or to the office of STEM education. So there may be a larger pool of people contributing, but the direct contact at my school comes from the provost through the dean of education. • **Participant**

• In our case the provost would go to the long-term dean of natural sciences because, quite honestly, she sold the program. It was her pet program. • **Participant (UTeach)**

• The words here are very important and I think you've phrased them right: "responsibility" and "directly accountable" versus "primary advisor." There's a great deal of difference. On our campus there's a person the provost works with very closely at the associate provost level as a primary advisor, but when it comes to responsibility, it's always the responsibility of those units that generate the teachers. So the wording is good. It becomes ambiguous when you talk about the "go-to" person because most presidents and provosts will have advisors they go to. • **Participant (Kentucky)**

• I'm in the physics department and we have a new provost, and we have all of these committees. We have a university-wide program committee for teacher prep. It seems like the provost goes to these committees to get the feedback. I don't know if it's because he's new and this is part of a dog and pony show or if this is really how he will continue to gather information. • **Participant**

Question 1: Making STEM Teacher Preparation a High Priority

• I think you could add to this list the state higher education coordinating board because they really have power, particularly with money coming down. It directly ties to the

Who Has the Authority to Influence STEM Faculty?

• On question four, I think it would be useful to get at not only who is the most responsible or directly responsible but how this trickles down. We have these conversations about how to really produce institutional change. It's always going to be the dean of the college of education. Somehow, that person has to have the authority, influence or whatever to get it down to the STEM faculty. There's a disconnect there, so it's a trickle down issue. • **Participant**

Raising Provost Awareness

• If we wanted to raise the awareness of provosts, are any of these questions more or less valuable in doing that? Question number one, for example: What would it take to make STEM teacher preparation a higher priority on your campus? • **Nancy Shapiro**

Stem Centers/UTeach Model

• The other piece of this is STEM centers. More and more campuses are getting STEM centers, but what do they look like, how are they funded and where are they housed? I think the UTeach initiative has really driven universities' thinking about different ways of getting at the production of science and math teachers. **• Jennifer Presley**

• It's primarily science and math and now engineering. **• Participant (UTeach)**

• The model there was to sort of start afresh with an entity that brought faculty in. There are now thirteen replications with several more on the way. It has been very clear in our group that while this somewhat rigid replication process fits some institutions, for others it doesn't quite fit. We have two UTeach institutions among the twenty-six, Kansas and University of Colorado at Boulder. That's the reason for this who, what and where question. I have no opinion on what we're going to learn. Is there a best practice? Is the UTeach model the best practice? **• Jennifer Presley**

legislature if it's a state school, and a lot of these are. **• Participant**

• There's an accountability measure here, and the more accountability that is put on the shoulders of higher education for producing more teachers, the more visible our efforts become because our efforts are in direct response to those accountability measures. It is a push-pull. On the one hand we don't want to be told we have to triple the amount of STEM teachers coming out of our institutions because that means somebody has to do the work. On the other hand, if we are in these institutions and somebody says to the president, triple the number of STEM teachers in five years, I want a report every year, then your project gets raised to a priority level. We're trying to figure out what are the levers that will raise this issue on the campus. That external one that was just mentioned is certainly one of them. **• Nancy Shapiro**

• The state board of education is very important. It goes hand in hand with funding also. **• Participant**

What Do You *Want* Provosts to Do?

• What do you want provosts to do? What do you expect of the provost? They've got colleges to deal with, they've got thousands of other things to deal with. What do you expect me to do? Set up an organization? **• Participant**

• We are not directing our institutions. We are

providing an environment that is in a way horizontal because of our theory of action. We have 15 provosts, many of whom had not thought about STEM education before they came to Miami. We're providing a breakthrough, critical mass of leaders at this set of institutions. We are also providing enough transparency regarding how these institutions are going about the charge of strengthening teacher preparation on their campuses. We are not providing solutions. **• Jennifer Presley**

• But you're making recommendations, right? **• Participant**

• No. **• Jennifer Presley**

• Well what are you doing? **• Participant**

• The research. We may find that out of the twenty-six we do have data, but it won't be our recommendation it will be the recommendation that grows out of this transparency of learning from each other in the twenty-six institutions. **• Jennifer Presley**

• If I'm the provost and I'm looking at this, I'd think you were going to give me something that would tell me how to rearrange my office for STEM education. **• Participant**

• That comes next. Until we dig into this we don't really know. **• Jennifer Presley**

Other Influencing Factors: Faculty Governance, State Licensure

• You have almost a hierarchy of factors, like what does it take to make teacher prepara-

tion a higher priority, and then in question four you ask who is held accountable for meeting your institution's STEM teacher preparation goals. I know our provost is very aware of the influencing factors on campus. The influencing factors in working with our education dean includes a concern for getting new courses and new curricula for teacher education through the faculty senate and how the faculty as a whole view these sorts of changes. The provost often spends a lot of time being concerned about the senate and faculty governance. • **Participant**

• The provost and the faculty may decide there's a great program they want to do, like UTeach, but there may be elements of that UTeach program... I'm at a university that has recently been funded to replicate the UTeach model and I've been involved in that process analysis. As we looked at the covariants, there is what the faculty may want to do, what a dean may want to do, what the partnership may want to do, and then there's the state board of education that determines some policies at the state level that may need to be sifted through as well. We have a wonderful collaboration because we have a good relationship with people who hold those policy positions, but it's more than what the faculty decide or what the institution decides or even what a higher education commission decides. It's who is the director for teacher licensure in that state and how are we going to affect legislation? It goes beyond just the institution. • **Participant**

• That's what I meant when I said earlier that the state coordinating board has such a powerful influence on this. They set targets, they determine policy and they in turn, through the education commissioner, have to work with the department of education. These are all influencing and determining factors.
  • **Participant**

• We have sort of moved away from that and said, independent of what the states are doing, our institutions have made this commitment to produce more and higher quality math and science teachers. Independent of those outside policies, isn't there still this imperative to think about what the culture is within the university that makes this more or less attractive to faculty, particularly disciplinary faculty? Can we ask those questions in a way that is independent of external policy?
  • **Jennifer Presley**

Faculty Rewards

• Regarding questions 10 through 13 on faculty rewards, I don't think any provost is going to check "none." Is there a reason why you included that option? • **Participant**

• I was the one who argued for that. I felt we couldn't make assumptions about how they were going to respond. This is also going to team leaders, and they may check "none."
  • **Jennifer Presley**

Leadership Strategies

• You're also getting at the leadership and the role that APLU institutions play in these types of initiatives in the state. Certainly the presidents have a leadership and an influence to a greater or lesser extent, dependent on the other stakeholders. I think an interesting question asked at an earlier APLU meeting was, what strategies do provosts and presidents employ to bring in the cooperation or support of these other influencing organizations in the state. Some have statewide task forces. That's how we did it in Kentucky. We all know that certain provosts have more or less influence, so strategies are important. • **Participant (Kentucky)**

Correlation Between Survey Results and Which Universities are Doing the Best Job

• You're attempting to identify best practices through this survey. Will there be any correlation between the survey and what is happening at the university level in terms of actual results in STEM teacher preparation? • **Participant**

• Yes. We're giving the second part of this survey to the team leaders to get a different perspective. Also, the member institutions have plans with targets, measures and so on for what they will accomplish by the summer of 2011. Another measure is which of our 26 provosts came to our Miami meeting. That certainly signals something. • **Participant**

The purpose of this survey is to gauge the relative position of STEM teacher preparation initiatives on APLU campuses and the role that provosts and other senior academic leaders play in moving this agenda forward. In particular, we are interested in collecting information about faculty appointments, cross-campus structures such as STEM centers, and rewards systems for teaching, education research, and working with teacher preparation programs and K-12 schools. We would like to collect and share information that would be useful to you. We hope to be able to share strategies and innovative approaches to STEM teacher preparation as part of the TLC knowledge network.

Feedback, questions, comments?

Where to Find Us:

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SMTI TLC Provost Survey
Draft Version January 25, 2020

1. What would it take to make STEM teacher preparation a higher priority on your campus? (Please rank order all factors that apply, with 1 being the most important factor.)

_____Institutional Strategic plan emphasis
_____Presidential bully pulpit recognition
_____Increased state or federal funding
_____Increased external pressure from K-12 community (e.g., teacher shortages)
_____Strong evidence that undergraduate education as a whole benefits from teacher preparation programs on the campus
_____Other (please list):_____

2. How often do you discuss your institution's STEM teacher preparation programs with your president? (check one)

_____Once a year (annual review)
_____Twice a year (mid-year review)
_____Periodically (i.e., during strategic planning)
_____More frequently, informal (not scheduled)
_____More frequently, formal (at regular intervals)
_____Never

3. How familiar are you with university/school partnerships at your institution? (check one)

_____Familiar with them all
_____Familiar with a majority of them
_____Aware that campus has some, but do not know source of funding or details
_____Unaware of partnerships (this is program-level detail that does not rise to provost level)

4. Whom do you hold directly accountable for meeting your institution's STEM teacher preparation goals? Please rank order all that apply, with 1 as your first "go-to-person," 2 as your second "go-to-person," etc.

_____Education Dean
_____STEM Dean(s) (specify:_____
     _____)

_____Associate Provost (specify:_____
     _____)
_____Associate Dean (specify:_____
     _____)
_____Department Chair(s) (specify:_____
     _____)
_____Tenure Track Faculty
_____Tenured Faculty
_____Non Tenure Track Instructional Faculty
_____Academic Administrators (e.g., Program Directors, Center Directors)
_____Other (please list):_____
     _____
_____No One/Don't Know

5. On what measures is your institution held accountable for STEM teacher preparation? (check all that apply)

_____Meeting enrollment targets/benchmarks
_____Meeting graduation targets/benchmarks
_____Meeting external needs (e.g., teacher supply in local school districts)
_____Building external partnerships (e.g., work with K-12 school districts)
_____Faculty research and scholarship
_____Graduate student support
_____Generating external funding through grants
_____Other (please list):_____
     _____
_____None/Don't Know

6. Does your campus support any of the following? What is the source of funding for each? (specify approximate percentages)

Hard/ Institutional	Soft/ Grant-Funded	
_____%	_____%	Education faculty appointments in STEM departments
_____%	_____%	STEM faculty appointments in education depts.
_____%	_____%	Discipline-based education researchers in STEM depts.
_____%	_____%	Faculty appointments in a campus STEM center

6a. Please respond if you have any types of the faculty appointments in education and STEM described directly above:

How many of these faculty positions do you have, and in what disciplines?

_____
_____

Are these considered joint faculty appointments, or are they housed in one department only?

_____
_____

How did these faculty positions originate?

_____
_____

Is your campus planning to add more of these types of faculty positions? In what discipline?

_____
_____

What role do these faculty play in STEM teacher preparation?

_____
_____

7. Does your campus have a STEM Center?

    Yes   No   Don't Know

7a. If yes, please answer the following questions:

What is the mission and major areas of responsibility of the STEM Center?

_____
_____

To whom does it report?

_____
_____

How is it staffed?

_____
_____

How is it funded? (Include internal and external sources)

_____
_____

What role does the STEM Center play in STEM teacher preparation?

_____
_____

8. Does your campus have an endowed chair(s) in STEM education?

    Yes   No   Don't Know

8a. If yes, please specify:

_____
_____

9. Does education research in the STEM disciplines take place on your campus?

    Yes   No   Don't Know

9a. If yes, by whom:

_____
_____

10. How does your institution reward faculty for **excellent teaching**? (check all that apply for each category of faculty

STEM Faculty	Education Faculty	
_____	_____	is evaluated and rewarded in the tenure and promotion process
_____	_____	is recognized with bonuses and/or merit raises
_____	_____	is rewarded with campus level awards and recognition
_____	_____	is supported with course releases
_____	_____	is recognized with summer research funds/other financial awards
_____	_____	other:_____ _____
_____	_____	none

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Science & Mathematics Teacher Imperative

11. How does your institution reward faculty for <u>**education research in the discipline**</u>? (check all that apply for each category of faculty

STEM Faculty	Education Faculty	
_____	_____	is evaluated and rewarded in the tenure and promotion process
_____	_____	is recognized with bonuses and/or merit raises
_____	_____	is rewarded with campus level awards and recognition
_____	_____	is supported with course releases
_____	_____	is recognized with summer research funds/other financial awards
_____	_____	other:_____ _____
_____	_____	none

12. How does your institution reward faculty for <u>**work with your campus's teacher preparation programs**</u>? (check all that apply for each category of faculty

STEM Faculty	Education Faculty	
_____	_____	is evaluated and rewarded in the tenure and promotion process
_____	_____	is recognized with bonuses and/or merit raises
_____	_____	is rewarded with campus level awards and recognition
_____	_____	is supported with course releases
_____	_____	is recognized with summer research funds/other financial awards
_____	_____	other:_____ _____
_____	_____	none

13. How does your institution reward faculty for <u>**work with K-12 schools**</u>? (check all that apply for each category of faculty

STEM Faculty	Education Faculty	
_____	_____	is evaluated and rewarded in the tenure and promotion process
_____	_____	is recognized with bonuses and/or merit raises
_____	_____	is rewarded with campus level awards and recognition
_____	_____	is supported with course releases
_____	_____	is recognized with summer research funds/other financial awards
_____	_____	other:_____ _____
_____	_____	none

14. Are there data points on STEM teacher preparation programs <u>**not covered**</u> by this survey that would be useful for benchmarking with other APLU institutions? (please specify)

_____
_____
_____
_____

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