Seeking Consensus on Quality in Science & Mathematics Teacher Preparation

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APLU/SMTI Commitment

• APLU Board unanimously agreed to institutional commitments and launched the invitation to commit to the Science and Mathematics Teacher Imperative (SMTI) in November, 2008.

• The SMTI commitment: to increase the quantity and quality of science and mathematics teachers
What Constitutes Quality?

Senior institutional leaders could envision ways to increase the quantity of their science-math programs, but determining quality seemed far more perplexing.

Presidents and chancellors framed two primary question about quality.
What Constitutes Quality?

“What are the most critical components or indicators of quality programs?

“How can I best leverage my role to help assure quality science-math teacher prep?”
What Constitutes Quality?

A comprehensive review of the research literature provided very mixed results and was largely non-definitive, especially about the role of institutional leadership.

Thus, we embarked upon a different path to answer the two questions for campus leaders.
The Quality Initiative: NSF-Supported Research Design

• Develop questions and interview protocols
• Achieve broad consensus on individuals to interview
• Convene disciplinary focus groups to ask the same questions
• Engage respected professionals to help conduct the interviews
• Invite interviewees and selected focus group members to be a colloquium participants
The Quality Initiative: NSF-Supported Research Design (Cont.)

• Analyze and synthesize the data from the interviews and focus groups with the aid of qualitative analysis software
• Write briefs for each of four major themes that emerged from the analysis
• Convene a colloquium to seek consensus on the key attributes of quality science and mathematics teacher preparation
• Summarize findings for campus leaders and others
The Quality Initiative: NSF-Supported Research Design (Cont.)

Thirty-two national known researchers and thought leaders in teacher preparation, national award-winning practicing teachers and recognized policy leaders were interviewed.

Group interviews were conducted with representatives of six science and mathematics disciplinary and professional societies.

75 people in total were interviewed!
Findings: Four Themes of Quality

Respondents described the key characteristics of their vision of an ideal science and mathematics preparation program. A clear consensus emerged.* The results were compiled into four thematic briefs:

1. Entry and Exit Standards
2. Clinical Preparation and Induction
3. Knowing and Teaching Disciplinary Content
4. Evaluation and Research to Improve Teacher Preparation

*Consensus was defined as near, but not necessarily complete, unanimity.
1. Entry & Exit Standards: The Key Questions

1. Are we clear about the characteristics, abilities, and demographics we are seeking to recruit and select into our programs?

2. Do we have the right conditions and incentives in place to recruit consistently strong teacher candidates?

3. What are the best processes and procedures we should be using to recruit and select the candidate profile we seek?

4. How do we assure that the profile of candidates we recruit looks like the completer profile?
2. Clinical Prep & Induction: The Key Questions

1. Do we have in place the ideal scope and sequence of clinical experiences?
2. Are we carefully selecting and jointly preparing the IHE and P-12 faculty to supervise teacher candidates during clinical practice?
3. Are our clinical placements carefully selected to assure a diversity of settings?
4. Are we actively supporting the induction of our teachers?
3. Knowing and Teaching Disciplinary Content: The Key Questions

• Do our disciplinary courses assure that candidates understand the nature of the mathematics and/or science disciplines.

• Do our teacher candidates have the knowledge and skills to teach the disciplines in a developmentally appropriate way?

• Do we have effective collaboration across the education and disciplinary departments?

• Do our education and disciplinary faculty annually review the success metrics of program candidates and completers?
4. Evaluation and Research to Improve Teacher Preparation: The Key Questions

1. Do we have a comprehensive program assessment/evaluation system that spans recruitment to entry to completers as teachers?
2. Do we have systems to support the collection, analysis, and reporting of program evaluation and assessment data?
3. What is the most urgent research or program assessment/evaluation that needs to be undertaken?
4. How can we improve our program evaluation and research findings for all stakeholders P-20?
The Quality Initiative: The Boulder Colloquium

• An invited colloquium of those interviewed, including representatives from the six focus groups, was convened in Boulder, CO, April 22-23, 2012 to consider the four themes and the implications for chancellors and presidents.

• The 30-hour colloquium was the basis for crafting *10 Essential Questions* for campus leaders to ask and answer – since consolidated to *5 Strategic Actions*. 
Five Strategic Actions

1. **Mission & Strategy**
   
The institution’s mission, strategic priorities, and public pronouncements of campus leaders is supportive of teacher preparation.
Five Strategic Actions

2. Policy & Practice

Institutional policies and practices, including financial allocations, align to strengthen clinically based teacher preparation.
3. Incentives & Rewards

Institutional incentives and rewards, including tenure and promotion, encourage increased disciplinary and education faculty collaboration in clinically-based teacher preparation; in beginning teacher support; and in professional advancement for inservice teachers – particularly in partnership schools.
Five Strategic Actions

4. Data-driven Program Improvement

Institutional policies and infrastructure support the systematic collection and analysis of data to make informed decisions about program impacts and improvement.
5. K-20 Partnership

Campus leadership is engaged in a strong partnership and has effective communication with area district superintendents.
Teacher Development Continuum

PRE-PRE-SERVICE
Multiple sources

PRE-SERVICE
Undergraduate, Graduate or Alternative Route

IN-SERVICE
Initial Employment To Retirement

Assessment & Feedback

RECRUITMENT
- K-12 Outreach
- Teacher Cadet & FT Clubs
- Community College and University Students
- Mid-Career & Para-professionals

PREPARATION
- Disciplinary Content & Research
- Pedagogical Content and Research
- Clinical, Field & Intern Experiences

MENTORING & INDUCTION
Beginning Teacher Support
- Initial License
  - Performance Based
- Continuing License
  - Performance Based

DEVELOPMENT
- Advanced Academic Study
- Aligned & Standards Based Professional Growth Activities
- NBPTS Preparation & other Master Teacher Preparation

Leadership, Policy and Infrastructure

Higher Levels of Learning For All Students

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Be in touch

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## The KEI

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<th>Assessment Categories</th>
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| **Candidate Selection Profile** | Academic Strength | PRIOR ACHIEVEMENT—(1) For Undergraduate Programs: Non-education course GPA required for program admission. Mean and range of high school GPA percentile (or class rank) for-candidates admitted as freshmen. Mean and tercile distribution of candidates’ SAT/ACT scores. GPA in major and overall required for program completion. Average percentile rank of completers’ GPA in their major at the university, by cohort.  
—(2) For Post-Baccalaureate Programs: Mean and range of candidates’ college GPA percentile and mean and tercile distribution of GRE scores  
TEST PERFORMANCE—For All Programs: Mean and tercile distribution of admitted candidate scores on rigorous national test of college sophomore-level general knowledge and reasoning skills |
| **Teaching Promise** | Teaching Promise | ATTITUDES, VALUES, AND BEHAVIORS SCREEN—Percent of accepted program candidates whose score on a rigorous and validated “fitness for teaching” assessment demonstrates a strong promise for teaching |
| **Candidate/Completer Diversity** | Candidate/Completer Diversity | DISAGGREGATED COMPLETIONS COMPARED TO ADMISSIONS—Number & percent of completers in newest graduating cohort AND number and percent of candidates originally admitted in that same cohort: overall and by race/ethnicity, age, and gender |
| **Knowledge and Skills for Teaching** | Content Knowledge | CONTENT KNOWLEDGE TEST—Program completer mean score, tercile distribution, and pass rate on rigorous and validated nationally normed assessment of college-level content knowledge used for initial licensure |
| | Pedagogical Content Knowledge | PEDAGOGICAL CONTENT KNOWLEDGE TEST—Program completer mean score, tercile distribution, and pass rate on rigorous and validated nationally normed assessment of comprehensive pedagogical content knowledge used for initial licensure |
| | Teaching Skill | TEACHING SKILL PERFORMANCE TEST—Program completer mean score, tercile distribution, and pass rate on rigorous and validated nationally normed assessment of demonstrated teaching skill used for initial licensure |
| | Completer Rating of Program | EXIT AND FIRST YEAR COMPLETER SURVEY ON PREPARATION—State- or nationally-developed program completer survey of teaching preparedness and program quality, by cohort, upon program (including alternate route) completion and at end of first year of full-time teaching |
| **Performance as Classroom Teachers** | Impact on K-12 Students | TEACHER ASSESSMENTS BASED ON STUDENT LEARNING—Assessment of program completers or alternate route candidates during their first three years of full-time teaching using valid and rigorous student-learning driven measures, including value-added and other statewide comparative evidence of K-12 student growth overall and in low-income and low-performing schools |
| | Demonstrated Teaching Skill | ASSESSMENTS OF TEACHING SKILL—Annual assessment based on observations of program completers’ or alternate route candidates’ first three years of full-time classroom teaching, using valid, reliable, and rigorous statewide instruments and protocols |
| | K-12 Student Perceptions | STUDENT SURVEYS ON TEACHING PRACTICE—K-12 student surveys on completers’ or alternate route candidates’ teaching practice during first three years of full-time teaching, using valid and reliable statewide instruments |
| **Program Productivity, Alignment to State Needs** | Entry and Persistence in Teaching | TEACHING EMPLOYMENT AND PERSISTENCE—(1) Percent of completers or alternate route candidates, by cohort and gender – race-ethnicity, employed and persisting in teaching years 1-5 after program completion or initial alternate route placement, in-state and out-of-state  
—(2) Percent of completers attaining a second stage teaching license in states with multi-tiered licensure |
| | Placement/Persistence in High-Need Subjects/Schools | HIGH-NEED EMPLOYMENT AND PERSISTENCE—Number & percent of completers or alternate route candidates, by cohort, employed and persisting in teaching in low-performing, low-income, or remote rural schools or in high need subjects years 1-5 after program completion or initial alternate route placement, in-state and out-of-state |
The Key Effectiveness Indicators

• Focused on measures for an annual, publicly-reported assessment of preparation programs
• Measures had to
  – have strong face validity, as well as potential content and construct validity
  – rely on data that could conceivably obtained within the next 5 years
  – be useful for both program accountability and program improvement