Why We Are Here
Where We Are Going

Introductory Remarks
PRISE-II Network Meeting
DFW AA Training Center
Sunday, October 9, 2011

Carol L. Stuessy, Project Director
Texas A&M University
Introductions

• Carol Stuessy, P.I., PRISE
• Dane Bozeman, Post-Doctoral Research Scientist
• Sara Spikes, Post-Doctoral Research Scientist
• Tyrone Blocker, Graduate PRISE Fellow
• Laura Ruebush, Graduate PRISE Fellow
• Caroline Vasquez, Graduate PRISE Fellow
Teacher Professional Continuum
Model One: Equal Expectations

All presumed expert
No need to seek new hires that “match” both school and teacher needs
New-to-School teachers informally are “taken under the wings” of more experienced teachers
No need for organized support for any one group or all teachers
Novice teachers and new-to-school teachers go through an “orientation” at district and/or school levels for procedural details of employment
No need for customized professional development for teachers at different stages in their careers
The responsibility to “train” teachers resides within the “training institution” before the school hires them
Teacher Professional Continuum
Model Two: Deficiency

**Science Program**

Novice Science Teacher  →  Science Teacher With Some Experience  →  More Experienced Science Teacher

- **Science Program “links” teachers** together within a structure of communication and decision-making at varying levels.
- Novice teachers receive **mentorship from science teachers** with more experience, which may be assigned by the principal.
- **Training for mentors**, however, rarely exists.
- **No mechanism for feedback** to administration about “what works best” in mentoring.
- **Novice teachers** are the only ones formally assigned for mentorship/school-based professional learning.
- Experienced teachers not performing well (i.e., students are having trouble) may be assigned for particular “growth experiences” as **deficiency plans**.
- Professional development may occur, regardless of years of experience, with **random ways to determine who chooses** what to attend, outside the school.
Teacher Professional Continuum Model

Three: Growth Model

Professional Culture

Science Program

Novice Science Teacher

Mid-Career Science Teacher

Veteran Science Teacher

Strengths are recognized in teachers at all stages in the TPC in a rich professional culture. Each type of teacher contributes to the growth of others. Emphases change for professional development with teachers’ experience and career goals.

Mentorship leads to professional growth for mentors as well as new teachers. Professional development experiences are carefully planned and programs developed to optimize the effects on teacher learning. Many PD experiences occur within the school walls; times are arranged for mentoring and classroom observation.
About PRISE

- **Funding Source** – NSF
- **Goals** of the project
  1. **Characterize the TPC of high school science teachers** in Texas to learn more about how high schools currently support their teachers as they move through the professional continuum.
  2. **Determine the relationships of schools and the TPC** in creating **optimal professional cultures** that lead to **science teacher retention** and positive results for **students’ science achievement and college readiness**.
  3. **Prepare new policy researchers** to create research findings that inform decisions schools, districts, states, and the nation makes about science.
Why This Meeting

• Goals of this meeting
  – Familiarize the membership at your schools with the overall goals of the project as they specifically relate to highly successful schools with high numbers of historically underrepresented students in science
  – Form relationships between the PRISE research group members and network school administrators
  – Develop a shared understandings about our complementary roles in seeking and providing information about your school
  – Shared our vision that the information we gather will be used to benefit all high schools desiring to reach similar levels of high achievement for their students
Why Science

• “At no time in history has improving science education been more important than it is today” (Duschl et al, 2007).

• Society functions and the world changes with advances in STEM discovery and application

• Science enables members of our society to understand how the world and things residing within it work

• Policy debates require science literacy (e.g., cloning, alternative fuel sources, stem cell research)
What We Currently Know – U.S. Perspectives

• Changes in the ways we teach science have resulted in modest improvements in U.S. science education, particularly in comparison to other countries

• In the U.S., gaps in science achievement occur in populations of majority group students and both economically disadvantaged and non-Asian minority students

• In the U.S., fewer high school graduates choose STEM-related careers when going to college
What We Currently Know – Texas Perspectives

• Many large urban schools have high numbers of student who do not graduate from high school
• Changes in the ways we teach science in Texas have not resulted in higher college-entrance examination scores
• Roughly 16% of all high schools in Texas demonstrate high proficiency in science and college readiness
• A little over 2% of all high schools in Texas with high proportions (>75%) of Hispanic and African-American students demonstrate high proficiency in science and college readiness
• Because the number in the second group is very small, the PRISE-I study did not include any of the high-proportion schools
• A science teacher retention crisis looms; all science teachers (but especially novice teachers) are leaving the profession at numbers that are increasing
Schools and Teachers Who Work Together Make It Happen for Students

Simplified Model of High Schools as Systems of Support for Students' Academic Achievement and College Readiness Emphasizing the Interrelatedness of School Support and Teacher Variables

- School Support for the Professional Growth and Retention of Science Teachers
- Teacher Dimensions of Commitment, Satisfaction, and Retention
What Do We Know About What’s Important in Getting Students There?

Simplified Model of High Schools as Systems of Support for Students' Academic Achievement and College Readiness Emphasizing the Interrelatedness of School Support and Teacher Variables

- Science Achievement and College Readiness
- Professional Development Support
- Professional Activity
- Teacher Dimensions of Commitment, Satisfaction, and Retention
- Induction Program
- Job Satisfaction
- Recruitment Strategies
- Teacher Retention

School Support for the Professional Growth and Retention of Science Teachers
It’s Not Just About Variables: It’s Also About Associations Among Variables

School Support for the Professional Growth and Retention of Science Teachers

Science Achievement and College Readiness

Professional Development Support

Induction Program

Professional Activity

Job Satisfaction

Recruitment Strategies

Teacher Retention

Simplified Model of High Schools as Systems of Support for Students’ Academic Achievement and College Readiness Emphasizing the Interrelatedness of School Support and Teacher Variables

Teacher Dimensions of Commitment, Satisfaction, and Retention
And With Many Variables, Associations Go Both Ways
Best School Supports Are Tailored to Needs of Teachers at Different Points on the TPC

Simplified Model of High Schools as Systems of Support for Students' Academic Achievement and College Readiness Emphasizing the Interrelatedness of School Support and Teacher Variables
When School Support is High, Science Teachers Are Retained

School Support for the Professional Growth and Retention of Science Teachers

Science Achievement and College Readiness

Professional Development Support

Induction Program

Recruitment Strategies

Teacher Retention

Teacher Dimensions of Commitment, Satisfaction, and Retention

Simplified Model of High Schools as Systems of Support for Students' Academic Achievement and College Readiness Emphasizing the Interrelatedness of School Support and Teacher Variables
When School Support is High, Science Teachers Report Higher Levels of Job Satisfaction
When School Support is High, Science Teachers’ Professional Activity Is Also High

Simplified Model of High Schools as Systems of Support for Students' Academic Achievement and College Readiness Emphasizing the Interrelatedness of School Support and Teacher Variables
Schools with High Levels of SASS also have High Levels of School Support and Higher Levels of Teacher Dimensions
Seven of the Eight High-Achieving Schools in the PRISE-I Sample Showed This Pattern
Take Care of Your Science Teachers’ Professional Needs and You Will Find:
* Happy, Active Science Teachers who are Retained
* Students Who Do Well in Science and are Ready for College

Teachers and Schools Work Together to Make It Happen for Students
A Caveat:
All High-SASS Sample PRISE-I Schools Were Schools with Low Proportions of Minority Students
Some Numbers May be Helpful Here in Understanding Why This Occurred

- Original Population of PRISE-I Texas High Schools = 1,333 (2007-2008)
- Random sampling chose 50 schools out of 1,333 on the basis of size, minority enrollment proportions, and geographic location
- Of those 50 schools, only 8 (16%) were determined to be High-SASS
- The 50 original sample schools were identified as PRISE-I schools

- Current Population of PRISE-II Texas High Schools = 1,370 (2010-2011)
- Examination of all schools in the current population identified 29 (2%) of 1,370 schools as both high-minority and high-SASS
- Purposive sampling chose 8 of the 29 as being representative of the entire number of high-minority and high-SASS
- Your schools is one identified as a PRISE-II school
What Associations Occur between School Support Practices and Teacher Dimensions in Highly Successful, High-Minority Schools?
Overview of the Research Context: Aspects of Research by PRISE Researchers

Introduction
Carol Stuessy
Conceptual Framework Development

PRISE Conceptual Frameworks are developed concurrently with literature review and new research results. Resulting frameworks guide the design and implementation of the PRISE research agenda. As new information is gathered, the framework is continuously modified.

Sampling Plan

50 randomly selected PRISE-I sample schools and 8 purposively chosen PRISE-II high-minority schools are sources for information about relationships between schools, teachers, and student outcomes in science.

Data Sources and Instrumentation

<table>
<thead>
<tr>
<th>Source</th>
<th>Collection and Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interviews of school principals, science liaisons, new teachers and mentor teachers</td>
<td>School visits and face-to-face interviews with principals and science liaisons; telephone calls to beginning teachers, teachers new to the school, and mentors</td>
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<tr>
<td>All science teachers in each of the 50 PRISE-I and 8 PRISE-II sample schools</td>
<td>Texas Poll of Secondary Science Teachers: questionnaire on professional activity and job satisfaction</td>
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<tr>
<td>State-maintained databases</td>
<td>School performance data (science achievement, AP enrollment); teacher and school demographics</td>
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<tr>
<td>School master schedules</td>
<td>School schedule, science course offerings, common planning time</td>
</tr>
<tr>
<td>Census reports</td>
<td>Community population, distributions of minority populations, average household income</td>
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Dissemination and Policy Deliberation

Dissemination includes stakeholder policy forums and PRISE Network Meetings. Products include dissertations, research summary documents, policy briefs, research reports, and presentations at science education professional meetings. State, district, and school policy makers and administrators use PRISE research products to inform development of policies to alleviate teacher shortages and increase students’ science proficiency and college readiness. (See http://prise.tamu.edu.)

Contact Carol L. Stuessy for more information, c-stuessy@tamu.edu

Roles of High Schools and Science Teachers in Preparing Students in Science and for College

Data are collected from interviews, questionnaires, school master schedules, state-maintained databases, and census reports to create research reports. Data collection occurs through interviews at the school site and via telephone; teachers complete questionnaires and mail back to Texas A&M University; archival data are retrieved to identify relationships among variables.

Data Analysis and Synthesis

Mixed methods are employed to analyze data from interviews, questionnaires, school master schedules, and state archives. Results describe relationships among school support and teacher variables with students’ proficiency and college readiness scores. Databases accumulate all data collected and analyzed.

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Schools and the Teacher Professional Continuum

Laura Ruebusch
Professional Development

• Quality of science teachers impacts
  – Student science proficiencies
  – College Readiness

• Most rely on continuous PD to support changes in practice

• Type and quality of PD often difficult to determine
Defining “high-quality” PD

• Focus on subject-specific content and how students learn
• Participate in intensive, prolonged training
• Assure that the methods align with standards

• Practice methods in a risk-free environment before implementation
• Provide multiple follow-up sessions
• Collaborate with colleagues and experts
Professional Culture

- The interaction of teachers, specialists, and administrators in the school environment
  - formal mentoring system
  - classroom observations with feedback
  - official and informal meetings among teachers
  - special status granted to novice teachers
  - collective responsibility regarding student expectations and success
  - professional development

- Frequent interactions with colleagues across various experience levels increases
  - Job satisfaction
  - Retention
Teacher Professional Continuum

• Represents growth in experience and expertise through distinctions of teacher types

  – Novice, 1-3 years in profession
  – Mid-career, 4-7 years in the profession
  – Veteran, 8 or more years in the profession
District, State, and National Policies

Core Skill Development

Orchestration and Innovation in the Classroom

Leadership

Novice Science Teacher

Mid-Career Science Teacher

Veteran Science Teacher

Teacher Professional Continuum (TPC)
References

**Professional Culture**


**Professional Development**


**TPC**

Science Teachers’
Job Satisfaction and Retention

Dane Bozeman
Sara Spikes
Job Satisfaction

The Texas High Schools’ Report Card

• A  Occupational Choice
• B+ Collegiality & Cooperation Among Teachers
• B+ Student-Centered Focus on Academics
• B  Administrative Communication & Teaching Assignment

• B- Professional development support
• B- Autonomy & Recognition
• D- Student-Centered Focus on Careers & Informal Science Activities
• F  Science Lab Facilities & Equipment
Job Satisfaction

Collegiality

Team effort in improving student achievement

Science program contributes to career development of students

Cooperation among teachers at the school
Retention

2008-2009
- Stayer: 290, 75%
- Mover: 48, 13%
- Leaver: 47, 12%

2009-2010
- Stayer: 247, 64%
- Mover: 65, 17%
- Leaver: 73, 19%

Teachers more likely to stay at a school
- Veteran teacher 40-49 yrs. Female

Teachers more likely to move to another school
- Mid-Career teacher 20-29 yrs. Male

Teachers more likely to leave the profession
- Novice teacher 20-29 or > 60 yrs. Female
Retention

Working Conditions

Well-equipped facilities

Teaching assignments

Student demographics
References

Job Satisfaction


Retention

Addressing Diversity

How do we facilitate achievement for all students?

How do we bridge the discontinuity between teachers and students?

How are we meeting these challenges:

• Abilities
• Language
• Culture
Culturally Responsive Pedagogy Facilitates and Supports the Achievement of All Students

How do we facilitate achievement for all students?

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Culturally Responsive Pedagogy Facilitates and Supports the Achievement of All Students

In a culturally responsive classroom:

• Effective teaching and learning occurs

• Culturally supported

• Learner-centered context
Culturally Responsive Pedagogy Facilitates and Supports the Achievement of All Students

Students strengths are:

• Identified

• Nurtured

• Utilized to promote student achievement
The Dimensions of Culturally Responsive Pedagogy

**Personal**
- Cognitive
- Emotional
- Sociocultural

**Institutional**
- Mission Statement
- Values
- Beliefs
- Policies
- Community involvement

**Instructional**
- Materials
- Strategies
- Activities