STELAR and ITEST Overview

NSF ITEST PI & Evaluator Meeting

Enhancing the Quality and Reach of STEM Innovations

Tuesday August, 19th 2014
STEM Learning & Research Center (STELAR)
Education Development Center, Inc.
STELAR Overview

- **ITEST Learning Resource Center (2003-2012)**
- **Partners:** EDC, Inc. + EdLab Group + Goodman Research Group, Inc.
- **Staff**
  - PIs – Sarita Pillai, Carrie Parker, Karen Peterson
  - Senior and supporting staff – Joyce Malyn-Smith, Bernadette Sibuma, Kate Goddard, Becca Schillaci (absent)
  - Evaluator - Karen Gareis
Meeting Goals

- Meet with NSF program officers, understand the short and long-term goals of the ITEST program and how projects contribute to those goals
- Examine issues related to design and implementation of high quality research and evaluation within the ITEST context
- Discuss strategies for broadening participation in the ITEST COP
- Make new, and deepen, existing connections with colleagues from across the country to share lessons learned and best practices
- Continue working together to synthesize findings on topics of mutual interest via working groups
Your Goals
STEM Learning and Research Center (STELAR) Goals

• Facilitate projects’ success through **technical support** with a focus on synthesis of findings
• Inform and influence the field of STEM stakeholders by **disseminating** project findings nationally
• Deepen the impact and reach of the ITEST program by **broadening participation** in the ITEST portfolio
STELAR: Core Areas of Work

- **Technical Support** - Management Information System (MIS), webinars, F2F meetings, working groups
- **Dissemination** – partnerships, dissemination network, capacity building, use of technology and social media
- **Outreach** – targeted outreach to institutions underrepresented in the portfolio (e.g., MSIs and community colleges)

http://stelar.edc.org
To build understandings of best practices, factors, contexts and processes contributing to K-12 students' motivation and participation in STEM

Helps students to be aware of STEM careers, and to pursue formal school-based and informal out-of-school educational experiences to prepare for such careers

Includes 288 current and past projects across 44 states have served 247,700 students, 9600 educators, 3000 parents and caregivers
ITEST Portfolio: Active Projects 2014

- Mathematics, 11%
- Bioscience, 8%
- Engineering, 34%
- Computer Science, 14%
- Multiple Disciplines, 10%
- Environmental Science, 23%

*Based on Spring 2014 MIS data*
• **Computer Science** gaming & simulations, general programming, web development, multimedia – audio, video and animation, computer hardware.

• **Bioscience** bioinformatics, biotechnology, DNA analysis/sequencing, neuroscience and biomedicine

• **Environmental Science** GIS/GPS, remote sensing technology, climate modeling, ecological research/analysis

• **Engineering** aerospace, astronomy, design, robotics and nanotechnology
NSF Leadership & Program Officers

Dr. Joan Ferrini-Mundy
Assistant Director, EHR

Dr. Sarah Kay McDonald
Division Director, DRL

Dr. David Haury
Program Director, ITEST
THE STATE OF ITEST PROJECTS
2014
Management Information System (MIS)

- MIS covers ITEST work completed between September 2012 and August 2013
- MIS completion rate: 87% of active ITEST Projects
- Project Stage:
  - Baseline (no work with participants from 9/12-8/13): 21 projects
  - Annual (work with participants from 9/12-8/13 and beyond): 22 projects
  - Final (worked with participants from 9/12-8/13, but not after): 22 projects
Project Design (n=65)

Geographic Area

- Urban: 80%
- Suburban: 58%
- Rural: 52%

Grade Span

- High School (9-12): 66%
- Middle School (6-8): 66%
- Elementary School (K-5): 15%
- Early childhood (PK): 2%
Project Design: Activities (n=65)

Most common project activities:

• Hands-on activities using technologies common in the STEM workplace (75%)
• Curriculum development (68%)
• Problem-based learning (65%)
• Career skills development (62%)
• Participation of visiting scientists or STEM professionals (60%)
97% of projects work with at least one partner institution

- College/University: 77%
- PK-12 school: 68%
- Researcher, Research institution: 45%
- Business/Industry: 45%
- Community-based organization: 37%
- Not-for-profit organization: 35%
- Informal science education organization: 22%
- Government laboratory: 15%
- Historically Black college/university: 11%
- Hispanic serving institution: 9%
- Other minority serving institution: 3%
## Research/Evaluation Design (n=65)

<table>
<thead>
<tr>
<th>Design Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantitative with pre/post design</td>
<td>51%</td>
</tr>
<tr>
<td>Qualitative, no comparison group</td>
<td>48%</td>
</tr>
<tr>
<td>Quantitative, no comparison group</td>
<td>34%</td>
</tr>
<tr>
<td>Quasi-Experimental</td>
<td>23%</td>
</tr>
<tr>
<td>Qualitative, with comparison group</td>
<td>22%</td>
</tr>
<tr>
<td>Quantitative, with comparison group</td>
<td>20%</td>
</tr>
<tr>
<td>Experimental</td>
<td>5%</td>
</tr>
</tbody>
</table>
## Research Design
(n=65)

<table>
<thead>
<tr>
<th>Projects with Youth</th>
<th>Projects with Educators</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcomes</strong></td>
<td><strong>Outcomes</strong></td>
</tr>
<tr>
<td>Changes in interest in STEM (57%)</td>
<td>Changes in self-efficacy in teaching STEM content (50%)</td>
</tr>
<tr>
<td>Changes in interest in STEM careers (54%)</td>
<td>Changes in practice/pedagogy (44%)</td>
</tr>
<tr>
<td>Changes in STEM content knowledge (42%)</td>
<td>Changes in knowledge for using technology tools in STEM teaching (41%)</td>
</tr>
<tr>
<td><strong>Data collection methods</strong></td>
<td><strong>Data collection methods</strong></td>
</tr>
<tr>
<td>Pre- and/or post-assessments (88%)</td>
<td>Pre- and/or post-assessments (59%)</td>
</tr>
<tr>
<td>ITEST project observations (50%)</td>
<td>Educator interviews (54%)</td>
</tr>
<tr>
<td>Youth interviews (50%)</td>
<td></td>
</tr>
<tr>
<td><strong>Instruments</strong></td>
<td><strong>Instruments</strong></td>
</tr>
<tr>
<td>48% use externally developed and validated instruments</td>
<td>24% use externally developed and validated instruments</td>
</tr>
</tbody>
</table>
Active Projects with Youth

- 36 of 44 active projects (82%) worked directly with youth
- 22,000 youth served in 2012-2013

### Top Formats with Youth

<table>
<thead>
<tr>
<th>Format</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>After school program</td>
<td>58%</td>
</tr>
<tr>
<td>1-2 sessions summer program</td>
<td>44%</td>
</tr>
<tr>
<td>In-school program</td>
<td>42%</td>
</tr>
</tbody>
</table>

### Youth Contact Hours

<table>
<thead>
<tr>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 25 hours</td>
<td>47%</td>
</tr>
<tr>
<td>25-49 hours</td>
<td>36%</td>
</tr>
<tr>
<td>50-74 hours</td>
<td>28%</td>
</tr>
<tr>
<td>75-99 hours</td>
<td>11%</td>
</tr>
<tr>
<td>More than 100 hours</td>
<td>28%</td>
</tr>
</tbody>
</table>
Diversity of Youth Served Out of School

- White/Caucasian (not of Hispanic origin): 50%
- Hispanic or Latino: 15%
- Black/African American (not of Hispanic origin): 24%
- Asian or Pacific Islander: 4%
- American Indian or Alaska Native: 4%
- More than one race reported: 3%
### Active Projects with Educators

- 37 of 44 active projects (84%) worked with educators
- 1,700 educators served in 2012-2013
- 22,700 youth taught, in 21 projects

#### Educator Contact Hours

<table>
<thead>
<tr>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 25 hours</td>
<td>43%</td>
</tr>
<tr>
<td>25-49 hours</td>
<td>41%</td>
</tr>
<tr>
<td>50-74 hours</td>
<td>32%</td>
</tr>
<tr>
<td>75-99 hours</td>
<td>16%</td>
</tr>
<tr>
<td>More than 100 hours</td>
<td>16%</td>
</tr>
</tbody>
</table>

#### Top Formats with Educators

- **Summer Institute and/or Training**: 57%
- **PD after school hours**: 43%
- **Virtual / Distance Learning**: 35%
- **PD during school hours**: 32%
Dissemination Activities (n=44)

<table>
<thead>
<tr>
<th>Dissemination Activity</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Conference presentations</td>
<td>73%</td>
</tr>
<tr>
<td>Website</td>
<td>68%</td>
</tr>
<tr>
<td>Workshops</td>
<td>50%</td>
</tr>
<tr>
<td>Media (newspaper, TV, video, radio)</td>
<td>48%</td>
</tr>
<tr>
<td>Invited presentations</td>
<td>43%</td>
</tr>
<tr>
<td>Meetings/topical convenings</td>
<td>36%</td>
</tr>
<tr>
<td>Social networking</td>
<td>32%</td>
</tr>
<tr>
<td>Peer-reviewed journal articles</td>
<td>30%</td>
</tr>
<tr>
<td>Newsletters</td>
<td>25%</td>
</tr>
<tr>
<td>Book chapters</td>
<td>23%</td>
</tr>
<tr>
<td>Blogs</td>
<td>16%</td>
</tr>
<tr>
<td>Podcasts or webinars</td>
<td>9%</td>
</tr>
</tbody>
</table>
### Products (n=44)

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curriculum/instructional materials</td>
<td>82%</td>
</tr>
<tr>
<td>Website</td>
<td>50%</td>
</tr>
<tr>
<td>Professional development materials/teacher training</td>
<td>50%</td>
</tr>
<tr>
<td>Research findings</td>
<td>34%</td>
</tr>
<tr>
<td>Instruments</td>
<td>30%</td>
</tr>
<tr>
<td>Videos/Multimedia</td>
<td>25%</td>
</tr>
<tr>
<td>Implementation models</td>
<td>23%</td>
</tr>
<tr>
<td>Evaluation strategies</td>
<td>23%</td>
</tr>
<tr>
<td>Program models</td>
<td>20%</td>
</tr>
<tr>
<td>Virtual environments</td>
<td>14%</td>
</tr>
<tr>
<td>Software</td>
<td>11%</td>
</tr>
<tr>
<td>Games</td>
<td>11%</td>
</tr>
<tr>
<td>Apps for phone or tablet</td>
<td>9%</td>
</tr>
<tr>
<td>Theoretical constructs</td>
<td>5%</td>
</tr>
<tr>
<td>Technology designs/Prototypes</td>
<td>5%</td>
</tr>
<tr>
<td>Textbooks</td>
<td>2%</td>
</tr>
</tbody>
</table>
Next Steps

• **Analysis**
  – Open responses, especially:
    • Strategies to broaden participation
    • Strategies to contribute to STEM workforce development
  – Longitudinal analysis of the five years of MIS results

• **Next round of MIS data collection**
  – Fall 2014 for all active projects, including any newly-funded projects

• **What else would you like to see?**
  – How can the MIS results serve you better?
Event Overview: Tuesday

- Collaboration Networking
- Workshops
- Emerging Technology Demonstrations
- Birds of a Feather Dinner (optional)
- Event Evaluation
Event Overview: Wednesday

- Breakfast at 8:00am
- Evaluator Meeting: 8:15am-9:15am (Taylor)
- NSF ITEST Program Officer Panel
- Working Groups
- AISL Technical Assistance Workshops (optional)
Let's get to know each other!
Collaboration Networking

- Your Name
- Your Organization/Program & Role
- Resources (*what do you have to share*)
- Needs (*what do you need to meet your goals*)
- 2 Minutes Each
- Bring your business card to exchange
- You might need a pen to write down great ideas!
Next Up - Workshops (1:45pm - 3:00pm)

Enhancing Project Implementation with Partnerships (Taylor)

Implementing High-Quality Research and Evaluation (Taft)
Next Up - Workshops (3:15pm - 4:30pm)

Strategies for Broadening Participation
(Taylor)

High-Quality Research and Evaluation Design
(Taft)
Emerging Technologies Demonstrations

- The CryptoClub: Extending Learning with Student-Generated Tutorials
- iDesign: Developing Technological Fluency Through Culturally-Relevant Game Design
- Innovative Flight Simulation Experiences for Students and Teachers
- Innovative Technology in Science Inquiry (ITSI-SU)
- NanoExperiences: Pathways to Workforce Success
- Predicting STEM Career Choice From Computational Indicators of Student Engagement Within Middle School Mathematics Classes
- STEM Digital Images in Geoscience Investigations: Teaching Analysis with Light (STEM DIGITAL)
- Visualization Basics: Using Gaming to Improve Computational Thinking
STELAR and ITEST Overview

NSF ITEST PI & Evaluator Meeting

Enhancing the Quality and Reach of STEM Innovations

Wednesday August, 20\textsuperscript{th} 2014

STEM Learning & Research Center (STELAR)
Education Development Center, Inc.
ITEST PI Meeting
August 20th, 2014

Images courtesy of ISE PI Meeting 2012 attendees
From left to right: Geoffrey Haines-Stiles; Mohini Patel Glanz, NWABR; Scot Osterweil; April Luehmann
Jamie Bell, Kalie Sacco, Grace Troxel (Association of Science-Technology Centers)

John Falk (Oregon State University, Free-Choice Learning Program)

Kirsten Ellenbogen (Great Lakes Science Center)

Kevin Crowley (University of Pittsburgh Center for Learning in Out-of-School Environments)

Sue Ellen McCann (KQED Public Media)
CAISE’s roles describe how we interact with our audiences.
Resources for PIs on InformalScience.org

- Searchable database of 9,000+ project, research, and evaluation resources


- ISE Evidence Wiki

- EBSCO database (access to thousands of peer-reviewed education journals)

- Community resources: member database, calendar, interest groups, newsletter, perspectives blogs
NSF Program Officers Panel

- David Haury
- David Campbell
- Edith Gummer
- Celeste Pea
STELAR Website Overview

FEATURED NEWS

THE SCIENCE OF LEARNING
Scientific American article features ITEST study on predicting STEM career choice.

Learn more »

Helping prepare a diverse, skilled, and innovative STEM workforce.
Next Up - Working Groups

Research & Evaluation Design in ITEST
(Taylor)

Outreach and Dissemination
(Taft)

Using Data to Tell the ITEST Story
(Truman)
Working Group Report Outs

- Theme
- Key Dates
- Product
- One question you have for convening attendees
Next Steps

• Event Evaluation

• Event Materials on STELAR website

• STELAR Webinars:
  – ITEST Solicitation – September 3
  – Using Social Media to Disseminate Your Project Work – September 18

• MIS Fall 2014

• Working Groups
Closing Reflections