EDC — Education Development Center

SUPPORTING ENGINEERING EDUCATION WITHIN THE NSF ITEST PROGRAM

STEM Learning & Resource Center (STELAR)

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Education Development Center

EDC designs, implements, and evaluates programs to improve education, health, and economic opportunity worldwide, with a focus on vulnerable and underserved populations.

Examples of our work include:

- Expanding access to education though the use of innovative technologies

- Providing national leadership in STEM education

- Developing comprehensive improvements to education and health systems

- Managing dozens of national networks and resource centers

- Pioneering livelihood development around the world with learners of all ages

EDC & ITEST

EDC has served as the resource center for the ITEST program since the program's inception in 2003

2003-2012   ITEST Learning and Resource Center (ITEST LRC)

2013-today   STEM Learning and Research Center (STELAR)

NSF ITEST PROGRAM

Innovative **T**echnology **E**xperiences for

Students and **T**eachers

NSF ITEST Program Solicitation

NSF ITEST Program

STEM workforce development PreK-12

Formal and informal learning environments

Focus on broadening participation in STEM

Funding provided by the H-1B visa program

NSF ITEST Program Goals

ITEST supports projects that engage students in technology-rich experiences that:

(1) increase awareness and interest of STEM and ICT occupations

(2) motivate students to pursue appropriate education pathways to those occupations

(3) develop STEM-specific disciplinary content knowledge and practices that promote critical thinking, reasoning, and communication skills needed for entering the STEM and ICT workforce of the future.
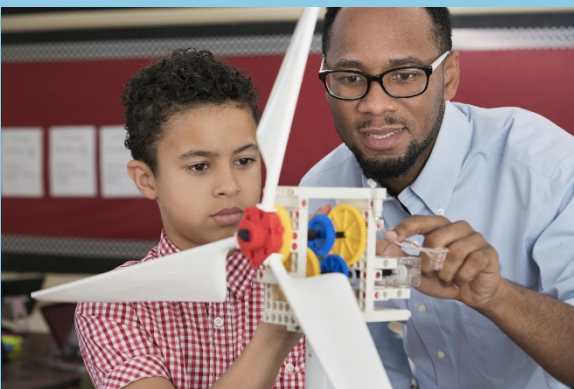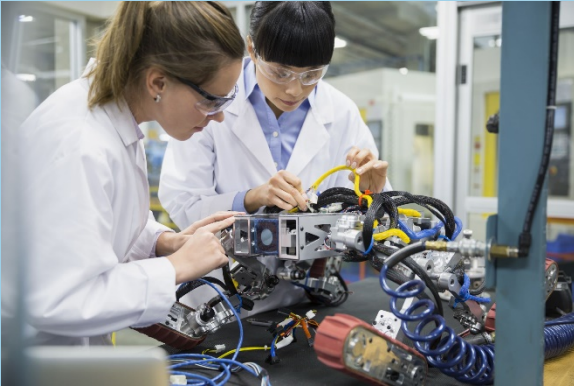
STEM-related Workforce Fields

- Science, Technology, Engineering and Mathematics (STEM) disciplines

- Information and Communications Technology (ICT)

- Computer Science, Data Analytics, Data Science, and related fields

- Professionals at all levels, including technicians, technologists, scientists, engineers, computer scientists, and mathematicians

- STEM subject area teachers!

Designing Innovations that meet ITEST Program Goals

Innovative Use of Technologies

Innovative Learning Experiences

STEM Workforce Development

Strategies for Broadening Participation

Strategic Partnerships

All ITEST Projects

Perform Research

Engage PreK-12 Youth

Design Innovations
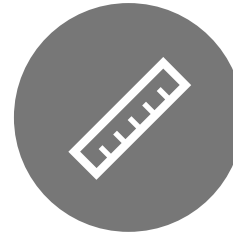
Measure Outcomes

Evaluate Project Performance
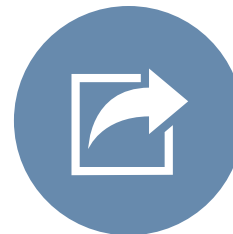
Disseminate Project Findings

ITEST's Resource Center

- Provides **technical assistance** to funded ITEST projects

- **Disseminates findings** to the broader STEM education community

- Provides **proposal development assistance** to those interested in submitting a proposal

- Conducting outreach efforts to **broaden participation** in the ITEST community—specifically targeting:

  - Minority-serving Institutions (HBCUs, HSIs, Tribal Colleges)
  - Community Colleges
  - School Districts

  - Formal and Informal Learning Centers
  - Underrepresented geographic regions (rural/urban)

ITEST Program

Since 2003, ITEST has awarded nearly $521 million across 500 projects.

ITEST projects have served…

- 830,000 youth
- 52,000 educators
- 10,000 parents and caregivers

33%

67%

■ Engineering ■ STEM Education

Figure 1: ITEST Engineering Model

A Sampling of Theoretical Underpinnings

- Social Development Theory (Vygotsky, 1978)
- Social Cognitive Theory (Bandura, 1986)
- Social Cognitive Career Theory (Lent, Brown, & Hackett, 1994)
- Learning is an active process that integrates experience, interaction, and reflection (Dewey, 1933, 1938)
- Self-regulation (Zimmerman & Schunk, 2011; Pape, Zimmerman, & Pajares, 2002; Pintrich & de Groot, 1990)
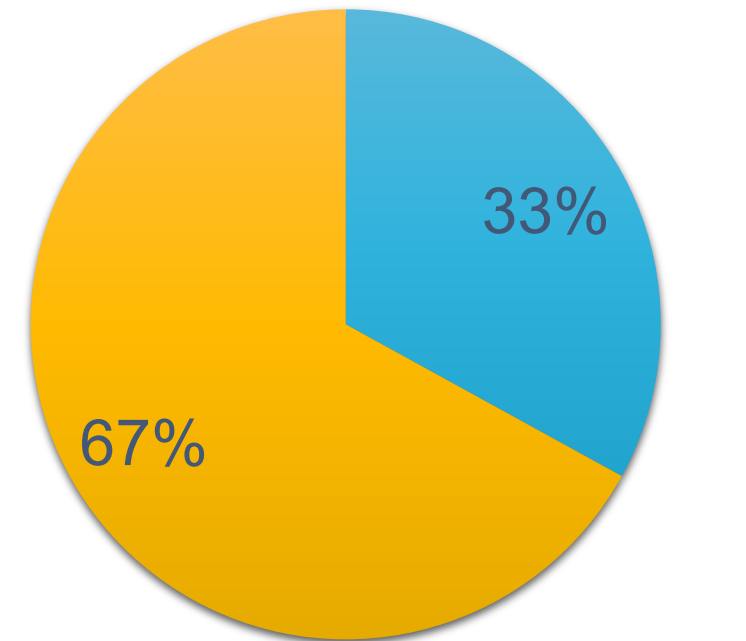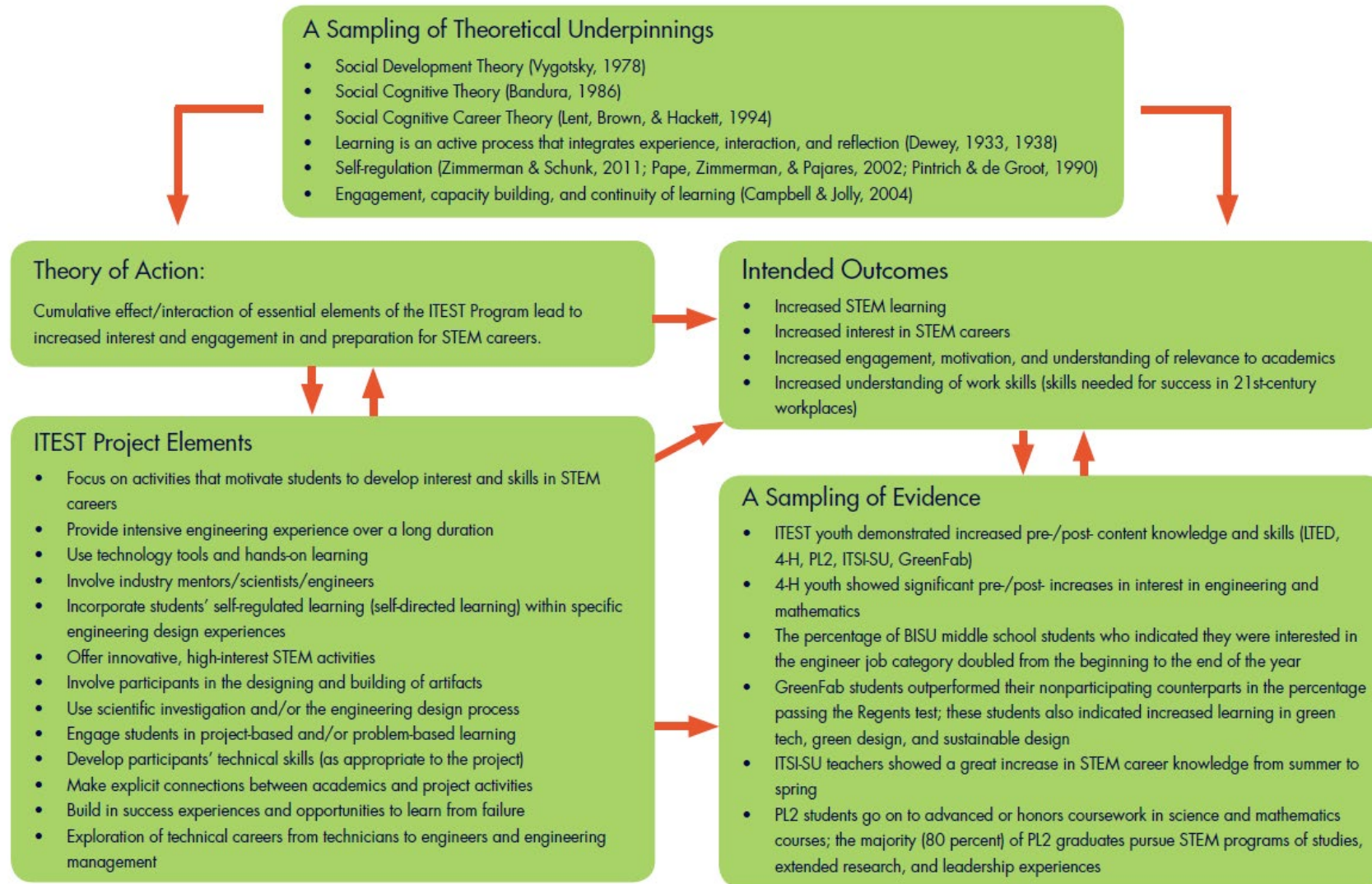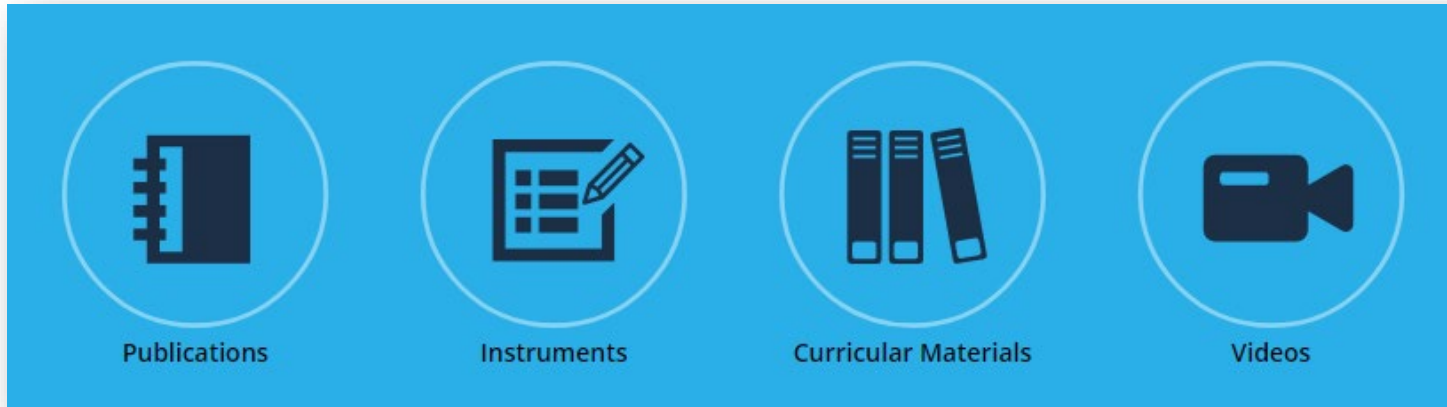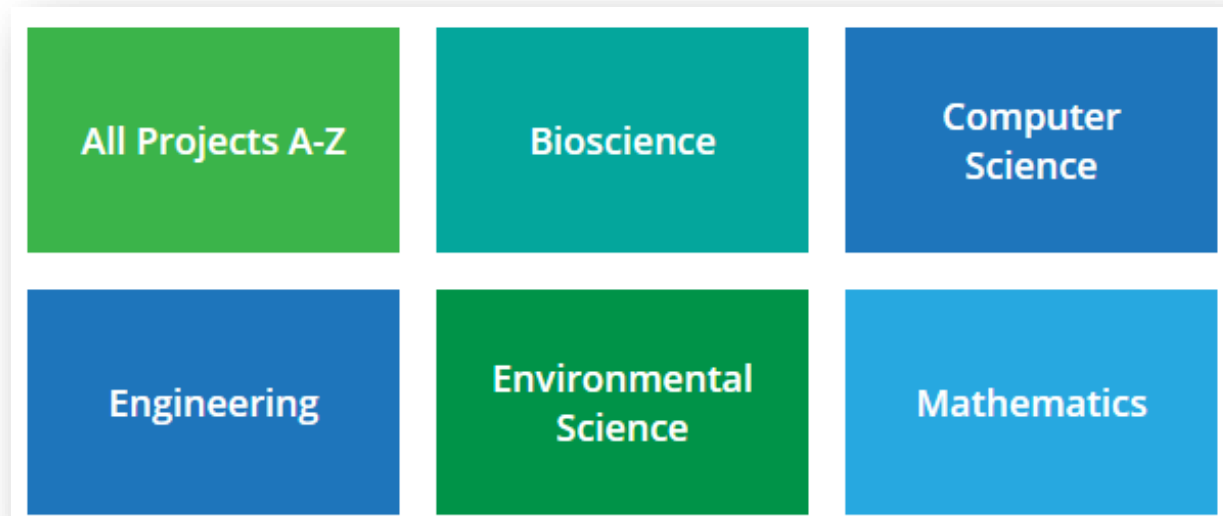- Engagement, capacity building, and continuity of learning (Campbell & Jolly, 2004)

Theory of Action:

Cumulative effect/interaction of essential elements of the ITEST Program lead to increased interest and engagement in and preparation for STEM careers.

Intended Outcomes

- Increased STEM learning
- Increased interest in STEM careers
- Increased engagement, motivation, and understanding of relevance to academics
- Increased understanding of work skills (skills needed for success in 21st-century workplaces)

ITEST Project Elements

- Focus on activities that motivate students to develop interest and skills in STEM careers
- Provide intensive engineering experience over a long duration
- Use technology tools and hands-on learning
- Involve industry mentors/scientists/engineers
- Incorporate students' self-regulated learning (self-directed learning) within specific engineering design experiences
- Offer innovative, high-interest STEM activities
- Involve participants in the designing and building of artifacts
- Use scientific investigation and/or the engineering design process
- Engage students in project-based and/or problem-based learning
- Develop participants' technical skills (as appropriate to the project)
- Make explicit connections between academics and project activities
- Build in success experiences and opportunities to learn from failure
- Exploration of technical careers from technicians to engineers and engineering management

A Sampling of Evidence

- ITEST youth demonstrated increased pre-/post- content knowledge and skills (LTED, 4-H, PL2, ITSI-SU, GreenFab)
- 4-H youth showed significant pre-/post- increases in interest in engineering and mathematics
- The percentage of BISU middle school students who indicated they were interested in the engineer job category doubled from the beginning to the end of the year
- GreenFab students outperformed their nonparticipating counterparts in the percentage passing the Regents test; these students also indicated increased learning in green tech, green design, and sustainable design
- ITSI-SU teachers showed a great increase in STEM career knowledge from summer to spring
- PL2 students go on to advanced or honors coursework in science and mathematics courses; the majority (80 percent) of PL2 graduates pursue STEM programs of studies, extended research, and leadership experiences

Resource Library

Publications   Instruments   Curricular Materials   Videos

Proposal Development

+ GET TO KNOW ITEST
+ PREPARE YOUR PROPOSAL FOR SUBMISSION
+ DEVELOP A ROBUST RESEARCH DESIGN
+ CREATE AN EFFECTIVE EVALUATION STRATEGY
+ CONNECT WITH PARTNERS
+ REACH UNDERSERVED POPULATIONS
+ DEVELOP THE WORKFORCE OF THE FUTURE

Project Profiles

All Projects A-Z	Bioscience	Computer Science
Engineering	Environmental Science	Mathematics

For more information:

- Email the team at STELAR@edc.org

- Join the STELAR mailing list:
  https://go.edc.org/STELAR-MailingList

- Follow us on Twitter: [@STELAR_CTR](https://twitter.com/STELAR_CTR)

- Join us on: https://www.linkedin.com/company/stelar-nsf-itest-community

THANK YOU!

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