Improving Critical Thinking through the Assessment of High-Impact Practices

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ASSESSING CRITICAL THINKING

CRITICAL-THINKING ASSESSMENT TEST (CAT)

- ✓ Developed by faculty from a wide variety of institutions and disciplines.
- ✓ Guided by experts in the cognitive/learning sciences and assessment fields.
- ✓ Supported by the National Science Foundation (NSF).

An effective tool to assess critical thinking (CT) in a variety of disciplines and a means to help researchers and faculty identify effective strategies to improve students' CT skills.

IMPROVING CRITICAL THINKING

Ongoing work in the Center for Assessment assists other projects, some funded by NSF, that are making significant progress in improving students' CT skills. These collaborations are providing useful information to transform educational practices.

A considerable number of projects have shown significant overall gains in CAT performance and others have found significant gains on one or more questions associated with treatment effects. These results demonstrate the potential usefulness of the CAT instrument as a tool for measuring treatment effects in courses and programs that have targeted critical thinking/real-world problem solving using high-impact practices.

CT GAINS: 4 YEARS VERSUS HIGH-IMPACT COURSES
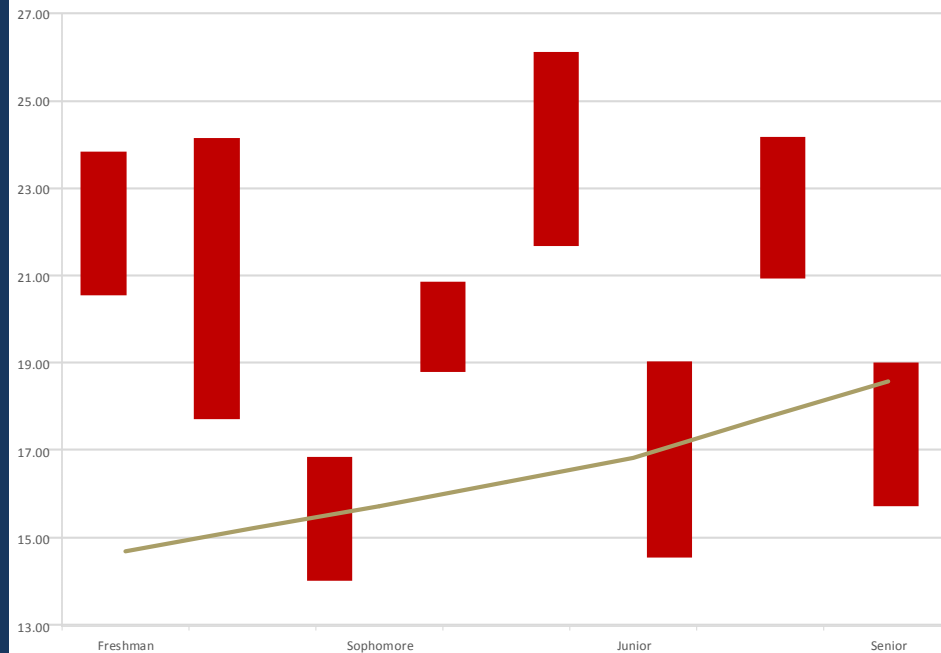
NOTE: STUDENTS IN THE HIGH-IMPACT COURSES MAY HAVE ENTERED WITH A HIGHER ABILITY THAN THOSE IN THE CAT NATIONAL NORM DATABASE.

SOME SUCCESSFUL PROJECTS

Clemson University
Development of an Inquiry-Based Cell Biology Laboratory with Emphasis on Scientific Communication Skills

Duquesne University
A Model for Incorporating Application-Based Service Learning in the Undergraduate Science Curriculum

Northeastern Illinois University
A Hybrid Course Model of Peer-Led Learning for the Social Sciences

Purdue University
An Adaptation of a Research-Based Laboratory Model to Life Sciences

Rose-Hulman Institute of Technology
The Development and Assessment of a New Test and Product Engineering Certificate Program

Sam Houston State University
Foundations of Science

University of Central Florida
Learning Environment and Academic Research Network (LEARN): A Model for Retention in the STEM Disciplines

University of Wisconsin-Madison
Teaching Nature of Science and Scientific Inquiry in the Context of Scientific Paradigms: Assessing Student Understanding

SKILLS EVALUATED BY THE CAT

EVALUATING INFORMATION

- **Separate factual information from inferences.**
- **Interpret numerical relationships in graphs.**
- **Understand the limitations of correlational data.**
- **Evaluate evidence and identify inappropriate conclusions.**

CREATIVE THINKING

- **Identify alternative interpretations for data or observations.**
- **Identify new information that might support or contradict a hypothesis.**
- **Explain how new information can change a problem.**

LEARNING & PROBLEM SOLVING

- **Separate relevant from irrelevant information.**
- **Integrate information to solve problems.**
- **Learn & apply new information.**
- **Use mathematical skills to solve real-world problems.**

COMMUNICATION

- **Communicate ideas effectively.**

CLOSING THE LOOP