## Identifying Courses that Improve Students' Critical Thinking Skills Using the CAT Instrument: A Case Study

Kevin Harris, Barry Stein, Ada Haynes, Elizabeth Lisic, and Katie Leming Tennessee Technological University

Abstract- There is increasing interest in understanding how

over the college experience are not merely the result of a maturation process independent of a college experience [9].

The results of our collaborations with over 200 institutions across the country indicate that higher education is contributing to gains in students' critical thinking. The data in figure 1 indicate an average increase of about 26% over a four year program of study. Should we expect greater gains? To answer the question about whether the college experience can and should produce greater gains in critical thinking as measured by the CAT instrument, it is necessary to evaluate the skills assessed by specific questions in the CAT instrument. All but two of the skill areas were impacted by one or more of the seven courses evaluated. It should be noted that three of the seven courses evaluated did not result in gains on any of the CAT questions.

 TABLE 2

 SKILLS MEASURED BY INDIVIDUAL CAT QUESTIONS

CAT Question Focus Courses Impacting

Accreditation Cycle. Baltimore, MD: Accreditation Board of Engineering and Technology, 2005.

[3] AACU (Association of American Colleges and Universities), "It Takes More than a Major: Employer Priorities for College Learning and Student Success," 2013. http://www.aacu.org/.

[4] R. Arum, J. Roksa, and E. Cho, "Improving Undergraduate Learning: Findings and Policy Recommendations from the SSRC-CLA Longitudinal Project," 2011. http://www.ssrc.org/.

[5] P. Ewell, "The 'Quality Agenda:' An Overview of Current Efforts to Examine Quality Higher Education." Discussion paper prepared for the American Council on Education (ACE), 2014. http://www.acenet.edu/.

[6] B. Stein, A. Haynes, and M. Redding, "Project CAT: Assessing Critical Thinking Skills," in *Proceedings of the National STEM Assessment Conference*, D. Deeds and B. Callen, Eds. NSF, 2007.

[7] A. Haynes, E. Lisic, M. Goltz, B. Stein, and K. Harris, "Moving Beyond Assessment to Improving Students' Critical Thinking Skills: A Model for Implementing Change," submitted for publication.

[8] B. Stein, A. Haynes, M. Redding, T. Ennis, and M. Cecil, "Assessing Critical Thinking in STEM and Beyond," in *Innovations in E-learning, Instruction Technology, Assessment, and Engineering Education*, M. Iskander, Ed. Springer, 2007, pp. 79-82.

[9] K. Harris, B. Stein, A. Haynes, E. Lisic, and K. Leming, "Critical Thinking and Age: The Impact of Maturation on the Critical- thinking Assessment Test (CAT)," in prep.

[10] B. Stein, A. Haynes, M. Redding, K. Harris, M. Tylka. and E. Lisic, "Faculty Driven Assessment of Critical Thinking: National Dissemination of the CAT Instrument," in *Technological Developments in Networking, Education and Automation*, Springer, 2010, pp. 55-58.