Evidence Based Library and Information Practice

Evidence Summary

Critical Thinking Exercises in the Classroom are Helpful but not Sufficient for Improving Critical Thinking Test Scores

A Review of:
Wallace, E. D., & Jefferson, R. N. (2013). Developing Critical Thinking Skills For Information Seeking Success. New Review of Academic Librarianship, 19(3): 246-255. http://dx.doi.org/10.1080/13614533.2013.802702

Reviewed by:
Heather Coates
Digital Scholarship & Data Management Librarian
Indiana University-Purdue University Indianapolis (IUPUI) University Library
Indianapolis, Indiana, United States of America
Email: hcoates@iupui.edu

Received: 7 Mar. 2014 **Accepted:** 30 Apr. 2014

Abstract

Objective – To determine whether a series of workbook exercises contributed to improved critical thinking test scores.

Design – Post-test design with a quasi-experimental control group.

Setting – Military college in the United States of America.

Subjects – 76 undergraduates enrolled in a required freshman orientation seminar.

Methods – Approximately one third of the enrolled participants (n=26) were provided with a copy of the book *Critical Thinking: Building the Basics*. A subset of exercises was completed independently over three to four class sessions during the first three weeks of the semester. The control group (n=50) did not receive any critical skills thinking instruction. The iCritical Thinking Skills Test, an online exam provided by Educational Testing Service (ETS), was administered to both groups during a class session. The exam consists of 7 types of tasks: define, access, evaluate, manage, integrate, create, communicate, evaluated using 14 tasks based on real-world scenarios.

Main Results – Approximately 20% (15) of all students passed the test, 9 from the intervention group and 6 from the control group. Significant differences were detected between the groups on the Integrate and

Manage subtests. The range for individual subtests and total scores was wide. Scores for two of the seven subtests, Create and Evaluate, showed the greatest amount of variability; the Communicate subtest scores had the least.

Conclusion – Limitations of the study include potential motivational differences between the groups. Students who completed workbook exercises appeared to be motivated to do well on the test, while those who did not seemed less motivated. The effectiveness of exercises in developing critical thinking skills in this study will persuade administrators to consider using such exercises in the classroom.

Commentary

Despite their perceived importance for student learning outcomes, critical thinking skills are rarely taught explicitly in the college classroom. In part, this is because few approach an operational definition than can be used to inform instruction and evaluation. Those definitions included in a recent systematic review (Behar-Horenstein & Niu, 2011) describe critical thinking as an attitude, application of skills, and a process. Similarly, many instructional methods have been used, but are not sufficiently characterized in the literature. This, along with the preponderance of pre- and quasi-experimental studies using small samples sizes, threatens internal validity, thus limiting applicability to other instructional settings because causal effects for the interventions cannot be asserted.

The study reviewed here examines this relatively understudied area, the role of critical thinking skills in information seeking and use. Glynn's (2006) tool developed for library and information science was used to appraise the article. Unfortunately, the article does not include sufficient detail to support a comprehensive appraisal, though it mirrors many of the design weaknesses described above.

The major strengths of the study by Wallace and Jefferson (2013) are the use of explicit and active learning strategies. However, it is difficult to establish the quality and generalizability of the evidence reported due to incomplete description of the study. Critical elements of the study are not described, including the population, sample, and the details of the instructional intervention. Without this information, it is difficult to determine the relevance to professional practice.

Another area of confusion is which of two testing instruments were used. The authors report using the "iCritical Thinking Skills Test" offered by ETS. No such test is listed by ETS, but they do offer the iCritical Thinking Certification (ETS, 2010). Both tests include the same seven task areas, but the iSkills test was designed and validated to assess information literacy skills. Since the authors' citation does not match the narrative description, it is impossible to determine whether the instrument used was appropriate.

There are further concerns relating to the testing situation regarding validity of the test results. The class period was not long enough to allow for completion of the registration process (15 minutes) and the test (60 minutes). If students perceived that the exercises and/or the test were irrelevant to the course, it is likely that their performance does not reflect their actual abilities. A lack of motivation may be a confounding variable for test performance. Furthermore, the accuracy of the ANOVA results for subtest differences is questionable. The reported ANOVA results are inconsistent with the table values, but consistent with the narrative. More generally, the authors do not adequately discuss the implications of the findings, particularly the study limitations and how they may be addressed in future research. Overall, the missing and conflicting information presented in this article raise significant concerns as to the validity and applicability of the findings.

Despite the methodological concerns, this study contributes to a gap in the literature. Given the increasing demand to demonstrate the value of higher education, this is an area ripe for further study. However, future studies should address the design limitations outlined

by Behar-Horenstein and Nui (2011), by using carefully design quasi-experimental or experimental studies that combine quantitative and qualitative approaches for measuring change in critical thinking ability.

References

Glynn, L. (2006). A critical appraisal tool for library and information research. *Library Hi Tech*, *24*(3), 387-399. doi:10.1108/07378830610692154

Behar-Horenstein, L. & Niu, L. (2011). Teaching critical thinking skills in higher education: A review of the literature, *Journal of College Teaching & Learning, 8*(2), 25-42. Retrieved from http://journals.cluteonline.com/index.php/TLC/article/view/3554/3601

Educational Testing Service. (2010). iCritical Thinking Certification. Retrieved from http://www.certiport.com/portal/common/documentlibrary/iCritical_Thinking-datasheet.pdf