

Investigating Different Critical Thinking Tests in an Authentic Inquiry

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Abstract: This paper aims to examine different critical thinking tests in an authentic context. This is a case study of Humanities course in a Hong Kong secondary school where the teacher places emphasis on critical thinking elements in the curriculum design and is also adopting collaborative inquiry in his/her teaching. Various measurements are employed to test students' critical thinking ability, and results of these critical thinking tests and the consistency among them are reported.

Introduction

Authentic inquiry is widely hailed as essential and desirable for learning in the 21st century (Kuhlthau, Maniotes, & Caspari, 2007). Computer-supported Collaborative Learning (CSCL) environments have great potential to support students to share and deepen their ideas online, as well as engage in authentic problems. According to Bereiter (2002), students can develop critical thinking through engaging in knowledge building, where explicit instruction on general critical thinking criteria is needless. In this study, the mixed approach (See Ennis, 1989) is adopted that some critical thinking skills are taught in separate mini-lessons, and students are also provided with an immersive environment for solving authentic problems. Although a great deal of measurements is developed to measure some aspects of critical thinking, the work reported in this paper is motivated by the central problem: Is there consistency in different critical thinking tests, and which one can best reflect students' critical thinking ability during the inquiry unit? This paper presents a case study in a secondary school humanities class in Hong Kong.

Authentic Inquiry in CSCL

Computer-supported Collaborative Learning (CSCL) is emerging as an important area of study in the interdisciplinary field of learning sciences (Sawyer, 2006). CSCL refers to situations where two or more people learn collaboratively together using computers. The networked platform offers great potential for students and teachers to implement collaborative inquiry in their classrooms. During the authentic inquiry, participants generate original research questions, and collect required information and conduct experiments or analyses so as to arrive at their own conclusions (Hanegan & Bigler, 2009). According to Chinn & Malhotra (2002), there is a lack of scientific method available to evaluate authentic inquiry. While many scholars in the field of CSCL embrace learning and collaboration, knowledge building is one of the earliest attempts that shape the field of CSCL (Koschmann, 2003). According to Scardamalia (2002) and Bereiter (2002), knowledge building is the progress where knowledge advances in the human society, while learning occurs as a by-product. There is a networked system designed for collaborative knowledge building (Knowledge Forum®, KF in short). With the shared discourse network, students' ideas and theories are displayed by graphics or notes as conceptual artifacts. Educators who employed KF generally prefer to give students some authentic problems for discussion, such as global warming, energy crisis (Leng, Lai, & Law, 2008). Despite substantial variation, many open-ended collaborative learning activities such as authentic inquiry share the common goal of achieving knowledge advancement and have the potential to facilitate collaborative knowledge building.

Critical Thinking

The philosophical tradition of critical thinking can ascend to ancient times of Socrates (Paul, 1995). There are numerous works done to conceptualize the term critical thinking (Ennis, 1987; Facione, 1998). The modern history of critical thinking, can be traced back to John Dewey coining the term of "reflective thinking" in 1930s. Based on Dewey's ideas, many theorists contribute to the development of critical thinking in the ensuing years (Ennis, 1996; Lipman, 1988; McPeck, 1981). Ennis is one of the most influential researcher in this field. According to Ennis (1985), critical thinking is "reasonable reflective thinking that is focused on deciding what to believe or do" (p. 45). Besides possession of the relevant skills of critical thinking, one needs to be disposed to use those skills in appropriate situations (Fisher, 2001). In addition, McPeck (1981) contends that specialized knowledge within the field is also requisite to critical thinking.

In order to capture the important elements of critical thinking, there are three tests employed in this paper: The Cornell Critical Thinking Test, Level X (CCTT; Ennis & Millman, 1985), The Inventory of Belief and Critical Thinking Disposition (IBCTD; Yeh, 1999), and the adapted Ennis-Weir critical thinking essay test (Ennis & Weir, 1985). Both CCTT and IBCTD are standardized tests, while the former test is used to measure critical thinking skills, the latter is employed to measure critical thinking dispositions. The Ennis-Weir is

adopted as an open-ended test to measure the logical dimension of critical thinking, including seven critical thinking competencies such as relevance, appropriate use of authoritative sources, appropriate reasoning.

Design and Method

One teacher and his students (32 students) are involved in this study. The classroom context for this study is one in which the teacher tries to apply knowledge building as a pedagogical treatment to promote students' critical thinking skills and dispositions. Both the teacher and students have no previous experience in adopting the online platform KF to support their authentic discussions. The two tests on critical thinking skills and dispositions are administered at the start and the end of the inquiry unit respectively so that possible changes in students' critical thinking could be observed over the duration of the learning module. In order to promote students' critical thinking skills and deepen their understanding on other group's design, this study modifies the critique form to an essay test on critical thinking. Thirty students in the classroom have taken the pre- and post-test on critical thinking skills and dispositions for the designed learning module. For peer critique forms, two group presentations are selected randomly for analysis purpose. Twenty-eight critique forms are collected on their responses to the two group's presentation.

Results and Discussions

This paper examines two famous critical thinking tests focusing on skills and dispositions respectively, and also attempts to design an essay tests incorporated with course content. These various tests on critical thinking, though different in format, can measure separate aspects of critical thinking. The analysis has been done to explore the relationship between the standardized critical thinking tests and the essay test designed in a real inquiry context. As a result, inconsistency is found between those different tests. The results of CCTT and IBCTD show that students' critical thinking ability seem to remain unchanged, even after experiencing multiple inquiry tasks. In the essay test, students who represent their ability in using multiple critical thinking competencies are very likely to score high. It is also noted that students who excel others in *overall strength of the argument* signify their proficiency in argument appraisal. The similar situation is happened to the competence of *appropriate reasoning*, and *appropriate use of authentic sources*. We may infer that teachers need to focus on teaching students how to offer good reasons and judge the overall strength towards one's argument, in order for students to achieve maximum performance in authentic tasks on critical thinking.

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