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Cultivating critical thinkers: Exploring transfer of learning from pre-service teacher training to classroom practice

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HIGHLIGHTS

- Explores transfer of learning from teacher training to classroom practice.
- Two pre-service teachers and 108 junior high school students participated.
- Critical thinking skills and dispositions were successfully transferred to learners.
- Development in critical thinking was associated with improved academic achievement.
- Empirical results should be replicated with a larger unbiased sample.

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ABSTRACT

This study explores the transfer of critical thinking skills and dispositions from pre-service teacher training to classroom practice and student achievement in the cases of two graduates from a course on critical thinking-integrated instruction. Two 7th and two 8th grade classes were randomly assigned as experimental (CT-integrated instruction), or comparison (traditional instruction) groups. Empirical results demonstrated that, in these two cases, the teachers successfully developed CT-integrated instruction for effectively fostering students' CT skills and dispositions, while improving student achievement. Future research should include larger and more representative samples to avoid bias and reliably evaluate CT-based teacher training initiatives.

1. Introduction

1.1. The importance of critical thinking in learning

Most researchers and classroom teachers agree that cultivating students' thinking abilities, especially critical thinking-integrated instruction (CT), is one of the most urgent learning objectives for modern education. What, exactly, is CT? Ennis (1987) offers a widely accepted definition of CT as "reasonable, reflective thinking that is focused on deciding what to believe or do." CT is classified as higher-level thinking (Paul, 1995; Yang, Newby, & Bill, 2005) and includes elements from both the *cognitive* domain, critical thinking skills (CTS), and the *affective* domain, critical thinking dispositions (CTD) (Facione, 2011; Yang & Chou, 2008; Yeh, 2000). CTS involves cognitive skills, including analysis, evaluation, inference, deductive reasoning, and inductive reasoning while CTD is characterized by inquisitiveness, open-mindedness, systematicity, CT-confidence, truth-seeking, cognitive maturity, and analyticity (Facione).

Critical thinking is such an important issue in 21st century teaching and learning, largely because it is an important element in life success. Judging the veracity of various sources of information, one element of CT, is a daily challenge in contemporary society, particularly given the information overload typical of the Internet age. These changing conditions require an evaluation of learning outcomes such as CT in 21st century education (Yang & Chou, 2008).

1.2. Teacher education and critical thinking

In order to foster CT in students, it is necessary to first nurture teachers' CT (Elder & Paul, 1994). Unfortunately, studies have shown that few instructors and students in the area of teacher education had the necessary background, understanding, or experience in CT training approaches and classroom instruction (Paul,

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Elder, & Bartell, 1997). In order to provide pre-service or in-service teachers with the competencies necessary for CT-integrated instruction, several areas must be addressed, including development of CTS and CTD, a structural approach to understanding problems and arguments, and metacognitive skills, including monitoring and reflection (Halpern, 1998).

The influence of teacher belief and teacher experience in developing the ability to conduct CT-integrated instruction is profound, particularly given the diversity of student ability levels and corresponding teacher beliefs that the appropriateness of high- and low-CT activities is related to student's (academic or motivational) advantages (Warburton & Torff, 2005). The authors suggest that teacher education models that demonstrate effective use of CT activities, incorporating opportunities for guided practice in designing, implementing, and assessing CT activities, and fostering an environment conducive to reflective thinking, will best address CT-related teacher beliefs (Warburton & Torff, 2005).

Professional CT knowledge, teaching efficacy, and teaching behaviors are important factors in the design of CT instruction (Yeh, 1999). As such, several teaching strategies or learning theories, such as cooperative learning, reciprocal teaching (Brown & Palincsar, 1989), communities of practice (Wenger, 1998), case study pedagogy and teacher questioning (Wood & Anderson, 2001), problem-centered instruction (Casey & Howson, 1993), and the integration and direct teaching of CTS have been proposed to help promote CTS (Daud & Husin, 2004). However, to date, few researchers have attempted the design and empirical evaluation of a model which integrates and systematically organizes these teaching strategies in a manner which is appropriate for training and use with pre-service and novice teachers.

1.3. The sociocultural context of critical thinking in Taiwan

In Taiwan, the educational system is the responsibility of the Ministry of Education. Access to high school and university is controlled by a series of national exams. While this system is effective in producing graduates who score well on international tests of math and science, it has been criticized for fostering excessive pressure and promoting rote memorization in favor of higher thinking and creativity. In part due to a Confucian tradition in education, public schools in Taiwan are characterized by extensive testing, use of lecture-type instruction, high levels of discipline, and large class-sizes. In the past, due to the influence of collectivist-oriented culture and constraining education policy, students in Taiwan have not been encouraged to think critically and reflectively (McBride, Xiang, Wittenburg, & Shen, 2002). However, a climate of educational reform in Taiwan has resulted in a positive attitude toward improvement and innovation in teaching and learning, with the provision of ample funding for research.

With a growing awareness in Asian higher education that students need to learn English to have a strong competitive advantage in the workplace of the future (Nunan, 2003), in recent years, there has been increased attention given to English proficiency by the Taiwanese Ministry of Education. However, Taiwan lags behind other Asian countries, in terms of English proficiency. According to a report published by the Educational Testing Service (2010) in Taiwan, the average score of Taiwanese students ranked Taiwan 6th (behind China and South Korea) out of 12 Asia countries on the Test of English for International Communication (TOEIC).

1.4. Arguments for implementing critical thinking instruction in Taiwan

Although a general consensus has been formed concerning the value of incorporating CTS into classroom instruction, some arguments have been raised against incorporating CT into English language or other education programs in non-Western nations. Some argue that CT is a social practice which may not be appropriate for use with non-Western students. Atkinson (1997) refers to CT's focus on reductive and exclusive argumentation and individualism which could clash with the values of other, especially Eastern, cultures. Some argue that CT is largely a western principle and its values of argumentation, questioning, evaluation, and focusing on errors conflict with Confucian principles of harmony, respect, and passing down essential knowledge (Greenholz, 2003; Tweed & Lehrman, 2002). Thus, it may be more difficult and time-consuming to incorporate Socratic questioning into classes which are in the tradition of Confucian education.

In terms of English language learning, however, other scholars have refuted the cultural argument and noted that English, as a Western language, should be taught in the context of Western culture. That is, one component of second language education involves exposing the students to the culture and norms of the speakers of that language. Curry (1999) suggests that the English language learning classroom may be an ideal environment in which to acquire CTS, preparing students for interaction with native speakers of English and fostering social empowerment through the questioning and challenging of the status quo. Benesch (1999) agrees that dialogical CT, involving the exploration and debate of different perspectives, can be extremely useful in second language classes. This also fits well with the goals of social constructivism which emphasizes purposeful interaction in the target language, utilizing authentic situations and activities which offer choice, collaboration, and feedback. One caveat concerning the incorporation of CT into second language classrooms is that a focus on sustained content is vital. It is only through extended focus on a single theme that students can acquire the necessary background knowledge required to think critically (Pally, 1997). Thus, despite the criticisms of some scholars, we believe that English language instruction is an appropriate forum for CT-integrated activities, as the collaborative/interactive features of CT activities can augment language learning and challenge learners to expand their thinking.

2. Background to the study

2.1. The challenge of teacher training for promoting critical thinking

In response to findings that elementary and high school students score lower than US children in tests of logic and independent thinking, Yeh (1991) points out that teacher education courses in Taiwan tend to value pre-service teachers' professional or domain-specific skills, such as Chinese and math abilities, and rarely focus on critical thinking skills. Some researchers have explored the inclusion of critical thinking in teacher education in Taiwan, such as Wen (2001), who developed workshops integrating critical thinking concepts, instructional theory, and the national curriculum guidelines for enhancing in-service elementary and high school teachers' critical thinking skills. Yeh (1998, 1999) conducted a short-term quasi-experimental design using computer simulation, demonstrating that effective critical thinking instruction requires three factors: professional knowledge of CT instruction, personal critical thinking abilities, and positive teaching behaviors for enhancing students' critical thinking.

While these studies have made progress in enhancing the design of pre-service teacher training courses for fostering critical thinking abilities, they do not provide systematic and complete instructional models. The lack of a clear instruction model effectively limits the effectiveness of teaching training and makes it difficult for teachers who intend to integrate CT instruction in class, but are unsure of where to begin (Su & Huang, 2006).