

Content-Based Reading and Writing for Critical Thinking Skills in an EFL Context

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Abstract

This paper reports the findings of a study examining the effectiveness of promoting learners' critical thinking skills and EFL skills with a content-based approach. Despite little argument among theorists and educators regarding the interrelatedness between thinking and language development, in the tradition and transition of L2 teaching methodology, the integration of language and thinking has been peripheral. Language as a way of thinking and learning has been more of a pedagogical catchphrase than instructional practice.

This study attempts to bridge the gap between theories and instructional practices through the design and implementation of a content-based junior high school EFL syllabus. Two groups of junior high school students participated in the study. A five-unit syllabus, including the subject areas of language arts, mathematics, science, and social studies, was designed and implemented. Data were collected via class assignments, a critical thinking assessment instrument, a questionnaire, and a teacher-constructed language proficiency test. The findings revealed significant gains in the students' English language proficiency test scores. Critical thinking skills and content area knowledge mastery were also found. The questionnaire results show positive responses toward the content-based EFL learning and teaching from the participating students. Based on these findings, instructional suggestions and caveats are provided.

Key Words: content-based instruction, critical thinking, EFL



INTRODUCTION

Research evidence has shown that cognition and language development are closely related. It is through language that children come to know the world (Vacca, Vacca, & Gove, 1995). Such close relationships between language and thinking skills have long been recognized by theorists and educators (Piaget, 1971; Vygotsky, 1962). It is believed that developing students' ability to reflect on their own learning process can help them progress in learning. Higher-order thinking skills promote higher order learning skills which in turn enable students to reach higher levels of language proficiency (Renner, 1996).

Efforts have been made by English language arts, English as a second language (ESL), English as a foreign language (EFL), and modern foreign language educators to integrate the promotion of thinking skills into language curricula. Various English language arts programs in the U.S. have been implemented to facilitate language learning and cognitive development in a complimentary manner and research findings have shown that many aspects of reading and writing are pertinent to important thinking skills (Moffett & Wagner, 1983; Pearson & Tierney, 1984; Stanford & Roark, 1974; Staton, 1984). Educators have also argued for the importance of promoting higher-order thinking skills in ESL and EFL classrooms (Chamot, 1995; Tarvin & Al-Arishi, 1991) and empirical evidence supports the effectiveness of teaching critical thinking skills along with English as a second or foreign language (Chapple & Curtis, 2000; Davidson, 1994, 1995). Modern foreign language educators and institutes have

also begun to emphasize the importance of thinking skills. For example, the Qualifications and Curriculum Authority (2001-2002), a non-departmental organization sponsored by the Department of Education and Skills in the U.K., asserts that modern foreign language teaching must incorporate activities to help children reflect on their own thinking processes and language-learning strategies. It further outlines activities to include: (1) identifying and understanding the links between the target language and native language in lexis, syntax, and grammar; (2) drawing inferences from unfamiliar language and unexpected responses; (3) using their knowledge of grammar to deduce the meaning of new words and structures; (4) using language creatively to express their ideas, attitudes and opinions; (5) adapting and revising language for their own purposes; (6) identifying and using language patterns; and (7) devising their own language-learning strategies.

Although there is little argument among theorists and educators about the interrelatedness of the development of languages and thinking skills, in typical school settings, language learning and thinking skills are often treated as independent processes (Miraman & Tishman, 1988; Suhor, 1984). In the tradition and transition of English language teaching methodology, the integration of language and thinking has been peripheral (Pica, 2000). Language as a way of thinking and learning has been more of a pedagogical catchphrase than instructional practice. The Thinking-Approach Project (2004) supported by the British Council criticizes the traditional approaches (i.e., grammar-based syllabus, functional-notional syllabus, natural approach, etc.) to language education. It points out the key contradiction that language teachers spend most of their time teaching



language competence but do not prepare students for life in the real world. Kabilan (2000) also argues that the now popular communicative approach to language teaching, which emphasizes the use of language as a communication tool, does not really help students to become proficient in the target language. He suggests that for learners to be proficient in a language, they need to be able to think creatively and critically when using the target language.

This gap between language learning theories and pedagogical practices has become the focus of attention of language educators. Questions regarding how thinking skills in English should be taught have been raised (Suhor, 1984). A review of the literature shows that various techniques have been suggested. For example, Kabilan (2000) proposed the use of the pedagogy of questioning based on Freire's constructs (1970, 1973); Zainuddin and Moore (2003) experimented with a structured controversial dialogue technique for fostering critical thinking among English language learners; Kasper (2000) engaged high-intermediate ESL students in sustained content study within collaborative learning communities and used information technology resources to hone students' linguistic as well as thinking skills.

Among the suggested methods and techniques, content-based teaching is an approach considered by many as an effective way to teach language skills while supporting the development of critical thinking. It is believed that the pervasiveness of language in the teaching of all subjects and the close ties of oral and written language to thinking make content-based language learning the most persuasive way of insuring effective teaching of higher-level thinking skills (Stoller, 1997). Through content-based instruction, learners develop

language skills while simultaneously becoming more knowledgeable about the world they live in. The activities of the content-based language classroom can stimulate students to think and learn through the use of the target language (Brinton, Snow, & Wesche, 1989).

For some reason, the learning of higher-level thinking skills appears to be more challenging for Asian learners of English than for EFL learners of other ethnicities. Some researchers characterize Asian learners of English as lacking an individual voice and critical thinking skills (Stapleton, 2002). For example, Atkinson (1997) and Fox (1994) depict Japanese learners as group-oriented, harmony-seeking, hierarchical, and non-critical thinkers. Harklau (1994) points out that the Taiwanese students in U.S. high school classrooms bring with them the belief that “being quiet is good” because the schools in Taiwan expect students to be quiet in the classroom. Whether the claims about Asian EFL learners’ lack of critical thinking skills are correct or a matter of not being able to understand Asian culture, the transmission of educational practices in Taiwan is factual. Like the English language classrooms in many Asian countries, in which student-teacher interaction is either lacking or inadequate, the English language instruction in Taiwan is far from being conducive to fostering critical thinking skills.

Since language development and thinking are closely related and the teaching of higher-order thinking skills should be an integral part of an L2 curriculum, this study was designed and conducted to examine the feasibility of promoting critical thinking skills in an EFL classroom in Taiwan. Based on the positive effects reported in related literature, content-based language teaching was adopted as the instructional approach for the study.



LITERATURE REVIEW

The Importance of Teaching Critical Thinking in L2 Classrooms

Critical thinking is recognized as an important competence for students to acquire in academic language (Connolly, 2000; Davidson, 1998; Davidson & Dunham, 1997). Kress (1985) further postulates that critical thinking is a social practice and is language itself. Maybe even more than L1 teachers, L2 teachers have reasons to introduce their students to aspects of critical thinking because if they do not, their students may well founder when they are confronted with the necessity of thinking critically, especially in an academic setting (Davidson, 1998).

A variety of definitions of critical thinking have been provided by theorists and educators. Siegel (1988) calls critical thinking “the educational cognate of rationality” (p.32). Lipman (1991) defines it as healthy skepticism, whereas Norris and Ennis (1989) call it “reasonable and reflective thinking that is focused upon deciding what to believe and do” (p.3). Elder and Paul (1994) postulate that critical thinking is the ability of thinkers to take charge of their own thinking and develop sound criteria and standards for analyzing and assessing their own thinking. Maiorana (1992) stresses that the purpose of critical thinking is to achieve understanding, evaluate viewpoints, and solve problems. There is little essential difference in these definitions.

Educators in at least three areas of second language acquisition (SLA) have described the critical thinking skills needed for academic/professional work (Pally, 2000). English for Academic

Purpose (EAP) emphasizes that students should be able to attain English language competence in cause and effect, description, categorization, and differentiation, specifically for comparison and contrast. EAP also emphasizes the skills of skimming, scanning, and the ability to use the rhetorical conventions of academic or professional disciplines. Cognitive psychology highlights the understanding of the principles of temporal sequence, cause and effect, judgment, and choice (Mohan, 1986, 1990; Vygotsky, 1962; Widdowson, 1990). Critical pedagogy focuses on examining “the deep meanings, personal implications, and social consequences of any knowledge, theme, technique, text, or material...its internal structure and its connections to self and society” (Shor, 1992, p. 169). ESL/EFL students need many of the critical thinking skills as emphasized in the three areas to become proficient users of English. Critical thinking is an ongoing process in which all language learners must engage, regardless of their language proficiency levels. Critical thinking involves the use of information, experience, and world knowledge in ways which allow L2 learners to seek alternatives, make inferences, pose questions, and solve problems, thereby signaling understanding in a variety of complex ways.

The need for critical thinking in an L2 classroom does not mean that EFL learners lack the ability to engage in critical thinking. In fact, EFL students usually come to L2 classrooms with a variety of critical thinking skills developed in their L1. Many students are ready for and need to do critical thinking in L2. Since higher-order thinking skills are increasingly required for success in a knowledge-based society, it is the responsibility of EFL teachers to assist their students to acquire critical thinking skills while learning English. Without adequate



practice in critical thinking, EFL students may lack a full “scaffold” to academic study, miss the opportunity to advance up the ladder in the global workplace, or not be able to actively participate in the international community.

Content-based Instruction for Promoting Thinking Skills

Content-based instruction is defined as the integration of content learning with language teaching aims. It is the “concurrent study of language and subject matter, with the form and sequence of language presentation dictated by content materials” (Brinton, Snow, & Wesche, 1989, p.2). The language curriculum takes into consideration both the academic needs and interests of the students, crossing over the barrier between language and subject matter courses. The purpose is to develop students’ academic language skills. It also provides students with study skills which enable them to express a range of critical perspectives on social issues and to engage in quick-paced interactions (Duff, 2001).

In the United States and Canada, content-based instruction first arose from the need to teach the standard curriculum in ESL immersion programs while focusing on the instruction of the language (Allen & Howard, 1981; Brinton, Snow, & Wesche, 1990; Duff, 2001; Early, 2001; Mohen, 1986; Reilly, 1988; Swain, 1999). The emphasis was not only on learning English, but also on using the English language as a medium to learn mathematics, science, social studies, or other academic subjects. One of the reasons for the interest among educators in developing content-based language instruction is the theory that language acquisition is based on input that is meaningful

and understandable to the learner (Krashen, 1985a, 1985b). Input must be comprehensible to the learner and be offered in such a way as to allow multiple opportunities to understand and use the language. If comprehensible input is provided and the student feels little anxiety, then acquisition will take place. Another important reason for the perceived need to implement content-based ESL instruction is based on Cummins' (1981) hypothesis of two different kinds of language proficiency: basic interpersonal communication skills (BICS), which are language skills used in interpersonal interactions or in informal situations, and cognitive academic language proficiency (CALP), which is the kind of language proficiency required to make sense of and use academic language in less contextually rich (or more context-reduced) situations. Cummins suggests that BICS are relatively easy to acquire, taking only one to two years, but that CALP is much more difficult, taking five to seven years to acquire and necessitating direct teaching of the language in an academic context (Cummins, 1984). Cummins' hypothesis has been investigated and supported by research. For example, Collier (1987) found that it takes five to ten years for ESL students to reach the level of their native-speaking peers, as measured by performance on standardized tests. With the support from Cummins's theorization and empirical studies, increasing the cognitive academic language proficiency of language minority students has become a primary objective in ESL teaching. Programs aiming at enhancing cognitive academic language learning were designed for ESL students in the U.S. public school system; thus, activities to enhance general learning skills and academic language development took center stage (Chamot & O'Malley, 1986, 1987). Many content-based ESL programs aim to



provide students with opportunities to learn CALP, as well as to ensure a less abrupt transition from the ESL classroom to an all-English-medium academic program (Mohan & Beckett, 2003; Montes, 2002). Studies have shown that, besides reinforcing school curriculum and serving as a foundation for relevance to the overall school programs, content-based instruction promotes natural language learning and higher-order thinking skills (Met, 1991).

The content-based approach has also been considered as a viable alternative to traditional foreign language instruction (Bueno, 2002; Dupuy, 2000; Halvorsen & Gettings, 1995; Matthews, 2002; Moeller, 1994; Pally, 1999). Educators agree that a focus on content is essential for developing language proficiency and meeting students' professional and personal goals (Bragger & Rice, 1999; Hoecherl-Alden, 2000; Peck, 1987; Snow & Brinton, 1988). More importantly, foreign language teachers can work with their students on academic needs and critical thinking skills, while also fulfilling language learning objectives. In content-based foreign language instruction, the activities in the language class are specific to the subject matter being taught, and are designed to stimulate students to think and learn through the use of the target language. The fundamental organization of the curriculum is derived from the subject matter, rather than from forms, functions, or situations (Leaver & Stryker, 1989). The material used for instruction consists primarily of authentic texts produced for native speakers. Students are immersed in the foreign language while learning the content of other areas. The foreign language is used to learn new information that is appropriate to the cognitive and affective needs of the learners and to the proficiency level of the class.

Empirical Studies on Content-based Instruction and Critical Thinking for L2 Learners

Although much thought and research have been devoted to both content-based instruction and the teaching of critical thinking skills, only a few studies have actually investigated the development of critical thinking skills of EFL learners, let alone the effects of content-based instruction on promoting critical thinking skills. A search of related literature revealed that such investigations have been quite recent and limited.

One such study directly investigating the topic was conducted by Davidson and Dunham (1996). They used the Ennis-Weir Critical Thinking Essay Test to assess the progress of 36 Japanese EFL college students' critical thinking after a year of intensive content-based English instruction. A control group received only content-based intensive English instruction, while the treatment group received additional training in critical thinking. The treatment group scored significantly higher on the test. The researchers concluded that critical thinking skills could indeed be taught as part of EFL instruction.

In Hong Kong, Chapple and Curtis (2000) used film as a source of content in language courses. In their study, 31 Cantonese students taking a general education course taught in English were asked to rate their own progress. Although the researchers did not plan to focus their investigation on the development of critical thinking skills, the responses of the students indicated they had made the greatest gains in analytical and critical thinking; English language skills were rated only as the second greatest gain.

Similar unexpected findings were reported in Huang's (2003a,



2003b) study of content-based Chinese as a foreign language program. The program focused on classroom language activities that were designed and implemented to serve the dual goals of language development and cultural learning. Although data on students' cognitive involvement were not collected, the researcher found obvious evidence of the children's use of certain thinking processes: by thinking and talking about reasons, the children engaged in higher-level cognitive activity. The researcher concluded that the children had gained more opportunities for cognitive development through engaging in various thinking processes in the content-based language program.

Significance and Purpose of the Study

Since there have been few empirical studies on the effects of using the content-based approach to promote critical thinking skills, the researcher hoped that the implementation of the study would provide further information about this approach. Atkinson (1997) is skeptical about the prospect of success for critical thinking in the ESL/EFL classroom.

Atkinson refers to the lack of empirical confirmation of the transferability of critical thinking skills; however, there are empirical indications/studies that critical thinking can be applied with encouraging results in ESL/EFL contexts (e.g., Chapple & Curtis, 2000; Davidson & Dunham, 1996). Obviously, more research on the topic is needed in order to provide language educators with adequate information to make sound instructional decisions. Besides, according to the finding of Verplaetse's study (1998), teachers often

underestimate L2 students' language competency; L2 students receive significantly fewer high-level cognitive and open-ended questions in initiating and scaffolding moves than L1 students. It is high time that EFL teachers pay serious attention to this problem and give their students opportunities to develop higher-order thinking skills while learning the English language.

EFL students in Taiwan may have years of experience being asked to engage in conversations and reading simple texts related to functional language uses, but not necessarily chances for higher-level thinking and content reading. Implementing the content-based EFL instruction to promote critical thinking skills may prove to be an effective approach in helping students to be active and creative users of English. The purpose of this study, therefore, was to examine the effectiveness of promoting EFL learners' critical thinking skills with a content-based approach. In addition, practical concerns about promoting critical thinking skills in an EFL setting in Taiwan were documented.

Research Questions

While the purposes of the project were to examine the effectiveness of promoting EFL learners' critical thinking skills with a content-based approach and to document the practical concerns about promoting critical thinking skills in an EFL setting in Taiwan, the research questions of the study can be specified as follows:

1. Can learners gain critical thinking skills via content-based English as a foreign language instruction?
2. What are the potential effects of content-based EFL instruction in promoting critical thinking skills?



3. What are the participating EFL learners' responses to critical thinking instruction?

METHODOLOGY

Curriculum Design

For the study, special care was taken in designing and implementing the curriculum. After discussions with the academic affairs director of the school participating in the study and the two English teachers who would be assisting in the recruitment of students for the project, the researcher developed five instructional units in the subject areas of language arts, mathematics, science and social studies. Each unit required 3 hours of instruction time and was taught on weekends as an enrichment program for the students' regular English instruction.

After giving an English language proficiency test to the students who signed up for the study and surveying the students' textbooks of English and other subjects, the researcher decided on the topics of the instructional units, instructional materials, and teaching activities. The topics and instructional materials were: (1) *The Fox and the Crow* from *Aesop's Fables*; (2) *The Frog's Life Cycle* from *Welcome to Content Area Reading* (Coan, 2004) and *Frogs* published by McGraw-Hill Book Club; (3) problem solving and math problems from *Scholastic Explains Math Homework*; and (4) a simplified version of *Tuck Everlasting* (Babbitt, 1975). Each of the topics required three hours of instructional time. The instructional approach

adopted the topic-based instruction in which the syllabus is structured around the themes and the linguistic items in the syllabus are subordinated to the organizing function of the theme. While reading and writing the information on the different topics, the students used the content as a meaningful context for developing language and thinking skills. The design of critical thinking tasks for the students incorporated: (1) selection of tasks from different levels of the cognitive domain, (2) prior knowledge and experience of the students whenever possible, (3) contextualization of the task with activities and graphic organizers for reading and writing, (4) awareness of language complexity when asking students questions or providing directions, and (5) frequent assessment of the students' progress.

Participants

Thirty-two students, ages 12 to 13, from a junior high school in central Taiwan were recruited for the study. The researcher's original plan was to put the students into two groups, one being experimental and one being controlled, for different instructional approaches; the plan, however, had to be modified due to time constraints and the prospective students' and parents' requests that the students be taught with the same instructional method¹. After careful discussions with the students' English teachers, it was finally decided that the students would be put into two groups of similar language proficiency and taught with the same content-based critical thinking curriculum. An English quiz created by the researcher was then administered to

¹ A consent form was sent to parents of the participating students for written approval.



ensure that the students in the two groups were of the same language proficiency level and had similar experience in learning English as a foreign language².

Data Collection and Analysis

In order to understand the effects of the instructional approach, the researcher documented the students' learning. The students' gains in critical thinking skills were the main area of investigation; however, their grasp of content knowledge and improvement in English language skills were also assessed and analyzed. The students' thinking skills were measured by using the *Critical Thinking Test, Level 1*, designed by Yeh (2003) and by analyzing the students' writing samples using Bloom's taxonomy. Although a number of instruments for measuring critical thinking skills have been constructed (e.g., Cornell Critical Thinking Measurements, Ennis-Weir Critical Thinking Essay Test, etc.), Yeh's instrument was selected because it has been specifically designed to assess Taiwanese junior high school students' critical thinking skills and its validity and reliability have been established (Tsai, 2003). The instrument was considered suitable for the age group of the students in this study and having the questions in Chinese eliminated the possibility of confounding language factors with thinking skills. There were 25 multiple-choice questions in the instrument, which measured students' abilities in assumption

² A *t*-test was used to analyze the students' English quiz scores and the result showed that the difference between the English language proficiency levels of the two groups was not statistically significant ($M = 87.00$, $SD = 14.04$; $M = 82.75$, $SD = 20.34$; $p > .05$).

identification, induction, deduction, interpretation, and argument evaluation. The instrument was given at the beginning and end of the project. The students' pre- and post-project scores were compared. Bloom's Taxonomy of Cognitive Domains was used to analyze students' writing samples for critical thinking skills since it has been suggested to be a useful framework for increasing cognitive responses through language (Bloom, 1956; Portland Public Schools, 2004). According to Bloom, there are six progressively complex domains of thinking: knowledge, comprehension, application, analysis, synthesis, and evaluation. English language learners need to practice critical thinking in all domains, with attention to increasing, but not overloading, cognitive demand through careful attention to language use. For this study, the students' work was rated using the taxonomy to identify the complexity of the students' thinking³.

The students' learning of content area knowledge was assessed by examining their in-class work samples and homework. For the assessment of students' progress in English language skills, pre- and post-tests were administered both at the outset and the end of the project. The test was constructed by this researcher based on the vocabulary list and sentence structures suggested by the Ministry of

³ The skills demonstrated in the six types of cognitive domains are as the following: (a) knowledge: observation and recall of information, such as dates, events, places, and main ideas; (b) comprehension: understanding, interpreting, as well as comparing and contrasting information; (c) application: using information, concepts and methods in new situations; (d) analysis: seeing patterns, organizing parts, and recognizing hidden meanings; (e) synthesis: using old information to create new ones, generalizing from given facts, and drawing conclusions; (f) Evaluation: assessing value of theories, making choices based on reasoned argument, and verifying value of evidence.



Education for junior high school English textbook writing so that its validity and level of difficulty could be ensured.

Finally, a student questionnaire was administered at the end of the semester for a comprehensive understanding of the students' responses toward learning using the approach. The questionnaire contained 29 Likert-scale questions and nine open-ended questions.

FINDINGS

Although critical thinking skills were the main focus of the study, the students' gains in content area knowledge and English language proficiency were examined as well. As researchers and theorists have long maintained, language and thinking skills are closely related and inseparable (Piaget, 1971; Renner, 1996; Vacca, Vacca, & Gove, 1995; Vygotsky, 1962).

Critical Thinking and Content Area Knowledge

To assess the students' gains in critical thinking skills, firstly the scores of the students' pre- and post-tests of the different types of critical thinking skills as defined by Yeh (2003) were calculated (see Table 1).

Table 1
Participating Students' Critical Thinking Skills Test Scores
Before and After Project by Type (N = 32)

	Critical Thinking Skills	Assumption Identification	Induction	Deduction	Interpretation	Argument Evaluation
Pre-test	<i>M</i>	15.125	12.500	13.375	11.500	9.500
	<i>SD</i>	4.626	5.156	4.141	4.280	4.280
Post-test	<i>M</i>	15.968	13.343	14.875	11.500	8.250
	<i>SD</i>	3.668	4.232	4.000	4.280	4.649

ANOVA was then administered on the pre- and post test scores of the Critical Thinking Skills Test for statistical significance. The mean score and standard deviation of the pre-test were 60.63 and 14.66 and those of the post-test were 63.97 and 9.62. Although the mean post-test score was higher than the mean pre-test score, the difference was not statistically significant (see Table 2).

Table 2
Pre- and Post-Critical Thinking Tests (N = 32)

	<i>M</i>	<i>SD</i>	<i>df</i>	<i>F</i>	<i>Sig</i>
Pre-test	60.625	14.657	1	2.215	.147
Post-test	63.967	9.620			

Further statistical analyses were then conducted on the pre- and post-test scores of each type of thinking skill. Again, no statistical significance was found.

To examine the students' use of thinking skills when working on

the different learning tasks in class, the students' writing samples were collected and analyzed. The writing samples included: (1) a reasoning and conclusion chart for *The Fox and the Crow* unit, (2) a compare-and-contrast diagram for the *Frogs* unit, (3) math exercises for the math unit, and (4) writing a letter to Winnie Foster, the protagonist in the story *Tuck Everlasting*.

The reasoning and conclusion chart required the students to draw their own conclusions after reading the story, *The Fox and the Crow*, and then provide at least three reasons for their conclusions. All of the students successfully completed the chart. Their conclusions fell into two categories: (A) lessons learned from the story, and (B) judgments about the two protagonists, the fox and the crow. For the first category, the lessons the students learned were quite diverse. Some thought that they learned to be careful about flattery; some learned that flattery could be useful; some learned that being proud could get oneself into trouble; some learned to never speak to strangers; and some learned that cheese could smell good. As for the second category, the students had their own ways of interpreting the behaviors of the fox and the crow, too. Some argued that the fox was smart and the crow was stupid; some, on the other hand, argued that the fox was immoral and the crow was innocent; they also suggested that the crow should have eaten the cheese before singing, not after singing. In sum, all of the chart writings demonstrated not only a good comprehension of the story, but also the ability to analyze and evaluate the different elements of the story with a fair amount of reasons.

The compare-and-contrast chart revealed similar learning outcomes. The students were asked to compare and contrast the

similarities and differences between the story, *The Fox and the Crow*, and the book, *Frogs*. However, the instruction for this assignment was intentionally vague so that the students would have to find their own point of comparisons. The students' writings revealed the following types: (A) compare and contrast the fox, the crow, and frogs as different types of animals; (B) compare and contrast the two books as different genres of text; and (C) compare and contrast the purposes of reading the two types of text. In terms of comparing them as animals, the students listed the differences and similarities between their physical features; for example, birds vs. mammals vs. amphibians, different kinds of habitats and diets of the animals, etc. As for the comparison of the books as different types of text, the students noted that one was a fable which was a narrative text and the other provided facts and was an information text. They listed the literary elements of the narrative text and the formats (such as table of contents, headings and subheadings, tables, graphs, etc.) of the information text. The students found fables could teach them to use their imagination and learn important lessons, whereas the information text gave them useful knowledge about the world we live in. The students' writings undoubtedly suggested their ability to analyze and synthesize the information they had obtained from engaging in the learning of the two instructional units.

The math unit required the students to work on twenty-five word problems and then construct their own math questions using the four types of problem-solving strategies they learned in the unit. The tasks required not only the ability to comprehend the questions but also math and problem-solving skills. The students had 30 minutes to work on them and 60 was a passing score. The mean score of the



students' grades was 66.83 and the standard deviation of the scores was 16.06.

The students wrote letters to Winnie Foster (the protagonist in the story, *Tuck Everlasting*) after reading a simplified version of the book. Their letters were read multiple times by the researcher and two research assistants to identify their levels of cognitive domains as defined by Bloom (1956). The categorization of each letter was discussed and agreed upon by all three raters before it was finally assigned. All of the letters were considered to have demonstrated good understandings of the story; thus reached both the knowledge and the comprehension levels. Among the thirty-one letters (one student was absent on the day the class worked on the letter), two were categorized as being on the application level, two reached the analysis level, eighteen synthesis, and nine evaluation.

The following are examples of the writing of the different levels and the cognitive skills that they have demonstrated:

Example 1 (Bloom's Taxonomy-Application, Skills demonstrated-engagement with the story and relate oneself to the protagonist)

Dear Winnie,

My name is Alice. I think we can make good pen pals. I know your life and think you are a special girl. You can give up your life to save your best friend, toad. If that thing happened to me, I think I also do that. I learn a lot from you. You make me to become more brave and kind. Remember be happy everyday.

*Best wishes,
Alice*

Example 2 (Bloom's Taxonomy-Analysis, Skills demonstrated- Identify problems faced by the protagonist and see the consequences of different decisions that could lead to...; recognize hidden meanings about life and life cycles)

Dear Winnie,

How are you? I am Jennifer. Nice to meet you! I think we can be good friends. I know your problem and I think maybe I can help you.

If I were you, I wouldn't drink the spring water because I don't want to see my parents and best friends die one by one. And everyone dies. That's life cycle. So I will give the water to the toad. There are many boys in the world. I can love another one. Not only Jessie. So don't worry about it. Okay?

Good luck and take care.

*Sincerely,
Jennifer*

Example 3 (Bloom's Taxonomy-Synthesis; Skills demonstrated- Generalize from given facts; relate one's own experience to the story; draw conclusions)

Dear Winnie,

My name is Janice. I live in Taiwan. I think you must live in the USA or other country because we don't have woods or even a secret place to have such enchanting and mystery stuff, like the spring that can make people live forever. I can't stand for it if I were you. I would like to play and hunt for plants and animals in the woods, too! I like the wilds since I was a little kid. I have been in Michigan till five years old, so I have been living beside the woods, too. My mother took me and my brother back to Michigan Lansing again for one year when I was nine year old. We live in a village. It is just like going to heaven. It is not as dirty as the country side in Taiwan and it is not as noisy as the city in Taiwan. In Taiwan the smell of the gas from the cars, trucks and motel cycles stinks. But in Lansing, the smell of the grass can make you feel very happy and kind. Well, I think I said too much. If you have time, I

would like to invite you to Taiwan, even you were a ghost ☺

You were very brave and kind. You protect the spring from the stranger and saved Mae and the toad. Nice to meet you!!

*Sincerely,
Janice*

Example 4 (Bloom's Taxonomy-Evaluation, Skills demonstrated- Identify problems faced by the protagonist and see the consequences of different decisions that could lead to...; explicit reasoning and explanation; make choices based on reasoned argument)

Dear Winnie,

How are you lately? This is Ginger. I heard of your situation and I realized that you are puzzled. Here is my advice for you:

- 1. If you loved Tuck more than loving yourself, then you should drink the spring water.*
- 2. If you thought that the toad is your best friend more than anything else then you'd better leave the water for it.*

Due to the reasons above, I think you have better to think it twice to decide what you care the most (Love and Friendship).

And now here are my way to figure out this problem if I were you:

I would drink the water.

Reasons:

- 1. If I died, people whom cares about me will be sad and depressed. So I would rather cry for them instead of they cry for me.*
- 2. Friendship will be more important for me than love, but once the toad drinks the water, it will be lonely, too.*

Well, it's all up to you. Take your time to think further more.

*Sincerely,
Ginger*

English Language Proficiency

The two sets of English language proficiency test scores were analyzed with a repeated measure ANOVA and the finding indicated a significant difference; $F(1, 31) = 6.93, p < .05$, partial eta squared = .18. The results indicated a significant increase in the students' English language proficiency scores after the program (see Table 3).

Table 3
Pre- and Post-tests of English Language Proficiency

	<i>M</i>	<i>SD</i>	<i>df</i>	<i>F</i>	Sig.
Pre-test	84.875	17.326	1	6.932	.013
Post-test	90.344	9.740			

Overall Responses to the Approach

For a comprehensive understanding of the students' responses to the instructional approach, an end-of-project questionnaire was administered. The questionnaire findings revealed very positive responses from the participating students. They thought that they had gained content area knowledge ($M = 4.44, SD = .72$), English language skills ($M = 4.44, SD = .70$), and thinking skills ($M = 4.31, SD = .58$). They agreed that learning English through content-area instruction was interesting ($M = 4.25, SD = .72$) and thought that the instruction had increased their motivation to learn English ($M = 4.37, SD = .62$). The approach made English learning meaningful ($M = 4.38, SD = .83$) as well and even gave them opportunities to think ($M = 4.19, SD = .72$). Among the four instructional units, they liked the *Tuck*

Everlasting and the time capsule-making units the most ($M = 4.19$, $SD = .62$), and the *Frogs* unit the least ($M = 3.63$; $SD = .98$). *The Fox and the Crow* unit was ranked the second favorite ($M = 4.13$, $SD = 1.09$), and the math unit the third ($M = 3.81$; $SD = .83$). In terms of English language skills, all of the units helped them gain more knowledge and improve their skills in English. Among the four, however, working on the reading and writing related to *Tuck Everlasting* was considered most helpful in enhancing their English language ability ($M = 4.38$, $SD = .72$). *The Fox and the Crow* unit ($M = 4.36$, $SD = 1.09$) was second to the *Tuck Everlasting* unit in that regard. The *Frogs* unit was considered the least helpful among the five units ($M = 3.63$, $SD = .85$). As for their effectiveness in building thinking ability, The *Tuck Everlasting* unit and *The Fox and the Crow* unit were both considered very effective ($M = 4.38$, $SD = .80$; $M = 4.38$, $SD = .10$) while the *Frogs* unit and the math unit were not quite as effective ($M = 3.94$, $SD = .96$; $M = 3.88$, $SD = .72$). Overall, the students thought that taking part in the project helped them to learn much content area knowledge ($M = 4.13$, $SD = .70$), increased their English language skills ($M = 4.31$, $SD = .85$), enhanced their thinking ability ($M = 4.06$, $SD = .75$), and helped them to gain confidence in their own English language ability ($M = 4.25$, $SD = .75$). In comparison to their regular English classes, the curriculum of the study was considered to be more effective in helping them learn English ($M = 4.06$, $SD = .85$), content area knowledge ($M = 4.19$, $SD = .83$), and critical thinking skills ($M = 4.31$, $SD = .70$). Most of the students hoped that their regular English classroom could adopt the same approach as was used in the study ($M = 3.81$, $SD = .98$) and would

join the project again if they were given a chance to do so in the future ($M = 4.25$, $SD = .85$).

The students' responses to the open-ended questionnaire revealed further insights. Table 4 summarizes their typical answers to the questions concerning the strengths and weaknesses of the curriculum in terms of facilitating the different areas of learning.

Table 4
Summary of Participants' Responses to Open-Ended Questions

Area of Learning	Strengths	Weaknesses
English	<p><i>I have learned to read interesting materials and gained much knowledge that was not usually included in my English class.</i></p> <p><i>I did not know that learning English could be so fun!</i></p> <p><i>I have learned many English vocabulary words and understood them!</i></p> <p><i>I love to think in English.</i></p> <p><i>I have more confidence in my own English now.</i></p> <p><i>I think my English is now better than a lot of other students who did not take part in the study! I feel proud of myself.</i></p>	<p><i>There were too many vocabulary words and some grammar was too hard.</i></p> <p><i>This approach seems to take longer time to learn than the regular English class.</i></p> <p><i>The Fox and the Crow unit was too easy.</i></p> <p><i>We needed more hours for each unit.</i></p>

Table 4 (continued)

Content area knowledge	<i>My math ability has improved.</i>	<i>The lessons are kind of easy for me.</i>
	<i>I have learned the terms in math, science, and social science and the content is easy for me to understand.</i>	<i>Five units are not enough.</i>
	<i>I learned to think in English and use English to express concepts in content areas.</i>	<i>The pictures of some frogs are disgusting.</i> <i>There is too much thinking to do.</i>
Thinking skills	<i>I have learned how to think in English and this is what I did not have a chance to do before.</i>	<i>It's confusing sometimes, especially the math lessons.</i>
	<i>My thinking skills have improved.</i>	<i>We need more classes like these.</i>
	<i>I enjoyed talking about and expressing my thoughts in English.</i>	
	<i>I can think faster and more effectively now.</i>	
	<i>I feel like studying even harder from now on.</i>	
	<i>I've learned how to make associations.</i>	

As for the best parts of the curriculum, the students enjoyed reading the story, *Tuck Everlasting*, the most. They also liked working on math through English and learning about the life cycle of frogs. The students were surprised to find that they could learn so much from the English lessons. They stated that they gained not only knowledge and thinking skills but also new English words and improved confidence.

Obviously the disappointment with the lessons related to the

short period of time devoted to the lessons. The students complained that the lessons ended too quickly and that there were not enough lessons. Therefore, they suggested adding more hours and units to the curriculum and making the lessons even more challenging. Finally, the students pleaded to have the opportunity to participate in a similar program in the near future.

DISCUSSION AND CONCLUSION

The purpose of this study was to examine the efficacy of implementing a content-based reading and writing approach for critical thinking skills in an EFL context. Specifically, three research questions were asked: (A) Can learners gain critical thinking skills via content-based English as a foreign language instruction? (B) What are the potential effects of content-based EFL instruction in promoting critical thinking skills? (C) What are the participating EFL learners' responses to critical thinking instruction? A five-unit content-based EFL syllabus was designed and implemented. The research data collected for this study included the scores of pre- and post-critical thinking skills tests, work samples from the students' assignments, pre- and post-test scores of an English language proficiency test constructed by this researcher, and responses from an end-of-project student questionnaire. The Critical Thinking Skills test results showed no significant differences between the students' critical thinking scores before and after taking the lessons in all five areas of critical thinking indicators defined by Yeh (2003). Nevertheless, the students' work samples revealed exercises of critical thinking skills in all six



cognitive domains as categorized by Bloom (1956). The students performed significantly better on their English language proficiency test after the project. The end-of-project questionnaire indicated positive responses toward the instructional approach. The students believed that they had gained much in subject area knowledge, thinking skills, English language ability, and most important of all, confidence and motivation to learn in all of the above aspects.

Despite the inconsistency between the results of the Critical Thinking Skills Test and the findings from the close examinations of the work samples, this researcher believes that critical thinking did take place when the students engaged in the reading and writing activities of each unit in the syllabus. As a matter of fact, critical thinking processes are broad enough that a long list of indicators could be used to represent the different types of skills (Perkins & Murphy, 2006). Although researchers have attempted to summarize and identify the construct of critical thinking (e.g., Bullen, 1997; Clulow & Brace-Govan, 2001; Garrison, Anderson, & Archer, 2001; Henri, 1992; Newman, Webb, & Cochrane, 1995; Norris & Ennis, 1989), none of them claimed that their lists were complete. Besides, as Garrison, Anderson, and Archer (2001) indicated, during the process of critical inquiry, a triggering event, which could be an issue, a dilemma, or a problem that emerges from experience, needs to be identified or recognized by the learner. The Critical Thinking Skills Test, as a standardized test, despite its objectivity in measuring students' critical thinking skills in given situations, did not have the capacity to measure this group of students' performances when they encountered particular triggering events in the instructional units of

this study. Therefore, the test results might not be indicative of the students' critical thinking skills. The in-depth analysis by this researcher and two research assistants of the students' writings, on the other hand, probably provided better insights into the students' use of higher-order skills when they encountered different "triggering events" in the units. The questionnaire results seem to have confirmed this as well: the students reported that they could think in English and enjoyed exercising thinking skills when they read the materials and expressed their thoughts in English.

As for other potential effects when implementing a content-based EFL instruction, the findings are many and they echo theorists' claims and findings of earlier studies. Although content-area based instruction focuses on subject matter, rather than on the forms or functions of the target language, it brings interesting content topics into the language classroom and the students can use the target language to read, comprehend, discuss, reason, and express their thoughts in writing (Brinton, Snow, & Wesche, 1989; Huang, 2003a, 2003b; Swartz, 2000). An area in which the participating students obviously gained was the knowledge of different subjects. The analysis of the student assignments and work samples indicated that they not only understood the content of the materials but were also able to draw personal relevance from the materials they read. This comprehension of content area knowledge, in turn, made the learning meaningful (Krashen, 1985a, 1985b) and enhanced the students' academic language skills (Chamot & O'Malley, 1986, 1987; Cummins, 1981, 1984). Indeed, similar to the findings in the study by Chapple and Curtis (2000), those in this study indicate that students'



growth in English language skills was noted by the students themselves and was reflected in the students' scores on language proficiency tests. Besides content area knowledge and enhanced English language skills, an additional benefit enthusiastically reported by the students was the increased confidence and motivation in learning and thinking in English. The students discovered that they could use English in many different contexts. They found that they could use their knowledge in math, science, social studies, and language arts to help them understand and learn English. English did not have to be learned in isolation and they could utilize much of what they already knew when learning English.

The answer to the third research question could clearly be found in the students' responses to the end-of-project questionnaire. The overwhelmingly positive responses from the students proved the success of the approach. The students enjoyed the lessons in spite of having to give us their weekends. They also were enthusiastically anticipating further opportunities to take classes and asked to have even more challenging materials!

The findings of this study indicated that the implementation of the content-based instruction for critical thinking skills might not only have helped the participants to develop their English language skills, but also their thinking skills. However, this study is limited in two ways. First, the number of participants in the study was small. Second, the original experimental design had to be modified and there was no control group to prove that the effects were solely due to the instruction. Due to the limited number of the sample and lack of a comparison group, generalization of the results should be done

cautiously. Finally, the process of implementation of the study revealed various hurdles that educators would have to go across to experiment with innovative teaching ideas in junior high schools in Taiwan. Although this researcher finally had the great fortune to implement this program on weekends as an enrichment to the regular English language instruction, judging from the compromises the design of the study had to make, the actual carrying out of the approach at regular junior high school classrooms in Taiwan in order to reap such benefits, might still be a long way to reality.

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以學科為本的英語閱讀與寫作提昇 國中生的批判性思考能力

摘要

本研究探討以學科領域為本的英語教學培養國中學生批判性思考能力的可行性及成效。許多學者都肯定語言發展與思考能力的相關性。近年來英語為第二語言及英語為外語的學者及教師紛紛提出學習語言時應同時學習高階思考能力的看法。有些學者試驗性的在其教學中使用不同的方法，希望能在教導學生英語的同時，提昇學生的批判性思考能力。在數個被實驗過或推薦的方法中學科領域為本的英語教學似乎最具潛力，然而其成效仍有待足夠的研究結果印證。本計畫即以國中學生為研究對象，接受學科領域為本的英語教學及從事批判性思考活動，再以問卷、批判性思考測驗、英語測驗成績、課室觀察、訪談、學生作品分析等質與量兼具的資料蒐集及分析後，本研究結果發現學生的批判性思考測驗成績雖無統計上的顯著改變但在課堂表現及作業上都呈現高度的批判性思考能力。在英語成績方面也有顯著成長。學生的問卷結果也顯示學生對以學科領域為本的教學相當肯定並認為這種英語學習課程能使他們學會以英語作高階思辨與溝通表達。

關鍵詞：以學科為本的英語教學 閱讀與寫作
批判性思考