

Integrating Thinking into L2 Learning: What do We Learn from Students' Learning Experience

Mei-Hui Chen

Shih Chien University, Kaohsiung Campus, Taiwan

Abstract—This study conducted a higher-order thinking approach in the L2 classroom and examined students' attitudes towards and perceptions of learning with high cognitive thinking. Teaching higher-order thinking is essential for learning and teachers are encouraged by education authorities to integrate high cognitive thinking into teaching. Yet, little is known about the extent to which students who are used to learning with lower-order thinking skills like reciting and comprehension in the L2 classroom can adapt to learning using higher-order thinking. This paper addresses this issue by exploring students' attitudes towards and perceptions of the importance of thinking in L2 learning and how it impacts on learning through the analysis of data collected from a case study design, including 40 self-completed questionnaires and semi-structured interviews with 16 students. This study shows that three-quarters of the students hold positive attitudes towards learning using higher-order thinking, and such learning facilitated their learning performance and learning behavior, while one quarter resisted. The findings of the study reflect on teaching higher-order thinking, and provide recommendations for integrating thinking skills into L2 teaching.

Index Terms—higher-order thinking, L2 learning, attitudes & perceptions

I. INTRODUCTION

Teaching thinking has been strongly advocated by educators and researchers to raise educational standards and to prepare learners for lifelong learning and has become a desirable goal in higher education worldwide (Halx & Reybold, 2006). The teaching of thinking is also important in terms of cultivating learners' competitiveness in a global job market (Au, 2006), and strengthening economic growth (World Bank, 2011). Thus, it is argued that the language learning should go beyond the acquisition of basic literacy skills, and it is now essential to equip learners with the ability to think critically by integrating thinking skills into L2 teaching. A number of researchers (e.g., Atkinson, 1997) postulated that it is difficult for non-native English-speaking students, in particular, Asian students, to learn to think critically because of their collective and hierarchical cultural backgrounds where students rarely challenge what they learned from the teacher. However, empirical studies (e.g., Author, 2015; Yang & Gamble, 2013) have shown that students who possess hierarchical cultural background can be trained with activities to foster a thinking-skills approach, resulting in an enhancement of L2 proficiency and cognitive ability.

Though it has been proven that the teaching of thinking benefits L2 learners, the implementation of integrating thinking into L2 instruction has been peripheral (Li, 2011). The learning of thinking has been included in L2 curricula around the world like Taiwan (Ministry of Education, 2008). To allow this part of the curricula to be implemented more effectively in the L2 classroom, an exploration of L2 teachers' conceptions of and practice in teaching thinking shows that teacher training to develop both content and pedagogical knowledge of teaching thinking is essential (Li, 2016). In addition to an enhancement of teachers' professional knowledge of teaching thinking, the present study argues that it is also crucial to understand students' attitudes towards the learning of thinking and to what extent the teaching of thinking impacts on their learning process, so that the design of thinking-based curricula can be more effective for student learning in general. As Brown (1989) argues, to improve the effectiveness of a language program, students' learning situations and attitudes within the context involved should be taken into account. Students' attitudes affect their willingness to participate in learning activities (Fushino, 2010). Yet, there is little research reporting students' attitudes towards and perception of the role of thinking in L2 learning and to what extent the teaching of thinking affects student learning. Identifying this gap in the literature, this study attempts to make the first contribution to the comprehending students' attitudes towards and perceptions of learning thinking skills. The findings are of interest to educators and researchers interested in the teaching and learning of higher-order thinking.

II. LITERATURE REVIEW

A. Thinking Skills & L2 Learning

Thinking skills is interpreted differently by researchers. In the present study they are referred to the mental processes of knowledge, comprehension, application, analysis, synthesis, and evaluation by Bloom (1956). Knowledge, comprehension and application are classified as lower-order thinking skills. In L2 classrooms lower-order thinking skills are fundamental and used to acquire the linguistic competence like memorizing, understanding the text and imitating (Ding, 2007). Lower-order thinking is often utilized for rote learning and answering lower-order or

comprehension-check questions which require students to recall facts, explain, and apply the vocabulary or grammar rules learned in class tests. Analysis, synthesis and evaluation are categorized as higher-order thinking (HOT) skills. This type of thinking is mainly used for active learning where students need to think critically and creatively such as reasoning, solving problems, forming concepts, considering opinions, making decisions and judgments, and generating new perspectives. It is important to note that in the process of using higher-order thinking, lower-order thinking is also operated as a pre-requisite of higher-order thinking. As Bloom (1956) suggests that value or judgment cannot be applied until one knows the facts, understand the facts, can apply the facts, is able to take the facts apart and put the facts back together. Thinking skills can be seen as a learning strategy and, importantly, it is a strategy that enhances learner autonomy (Wenden, 1991).

Thinking skills can be developed through experience, education, and training (Fisher, 1998) and taught at all levels to improve learners' achievement (Lipman, 2003). Research (Author, 2016) suggests that thinking skills can be promoted through the use of higher-order questions, sufficient wait-time, communication skills, collaboration, and social interaction (e.g., small group interaction). Vygotsky (1978) and Swain (2000) stated that social interaction is a key mechanism for cognition and language development. It allows for the occurrence of socio-cognitive conflicts (Mugny & Doise, 1978) where different perceptions arise and are readjusted and this process contributes greatly to cognitive and language development. Social interaction promotes active learning (Watson, 2001; Vygotsky, 1978), transferring, and boost self-confidence (Watson, 2000).

B. Thinking Skills Used in Taiwanese L2 Learning Context

English is the most commonly studied foreign language in Taiwan. Yet, exposure to English use outside the language classroom is rather limited. Two main teaching approaches are commonly used in English language teaching in higher education in Taiwan, namely the Grammar-Translation Method (GTM) and the Communicative Language Teaching (CLT) Approach (Liu, 2005). GTM mainly focuses on teachers explaining the grammar rules and vocabulary use and students utilizing mainly lower-order thinking skills like understanding the grammar rules, remembering the vocabulary, and applying the grammar rules and vocabulary learned in some form of test. CLT emphasizes the active communication which provides more opportunities for students to speak and use higher-order thinking skills like reasoning, solving problems and making judgments. However, it may be questioned as to whether this approach has been fully implemented in the way promised. As Coyle (2002) argues, this so-called 'communicative approach' in most L2 classrooms, with its prescribed syllabus topics based on transactional language, unintentionally promotes a reactive rather interactive role for learners. Most Taiwanese non-English major students arguably have lower motivation to learn English and higher anxiety when required to respond to teacher questions or engage in speaking activities (Liao, 2008). Nunan (2003) also points out that a lack of teacher training indicates CLT has not been fully put into operation in Taiwan. These teaching approaches mainly focus on the gain of linguistic competence and do not offer many opportunities for students to think critically and independently and to speak authentically. From a pedagogical perspective, the teaching methods applied in Taiwan provide learning opportunities mainly with lower-order thinking skills.

Taiwanese students have a collective and hierarchical cultural background where they are used to sitting quietly to listen in class, respond passively to comprehension-check questions, and practice speaking with mainly written dialogues (Liu, 2005); they tend to be inactive about L2 learning and rarely challenge what they learn from the teacher. Students' learning styles indicate that lower-order thinking skills like recalling linguistic knowledge and understanding the text are mainly used and higher-order thinking skills are rarely utilized. While students are used to learning with lower-order thinking skills, the extent to which higher-order thinking skills are considered important in L2 learning needs to be explored.

C. Thinking Skills & L2 Studies

Empirical studies have utilized a variety of thinking activities like critical thinking activities and higher-order questions to improve students' L2 and cognitive performance (Alcón, 1993; Author, 2015; Godfrey, 2001; Mehta & Al-Mahrooqi, 2015; Yang & Gamble, 2013; Zhang, Anderson, & Nguyen-Jahiel, 2013). On affective aspects, it was found that university students have negative attitudes towards answering higher-order questions in a teacher-led setting since they lack the confidence to speak English and it can be difficult for them to thinking critically in front of the class (Tan, 2007). Yet, research has shown that integrating thinking into L2 instruction can motivate students to take risks (Shahini & Riazi, 2011), enhance students' attitudes towards learning and decrease their language-use anxiety (Zhang, Anderson, & Nguyen-Jahiel, 2013), and arouse interest in learning with better interaction (Yang & Gamble, 2013). In particular, students with high positive attitudes towards the thinking tasks improve their L2 oral production (Dörnyei & Kormos, 2000). In addition to the benefit of the improvement of L2 and thinking performance, it is believed that a pedagogy mixing thinking skills and language learning promotes language transfer (Jones et al., 1987).

III. RESEARCH QUESTIONS

The present study aimed to conduct a higher-order thinking (HOT) approach (see below) in a L2 classroom and explore how students perceive the importance of thinking in L2 learning, their attitudes towards the approach, and the

extent to which the approach affects student learning. Research questions are as follows:

1. What are students' perceptions of the importance of lower-order and higher-order thinking in L2 learning?
2. What are students' attitudes towards and perceptions of the HOT approach?
3. What are students' perceived impacts of the HOT approach on their learning?

IV. METHODS

The present study was designed as a case study of an intervention. Yin (2003) asserts that an empirical inquiry investigates a current phenomenon within its real-life context and a case study is one means that researchers can use. A case study method allowed the researcher to explore students' attitudes towards and perceptions of the impact of the HOT approach on student learning in depth.

A. Participants

One EFL class of non-English major freshmen students (N = 40) at a university in Taiwan participated in this study. They were aged between 18 and 19 years. The research purpose and procedures were explained to participants and informed consent was obtained.

B. The HOT Approach

The present study aimed to conduct a HOT approach, based on social constructivist perspective, to motivate students to think and speak by engaging them in thinking-task group discussion. This approach consisted of thinking tasks designed with higher-order questions (Morgan & Saxton, 1994), including a use of wait-time (Tobin, 1987), probing (Wu, 1993), and communication skills (Long, 1996). The procedure had two steps (for a HOT lesson plan, see Appendix A). First, the teacher modeled the thinking tasks for students in a teacher-fronted setting, concentrating on activating students' background knowledge and demonstrating how to respond to higher-order questions, communication strategies and language use. Second, thinking tasks were implemented in small groups. Students were first required to present their opinions on the questions listed in the thinking-task handout and then encouraged to think critically about their group members' contributions to the discussion and interact by commenting on one another's opinions. Students were required to reach a consensus within a group through discussion. At this stage students applied the skills learned in the first step.

Four types of thinking tasks (an example of a thinking task, see Appendix B), including *5Ws*, *Odd One Out*, *Make-Up-A-Story*, and *Guess What I Say*, were used. Each task provided opportunities to exercise particular skills of higher cognition. Three different topics were developed for each task type, totaling 12 tasks in all. The topics used in the thinking tasks were related to the textbook contents and life experiences of the learners and links to related vocabulary and sentence patterns were provided to facilitate the discussion. A summary of the tasks is as follows.

5Ws (Butterworth & O'Conner, 2005) activates students' analysis, synthesis, and evaluation thinking, mainly asking questions such as "why," "how," and "which is better...."

Odd One Out (Leat, 1998) fosters classification skills, and requires students to classify three objects and pinpoint which one differs from the others.

Make-Up-A-Story develops synthesis thinking, requiring learners to create a story based on provided pictures.

Guess What I Say requires students to arrive at an answer (e.g., an idiom) using analytical thinking.

The intervention was conducted for 12 weeks. This class had 2-hour lesson per week. The students received a 50-minute lecture in the first lesson focusing on vocabulary, grammar, and reading comprehension. In the second lesson the HOT approach was implemented.

C. Data Collection

The questionnaire exploring the students' perceptions of the importance of thinking in L2 learning (see appendix C) was designed based on Bloom's six thinking levels with three questions for each thinking level, with a total of 18 items based on six-point Likert scales (from 'strongly agree' to 'strongly disagree') and was distributed to the 40 participants before the pre-test and after the post-test. Some of the concepts associated with thinking levels might be rather abstract for the respondents to understand. To make the questions more concrete for the respondents, an additional example was included. The questionnaire was piloted in Chinese version with a convenience sample of 30 university students in a college in Southern Taiwan. Some wordings and examples which were found inappropriate for the students were modified based on informants' feedback. A Cronbach's alpha internal consistency reliability was calculated and achieved the satisfactory level of .94.

This study adopted a semi-structured interview to find out how different students view the HOT approach. The interview was conducted one to one with 16 students who volunteered to be interviewed after the post-test. Interview questions mainly related to participants' attitudes towards and perceptions of the HOT approach and the impact on their learning. Questions included whether they liked the thinking approach, and whether they perceived any impact of the thinking approach on their English speaking, thinking, and learning in general. Interviewees were required to provide reasons and examples when responding to the questions. The students were interviewed in Chinese and all the interviews were audio recorded.

D. Data Analysis

Eighteen questions in the questionnaire regarding students' perceptions of the importance of thinking in L2 learning were classified into lower-order thinking (knowledge, comprehension, application) and higher-order thinking (analysis, synthesis, evaluation) and were analyzed using paired-samples t test. The transcripts of the interview data were first analyzed using 'open coding' (Merriam, 2009). I discussed the coding remarks with a trained researcher using a sample of the interview data. We then individually marked the data. The coding units were tallied. The interrater reliability reached a satisfactory agreement of 92.5%. The discrepancies in the initial coding results were discussed and a mutual agreement was reached. We then looked through the remarks, attempting to identify the themes through an iterative process to examine commonalities and differences in the remarks. Having identified the themes, we then categorized the remarks into the themes individually. The interrater reliability for the theme classification reached 97.3%.

V. RESULTS

A. The Perceived Importance of Thinking in L2 Learning

There was a significant difference in the perceived importance of using lower-order thinking in L2 learning after the intervention ($p = .028$, $p < .05$) while students' perception of using higher-order thinking did not change ($p = .878$, $p > .05$), as shown in Table 1. The mean score of perceived importance of using lower-order thinking at pre-test was 1.88 and 2.14 at post-test, meaning that students considered the use of lower-order thinking in English language learning important; however, they perceived it as significantly less important after the intervention. This can be explained by the fact that students used to enhance their English proficiency by reciting vocabulary and understanding grammar, yet through the training of higher-order thinking students realized that their speaking improved (see below) by using higher-order thinking skills. Thus, students decreased the perceived importance of lower-order thinking in L2 learning.

Students were of the opinion that higher-order thinking played an important role in L2 learning (mean = 2.42 at pre-test, 2.43 at post-test) and their attitudes remained the same after the intervention. However, it is interesting to see that students did not consider the use of higher-order thinking more important after they had perceived an improvement of their speaking and thinking performances. It seems possible that the result is due to the pressure and high cognitive demand required by the thinking tasks (see below).

Comparing the perceived importance of lower-order thinking to higher-order thinking, students considered lower-order thinking was more important than higher-order thinking. This can be explained by the facts that the exam-oriented education system has deeply influenced students' learning style. Students needed to recite vocabulary and understand the grammar rules, so they could apply the linguistic knowledge while taking a test. They also considered reciting more vocabulary essential while expressing opinions because they sometimes encountered a lack of vocabulary during discussions (see below).

TABLE 1.
PAIRED-SAMPLES T TEST ON THE PERCEIVED IMPORTANCE OF LOWER-ORDER AND HIGHER-ORDER THINKING

Thinking	Paired Differences				95% Confidence Interval of the Difference	t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	Mean				
	Lower	Upper	Lower	Upper				
Lower-order	-.25556	.70954	.11219	-.48248	-.02863	-2.278	39	.028
Higher-order	-.02339	.93219	.15122	-.32979	.28301	-.155	37	.878

B. Attitudes towards the HOT Approach

1. Enjoyment

The majority of students had positive attitudes towards the HOT approach. They considered the learning process to be interesting and motivating. Sample responses are as follows.

"I could express any opinion I wanted. I felt good."

"I really practiced English authentically. Speaking is very important because the main aim of learning English is to communicate with others, not to take exams."

2. Pressure and anxiety

Higher-order questions requires more effort and challenge in the use of the target language and as such was not universally popular. Around half of the student comments were related to pressure and anxiety. Responses showed that this attitude was due to low speaking proficiency, unfamiliar topics, and cognitive demands. Samples responses are as follows.

"I suffered a lot of pressure from it [the HOT approach]. I prefer the previous teaching method [a method similar to the grammar-translation method]."

"It was cognitively demanding when translating Chinese answers into English...It was tiring...Then I felt down."

To complicate the findings, half of the students who felt pressure held a positive attitude toward this pressure. They appreciated the pressure they were under because it supported their learning. Sample comments include:

“I improve with that pressure.”

“I felt very afraid in the beginning. It seemed there was always pressure in class...I didn’t pay any attention to the pressure. I just kept discussing and discussing. Later on I had the courage to speak, so the pressure was relieved.”

3. Resistance

A quarter of the students resisted this approach and preferred the teaching method which was similar to grammar-translation. Sample reasons are as follows.

“I learned more with the old method. I didn’t learn more vocabularies with this approach.”

“I don’t like this thinking approach. I felt pressured, yet I didn’t learn more.”

C. Perceived Impacts on Student Learning

The results also revealed the HOTS approach had a wide impact on student learning, ranging from immediate effects on student learning to a wider impact on long-term learning. Figure 1 reveals a summary of the overall perceived impacts found.

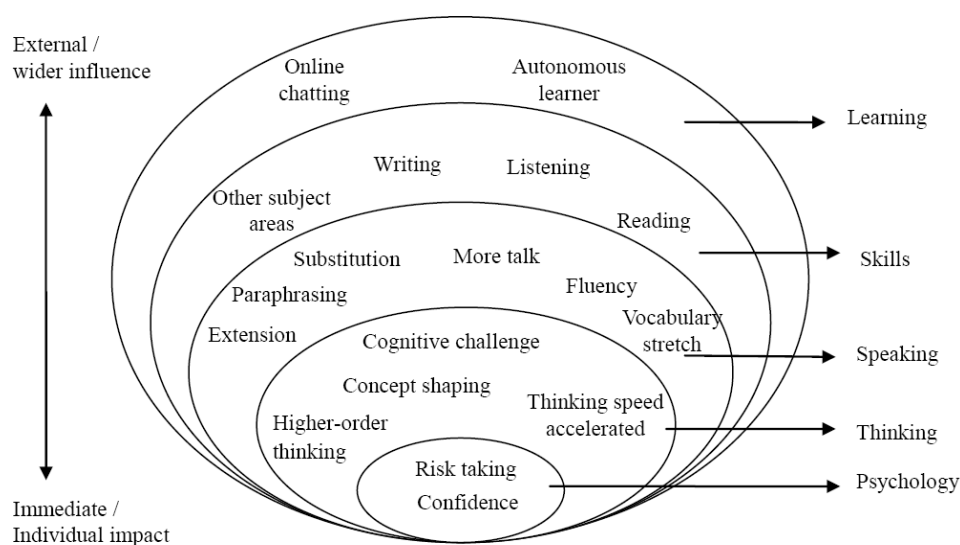


Figure 1. Perceptions of the effect of the HOTS approach on student performance

1. Psychology

The HOTS approach was perceived by students to have an effect on psychology. As mentioned above, students felt pressure and expressed a reluctance to speaking English due to a fear of making mistakes. It was not easy to conquer such a psychological barrier. However, students argued that they gained more confidence and were more willing to speak and were able to take risks in language use. The majority of students rationalized that their confidence towards speaking English increased because they had gotten used to expressing ideas in English. Sample responses include:

“I have more courage to speak and to take risks.”

“I have more confidence and feel that I am improving.”

2. Thinking

More than half of the students claimed that the thinking tasks were intellectually challenging and they had to think hard, which they rarely did before. Sample responses are as follows.

“My brain would go blank with the previous teaching method. Now I force myself to think in class.”

“It was cognitively demanding the first time we played Odd One Out.”

Socio-cognitive conflicts occurred in the process of arguing and reasoning. As a result, students noticed that their concept had been shaped; their viewpoints and values had changed, as commented below by a student.

“I sometimes noticed that my group members had different viewpoints and values from mine. I listened to their reasons. If their reasons and evidence could convince me of their viewpoints and values, I would agree with them. For example, once I considered appearance important when choosing an ideal mate. However, my group members disagreed with me and argument ensued. Finally, I was persuaded and agreed that appearance should not be seen as an important feature.”

The majority of students believed that their higher-order thinking developed and they could express their ideas more logically, providing reasons and evidence. The findings indicate that most students had benefited from the thinking approach in terms of their thinking performance. Sample comments include:

“I can use evidence, examples, and my viewpoints in my argument. My reasoning skill has become more logical.”

“I would analyse others’ viewpoints and evidence and evaluate whether what they said made sense to me. I also compared their thoughts with my ideas.”

A quarter of students perceived their thinking speed to have accelerated. They claimed that at the beginning it took

them much longer to think and to express their ideas. That means students could process information and respond faster. Sample comments are as follows.

“At the beginning I thought in Chinese, translated Chinese answers into English and then elaborated. Now I think in Chinese and elaborate immediately in English.”

“My CPU [brain] used to run slowly and sometimes it froze...Now I feel that my CPU has upgraded.”

3. Speaking

The thinking tasks required student to express their thoughts and comment on others' opinions, resulting in plenty of speaking opportunities provided. While most of the students considered they talked more, less than half of students believed that their speaking fluency improved. Although the number of the students holding positive belief about fluency was not high, it does indicate a greater opportunity for students to speak fluently was provided by this thinking approach. The impact on speaking performance also reflects on the use of vocabulary items which students had rarely used previously. It stretched the speakers in terms of lexical processing due to the need to express their ideas and opinions. Sample responses include:

“I do not clearly know how much I improve, but I am sure I talk more.”

“The fluency really improves...That means I can speak more fluently.”

“[Now I often use words which] I wouldn't use before.”

Students also claimed that their language communicative skills improved. They were able to use substitute words or paraphrase when lacking lexical items. Also, they perceived that their ability to extend the topic was enhanced. Sample responses include:

“I can use other words to substitute. For example, I don't know the word ‘*humble*’, I would explain it as *don't tell others I am good*.”

“When we played Guess What I Say, I used alternative words to explain without mentioning the idiom.”

“I could extend the topic for further discussion.”

4. Skills

The effect of the HOT approach on skills, such as writing, listening, and reading was also commented on by a quarter of respondents. They realized that they could compose English writing much faster than before and were aware of the improvement in listening and reading. Most significantly, the reasoning skills were applied to other subject areas. Sample responses are as follows:

“It used to take me a long time to compose one email in English. Now I can write one very quickly. I can do it more directly and do not need to think for a long time.”

“I used to feel that a little piece of information was missing [when listening to others]...just like playing jigsaw; I sometimes missed one piece, so I did not quite understand what it meant. Now I feel ‘oh, oh, oh, I see’... My listening and reading comprehension is improving.”

“I can talk more about art work in art class. I used to be quiet but now I start to express my views and apply the thinking skills to justify and evaluate the imposition of values on a piece of artwork, including mine and others' work.”

5. Learning

It was also very surprising that a quarter of students perceived that the HOT approach had influenced their learning styles. They were more aware of the autonomous learning and gained the courage to chat in English online. They felt this was due to the intervention. Sample comments include:

“The aim for me to learn English used to be passing exams. I was interested in learning English, but I would not study if there was no exam. Now I become more like an autonomous learner. I sometimes read English articles and advertisements which I would not do before.”

“I met a foreign net pal recently. I didn't dare to talk to foreigners before because I did not know what to say and how to say it in English. This time I did it on purpose in order to give myself a chance to use English.”

VI. DISCUSSION

A. Practicability

The practicability of introducing higher-order thinking skills into an L2 classroom mainly depends on students' perceived importance of thinking in L2 learning and attitudes towards the thinking tasks. The results reveal that students considered both higher-order and lower-order thinking important in L2 learning and they hold positive attitudes towards the HOT approach, indicating that students are able to adapt to high cognitive training in the L2 classroom. This finding is in contrast to the results of Tan (2007) who investigated students' attitudes towards higher-order questions in a teacher-led setting and encountered student resistance to higher-order questions. The present study found that students came to like the approach adopted in the current study, participated fully, and articulated their thoughts increasingly in English over time, as shown in the interview data. This positive attitude may be explained by student perceptions of an improvement in their own L2 speaking and thinking performance, as well as in that of other group members. A further explanation is the fact that in small group discussions pressure and anxiety can be alleviated, so students feel more at ease and confident to speak and conduct deeper thinking (Tsui, 1996).

The HOT approach however was not universally popular. The interview data revealed that one-quarter of the students resisted this approach and preferred the teaching method which was similar to grammar-translation. This resistance can

be explained by the following reasons. Firstly, the HOT approach is cognitively challenging and requires more effort. Secondly, students may not benefit or learn more than using the old methods; it could be that their learning styles enable them to benefit more from the more didactic teaching approach similar to grammar-translation (Coffield et al., 2004). A third reason is that the 12-week intervention was not long enough for these students to adapt to or fully benefit from it, which could be corroborated by the work of Eisenman and Payne (1997).

The problem of a negative attitude could be solved by two means. One is to include other types of thinking tasks, such as problem solving tasks so as to increase the variety and the likelihood of a match with students' preferences. The other possible solution could be offering a mixture of pedagogies. It can be argued that there is no 'one size fits all' pedagogy. As Nakatani (2005) stresses, training does not always improve learning for all students. Thus, to meet the demand of different learning styles, applying different types of pedagogy can be considered.

B. *The Importance of Higher-order Thinking*

It should be noted that it is through the use of high cognitive thinking more learning opportunities occur. In L2 learning, some commentators argue that lower-order thinking skills are the fundamental skills required. For example, Ding (2007) explored the learning strategies used in L2 learning by successful learners and found that memorization and imitation were the fundamental skills used for acquiring linguistic competence. Learners, according to Bloom (1956), need to use lower-order thinking skills to recall from their memory and to activate their schemata, so high cognitive skills can be operated. However, lower-order thinking does not facilitate creating more learning opportunities. Lower-order thinking can be seen to be a prerequisite for activating higher-order thinking. Overall, it is higher-order thinking that provides L2 learners with more language learning opportunities, leading to better student learning.

C. *Transfer*

The authentic scenarios created by thinking tasks impacts on L2 transfer. Students claimed that they were able to apply the target language learned to other fields like online communication. James (2006) states that the notion of *authenticity* is fundamental in learning transfer. When it matches with instructional materials and tasks in L2 classrooms, then students are more likely to see the relationship with the world outside the classroom and this may stimulate learning transfer. This finding supports Jones et al.'s (1987) proposition that a pedagogy mixing thinking skills and language learning promotes language transfer. This evidence suggests that L2 transfer could occur through the use of the HOT approach. However, the validity of this finding needs to be considered due to the limited number of cases reported. Overall, this finding indicates that the thinking approach may provide a greater possibility for L2 transfer, but further research is essential to explore the generalizability of this phenomenon.

The learning of higher-order thinking in the L2 also impacts on the transfer of thinking skills. Some students claimed that they could apply higher-order thinking skills learned to other subjects and online communication. For instance, they were able to critically comment on the art work presented in art class which they had rarely done before and elaborate their thoughts more logically with reasons in online chatting. Though the reported cases are limited, this finding is encouraging because it indicates that the teaching of a HOT approach facilitates the transfer of higher-order thinking skills. To the author's knowledge, the empirical research has not reported the transfer of thinking skills through thinking activities. Future research can focus on the extent to which thinking skills can be transferred to other subjects.

D. *Learning Behavior*

Evidence from the interview data reveal that students' disposition towards risk taking was developed. The thinking tasks were designed to require students to articulate their own thoughts and reach a consensus. When the desire to express thoughts occurs, it stimulates students to speak. In the present study students overcame a psychological barrier in terms of speaking in the target language and intellectual barriers when they started to think out loud and take on board the challenge involved. The change in observed behavior, breaking through these barriers, as found Shahini and Riazi (2011), enhanced risk taking. Arguably, the environment created by the use of group work produced less anxiety and facilitated this action. The participants in the current study claimed that at the beginning of the intervention they were afraid of making mistakes and did not have the confidence to speak. The finding of the present study supports Chen's (2002) study, which observed that Taiwanese students feel great stress when faced with oral activities in L2 classrooms. It is through the HOT approach training and the nature of thinking tasks they started to give it a try. This can be seen as a milestone in the learning process of L2 speaking. This result implies that the thinking approach encourages students to change, take risks and step into the real realm of L2 speaking, even though the utterances produced may be segmented and lack fluency.

The finding obtained from the interview data further showed there was an additional impact on students with low listening comprehension. A couple of students reported that they were not able to understand the questions or to follow the group discussion. As Godfrey (2001) found, students' English proficiency can hinder students from participating fully and also limit the degree to which they benefit from higher-order questions. This appears to be the case here. Therefore, any teacher considering a HOT approach needs to take this issue into account. This problem might be solved by employing questioning strategies, such as rephrasing, simplification, repetition and decomposition (Wu, 1993), both by the teacher or students. With further explanation, these students will still have the chance to voice their opinions.

The findings also show that students became autonomous learners in which they would proactively read English

articles and chat with online English speaking communities, which they rarely did before. The result of the present study supports Wenden's (1991) statement that thinking skills can be seen as a learning strategy and that such strategies fosters learner autonomy. This can be explained by a reduction in student anxiety levels when speaking English and a gain in the willingness to take risks. This finding also supports Zhou's (2016) study which investigated the roles of social anxiety, autonomy, and learning orientation in L2 learning, and found that students who experienced social anxiety in language learning were less autonomous; that is, students with less anxiety can be more autonomous.

VII. CONCLUSION AND RECOMMENDATIONS

The present study found that the majority of students hold positive attitudes towards the HOT approach and the importance of using higher-order thinking in L2 learning and perceived an improvement in their L2 speaking, thinking performance and their learning behavior. This study has indicated that incorporating the use of higher-order questions and a variety of thinking tasks offers a greater opportunity for students to adapt to the thinking approach and the hard work associated with it. This study provides some recommendations for teachers who intend to encourage the development of higher-order thinking in their students through a use of the HOT approach in the L2 classroom. First, some essential strategies (e.g., communication strategies and probing) to facilitate provoking higher-order thinking need to be applied while implementing the thinking tasks, and the means to manipulate these strategies can be found in Author's (2016) framework for incorporating thinking skills into L2 teaching. Second, teachers can use a variety of thinking tasks to encourage higher-order thinking, so students will not feel fatigue and therefore a negative attitude. Third, a mixture of pedagogies can better meet the demands of different learning styles. Fourth, when designing instruction material to promote the transfer of learning, some techniques for maximizing the potential of teaching for transfer in general education (James, 2006) could be applied. Last, instruction in appropriate questioning strategies (Wu, 1993) is necessary to facilitate a comprehension of higher-order questions. Finally, further research is essential within the L2 context to explore the extent to which language and thinking skills can be transferred through a use of thinking tasks.

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APPENDIX A. AN EXAMPLE OF A HOT LESSON PLAN

<p>I. Objective: At the end of the lesson, the students should be able to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> evaluate the best traveling package for freshmen; <input type="checkbox"/> take other's opinions into account; <input type="checkbox"/> reason with examples and evidence; <input type="checkbox"/> conduct higher-order thinking including evaluation, analysis, and synthesis.
<p>II. Thinking task: Travel packages. Students are required to assess the six travel packages and choose the best one for them to explore life and culture abroad. The six travel packages include building homes for street children in Peru, Hiking in Himalayas, learning to surf, community work with children in Kenya, wild animal safari in South Africa, and sightseeing in Europe.</p> <p>Material: Thinking task handouts and ppt.</p> <p>Values: Develop higher-order thinking; develop the ability to assess the best travel package for students to explore other cultures, taking factors like the value of the travel package, budget, and enjoyment into account.</p> <p>Means: Teacher modeling & group discussion</p>
<p>III. Procedure</p> <p>A. Teacher modeling (15 min)</p> <p>Aiming to activate students' schemata, and demonstrating how to respond to higher-order questions, communication strategies and language use. The teacher asks questions related to traveling as follows:</p> <p>"Do you like traveling?", "Have you been abroad?", "Do you like to experience lifestyle of different culture?", "What do you expect to see or to learn while travelling abroad?", "Do you like to help others? Why or why not?", "Would you spend your holidays building homes for street children?", "After studying for a semester, do you thinking it is a good idea to spend your holidays helping others?"</p> <p>The teacher can choose one student to answer the question and make comments on the response by saying, "I agree/disagree with you because...", or "That's a good idea, but I would..." Then the teacher invites other students to comment on the thoughts expressed to foster interaction among students. At this stage it is important to provide sufficient wait-time for students to come up with an answer. Also, the teacher can demonstrate communication skills like asking for clarification by saying "Could you please say that again?", "Do you mean...?", "Could you please explain what is meant by...?", etc.</p> <p>B. Thinking-task group discussion (30 min)</p> <p>The teacher gives students thinking task handouts and explains what students need to do.</p> <p>C. Wrap up (5 min)</p> <p>Have each group present their answers. Then the teacher invites the class to comment on the answers.</p>
<p>IV. Assignment</p> <p>Writing</p> <p>Students write down the best travel package for them with reasons provided. Also, they need to justify why the other travel packages are less suitable for them.</p>

APPENDIX B. AN EXAMPLE OF A THINKING TASK

Topic: What do you consider the best travel package to explore other cultures? Task Type: 5Ws

Higher-order thinking: Evaluation, analysis Task: Select the best travel package to explore other cultures. You are required to elaborate the best travel package you consider and then persuade others of your opinions with reasons, evidence and examples, reaching a group consensus.

Travel package 1: Build homes for street children in Peru



Who can volunteer? If you are 18 or over, you can be involved in this exciting project. Length: 17 days. Fee: NT\$55,800. Activity: 1. Spend two weeks to build homes for children there. 2. Spend 3 days to visit Machu Picchu.

Travel package 2: Hiking in Himalayas



This trip is physically demanding. Location: India Length: 12 days Fee: NT\$39,800 Activity: Hiking in Himalayas for 7 days, see magnificent rivers and mountain range Accom.: Wild camping x 7 nights, Hotel x 2 nights, night train x 2 nights

Travel package 3: Learning to surf



Location: Golden Coast in Australia. Length: 7 days. Fee: NT\$68,200 Activity: 1. Learn to ride a wave within a day. 2. Surf instructors will progress you through the basics of standing up, paddling, wave selection and ocean knowledge. You learn to turn and take the drop. Accom.: Cabin x 5 nights, Camping x 1 night

Travel package 4: Community work with children in Kenya



You can learn the different culture. Length: 2 weeks. Fee: NT\$34,000 Activity: 1. Help those children with AIDS virus in Kenya. 2. You can provide some basic skills and companionship, e.g. cooking meals, teaching English, art work, playing sports.

Travel package 5: Wild animal safari in South Africa



Length: 7 days Fee: NT\$52,100 Activity: Riding in a jeep to see wild animals and experience the nature. Accom.: Wild camping x 4 nights (no water for shower), Safari Lodge x 2 nights

Travel package 6: Sightseeing in Europe



Length: 15 days Fee: NT\$133,800 Accom.: 4 star hotels x 13 nights. Activity: bicycle-riding in Holland, cruising on River Rhine, visiting castles, German beer tasting, Opera night in Vienna, Jungfrau (mountain), the beach in Nice, shopping in Paris

APPENDIX C. QUESTIONNAIRE ITEMS

1. It is important to memorize what I have learned in English class.
2. It is important to recite English passages to practise English.
3. It is important to be able to recall what I have learned in English class.
4. It is important to understand the learning materials in English class.
5. Being able to summarize what we have read or listened to is important in English class.
6. Being able to retell what we have read or listened to is important in English class.
7. It is important to apply what we have learned in English class, e.g. to use the reading strategies learned in class to read English newspaper after class.
8. Being able to think what I would do as a character in a novel is important in English class.
9. It is important to be able to think 'alternative ways' to explain when people do not understand me in English class.
10. It is important to be able to give reasons in English class, e.g. to justify a decision I have made.
11. It is important to use comparison and contrast skills in English class, e.g. to tell similarities and differences of the two characters in a novel.

12. It is important to be able to analyse articles in English class, e.g. to analyse the strengths and weaknesses of a plan.
13. Being able to solve problems is important in English class, e.g. to think about a solution to save money.
14. Creativity is important in English class, e.g. to make a new ending for a story.
15. It is important to be able to design things in English class, e.g. to design an itinerary for a two-week holiday.
16. Being able to assess is important in English class, e.g. to assess which travelling package is better for students and provide reasons and evidence.
17. It is important to be able to make a good argument supported with reasons or evidence in English class, e.g. to argue for not having dress code on campus and provide with reasons or evidence.
18. It is important to be able to make judgment based on evidence or reasons in English class, e.g. to show my position, agree or disagree, and give reasons or evidence.

REFERENCES

- [1] Alcón, E. G. (1993). High cognitive question in NNS group classroom discussion: Do they facilitate comprehension & production of the foreign language? *RELC Journal*, 24, 73-85.
- [2] Atkinson, D. (1997). A critical approach to critical thinking in TESOL. *TESOL Quarterly*, 31, 71-94.
- [3] Au, K. (2006). Multicultural issues and literacy achievement. Mahwah, NJ: Erlbaum.
- [4] Bloom, B. S. (Ed.) (1956). Taxonomy of educational objectives: The classification of educational goals, handbook I: cognitive domain. New York, NY: Longman.
- [5] Brown, J. D. (1989). Language program evaluation: a synthesis of existing possibilities. In K. Johnson (ed.). *The second language curriculum*. Cambridge, England: Cambridge University, 222-241.
- [6] Butterworth, M., & O'Connor, M. (2005). Thinking through English. Cambridge, England: Chris Kington.
- [7] Chen, M. (2015). Fostering L2 speaking and thinking through a HOT approach. *Curriculum & Instruction Quarterly*, 18 (4), 193-225.
- [8] Chen, M. (2016). Theoretical framework for integrating higher-order thinking into L2 speaking. *Theory and Practice in Language Studies*, 6 (2), 217-226.
- [9] Chen, Y. (2002). The relationship between anxiety and English proficiency of EFL learners in Taiwan (Master's Thesis). National Kaohsiung First University of Science and Technology.
- [10] Coffield, F., Moseley, D., Hall, E., & Ecclestone, K. (2004). Should we be using learning styles? what research has to say to practice. London, Learning and skills research centre, Learning and Skills Development Agency.
- [11] Coyle, D. (2002). Towards a reconceptualisation of the MFL curriculum. In A. Swarbrick (ed.). *Teaching modern foreign languages in secondary schools: a reader*. London, England: Routledge, 156-172.
- [12] Ding, Y. (2007). Text memorization and imitation: the practices of successful Chinese learners of English. *System*, 35, 271-280.
- [13] Dörnyei, Z., & Kormos, J. (2000). The role of individual and social variables in oral task performance. *Language Teaching Research*, 4, 275-300.
- [14] Eisenman, G., & Payne, B. D. (1997). Effects of the higher order thinking skills program on at-risk young adolescents' self-concept, reading achievement, and thinking skills. *Research in middle level education quarterly*, 20 (3), 1-25.
- [15] Fisher, R. (1998). Teaching thinking: philosophical enquiry in the classroom. London, England: Cassell.
- [16] Fushino, K. (2010). Causal Relationships Between Communication Confidence, Beliefs About Group Work, and Willingness to Communicate in Foreign Language Group Work. *TESOL Quarterly*, 44, 700-724.
- [17] Godfrey, K. A. (2001). Teacher questioning techniques, student responses and critical thinking (Master's Thesis). Retrieved November 25, 2008, from http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/19/8d/27.pdf.
- [18] Halx, M. D., & Reybold, L. E. (2006). A pedagogy of force: Faculty perspectives of critical thinking capacity in undergraduate students. *The Journal of General Education*, 54, 293-315.
- [19] James, M. A. (2006). Teaching for transfer in ELT. *ELT journal*, 60 (2), 151-159.
- [20] Jones, B. F., Palincsar, A. S., Ogle, D. S., & Carr, E. G. (Eds.) (1987). *Strategic teaching and learning: cognitive instruction in the content areas*. Alexandria, VA: Association for supervision and curriculum development.
- [21] Leat, D. (1998). Thinking through geography. Cambridge, England: Chris Kington.
- [22] Li, L. (2011). Obstacles and opportunities for developing thinking through interaction in language classrooms. *Thinking Skills and Creativity*, 6(3), 146-158.
- [23] Li, L. (2016). Integrating thinking skills in foreign language learning: What can we learn from teachers' perspectives?, *Thinking Skills and Creativity*, 22, 273-288.
- [24] Liao, M. (2008). Comparison of English culture apprehension and oral English apprehension in English counseling for English majors and non-English majors. (Master's Thesis). National Kaohsiung Normal University.
- [25] Lipman, M. (2003). Think in education (2nd ed.). Cambridge, England: Cambridge University Press.
- [26] Liu, G. (2005). The trend and challenge for teaching EFL at Taiwanese universities. *RELC journal*, 36 (2), 211-221.
- [27] Long, M. H. (1996). The role of the linguistic environment in second language acquisition. In W. C. Ritchie & T. K. Bhatia (eds). *Handbook of second language acquisition*. New York, NY: Academic, 413-468.
- [28] Mehta, S., & Al-Mahrooqi, R. (2015). Can thinking be taught? Linking critical thinking and writing in an EFL context. *RELC Journal*, 46(1), 23-36.
- [29] Merriam, S. B. (2009). Qualitative research: A guide to design and implementation. San Francisco, CA: Jossey-Bass.
- [30] Ministry of Education. (2008). The project on excellence in instruction. Retrieved April 20, 2009, from <http://www.edu.tw/files/list/B0039>.
- [31] Morgan, N., & Saxton, J. (1994). Asking better questions: models, techniques and classroom activities for engaging students in

learning. Markham, Ont.: Pembroke.

- [32] Mugny, G., & Doise, W. (1978). Socio-cognitive conflict and the structure of individual and collective performances. *European Journal of Social Psychology*, 8, 181-192. doi: 10.1002/ejsp.2420080204.
- [33] Nakatani, Y. (2005). The effects of awareness-raising training on oral communication strategy use. *The modern language journal*, 89 (1), 76-91.
- [34] Nunan, D. (2003). The impact of English as a global language on educational policies and practices in the Asia-Pacific region. *TESOL quarterly*, 37(4), 589-613.
- [35] Shahini, G., & Riazi, A. M. (2011). A PBLT approach to teaching ESL speaking writing, and thinking skills. *ELT Journal*, 65(2), 170–179.
- [36] Swain, M. (2000). The output hypothesis and beyond: Mediating acquisition through collaborative dialogue. In J. Lantolf (Ed.), *Sociocultural theory and second language learning* (pp.97-114). Oxford, England: Oxford University Press.
- [37] Tan, Z. (2007). Questioning in Chinese university EL classrooms: What lies beyond it? *RELC Journal*, 38, 87-103.
- [38] Tobin, K. (1987). The role of wait-time in higher cognitive level learning. *Review of Educational Research*, 57, 69-95.
- [39] Tsui, A. (1996). Reticence and anxiety in second language learning. In K. Bailey & D. Nunan (eds). *Voices from the language classroom: qualitative research in second language education*. Cambridge, England: Cambridge University Press, 145-167.
- [40] Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- [41] Watson, J. (2000). Constructive instruction and learning difficulties. *Support for learning*, 15 (3), 135-141.
- [42] Watson, J. (2001). Social constructivism in the classroom. *Support for learning*, 16 (3), 140-147.
- [43] Wenden, A. (1991). *Learner strategies for learner autonomy*. London, England: Prentice-Hall International.
- [44] World Bank. (2011). *Learning for All: Investing in people's knowledge and skills to promote development*. Education sector strategy 2020. Washington, DC: TheWorld Bank. Retrieved March 23, 2013, from [http://siteresources.worldbank.org/EDUCATION/Resources/ESSU/Education Strategy 4 12 2011.pdf](http://siteresources.worldbank.org/EDUCATION/Resources/ESSU/Education+Strategy+4+12+2011.pdf).
- [45] Wu, K. (1993). Classroom interaction and teacher questions revisited. *RELC Journal*, 24(2), 49-68.
- [46] Yang, Y. T., & Gamble, J. (2013). Effective and practical critical thinking-enhanced EFL instruction. *ELT Journal*, 67, 398-412.
- [47] Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.). Thousand Oaks, CA: Sage.
- [48] Zhang, J., Anderson, R. C., & Nguyen-Jahiel, K. (2013). Language-rich discussions for English language learners. *International Journal of Educational Research*, 58, 44-60.
- [49] Zhou, M. (2016). The roles of social anxiety, autonomy, and learning orientation in second language learning: A structural equation modeling analysis. *System*, 63, 89-100.

Mei-Hui Chen is an assistant professor at Shih Chien University Kaohsiung Campus. She received her Ph.D in Education and Applied Linguistics At Newcastle University, UK. Her Ph.D thesis, *Infusing Thinking Skills into an L2 Classroom: a case study of an innovation in a Taiwanese university*, was shortlisted for Christopher Brumfit PhD Thesis Award in 2013. This award is sponsored by Cambridge University Press, UK, and promoted by Language Teaching. Her specialty is TEFL Methodology, infusing higher-order thinking into L2 classroom, and higher-order thinking activity design.