Learners’ Beliefs About The Effectiveness of Learning English Online and Their Use of Strategies: Do College Majors Matter?

Chou, Yu-Chen
Department of Foreign Languages and Literature Feng Chia University

Abstract

The study aims to explore the relationship between learners’ beliefs about the effectiveness of learning English online and their use of strategies. It is motivated by two facets. First, learners’ beliefs are conceptions of learning that learners hold and bring to the learning task (Benson & Lor, 1999) and learning strategies contribute to the development of the language system and affect learning directly (Rubin, 1987). Therefore, study of strategy use as an important mental or behavioral operation and learners’ beliefs as a determining factor influencing learning might shed light on understanding how learners’ beliefs relate to the skills they develop in learning languages. Second, online learning has been applied broadly as part of curriculum in learning English due to a very high rate of internet access, and the features of sheer flexibility, such as the repetitive practice, and time and geographical convenience.

The participants are 351 freshman students from a university in central Taiwan. A set of questionnaires including—Strategies Used in Online Learning and Beliefs about Online Learning—is adopted.
The results have shown that the participants use compensation strategies (Mean 3.22) most frequently, followed by cognitive strategies (Mean 3.11); the least used strategies fall into the categories of social (Mean 2.84), and affective strategies (Mean 2.79). Non-English majors use compensation strategies most, while English majors prefer metacognitive, cognitive and compensation strategies.

Correlation coefficient analysis indicates a fairly strong relationship between different strategy categories and belief types among all the participants. Interestingly, for English majors, there are no significant correlations between compensation strategies and all belief types as well as the entire belief questionnaire. Finally, English majors significantly use more strategies in the six categories than non-English majors, except that there is no difference between English majors and engineering majors in using compensation strategies.

Keywords: learners’ beliefs about the effectiveness of learning English online, online English learning strategies, English learning strategies
學習者對於英語線上學習效率之信念與學習策略運用：學生之主修科系具關聯性嗎？

周玉楨
逢甲大學外文系

摘要

本研究旨在探討英語學習者對於英語線上學習效率之信念與學習策略運用的關聯性。研究動機基於兩個面向：第一、信念為學習者持有之概念，學習策略則對語言系統建構具直接的貢獻性；第二、英語線上學習，因其極具靈活性，可反覆練習且不受時間地點限制，已廣泛被運用於教學課程。本研究以問卷為施測工具，受測者為351名台灣中部大學之大一學生。

研究結果顯示：最常被使用的策略為補償性策略（Mean 3.22），其次為認知策略（Mean 3.11）；最低頻率使用的策略為情感策略（Mean 2.79），其次為社交策略（Mean 2.84）。外文系學生最常使用後設認知策略、認知策略及補償性策略。學習者對於英語線上學習效率之信念與學習策略運用，二者具顯著正相關性。然而，外文系學生的英語線上學習效率之信念（三大信念類別與整體信念）與補償性策略，均未存在顯著相關性。此外，外文系學生運用六大學習策略顯著高於非外文系學生；但對於補償性策略之應用，外文系學生與工學院學生二者間並未存有顯著差異性。

關鍵字：英語線上學習效率之信念、英語線上學習策略、英語學習策略
INTRODUCTION

The study of learners’ factors has been attracting considerable research attention, due to the fact that paradigms of research on language teaching and learning tend to incline its focus on language learners themselves. Learners’ factors definitely have played significantly determining roles in the language learning process (Breen, 2001; Bernat & Gvozdenko, 2005). Evidence can be found in a considerable amount of research, indicating that learners’ affective variables, such as the use of language learning strategies, and learners’ motivation, beliefs, learning styles, expectations, anxiety, and attitudes, are crucial to influence language learning (Ellis, 1985; McLaughlin, 1987; Rubin, 1987; Shehan, 1989; O’Malley & Chamot, 1990; Oxford, 1990; Gardner & McIntryre, 1993; Oxford & Ehrman, 1995; Horwitz, 1985, 1987 & 1988). Therefore, due to the growing importance of learners’ factors, there is a strong demand for extensive research to investigate learners’ factors on specific groups of learners as well as different learning contexts.

However, for some decades, studies on investigating learners’ factors have mainly focused on the hardcopy context exclusively. Although there is a growing research interest in the online learning context, e.g., Anderson (2003), Rami et al. (2011), and Chou (2012), empirical research in this area has still been scarce. Research attention to explore learners’ factors and the interactions between or among these factors in the online learning context still remains rather insufficient. Among those learners’ factors, strategy use as an important mental operation and learners’ beliefs as a determining issue affecting the learning process are two prominent areas that might shed light on understanding how learners’ beliefs relate to the skills they develop in learning a foreign or second language.

In the current study, the research assumption denotes that learners are highly influenced by their beliefs, which in turn impact the ways they monitor their learning, the kinds of decision they make, and most importantly, the strategies they apply in learning languages. Since
language learning strategies “contribute to the development of the language system which the learner constructs and affect learning directly” (Rubin, 1987, p. 23); they are “steps taken by the learner to facilitate the acquisition, storage, retrieval, or use of information” (Oxford & Crookall, 1989, p. 404), and “beliefs are predispositions to action” (Rokeach, 1968, p. 113), the language learning process might be triggered and maintained by such “predispositions” and “steps.”

As there has been insufficient investigating research into the beliefs of learners and their use of strategies in the online learning context, the current study is motivated by the fact that online learning has been applied broadly as part of curriculum in learning languages in the last decade. Informally, from teachers’ practical experience, online learning either functioning as a core learning activity or a supplementary activity is adopted in almost all English classes. Especially, along with a very high rate of internet access, and the features of sheer flexibility, such as the repetitive practice, and time and geographical convenience, online learning has become more prominent in language learning. Therefore, much more research emphasis should be laid on this attractive learning medium in order to strengthen or maximize the impact of the empirical research findings in language learning and teaching.

Based on the concerns above, the current study aims to explore the relationship between learners’ beliefs about the effectiveness of learning English online and their use of strategies among college freshman students. Based on learners’ specialty, particular emphasis is placed on exploring the differences between English majors and Non-English majors. English majors serve as the comparative group since they are typically classified as learners with a high willingness to learn English. Ultimately, the current study aims to contribute to providing implications in the areas of English teaching and learning, and to either building a new framework or constructing related theories for this domain. A series of research questions are formed as follows.

1. What is the construct of learners’ beliefs about the effectiveness of learning English online?
2. What is the construct of learners’ strategy use in learning English online?

3. What are the relationships between learners’ beliefs about the effectiveness of learning English online and their use of strategies?

4. Is the independent variable—the learners’ major—a significant factor in both learners’ beliefs and strategy use in learning English online?

1. Definition and the Nature of Learners’ Beliefs

Language learners usually hold a variety of beliefs, and a complex set of attitudes and expectations toward language learning when they process the learning task (Nyikos & Oxford, 1993; Ellis, 1994). In particular, learners’ belief systems have a significant impact on their perceptions and judgments that in turn affect their learning behaviors (Horwitz, 1999). Hosenfeld (1978) defines learners’ beliefs as “mini theories” of language learning. Being influenced by their own mini theories, learners form the way they process language learning and facilitate the learning process to reach ultimate success. For Benson and Lor (1999), beliefs are “conceptions of learning” that learners hold and bring to the learning task. Victori and Lockhart (1995) postulate that beliefs are “general assumptions that students hold about themselves as learners, about factors influencing language learning, and about the nature of language learning and teaching” (p. 224).

Since beliefs are “psychologically held understandings, premises, or propositions about the world that are felt to be true” (Richardson, 1996, p. 103), learners’ beliefs are, therefore, closely related to their values, attitudes toward learning, and conceptions of learners’ roles in the learning process. The information and knowledge about learners’ belief systems are extremely important in terms of improving both learning effectiveness and autonomy.

2. Studies on Language Learners’ Beliefs
In the area of examining learners’ beliefs about language learning, the Beliefs About Language Learning Inventory (BALLI) created by Horwitz (1985, 1987, 1988 & 1999) has been widely employed as the instrument to assess learners’ belief construct in different research contexts, such as Horwitz (1987) in an ESL context in the US, Park (1997) in the Korean context, Yang (1999) in the Taiwanese context, Nikitina and Furuoka (2006) in the Malaysian context, Polat (2009) in the Georgian context. Originally, the BALLI items are divided into five categories: foreign language aptitude, the difficulty of language learning, the nature of language learning, learning and communication strategies, and motivation and expectations. Nikitina and Furuoka (2006) further examined the validity of the BALLI by employing inferential statistical and factor analysis. As a result, four factors—motivation, aptitude, strategy and ease of learning—were extracted, surely approving the validity of the BALLI. Although learners’ beliefs have been recognized as a contributory factor in the learning process, they are context-specific and learners from different cultural backgrounds may have different focuses. Therefore, among the tremendous studies employing the BALLI, due to the nature of the learners’ beliefs mentioned above, no congruent results have been obtained so far.

From a broad review of BALLI studies, Horwitz (1999) analyzed seven representative studies which were conducted based on a variety of learning contexts, and tried to identify similarities and differences across cultural groups. Although there were no “clear-cut” cultural differences among the participants from different cultural backgrounds, she concluded that beliefs may vary based on age, stage of learning, and professional status. Learning circumstances may contribute the differences than culture.

Instead of employing quantitative methods, Abraham and Vann (1987) conducted a case study of two learners to investigate whether beliefs affect learning outcomes. Evidence has shown that the learner who held broad beliefs, such as the importance of paying conscious attention to grammar, and persevering in communicating or understanding an idea, earned a better TOEFL score than the one who
showed a strong dislike of metalanguage, and preferred to abandon or change topics in some situations. Interestingly, at the end of the course, the latter learner performed better on a test of spoken English. The results suggest that different beliefs might result in different kinds of success in learning languages.

3. Defining and Categorizing Language Learning Strategies

Some researchers have recognized the importance of learning strategies in understanding learning processes and included strategies as an essential component in the learning models they developed (e.g., Stern, 1975; Ellis, 1985; McLaughlin, 1987; Rubin, 1987; Shehan, 1989; O’Malley & Chamot, 1990; Oxford, 1990; Gardner & McIntryre, 1993; Oxford & Ehrman, 1995). For example, Tarone (1980) and McLaughlin (1987) distinguish the value of strategies. In their second language acquisition models, language learning strategies, along with production strategies, and communication strategies are included. In Stern’s (1983) model of second language learning, he identifies five categories of variables: social context, learner characteristics, learning conditions, learning process, and learning outcome, in which learning strategies share the importance with other components involved. Stern (1983), therefore, identifies these language learning strategies as important operations in the learning process.

The earlier definitions of the purpose of learning strategies emphasized the practical function of improving language competence or facilitating language learning. For Bialystok (1978), language learning strategies are defined as “optional means for exploiting available information to improve competence in a second language” (p. 71). Chamot (1987) also viewed learning strategies as “techniques, approaches, or deliberate actions that students take in order to facilitate the learning and recall of both linguistic and content area information” (p. 71).

Later, some researchers expanded the definitions to an affective purpose. Oxford (1990) defines strategies as “specific actions taken by the learner to make learning easier, faster, more enjoyable, more self-
directed, more effective, and more transferable to new situations” (p. 8). MacIntyre (1994) also emphasizes the pleasure of learning and claims that “language learning strategies are the techniques and tricks that learners use to make the language easier to master” (p.185). Thus, based on this trend, Tamada (1997) comments that the purpose of language learning strategies “has changed from becoming good or successful learners who speak a second language fluently, to becoming intelligent learners who know very well about how to learn a second language more successfully” (p. 4).

Among these definitions, strategies can be viewed as either mental or behavioral activities. Stern (1983) and Oxford (1990) are likely to regard strategies as essentially behavioral. Stern (1983) postulates that “strategy is best reserved for general tendencies or overall characteristics of the approach employed by the learners, leaving techniques as the term to refer to particular forms of observable learning behavior” (p. 405). On the other hand, O’Malley and Chamot (1990), and Ellis (1994) consider strategies as both behavioral and mental. O’Malley & Chamot (1990) claim that strategies are “the special thoughts or behaviors that individuals use to help them comprehend, learn, or retain new information” (p. 1). Ellis (1994) also conceives strategies “mental or behavioral activity related to some specific stage in the overall process of language acquisition or language use” (p. 529).

Although there is little consensus on the definition of learning strategies, Wenden (1987) synthesizes learning strategies as “techniques, tactics, potentially conscious plans, consciously employed operations, learning skills, basic skills, functional skills, cognitive abilities, language processing strategies, problem-solving procedures” (p.7), as well as mental processes, and both observable and unobservable behaviors (Ellis, 1994). Each researcher has chosen one specific concept to focus on.

As to categorizing learning strategies, by mainly focusing on the cognitive domain, Rubin (1981) postulates that “cognitive strategies are the specific actions which contribute directly to the learning process” (p. 118). He observed adult second language learners and proposed six
categories of strategies: clarification or verification, monitoring, memorization, guessing or inductive inferencing, deductive reasoning, and practice. An issue raised in this early work is that some categories of strategies with the same outcome are identified under different categories by researchers. The type of participants under investigation, research settings, and the particular interests of the researchers are the factors influencing the decisions (Ellis, 1994). For example, Ellis (1994) argues that different categories, such as Naiman’s et al. (1978) “active task approach” strategies, Rubin’s (1981) “clarification or verification” strategy, and Wong-Fillmore’s (1976) “get some expression” and “make the most of what you have got” all share the same properties. These strategies refer to learners’ capacity to affect the learning situation, including asking for an example of how to use a word in a sentence, repeating words to confirm understanding, checking vocabulary in a dictionary, and using a different expression to check understanding.

Later in the 90s, some researchers developed broad and comprehensive categories of learning strategies. Considering the study of learning strategies in Anderson’s (1983) Adaptive Control of Thought (ACT) model which is framed by the cognitive stage, the associative stage, and the autonomous, O’Malley and Chamot (1990) claim that strategy use occurs in all three stages of development. O’Malley and Chamot (1990), focusing on the benefits of applying cognitive theory to strategies, identify three major categories: 1) Metacognitive strategies, such as selective attention, planning, monitoring, and evaluation, 2) Cognitive strategies, such as rehearsal, organization, inferencing, summarizing, deducing, imagery, transfer, and elaboration, and 3) Social/affective strategies, such as co-operation, questioning for clarification, and self-talk (pp. 44-45).

Building on the previous framework, Oxford (1990) presents a new taxonomy that might be the most comprehensive classification of learning strategies to date (Ellis, 1994). She distinguishes direct and indirect strategies. Under each, three subcategories are identified. Direct strategies include memory, cognitive, and compensation strategies. Memory strategies are techniques that help learners store and retrieve
new information. These strategies include skills such as using rhyming, creating mental linkage or grouping, and applying images to sounds. Cognitive strategies “operate directly on incoming information, manipulate it in ways that enhance learning” (O’Malley & Chamot, 1990, p. 44). Such strategies include reasoning, analyzing, summarizing, rehearsing, organizing and inferencing, as well as general practicing. Compensation strategies “enable learners to use the new language for either compensation or production despite limitations in knowledge” (Oxford, 1990, p. 47). Typical compensation strategies are guessing intelligently and overcoming limitations, such as selecting the topic, and using miming or gestures when the precise expressions are not known.

Indirect strategies refer to metacognitive, affective, and social strategies. Metacognitive strategies “make use of knowledge about cognitive processes and constitute an attempt to regulate language learning” (Ellis, 1995, p. 538). Such strategies involve paying attention, planning and monitoring the learning processes, evaluating one’s progress, searching for practice opportunities consciously and assessing how successful a particular strategy is. Affective strategies refer to emotions, attitudes, motivations, and values of language learning (Oxford, 1990). These strategies include using deep breathing to lower anxiety, using self-encouragement or self-rewards, and discussing feelings with someone else. Finally, social strategies refer to the ways in which learners cope with interacting with other learners or native speakers. These strategies include asking questions for clarification, cooperating with peers, and developing cultural understanding.

However, some arguments about present taxonomies still exist among researchers, although strategy classification has been made from limited lists to comprehensive and theoretically based taxonomies. For example, MacIntyre (1994) and LoCastro (1994) argue that memory and cognitive strategies in Oxford’s taxonomy are difficult to delineate. However, all efforts to classify learning strategies have contributed to providing an initial framework for further investigations into learning strategies.

4. Studies on Beliefs about Language Learning and Strategy Use
Bialystok (1981) found that Canadian secondary students learning French as a second language showed significantly varied degrees of beliefs about language learning involving formal or functional practice. The discrepancy of beliefs, as a result, affected their choice of strategies. Wenden (1987) also found that adult learners tended to adopt more cognitive strategies if they emphasized the importance of learning and considered beliefs relating to “learning about the language.” It is reasonable to infer that cognitive strategies benefit them to reason, analyze, and rehearse specific items of language. In addition, learners who emphasized the importance of using language and preferred “learning in a natural way” mainly adopted more communicative strategies.

Yang (1999) investigated the relationship between EFL learners’ beliefs and learning strategy use among Taiwanese college students and found that the learners’ self-efficacy beliefs about learning English were significantly related to their use of all types of learning strategies. In particular, functional practice strategies showed a strong bond to self-efficacy beliefs. Learners’ beliefs about the value and nature of learning spoken English appeared as a positive link to their use of formal oral practice strategies.

5. Studies on Strategy Use and Academic Majors

Learners’ academic majors as an independent variable in the study of learning strategies also catch some research attention. It is assumed that majors are related to learners’ specialty and job-oriented basis that might affect language learning motivation which is essentially one of the learners’ factors in second language acquisition.

Studies by researchers, such as Politzer and McGroarty (1985), Oxford and Nyikos (1989), and Chang (1990), have shown a general congruent result that majoring in academic subjects has a significant influence on employing learning strategies. In Politzer and McGroarty’s (1985) study, students majoring in humanities, social science, and education in particular used more learning strategies. Oxford and Nyikos (1989) also reported that students majoring in humanities, social science, and education used functional practice strategies more
frequently than those who majored in technical fields. Chang (1990) found that students with humanities, social science, or education majors employed overall learning strategies more frequently than those who majored in science. In the Thai context, Mullins (1992) indicated that the English majors in a university in Thailand used significantly more strategies than other groups; they used compensation, cognitive and metacognitive strategies at a high level as well as social, affective, and memory strategies at a medium level. This finding is supported by a comprehensive survey conducted by Chou (2002), showing that academic specialization had a strong effect on strategy use. English majors used significantly more strategies than those majoring in other subjects, such as nursing, industrial engineering, business and information management.

6. Studies on Strategy Use and Language Proficiency

First, various studies have investigated the relationship between strategy use and language proficiency. These studies adopting different ways for gauging language proficiency, such as proficiency and achievement tests (Green & Oxford, 1995; Chang, 1991; Bremner, 1999), entrance and placement exams (Mullin, 1992; Ku, 1995), and self-rating proficiency (Oxford & Nyikos, 1989; Wharton, 2000), all yield a consistent result in many studies, namely that the frequency and the number of strategies used are strongly related to language proficiency.

Green and Oxford (1995) investigated strategy use by 374 university students in Puerto Rico, and found that the more successful learners used about a third of the individual strategies on the SILL more frequently than less successful learners. Almost all of these strategies involved the active use of the target language, with a strong emphasis on practice in naturalistic situations. Focusing on 332 Korean university students, Park (1997) reported that a linear relationship existed between strategy use and language proficiency. Among the six categories of strategies, cognitive and social strategies were more predictive of the TOEFL scores than the other four categories.
By using self-reported proficiency data, Wharton (2000) found that college students in Singapore with higher self-rating proficiency used significantly more strategies. Self-reported proficiency data were also employed among 1,200 university students in the Midwestern US by Oxford and Nyikos (1989). They found that speaking, reading, and listening proficiency rates had significant effects on five factors of strategies (formal rule-related practice strategies; functional practice strategies; resourceful, independent strategies; general study strategies; and conversational input elicitation strategies), although each modality focused on a different combination of the above five factors.

Furthermore, in an ESL setting, Chang (1990) employed self-ratings of proficiency and an oral test (the Ilyin Oral Interview) to investigate strategy use by 50 Mainland Chinese and Taiwanese ESL students at the University of Georgia. No significant differences in the frequency of overall strategy use among students with different levels of English oral proficiency were found. However, the Chinese students in the higher proficiency group significantly used more social strategies than did those in the lower level. As for students’ perceived self-ratings, students who rated their language proficiency higher used more SILL strategies than students rating their language proficiency lower. The author speculated that the effect of self-rating proficiency on strategy use might be attributed to learners’ motivation.

A critical issue raised is that even learners with higher language proficiency tend to use more learning strategies than do lower proficiency learners, it is difficult to prove a direct causal relationship between strategy use and language proficiency. Even when the correlation is significant, it is still not clear to interpret whether strategy use is a contributor to successful learning or a reflection thereof. For example, the studies of strategies used by unsuccessful learners evoke a debate on causality. Vann and Abraham (1990) studied learning strategies employed by unsuccessful learners and found that unsuccessful learners used strategies generally in the same ways as did the successful learners. The differences only existed in the flexibility and appropriateness of using these strategies. The notion of strategy use
and proficiency as both causes and outcomes of each other remains a question to be studied.

However, some researchers (e.g., Skehan, 1989) suggest that it is not necessary to interpret the relationship between proficiency and strategy use as a causal relation. MacIntyre (1994) suggests that strategy use both results from and leads to increasing proficiency. The use of certain strategies leads to a higher level of proficiency; meanwhile an elevated level of proficiency causes the use of different strategies. Finally, Green and Oxford (1995) suggest “an ascending spiral” where the “active use of strategies helps students attain higher proficiency, which in turn makes it more likely that students will select this active use of strategies” (p. 288).

7. Studies on Online Learning Strategies

As to the online learning context, Anderson (2003) focused on investigating ESL and EFL learners’ online reading strategies, and found that problem solving strategies were used most frequently, and support reading strategies less frequently. There were no significant differences between the EFL and the ESL groups in using overall strategies, but the only differences appeared for the use of problem solving strategies, indicating that the EFL group used this strategy more significantly than did the ESL group.

Rami et al. (2011) designed a similar study to investigate 157 Malaysian adult ESL learners’ online reading strategies. The results of the study showed that the learners mostly used global reading strategies followed by problem solving strategies and support reading strategies. Learners used mainly global reading strategies due to their obtaining specific learning goals and purposes. However, they did not efficiently utilize online learning tools and features that were available in the Learning Management System.

In a comparison study of strategy use in the online and hard copy context, Chou (2012) investigated freshman students’ English learning strategies, focusing on exploring discrepancies between the online learning and hard copy context. The results have shown that the use of
all strategy categories in the hard copy context is higher than that in the online context. The participants on the higher proficiency level used compensation and metacognitive strategies more extensively than those on lower proficiency levels in both the online and the hard copy context. They also used more affective strategy in the online learning context. Female students were reported to adopt compensation strategies more significantly than male students did in online learning. In addition, in the hard copy context, females surpassed males by memory, cognitive, compensation, and metacognitive strategies.

In summary, the previous literature has contributed to the formation of strategy use and learners’ beliefs studies and serves as a fundamental research reference for the current study.

METHOD

1. Defining the Online Learning Context in the Current Study

   All participants in the current study are enrolled in a Freshman English program in which online learning is part of the compulsory curriculum yielding thirty percent of the final grade for each student. The materials of online software are identical to those of the textbooks, both focusing on listening, speaking and reading. Extra supplementary online learning materials covering vocabulary, grammar, reading, and listening comprehension are assigned by individual teachers. Since the online learning activities are mandatory in this program, each participant is assumed to have plenty of experience in learning English online, namely the participants are, to a certain degree, exposed to and familiar with the online learning context.

2. Participants

   The participants are 351 freshman students from a university in central Taiwan with a gender distribution of 68.4 percent male students and 31.6 percent female students. The participants are majoring in a wide range of subjects. Based on the homogeneous feature of their majors, the participants are in turn categorized into four groups: students from the school of engineering (41.9%), students from the
school of business (26.5%), students from the school of science (12.3%) and English majors (19.4%). Table 1 summarizes the participants’ demographic information.

<table>
<thead>
<tr>
<th>Gender/Major</th>
<th>Engineering</th>
<th>Business</th>
<th>Science</th>
<th>English</th>
<th>Total</th>
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<tbody>
<tr>
<td>Male</td>
<td>38.2% (134)</td>
<td>16.3% (57)</td>
<td>10.8% (38)</td>
<td>3.1% (11)</td>
<td>68.4% (240)</td>
</tr>
<tr>
<td>Female</td>
<td>3.7% (13)</td>
<td>10.2% (36)</td>
<td>1.4% (5)</td>
<td>16.3% (57)</td>
<td>31.6% (111)</td>
</tr>
<tr>
<td>Total</td>
<td>41.9% (147)</td>
<td>26.5% (93)</td>
<td>12.2% (43)</td>
<td>19.4% (68)</td>
<td>100% (351)</td>
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3. Instrument

A set of questionnaires in Chinese version including three parts—Strategies Used in Online Learning, Beliefs about Online Learning, and Personal Demographic Information—was adopted. Information on strategy use is elicited mainly by the SILL (Strategy Inventory for Language Learning ESL/EFL), Version 7.0 (Oxford, 1990) with some modifications to suitably reflect strategy use in the current online learning context. The SILL is a structured self-reported questionnaire that includes Likert-type scale items ranging from 1 (Never or almost never true of me), the lowest degree in the measurement of the variable, to 5 (Always or almost always true of me), the highest degree.

The modified version SILL (see Appendix) used in the current study includes 30 questions, covering six categories: memory strategies (Items 1 to 5), cognitive strategies (Items 6 to 13), compensation strategies (Items 14 to 17), metacognitive strategies (Items 18 to 23), affective strategies (Items 24 to 27), and social strategies (Items 28 to 30). Sample items are exemplified below.

1. Memory strategies: *I memorize new English words by grouping them into synonym and antonym when I study English online.*

2. Cognitive strategies: *I try to analyze the sentence structure when I study English online.*
3. Compensation strategies: *I guess the meaning of a new word when I study English online.*

4. Metacognitive strategies: *I think about my progress in learning English online.*

5. Affective strategies: *I encourage myself to improve my English skill when I study English online.*

6. Social strategies: *I try to search and learn about the culture of English speakers when I study English online.*

In addition, some items particularly related to the features of online learning are created, for example, in cognitive strategies, Item 9: “*I first scroll down to skim an English passage and then go back and read it carefully when I read English articles online.*” Item 7: “*I click the sound icon many times in order to practice pronunciation when I study English online.*” Item 8: “*I play sound files many times in order to improve listening comprehension.*” in affective strategies, Item 25: “*I log out the software when I feel frustrated or tired and then encourage myself to study later.*”

The second part of the questionnaire referring to eliciting information about learners’ beliefs about the effectiveness of learning English online is composed of eleven items all rated on a five-point Likert scale. These eleven items are classified into three subcategories: effectiveness of improving four skills (Items 1-5), effectiveness of increasing pleasure to learn (Items 6-8), and effectiveness of increasing sense of achievement and necessity of online learning (Items 9-11). The entire items are listed in Table 2.

<table>
<thead>
<tr>
<th>Table 2: Individual Items in Belief about Online Learning</th>
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<tbody>
<tr>
<td>Beliefs about effectiveness of improving four skills:</td>
</tr>
</tbody>
</table>
1. I believe that learning English online is effective to improve my listening comprehension.
2. I believe that learning English online is effective to improve my speaking ability.
3. I believe that learning English online is effective to improve my reading skill.
4. I believe that learning English online is effective to improve my writing skill.
5. I believe that learning English online is effective to improve my overall listening, speaking, reading and writing four skills.

Beliefs about effectiveness of increasing pleasure to learn:

6. I believe that learning English online is effective to increase learning pleasure.
7. I believe that learning English online is effective because I can study English on my own pace.
8. I believe that learning English online is effective because I can practice English online flexibly and repeatedly.

Beliefs about effectiveness of increasing sense of achievement and necessity of online learning:

9. I believe that learning English online is effective to increase a sense of achievement.
10. I believe that learning English online is effective because I can monitor my own progress.
11. In general, I believe that learning English online is necessary.

RESULTS

1. Reliability Analysis

A series of Alpha values are reported to verify the reliability of the entire instrument, as well as each strategy category and belief type. The internal consistency reliability measured by Cronbach’s alpha for the entire instrument computed on 351 participants is .951, while for six categories of the strategy use, the coefficient values range from .651 to .857, for three types of beliefs, from .794 to .851. Table 3 indicates the internal consistency reliability coefficients of the 30 items of Strategies Used in Online Learning: memory (.822), cognitive (.830), compensation (.651), metacognitive (.857), affective (.772) and social strategies (.742), and of the 11 items of Beliefs about Online Learning: beliefs about the effectiveness of improving four skills (.851), beliefs about the effectiveness of increasing pleasure to learn (.794), and beliefs
about the effectiveness of increasing sense of achievement and necessity of online learning (. 811).

Table 3: Internal Consistency Reliability of Strategies Used in Online Learning and Beliefs about Online Learning

<table>
<thead>
<tr>
<th>Category</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy</td>
<td></td>
</tr>
<tr>
<td>Memory</td>
<td>.822</td>
</tr>
<tr>
<td>Cognitive</td>
<td>.830</td>
</tr>
<tr>
<td>Compensation</td>
<td>.651</td>
</tr>
<tr>
<td>Metacognitive</td>
<td>.857</td>
</tr>
<tr>
<td>Affective</td>
<td>.772</td>
</tr>
<tr>
<td>Social</td>
<td>.742</td>
</tr>
<tr>
<td>Belief</td>
<td></td>
</tr>
<tr>
<td>Four Skills</td>
<td>.851</td>
</tr>
<tr>
<td>Pleasure to learn</td>
<td>.794</td>
</tr>
<tr>
<td>Achievement and necessity</td>
<td>.811</td>
</tr>
<tr>
<td>Overall</td>
<td>.951</td>
</tr>
</tbody>
</table>

According to Nunnaly (1978), the alpha value above 0.7 can be accepted as a reliability coefficient. The above coefficients are all acceptable except for the compensation strategy type. One possible interpretation for the comparatively low coefficient of .651 is that there are only four items in this category, and the small number of the items yields a lower coefficient. Another possible explanation might be that the correlation between the items in this category to some extent has decreased. It implies that the discrepancy among each participant for each item in compensation strategies is comparatively larger than in other strategy types. But since the overall strategy has reached the value of .951, the alpha value of .651 still fits in an acceptable range.

2. Descriptive Analysis and Paired t-Test

The mean of the overall strategy use among 351 participants is 3.00 with SD .73, and the mean of overall beliefs about the
effectiveness of learning English online is 3.47, with SD .70. Descriptive statistics of Strategies Used in Online Learning responses and Belief about Online Learning referring to the mean scores and standard deviation of individual categories are summarized in Table 4 and Table 5 respectively.

Table 4: Means, and Standard Deviations for Strategies Used in Online Learning

<table>
<thead>
<tr>
<th>Category/Major</th>
<th>Business</th>
<th>Engineering</th>
<th>Science</th>
<th>English</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory</td>
<td>2.90 (.71)</td>
<td>2.94 (.73)</td>
<td>2.74 (.72)</td>
<td>3.10 (.64)</td>
<td>2.93 (.71)</td>
</tr>
<tr>
<td>Cognitive</td>
<td>3.02 (.57)</td>
<td>3.13 (.67)</td>
<td>2.80 (.66)</td>
<td>3.39 (.63)</td>
<td>3.11 (.67)</td>
</tr>
<tr>
<td>Compensation</td>
<td>3.18 (.62)</td>
<td>3.28 (.67)</td>
<td>2.97 (.75)</td>
<td>3.32 (.63)</td>
<td>3.22 (.67)</td>
</tr>
<tr>
<td>Metacognitive</td>
<td>3.06 (.67)</td>
<td>3.06 (.69)</td>
<td>2.81 (.61)</td>
<td>3.43 (.61)</td>
<td>3.10 (.68)</td>
</tr>
<tr>
<td>Affective</td>
<td>2.68 (.69)</td>
<td>2.74 (.83)</td>
<td>2.54 (.75)</td>
<td>3.19 (.75)</td>
<td>2.79 (.79)</td>
</tr>
<tr>
<td>Social</td>
<td>2.77 (.76)</td>
<td>2.73 (.87)</td>
<td>2.59 (.79)</td>
<td>3.31 (.83)</td>
<td>2.84 (.86)</td>
</tr>
<tr>
<td>Total</td>
<td>2.94 (.67)</td>
<td>2.98 (.74)</td>
<td>2.74 (.71)</td>
<td>3.29 (.68)</td>
<td>3.00 (.73)</td>
</tr>
</tbody>
</table>

Table 5: Means, and Standard Deviations for Beliefs about Online Learning

<table>
<thead>
<tr>
<th>Category/Major</th>
<th>Business</th>
<th>Engineering</th>
<th>Science</th>
<th>English</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four Skills</td>
<td>3.35 (.73)</td>
<td>3.52 (.68)</td>
<td>3.20 (.66)</td>
<td>3.87 (.72)</td>
<td>3.50 (.72)</td>
</tr>
<tr>
<td>Pleasure to learn</td>
<td>3.33 (.78)</td>
<td>3.46 (.74)</td>
<td>3.12 (.62)</td>
<td>3.75 (.80)</td>
<td>3.44 (.77)</td>
</tr>
<tr>
<td>Achievement and necessity</td>
<td>3.36 (.68)</td>
<td>3.48 (.69)</td>
<td>3.15 (.59)</td>
<td>3.81 (.70)</td>
<td>3.47 (.69)</td>
</tr>
<tr>
<td>Total</td>
<td>3.36 (.73)</td>
<td>3.49 (.70)</td>
<td>3.16 (.61)</td>
<td>3.81 (.74)</td>
<td>3.47 (.70)</td>
</tr>
</tbody>
</table>

Theoretically, a mean score of all participants in the range of 5.0 to 3.5 on a SILL item is considered to reflect high frequency use of that strategy, 3.4 to 2.5 indicates medium use, and 2.4 to 1.0 implies low use (Oxford & Burry-Stock, 1995) The results show that the mean scores of all strategy categories based on different majors, ranging from 2.54
(science majors in affective strategies) to 3.39 (English majors in cognitive strategies), indicate that the participants used these strategies moderately. For all participants, the most frequently used strategies are compensation strategies (mean=3.22) followed by cognitive strategies (mean=3.11), metacognitive strategies (mean=3.10), and memory strategies (mean=2.93). The least used strategies fall into the categories of affective strategies (mean=2.79), and social strategies (mean=2.84). As for English majors, they prefer metacognitive strategies (mean=3.42), cognitive strategies (mean=3.39) and compensation strategies (mean=3.32). Although there are no significant differences among the use of these three categories, the use of metacognitive strategies is higher than that of affective strategies (t=3.478, p=0.001) and memory strategies (t=5.032, p=0.000).

The paired t-test results indicate that in general the participants use compensation strategies significantly higher than cognitive strategies (t=3.328, p=0.001), and there is no significant difference between the use of cognitive and metacognitive strategies. The mean score of metacognitive strategies is significantly higher than that of memory strategies (t=5.543, p=0.000). The mean of memory strategies in turn is higher than social strategies (t=2.360, p=0.000). However, no significant difference is found between social and affective strategies.

In addition, the overall mean score and mean scores of individual belief types ranging from 3.44 to 3.50 indicate a medium to high degree. In particular, the highest mean score of belief type is beliefs about the effectiveness of improving four skills (mean=3.50), followed by beliefs about increasing sense of achievement and necessity (mean=3.47), and beliefs about increasing pleasure to learn (mean=3.44).

Due to the fact that the mean scores of all three belief types have reached a medium to high degree, no significant differences among these types are found. However, it is worth mentioning that the mean score of beliefs about the effectiveness of improving four skills is higher than beliefs about achievement and necessity at the (t=1.949, p=0.052) level, in which the p value is only slightly higher than 0.05.
3. Correlation Analysis

For all participants, Pearson’s correlations between any two strategy categories and belief types are analyzed, showing positive Person Product Moment correlations of between .298 and .923. Theoretically, correlation coefficients which are lower than 0.35 are generally considered to represent low or weak correlations, 0.36 to 0.67 modest or moderate correlations, and 0.68 to 1.0 strong or high correlations with r coefficients 0.90 very high correlations (Mason, et al., 1983). In general, more than 90% of the coefficients are higher than 0.36, which suggest a fairly strong or high relationship between these strategy categories and belief types. Only the correlations between compensation strategies and beliefs about increasing pleasure to learn English (r=.298), and between compensation and beliefs about increasing sense of achievement and necessity (r=.328) are in the weak range. Table 6 indicates the results of Pearson’s correlations.

Table 6: Pearson Correlations among Strategy Categories and Belief Types for All Participants

<table>
<thead>
<tr>
<th></th>
<th>Memory</th>
<th>Cognitive</th>
<th>Compensation</th>
<th>Meta</th>
<th>Affective</th>
<th>Social</th>
<th>dSkills</th>
<th>Pleasure</th>
<th>Achievement</th>
<th>Total Beliefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory</td>
<td>1</td>
<td>.723**</td>
<td>.421**</td>
<td>.669**</td>
<td>.554**</td>
<td>.541**</td>
<td>.507**</td>
<td>.400**</td>
<td>.478**</td>
<td>.507**</td>
</tr>
<tr>
<td>Cognitive</td>
<td>.723**</td>
<td>1</td>
<td>.567**</td>
<td>.755**</td>
<td>.584**</td>
<td>.612**</td>
<td>.585**</td>
<td>.497**</td>
<td>.560**</td>
<td>.601**</td>
</tr>
<tr>
<td>Comprehensive</td>
<td>.421**</td>
<td>.567**</td>
<td>1</td>
<td>.560**</td>
<td>.476**</td>
<td>.436**</td>
<td>.370**</td>
<td>.298**</td>
<td>.328**</td>
<td>.364**</td>
</tr>
<tr>
<td>Meta Cognitive</td>
<td>.669**</td>
<td>.755**</td>
<td>.560**</td>
<td>1</td>
<td>.661**</td>
<td>.678**</td>
<td>.536**</td>
<td>.447**</td>
<td>.509**</td>
<td>.547**</td>
</tr>
</tbody>
</table>
Comparing English majors and non-English majors, the correlations among strategy categories and belief types are analyzed. Special emphasis is placed on the correlations between strategy use and belief types, which are highlighted in bold in Tables 7 and 8. The results of correlations between each category for English majors, and non-English majors are summarized in Table 7 and Table 8, respectively.

### Table 7: Pearson Correlations among Strategy Categories and Belief Types for English Majors

<table>
<thead>
<tr>
<th></th>
<th>Memory</th>
<th>Cognitive</th>
<th>Compensation</th>
<th>Meta</th>
<th>Affective</th>
<th>Social</th>
<th>4Skills</th>
<th>Pleasure</th>
<th>Achievement</th>
<th>Total Beliefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory</td>
<td>1</td>
<td>.653**</td>
<td>.444**</td>
<td>.621**</td>
<td>.600**</td>
<td>.590**</td>
<td>.394**</td>
<td>.366**</td>
<td>.385**</td>
<td>.410**</td>
</tr>
<tr>
<td>Cognitive</td>
<td>.653**</td>
<td>1</td>
<td>.512**</td>
<td>.742**</td>
<td>.616**</td>
<td>.665**</td>
<td>.438**</td>
<td>.348**</td>
<td>.485**</td>
<td>.455**</td>
</tr>
<tr>
<td>Comprehensive</td>
<td>.444**</td>
<td>.512**</td>
<td>1</td>
<td>.667**</td>
<td>.517**</td>
<td>.467**</td>
<td>.167</td>
<td>.123</td>
<td>.231</td>
<td>.186</td>
</tr>
<tr>
<td>Meta Cognitive</td>
<td>.621**</td>
<td>.742**</td>
<td>.667**</td>
<td>1</td>
<td>.686**</td>
<td>.715**</td>
<td>.421**</td>
<td>.330**</td>
<td>.419**</td>
<td>.418**</td>
</tr>
</tbody>
</table>

* p<0.05, ** p<0.01
For non-English majors, the correlations between strategy categories and belief types, ranging from .329 to .612, are all significant at the $p<.01$ level, as expected. Interestingly, for English majors, there are no significant correlations between compensation strategies and belief types (3 belief types, and the total belief).

4. Analysis of Variance

Table 8: Pearson Correlations among Strategy Categories and Belief Types for Non-English Majors

<table>
<thead>
<tr>
<th>Memory</th>
<th>Cognitive</th>
<th>Compensation</th>
<th>Meta</th>
<th>Affective</th>
<th>Social</th>
<th>4 Skills</th>
<th>Pleasure</th>
<th>Achievement</th>
<th>Total beliefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory</td>
<td>1</td>
<td>.733**</td>
<td>.411**</td>
<td>.673**</td>
<td>.536**</td>
<td>.522**</td>
<td>.520**</td>
<td>.394**</td>
<td>.485**</td>
</tr>
<tr>
<td>Cognitive</td>
<td>.733**</td>
<td>1</td>
<td>.577**</td>
<td>.744**</td>
<td>.550**</td>
<td>.573**</td>
<td>.592**</td>
<td>.507**</td>
<td>.554**</td>
</tr>
<tr>
<td>Comprehensive</td>
<td>.411**</td>
<td>.577**</td>
<td>1</td>
<td>.538**</td>
<td>.464**</td>
<td>.425**</td>
<td>.408**</td>
<td>.329**</td>
<td>.340**</td>
</tr>
<tr>
<td>Meta Cognitive</td>
<td>.673**</td>
<td>.744**</td>
<td>.538**</td>
<td>1</td>
<td>.630**</td>
<td>.645**</td>
<td>.526**</td>
<td>.442**</td>
<td>.499**</td>
</tr>
<tr>
<td>Affective</td>
<td>.536**</td>
<td>.550**</td>
<td>.464**</td>
<td>.630**</td>
<td>1</td>
<td>.731**</td>
<td>.443**</td>
<td>.360**</td>
<td>.461**</td>
</tr>
<tr>
<td>Social</td>
<td>.522**</td>
<td>.573**</td>
<td>.425**</td>
<td>.645**</td>
<td>.731**</td>
<td>1</td>
<td>.444**</td>
<td>.317**</td>
<td>.457**</td>
</tr>
<tr>
<td>4 Skills</td>
<td>.520**</td>
<td>.592**</td>
<td>.408**</td>
<td>.526**</td>
<td>.443**</td>
<td>.444**</td>
<td>1</td>
<td>.686**</td>
<td>.736**</td>
</tr>
<tr>
<td>Pleasure</td>
<td>.394**</td>
<td>.507**</td>
<td>.329**</td>
<td>.442**</td>
<td>.360**</td>
<td>.317**</td>
<td>.686**</td>
<td>1</td>
<td>.713**</td>
</tr>
<tr>
<td>Achievement</td>
<td>.485**</td>
<td>.554**</td>
<td>.340**</td>
<td>.499**</td>
<td>.461**</td>
<td>.457**</td>
<td>.736**</td>
<td>.713**</td>
<td>1</td>
</tr>
<tr>
<td>Total beliefs</td>
<td>.518**</td>
<td>.612**</td>
<td>.398**</td>
<td>.543**</td>
<td>.469**</td>
<td>.452**</td>
<td>.892**</td>
<td>.890**</td>
<td>.914**</td>
</tr>
</tbody>
</table>

* $p<0.05$, ** $p<0.01$
The ANOVA results show there are significant differences in strategy use among the participants with different majors in the five strategy categories: cognitive, metacognitive, compensation, affective and social strategies. The f value and p value are reported as follows: F(3, 348)=8.248, p<0.001 in cognitive strategies; F(3, 348)=3.164, p=0.025 in compensation strategies; F(3, 348)=8.683, p<0.001 in metacognitive strategies; F(3, 348)=8.629, p<0.001 in affective strategies, and F(3, 348)=9.647, p<0.001 in social strategies.

In addition, based on their majors, the participants also show significantly different degrees of beliefs in all three types. The f value and p value referring to the belief types are also included: F(3, 348)=10.583, p<0.001 in beliefs about the effectiveness of improving the four skills; F(3, 348)=7.250, p<0.001 in beliefs about the effectiveness of increasing pleasure to learn; F(3, 348)=7.047, p<0.001 in beliefs about the effectiveness of increasing sense of achievement and necessity.

Furthermore, according to Post Hoc Scheffe Tests, English majors significantly use more cognitive, compensation, metacognitive, affective and social strategies than non-English majors, except that there is no difference between English majors and engineering majors in using compensation strategies. Among non-English majors, the engineering majors significantly use more cognitive, compensation, and metacognitive strategies than science majors. The business majors also surpass the science majors in the use of cognitive and metacognitive strategies.

As to the degree of beliefs in the effectiveness of learning English online, English majors report that they have significantly stronger beliefs in all three types. The engineering majors also reveal higher degrees of beliefs in all three types than the science majors. Detailed comparisons are summarized in Table 9.
Table 9: Comparisons of Strategy Use and Degrees of Beliefs among Different Majors

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Comparison between Majors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive</td>
<td>English &gt; (Engineering/Business) &gt; Science</td>
</tr>
<tr>
<td>Compensation</td>
<td>(English/Engineering) &gt; Science</td>
</tr>
<tr>
<td>Metacognitive</td>
<td>English &gt; (Business/Engineering) &gt; Science</td>
</tr>
<tr>
<td>Affective</td>
<td>English &gt; (Engineering/Business/Science)</td>
</tr>
<tr>
<td>Social</td>
<td>English &gt; (Engineering/Business/Science)</td>
</tr>
<tr>
<td>Effectiveness of improving 4 skills</td>
<td>¹English &gt; Engineering &gt; Science  ²English &gt; Business</td>
</tr>
<tr>
<td>Pleasure to learn</td>
<td>¹English &gt; Engineering &gt; Science  ²English &gt; Business</td>
</tr>
<tr>
<td>Achievement and necessity</td>
<td>¹English &gt; Engineering &gt; Science  ²English &gt; Business</td>
</tr>
</tbody>
</table>

Note: Parentheses are used to indicate that there is no significant difference between majors inside the parentheses.

DISCUSSION AND IMPLICATIONS

The overall mean score 3.47 (SD .70) of the participants’ beliefs about online learning indicates a medium to high degree of confirmation of the effectiveness of learning English online. In particular, the English majors demonstrate an extremely strong belief about the effectiveness of online learning (Mean 3.87, SD .72). They consider that online learning is especially effective to improve the four skills of language learning—listening, speaking, reading, and writing (Mean 3.87, SD .72). On the other hand, non-English majors report a comparatively lower degree of the belief system, ranging from 3.16 to 3.49. As Ellis (1994) mentions, learner’s beliefs can be shaped by their past experience, both of education in general and of language learning in particular. A high degree of beliefs about the effectiveness of online learning may reflect the participants’ previous instruction they have experienced. From a pedagogical point of view, the English majors seem to have immersed themselves in the idea of the effectiveness of online learning and then
demonstrate a more positive attitude toward the benefits of online learning, compared to non-English majors.

As to the use of strategies, the mean score of the overall strategy use is 3.00 (SD .73), and those of individual strategy categories are ranging from 2.79 to 3.22, all indicating that the participants’ learning strategy use is ranked in the medium level. The results are consistent with those of some previous studies in the Asian context, for example, Chang (1990); Yang (1992); and Chou (2002 & 2012), where a medium use of strategy is reported. However, it must be noted that the previous comprehensive surveys using the SILL were all administered in the hard copy context. As to the online context, focusing on 307 Taiwanese college students, Chou (2012) reports the mean score of 2.85 in the online context and 2.99 in the hard copy context. The current result along with the results in existing literature again verifies the reliability of the SILL.

In regards to each specific category of strategies, the highest use of compensation strategies among the participants is similar to that observed in learners from other Asian countries. For example, in the hard copy context, Yang (1992), Ku (1995) and in the online context, Chou (2012) all report that compensation strategies are the most frequently used strategies among Taiwanese students. The evidence is also confirmed by Kim (1991), Mullins (1992), and Bremner (1999), indicating that Asian students employ compensation strategies more frequently than any other strategy categories.

It is worth discussing that compensation strategies are effective to enable learners to comprehend or produce new language despite their limitations in the target language. Greater use of compensation strategies among the participants in the online context might characterize their language learning situations in which they seem to struggle with low language competence. These participants, therefore, use compensation strategies, such as making guesses, coining new words, and using alternative words, to make progress in communication in the absence of a complete knowledge of vocabulary, grammar, idioms, and other language elements. In addition, the emphasis on compensation strategies may reflect the participants’ lack of language
exposure to learning English; therefore, they use such strategies in this input-poor environment.

However, from a close look at the use of compensation strategies among the participants with different majors, English majors, on the other hand, also rely on cognitive and metacognitive strategies. English majors do not use only compensation strategies which indicate a need to compensate for the lack of language knowledge. Instead, more exposure to the target language or more utilizing language skills has led to the use of not only compensation strategies but also cognitive and metacognitive strategies among English majors.

In addition, affective strategies are reported as the less frequently used strategies among the participants in online learning. The feature of affective strategies is related to dealing with emotions, attitudes, and motivations, including using deep breathing to lower anxiety, using self-encouragement or self-rewards. A reasonable interpretation is that the low degree of the usage might be due to the fact that the participants may have benefited from the properties of online learning, such as repetitive practice, flexible time and place of learning. Therefore, there is no strong need for the participants to lower down their learning pressure or anxiety when they study English online.

In regards to the correlations between strategy use and belief types, positive correlations are found between each pair of the strategy categories and belief types among all the participants. The results imply that the higher degree of the belief the participants hold, the higher frequency of strategy use they apply. Although it is difficult to indicate a causal relationship, the result has shed light on the importance of the strong bond between beliefs and strategy in the learning process. Actually, there is no need to interpret the relationship between beliefs and strategy use as a causal relation. It might be suggested that a higher degree of beliefs about the effectiveness of online learning leads to a greater use of strategies. Meanwhile, as the participants process the learning tasks, a variety of combinations of strategy use might cause a strong belief about the effectiveness of online learning.

Interestingly, for English majors, the correlations between compensation strategy use and all three types of beliefs and the entire
belief system are not significant. It implies that although English majors hold a really strong belief about the effectiveness of online learning, their belief system is not related to the use of compensation strategies. Instead, among English majors, the correlations between their belief system and the use of cognitive strategies is significant (Pearson’s $r=.455$) at the $p<0.01$ level, and the use of metacognitive strategies is significant (Pearson’s $r=.418$) at the $p<0.01$ level. This result signifies the importance and powerfulness of these two categories of strategies in processing new language knowledge. The properties of cognitive strategies refer to operating directly on incoming information for learners in order to internalize the new knowledge, and metacognitive strategies can “make use of knowledge about cognitive processes and constitute an attempt to regulate language learning” (Ellis, 1995, p. 538). For cognitive strategies, skills such as reasoning, analyzing, summarizing, rehearsing, organizing and inferencing as well as general practicing, and for metacognitive strategies, skills such as paying attention, planning and monitoring the learning processes, evaluating one’s progress, and searching for practice opportunities consciously, are extremely powerful in learning foreign languages.

Strong evidence about the importance of cognitive strategies can be approved by the finding that the correlation between the belief system and the use of cognitive strategies among non-English majors is significantly high ($r=.612$) at the $p<0.01$ level. Non-English majors realize the importance of manipulating the incoming information of language in ways that enhance earning (O’Malley & Chamot, 1990).

As is anticipated, the result of the relationship between strategy use and different academic majors in the current study is consistent with the general tenor of previous SILL studies in which significantly greater overall use of strategies is found among English majors (Mullins, 1992 & Chou, 2002). This result might be explained by the fact that the participants who major in English have specialized career interests. English majors whose careers rely on their language skills may develop a wider range of strategy use than learners who specialize in other areas that are not directly related to language interests.
To summarize, despite the fact that the problem of causality remains unresolved—whether a certain belief leads to a specific type of strategy use, or whether the greater use of strategies result in higher proficiency, the correlation between strategy use and beliefs may be used as a determining factor in successful language learning. The current study has opened a number of avenues for further research.

First, further research can focus on testing the validation of the SILL as a measurement among Asian learners in the online context. As to the concerns of ethnicity, researchers can investigate whether the SILL is suitable for examining cultural differences. For example, Taiwanese college students probably are not familiar with the specific techniques in the memory strategies listed in the SILL and further studies about modifying or coining new strategy items might be needed.

In addition, since learners’ employing learning strategies is essential for successful language learning, and when the environment moves to the virtual online modality, the major strategies developed for the traditional context must be updated or modified for the new technology. New tactics related to the online media must be invented and introduced to the learners. Further efforts should be made on formulating or identifying specific learning strategies based on the features of the online media in order to investigate learners’ online learning strategy use more accurately.

To conclude, it is reasonable to infer that learners who believe that it is a pleasure to learn a certain language are more likely to engage and retain the learning process (Pintrich & DeGroot, 1990). Therefore, it is essential to realize the construct of learners’ belief system, and the relationship between this system and other factors, such as strategy use. Horwitz (1999) suggests that “understanding learner beliefs about language learning is essential to understanding learner strategies and planning appropriate language instruction” (p. 557). Ultimately and hopefully, identifications of these beliefs and strategies used, and the correlations between them can provide information to future language teaching and learning research, curriculum and syllabus design and practical teaching in language courses.
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APPENDIX

The Modified Version of SILL:

1. I think of relationships between what I already know and new things I learn when I study English online.
2. I use new English words in a sentence so I can remember them when I study English online.
3. I remember a new English word by making a mental picture of a situation in which the word might be used when I study English online.
4. I use rhymes to remember new English words (e.g., I see a “cat” on a “mat”) when I study English online.
5. I memorize new English words by grouping them into synonym and antonym when I study English online.
6. I say or write new English words several times when I study English online.
7. I play sound files many times in order to improve listening comprehension.
8. I click the sound icon many times in order to practice pronunciation when I study English online.
9. I first scroll down to skim an English passage and then go back and read it carefully when I read English articles online.
10. I try to analyze the sentence structure when I study English online.
11. I find the meaning of an English word by dividing it into parts that I understand (e.g., prefix, root, or suffix) when I study English online.
12. I try not to translate word-for-word when I study English online.
13. I make summaries of information that I hear or read when I study English online.

14. I guess the meaning of a new word when I study English online.

15. I make up new words if I do not know the right ones when I study English online.

16. When I read English online, I avoid looking up every new word.

17. If I can’t think of an English word, I use a word or phrase that means the same thing when I study English online.

18. I notice my English mistakes and use that information to help me do better when I study English online.

19. I try to find out how to be a better and more effective learner of English when I study English online.

20. I plan my schedule so I will have enough time to study English online.

21. I look for opportunities to find related articles and to read as much as possible when I study English online.

22. I think about my progress in learning English online.

23. I have clear goals for improving my English skills when I study English online.

24. I encourage myself to improve my English skill when I study English online.

25. I log out the software when I feel frustrated or tired and then encourage myself to study later.

26. I write down my feelings in a language learning diary after I study English online.

27. I talk to someone else about how I feel about online learning after I study English online.

28. I practice English online with other students.
29. I ask questions for clarification after I study English online.

30. I try to search and learn about the culture of English speakers when I study English online.