APPLYING TWITTER TO EFL READING AND WRITING

IN A TAIWANESE COLLEGE SETTING

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ABSTRACT

This study is an exploration of the potential language learning value of applying Twitter as a tool for English as a Foreign Language (EFL) reading and writing in a college setting in Taiwan. The Twitter-assisted learning approach was based on Vygotsky's framework of social learning theories in which learners experience social collaboration, peer-modeling and a peer-monitoring process. Twitter, a microblogging social network website, provides learners an asynchronous platform and facilitates motivation for discussion. Participants were randomly assigned to two equal-size groups: a Twitter and non-Twitter group. Participants completed pretests and posttests to assess reading and writing. During this two-month investigation, both of the groups experienced the same learning materials and teaching methods, but the non-Twitter group engaged in free-writing activities while the Twitter group used Twitter for major course writing exercises. The students' pretest and posttest results were analyzed by independent and dependent sample t-tests. The analysis indicated that different learning approaches did not make a significant impact on the learners' reading and writing performance. However, the dependent sample t-test revealed that writing scores from the pretest to posttest in each group were significantly different. The learners were also given a Motivated Strategy Learning Questionnaire (MSLQ) to measure whether their learning attitudes changed after the experiment. Comparison of the mean scores of the MSLQ from these two groups, as well as an examination of the t values through an independent sample t-test analysis, indicated that Twitter-assisted learning had a significant positive influence on the experimental group's learning attitude.

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CHAPTER 1

INTRODUCTION

A trend of the modern age is that people like to express their views about specific interests and connect with others through the use of numerous Internet platforms that provide personal blogs, photo albums, and message boards. In particular, Twitter is a microblogging service that allows the quick exchange of information to different social groups. It is frequently used by individuals to communicate briefly and quickly with each other and with groups.

Twitter posts, known as tweets, are limited to 140 characters including spaces and punctuation, which concentrates the language accuracy and communicative precision (Grosseck & Holotescu, 2008). Members can track each other's personal updates and post 140-character maximum replies. "Twitter is the most popular microblogging application, with almost one million users, called Twitterers, who can send and receive messages via the web, SMS, instant message clients, and by third party applications" (Grosseck & Holotescu, 2008, p. 1). The setting of Twitter allows users to follow or to be followed in a virtual community that serves as a daily virtual conversation platform for people to talk about work, sports, politics, music, and so forth. Twitter provides a more anonymous medium of communication for those who may not like to express themselves in public. On the other hand, Twitter can also be used as a platform for high profile users, such as celebrities or politicians, to promote themselves or to update followers on their personal thoughts and life agenda.

Unlike the synchronous written communicative environment of a chat room, Twitter is mainly used for asynchronous interaction among users and followers (Dunlap & Lowenthal, 2009; Grosseck & Holotescu, 2008). The characteristics of microblogging on Twitter focus on higher frequency of personal updates compared with regular blogs and also provide swift dissemination of information. Twitter also offers a platform for quick communication that could play a role as a catalyst for language learning by means of improving target language communicative ability (Borau, Ullrich, Feng, & Shen, 2009).

Adopting technology to enhance learning efficiency has been studied and proven to be useful when the course structure and content are well-organized and well-blended with the use of the technology in a cyber-environment (Lee & Rha, 2009). The use of asynchronous and synchronous mediums of communication as venues for learning has become more prevalent in today's society and also more important for educational purposes. Current educational technology specifically enables communication that facilitates collaborative discussion, exchange of opinions, and critical thinking. Many platforms on the Internet offer such opportunities in the forms of discussion boards, blogs, or even video/audio conferences (Saeed, Yang, & Sinnappan, 2009). These technologies are certainly making an impact on current teaching and learning methods.

A web-writing approach offers students a communicative platform in which to communicate and express their opinions and creates opportunities for sufficient input by which all class members can read materials on the World Wide Web and communicate in a concise written form (Chuo, 2007). In most Asian countries, including Taiwan, college class size usually ranges from 50 to 60 students. Communication between students and teachers is difficult, and participation in the course activities is inefficient. Students have few opportunities to work with

their peers collaboratively in problem-solving tasks (Yang, 2011). However, the web-asynchronous approach has begun to change the traditional teacher-centered pedagogy (Yang, 2011) and has great potential to facilitate language learning (Borau et al., 2009).

Twitter as an educational tool provides an enhanced social presence, which is an important element of second language acquisition (SLA) theory. In Twitter-assisted learning, the method of engaging in social interaction, discussion, and collaborative learning is based on an asynchronous form of written communication (Borau et al., 2009; Dunlap & Lowenthal, 2009). Tweets allow instructors to track each learner's writing progress and ideas. Posting comments offers students a chance to practice using the language for situational communication while also giving teachers a chance to observe the actual performance of students' comprehension in their target language (Borau et al., 2009). When Twitter is being utilized for class discussion, it facilitates students' skills of summarization by consolidating their thoughts with concise and precise syntactic structure and vocabulary in their tweets (Bart, 2010). Moreover, Twitter can be used for promoting and disseminating opinions, articles, and quotes (Grosseck & Holotescu, 2008).

The overarching purpose of applying technology to education is to promote collaborative work among peers (Kessler & Bikowski, 2010; H. J. Lee & Rha, 2009; P. J. Tsai, Hwang, Tseng, & Hwang, 2008). It inspires discussion, idea synthesis, and new knowledge construction, which are hard to produce in a classroom environment (Lu & Yeh, 2008). Web-based writing, including blog writing or discussion board commenting, offers a stimulating and enjoyable method of communicative practice. The collaborative work and interactive message-based conversations can motivate students in their language learning process (Al-Jarf, 2004). From an educational technology perspective in teaching and learning, some recent studies indicate that, as

more teaching practices utilize educational functions of technology in the EFL classroom, students who have learned through these communicative devices have significantly greater frequency and opportunity to practice their writing skills (Al-Jarf, 2004; Chuo, 2007; Heinrich, Milne, & Moore, 2009; Stevens, 2008). Using web-based writing stimulates students' critical thinking through social interaction, and this creates more communication and more opportunities for learners to be exposed to real situational texts (Chuo, 2007). Al-Jarf (2004) compared traditional in-class writing methods with a method that combined traditional practices and web-based writing exercises and found that the computer-assisted learning approach significantly enhanced students' syntactic structures. Furthermore, the students in the experimental group with computer-assisted learning method also exhibited more fluency in their written sentences for communicative purposes and were more expressive in their ideas for essays.

With the increasing popularity of global networking services such as Facebook and Twitter, people are connecting to one another and subsequently sharing information on the English-dominated web. Nevertheless, Twitter is a unique social networking site. It is also referred to as microblogging because each message sent between users is limited to 140 characters including punctuation. It provides an asynchronous service for non-simultaneous social interaction in which users can update their personal statuses, exchange information, interact with friends, or report news (Java, Finin, Song, & Tseng, 2007). It offers a multifunctional and multicultural platform in which users can interact and make friends from different regions, and this opens up possibilities for cooperative learning.

In social groups' discussions, an asynchronous discussion platform has the capacity to facilitate learners' efficacy in language learning while also promoting social interaction that results in higher language achievement and problem solving capabilities (Borau et al., 2009; Lu

& Yeh, 2008). Therefore, it is possible to implement the web-based asynchronous approach to language learning methodology as an assistant tool for creating extensive interaction, which is normally restricted to traditional class structures.

Statement of Problem

In Taiwan, most English as foreign language (EFL) students do not have sufficient environmental stimuli in which to use communicative English. English proficiency is symbolic in nature and is often proven in the acquisition of a mere certificate that ascribes a learner's English competence level. Most EFL learners adopt rote methods in their vocabulary learning process in order to pass the English exams. As a result, most English courses favor prescriptive grammatical rules and vocabulary proficiency over oral fluency, reading comprehension, and communicative uses. In reading practice, students often engage in heavy dictionary use when confronted with an unfamiliar term. Students are often trained to summarize readings, but this practice is not done at the application level which connects the idea of the article to prior experience and knowledge. Moreover, most Taiwanese EFL learners are not exposed to adequate amounts of English reading material on a daily basis. Comprehensive reading exercises are condensed to a series of vocabulary tests and grammar drills. It is a common scenario in Taiwan for students to merely study the specific vocabulary and grammatical points in order to receive high scores on a specific test. In this test-oriented curriculum, the methodology of teaching EFL does not engage learners in utilizing the language communicatively. Expressing ideas in oral or written form is uncommon. From the cognitive development perspective, the learning domain (Bloom, 1956; Pohl, 2000) is limited to knowledge and comprehension stages, which cannot lead to other stages in order to produce creative or critical thinking ability in the process of language learning. Furthermore, many writing/reading courses in Taiwan

overemphasize the form instead of the meaning of the target language. This emphasis results in grammar drills and test-oriented learning styles rather than language use for authentic communication.

Research Questions

This research was conducted using quantitative methods in order to analyze EFL learners' syntactical competence, reading comprehension, and paragraphing accuracy in an attempt to examine whether Twitter had positive effects on EFL learners' reading and writing proficiency. The level of learners' motivation and attitude with Twitter-assisted learning was measured as well.

Three research questions guided this study:

1. Is there a difference in reading comprehension between learners who use Twitter as a supplementary approach to discuss course materials and learners taught without using Twitter as an assistant tool?

2. Is there a difference in students' writing competence between those using a Twitter microblogging platform and those who did not use Twitter for in-class discussion?

3. Is there a difference between motivation and devotion of the experimental group and the control group?

Significance of Study

It is important to recognize the significance of social interaction and its positive effect on language learning in terms of cooperative learning in which weaker learners receive assistance from stronger learners in well-organized environments with mutual learning objectives (P. J. Tsai et al., 2008). Twitter satisfies users' intrinsic needs for social communication, and the interaction creates habitual information or emotion sharing through the behaviors of tweeting,

retweeting, and following people (G. M. Chen, 2011). Therefore, the possible collateral benefit of adopting Twitter in language learning is that users will have sufficient exposure to their target language and will learn to deliver their thoughts in a concise and organized syntactic structure across tweets for their social groups (Borau et al., 2009). The more time spent on Twitter, the more one's sense of social connectivity will be satisfied through the process of tweeting (G. M. Chen, 2011). The environment of Twitter could stimulate users to utilize reading and writing in order to engage in social interaction and support communicative competence in English learning (Borau et al., 2009).

Many educators have asserted that information technology can be a tool to reinforce linguistic competence in global communication without geographic restriction and to enhance individual social engagement (Cummins, 2000). Further, there are certain benefits to social interaction in the target language (Lu & Yeh, 2008). For instance, learners can be stimulated by having interactive conversations with their peers (Borau et al., 2009). Vygotsky (1985) noted that during social interaction, weaker learners have an opportunity to be inspired by their stronger peers, and this process facilitates learners' cognitive development. The most important benefit is that communication activities in the socialization process lead to language internalization. Technology in language learning is intended to enhance learners' interaction and engagement (Yang, 2011), and computer-assisted methods could facilitate language learning by giving purposeful interaction and constructive feedback (Borau et al., 2009; Dunlap & Lowenthal, 2009; Murphy, 2007; Yang, 2011).

The asynchronous environment allows the instructor to provide feedback with guidelines, explicit explanations, and comments about learners' performance (Murphy, 2007). This teacher-student interaction helps learners gain information about their writing and allows them to

remodel themselves by reflecting on feedback. In this study, all Twitter microblogging was conducted with the same framework as an asynchronous teaching approach; the teacher and the students both made use of asynchronous communication, and the learning performance depended on how well the interaction and information were shared in the learning process. According to Murphy (2007), lower-level students have more target language exposure through reading material on the World Wide Web. Therefore, asynchronous collaborative learning environments have the potential to achieve the ideal goals of effective communication in language learning and problem solving.

One of the characteristics of adapting an asynchronous platform for learning is the feedback that inspires learners to modify their comments in the online learning community and stimulates social interaction through meaningful inquiries (Murphy, 2007). Murphy stated that learning outcomes are effective when learners from low to intermediate levels work collaboratively with other students and receive feedback from their instructor. The feedback in an asynchronous environment allows instructor and learners to elaborate upon the entries in further constructive detail on message boards. The asynchronous feedback platform provides teacher and students a learning community with a strong sense of engagement (Yang, 2011). Furthermore, outcomes in computer-assisted approaches to learning are effective because learners are able to engage in meaningful drills for authentic collaboration purposes or be guided in the expected direction by receiving elaborative feedback in the learning process. Interactive feedback for learning increases engagement because it provides explanations, hints to the answers, and suggestions by which learners with higher motivation are inspired (Junco, Heibergert, & Loken, 2011).

The instructor is responsible for facilitating online communication. Learners' modified interaction in written conversation is often monitored by their instructor (Easton, 2003; Murphy, 2007). In the scenario of applying Twitter in class, the instructor is able to monitor and give proper feedback on tweets for enhancing the communicative function of a learning community (Borau et al., 2009; Dunlap & Lowenthal, 2009; Grosseck & Holotescu, 2008; Junco et al., 2011; Stevens, 2008). Thus, Twitter has the potential to provide students with the stimulation for communicative competence for their target language (Borau et al., 2009). Furthermore, from the language acquisition perspective, language immersion in this scenario plays an important role in the acquisition process.

Twitter contains the functions of an asynchronous communication platform, and its quick and concise ways to respond also provide users an opportunity to engage in cooperative activities and to improve their communicative skills (Borau et al., 2009; Junco et al., 2011). Lu and Yeh (2008) indicated that cooperative learning should contain a social constructivism aspect that actively engages students in group discussion or brainstorming exercises. Cooperative learning accounts for the crucial elements of producing knowledge synthesis and critical thinking ability. This learning process stimulates learners to apply their newly learned knowledge to the intended situation, and learners modify their existing knowledge in order to produce the desired result through collaborative work. The positive effects of adapting this concept to distance learning with well-constructed and friendly environments are significant to learners in that cyberspace provides them an opportunity to utilize their target language to convey ideas or query course content in a communicative form.

Other positive learning effects of web communication include the functions of multimedia interface and frequent collaboration that could stimulate learners' motivation to

connect with their online community (Lu & Yeh, 2008). This collaboration is a strong advantage of adapting an asynchronous approach to learning in which the learners will be guided by specific discussion topics (Matsuo, Barolli, Xhafa, Koyama, & Durresi, 2008). In Taiwan, colleges seldom provide EFL courses with online interactive components. Most collegiate EFL courses do not supply learners with interactive blogging for discussing course assignments or content. However, increased Internet access in Taiwan makes asynchronous or synchronous learning and teaching a more viable option, and students can participate in web-based activities without time and location restrictions (Yang, 2011).

Asynchronous learning environments provide learners with both a longer period of time to respond with their comments and thoughts in the learning community and the use of a simultaneous chat function to deliver their ideas throughout the community. Twitter, as an asynchronous community, could facilitate learning via the web and allow users to interact with each other by asking questions, sharing information, and posting personal updates (Dunlap & Lowenthal, 2009; Grosseck & Holotescu, 2008; Stevens, 2008). It also serves a multifunctional purpose through users' online discussion and microblogging abilities, which capture both instructors' and learners' interests (Matsuo et al., 2008).

Since communication plays a vital role in web-based language learning, Cummins (2000) suggested that instruction should focus on the meaning of the language instead of the form of the language. Learners must make use of their communicative skills to produce new knowledge and constructive content. Cummins further explained that students must develop not only the grammatical structure, but also the semantic level of meaning in which words can convey ideas or convince interlocutors during the communication process. The platform of Twitter provides a cyber-connection for learners to communicate in their target language (Borau et al., 2009).

Nevertheless, this beneficial connection is rendered useless if the users do not possess the linguistic competence to participate in the interactive discussion.

The educational value of Twitter has been recognized by educational researchers and numerous educators regarding learning and collaborative work (Borau et al., 2009; Dunlap & Lowenthal, 2009; Grosseck & Holotescu, 2008; Johnson, 2011; Junco et al., 2011; Stevens, 2008; Young, 2010). Twitter-assisted learning shares the same theoretical foundation as the asynchronous learning approach in which learners are responsible for participating in a virtual community where each individual may contribute output regardless of geographic and time limitations. Young (2010) indicated that technology has shifted the instruction approach from teacher-centered to learner-centered so that teachers are the facilitators instead of authoritarians in the learning process. Furthermore, Twitter provides a microblogging space for those who are afraid of public speaking to voice their thoughts concisely through tweets (Bart, 2009). Twitter also enhances students' learning experiences by facilitating the convergence of solutions for problems and allowing learners to simultaneously view many others' opinions (Junco et al., 2011). From a learning perspective, Twittering enhances engagement for learners through reinforcing their thinking skills by condensing their writing on tweets due to the character limits (Borau et al., 2009; Junco et al., 2011). Tweets could also be a platform for students to collect ideas from their peers to solve problems related to their course tasks (Dunlap & Lowenthal, 2009).

From a perspective of learning English as a foreign language, students can both monitor and be models for other students through tweets because learners see all comments and have an interaction through tweets. They can compare their own idea formation with that of their peers, examine the use of syntactic structure, and select vocabulary (Borau et al., 2009). Dunlap and

Lowenthal (2009) have noted that Twitter enhances social interaction in that students share their

thoughts and questions regarding particular book chapters or learning materials in the classroom.

Twitter provides learners with personal, informative, entertaining, and academic experiences if

they are enthusiastically involved in web-based activities.

Successful online learning involves two-way communication from both the instructors

and the learners (Yang, 2011). The posted information on tweets can be promoted and clarified

for better communication in which the learners can easily grasp the concepts. Therefore, it is

important that Twitter for education be facilitated by organized online learning content with

structured guidelines that lead learners to participate in the discussion forum (Junco et al., 2011).

Technology for education has to be planned in advance in order to facilitate learning efficacy

through well-organized learning content so students can be stimulated and motivated to engage

in online communicative activities (Gaudet, 2005).

One of the noteworthy features of Twitter is that it allows researchers to track and collate

data on tweets, which then can be updated by the users anytime and anywhere. The nature of

this service allows users to access it with any device that has Internet capability. Twitter has

been used for sparking discussion and interaction among learners in a class because it creates a

strong communicative circle in which learners are motivated to participate in arranged debates

with each other and with their instructors (Grosseck & Holotescu, 2008). Dunlap and Lowenthal

(2009) noted that Twitter can facilitate communication between peers and faculty. Likewise, the

educational value of tweeting contributes to collaborative learning that increases interaction

among learners (Junco et al., 2011).

Twitter has become the most popular microblogging phenomenon from the perspective of

global communication (Java et al., 2007). It creates a virtual community that relies on the

interaction of members in a homogeneous social group who share the same objectives and

motivations to communicate among one another (Borau et al., 2009). Nevertheless, its

recreational functions and bond of inquisitive behavior come from Twitter social groups'

dedication and engagement. Twitter facilitates such communications (Bart, 2010). Stevens

(2008) related these Twitter phenomena to course activities. He stated that the responsive

microblogging features of interactive social networking expand the teaching materials to their

maximum extent so that the resources can also be shared and commented on with Twitter.

CHAPTER 2

LITERATURE REVIEW

Twitter has impacted daily life and information sharing (Chen, 2011). Some studies and numerous reports have suggested that Twitter is a convenient tool for learning and has educational value (Chen, 2011; Grosseck & Holotescu, 2008; Java et al., 2007; Johnson, 2011; Junco et al., 2011; Stevens, 2008; Wright, 2010; Young, 2010). There is not much literature on Twitter as a potential EFL or English as a second language (ESL) teaching and learning tool, but a few studies provide useful insights for the present study regarding Twitter and its application for instruction.

There have been many studies on computer-mediated learning that shed light on how learning can be assisted by the use of asynchronous and synchronous communication methods. Educational approaches that utilize computer-assisted learning techniques provide an alternative way for learners to engage in course activities through communicative methods that are different from conventional face-to-face approaches in both time and space aspects. Asynchronous platforms offer users a message board or discussion board that includes multimedia functions for information dissemination, and synchronous platforms provide real-time communication by speaking or writing functions through the medium. Such approaches focus on implementing a learner-centered curriculum, and the effects of doing so are substantially influenced by the

quality of interaction among students and teacher (Hou, Chang, & Sung, 2009; Johnson, 2011; Lu & Yeh, 2008; Wright, 2010).

Valuable educational computer-mediated applications that have been adopted include the functions of blog writing, business marketing, social networking, and information sharing (Grosseck & Holotescu, 2008). Grosseck and Holotescu (2008) suggested that there is great potential for the utilization of Twitter in the classroom. They found that Twitter can facilitate collaborative writing in class and can serve as a platform for idea stimulation among multiple users. Twitterers (i.e., people who use Twitter as a way of engaging social interaction) are able to construct their sentences in the form of tweets and communicate with other individuals and social groups. Furthermore, the written form of communication can possibly enhance the quality of the conversation for those who are afraid of speaking in public (Bart, 2009). The concise and precise writing style in Twitter reinforces the focus of the communication, and the writing process is potentially a good exercise for language learners (G. M. Chen, 2011).

Several areas in the literature are relevant to this study, including the role of the instructor in a computer-mediated learning environment, current educational activities with Twitter, and studies on social interaction, adult learning, and collaborative learning using asynchronous communication. Learners' performance and teachers' instruction in the asynchronous environment and social interaction theory are the major points of interest in this chapter. Interaction theories view language learning/acquisition from cognitive development perspectives and also describe processes that can clarify the theoretical framework of this study. Studies based on these theories reflect the current application of asynchronous approaches to learning and learners' progress in learning as they use Twitter as part of course activities. Twitter-assisted learning with goals for different learning phases is potentially helpful for increasing

intensive communication or discussion (Dunlap & Lowenthal, 2009). In any learning community, interaction is crucial for language learning in writing and thinking (Krashen, 2009; Powell & Kalina, 2009; Vygotsky, 1962) and should be considered for implementation into instructional design for constructivist teaching in which learners will be guided to discover their own preferred styles of learning (Lubliner, Widmeyer, & Deek, 2009).

The Role of the Instructor

It is important to describe the role of the instructor in the cyber learning environment and explore the related pedagogies of curriculum design. The role of the instructor determines whether the assisting technology will succeed as a result of the instructor's learning strategies, advice, and learning objectives (Meskill & Anthony, 2007). The instructor plays a crucial role in students' online discussion as a facilitator who utilizes an efficient method of learning rather than as a knowledge giver (Easton, 2003). Easton (2003) found that instructors in online distance learning play roles of providing skills of writing presentation, basic technical capabilities, management techniques, and learning engagement abilities. Easton further explicated that online distance learning instructors have social responsibilities in facilitating learners' self-directed and collaborative learning and suggested that the instructor needs to be aware of the learning efficiency of students' performance in completing the course tasks and to adjust the teaching approach according to students' reaction and performance. Therefore, instructors act as facilitators who stimulate students to produce meaningful discussions for academic purposes. Wright (2010) studied the role of Twitter in stimulating students' reflective thinking and found that the teacher is in control of engaging participants to respond to the questions by facilitating tweeting and connecting students' experiences and thoughts into larger discussion threads.

Students in the online environment cannot see the instructor and have little idea about the credibility of the instructor. Johnson (2011) investigated students' perceptions of online course teachers' credibility in the Twitter environment and concluded that teachers who revealed more personal information received the highest ratings of credibility from students. Johnson provided a refined scale of credibility for teachers that included competence, trustworthiness, and caring. Students need warm and positive attention in online learning environments, so Johnson indicated that the role of the instructor is not merely as a knowledge transmitter but also as a friendly figure in dealing with students' questions and learning issues.

Studies on the Educational Uses and Potential of Twitter

First-time Twitter users may consider the function of Twitter to be for trivial things in life, such as updating personal daily routines. However, Twitter has a unique function compared with instant messaging applications: its capability to broadcast to mass receivers instead of sending messages to an individual on instant messaging applications (Galagen, 2009). The purpose of applying Twitter is to increase opportunities for interaction (Dunlap & Lowenthal, 2009). Dunlap and Lowenthal (2009) found that Twitter is a bridge that increases students' learning engagement because its characteristics of promptness and conciseness attract users around the world and suggested that it could enhance collaborative learning and act as a quick information exchange platform in a virtual classroom.

The main function of Twitter is to disseminate personal statuses or update daily information among the users' social groups. It has the features of daily chatter, conversation with the users' interest groups, news reporting, and information sharing (Java et al., 2007). It was originally created to allow users to follow people such as friends, family, and celebrities but can also be used to monitor changes and developments in contemporary and quickly changing

controversial topics. The followers can watch people, groups, or topics on Twitter and then

comment with personal opinions, support, or opposition. Twitter is also compatible with mobile

phone technology for asynchronous interaction. Its multi-functional interface includes the ability

to post website links and private messages.

Twitter is designed to function on any device with Internet capability, so users can check

comments and post feedback anytime and anywhere (Young, 2010). This asynchronous

discussion could create a sense of modeling (Galagen, 2009). Learners can simultaneously

observe and engage in discussions through the online community (Grosseck & Holotescu, 2008).

When Twitter is used in an academic setting, users are told to participate in the activities, such as

answering questions, sharing thoughts, and commenting others' posts. It can also be utilized in

project collaboration and to promote literacy skills (Grosseck & Holotescu, 2008). Interpersonal

communication can be created by incorporating Twitter as a bridge to connect students and

faculty that allows for quick responses regarding students' projects, assignments, and ideas (Bart,

2010). It is not only helpful for improving learners' social presence by participating in course

tasks but also a potential tool for language teaching (Dunlap & Lowenthal, 2009).

There are many factors that will hinder learners' interactions, such as the instructor's

guidance and the class culture. Due to cultural factors in Asia such as Confucian philosophy

(Smith, Coldwell, Smith, & Murphy, 2005), most students tend to refrain from expressing their

thoughts in public and from criticizing and revealing opinions in front of teachers. Furthermore,

the traditional teacher's role in the classroom is as a figure of authority, and this causes most

students to feel intimidated and to keep quiet. In such a stratified environment, most students are

afraid of being embarrassed. Yang (2011) has discussed the problems of English learning in

Taiwan. In some big classes with 50 to 60 students and limited meeting times, it is difficult for

students to communicate with the teacher or with one another. Twitter provides a platform for those who are too shy to voice themselves (Bart, 2010) and to establish relationships by sharing personal updates, news, thoughts, and hobbies (Brown, Hendrickson, & Littau, 2011).

In their study of Twitter for language learning, Borau et al. (2009) showed that students can practice their target language (i.e., English) on Twitter and that tweeting actually let students produce authentic communication. Despite the limited time of the study, huge differences in the students' English levels, and the large size of the class, Borau et al. were able to enhance their participants' communicative competence mainly in three areas: grammatical, sociolinguistic, and discourse competence.

Moreover, Twitter can raise users' cultural awareness by allowing interaction with native speakers of the target language. In addition to helping students develop communicative competence, Twitter can be used as a blended learning community in which learners can meet their classmates both in person and online. Twitter-assisted learning reinforces learners' sense of the learning community so that learners will comply with group learning objectives and manners.

Tweeting also allows students to express their interests openly and to work on the same project collaboratively (Dunlap & Lowenthal, 2009) and allows teachers to check everyone's comments and responses. Students can also view their classmates' tweets and provide feedback. Galagen (2009) mentioned that users can actually obtain advice by tweeting their questions to followers who provide their thoughts or experiences and noted that Twitter is a strong social connection tool that links students and teachers after class hours.

The concept of interaction in social learning theory provides a theoretical framework for Twitter activities in the current research. According to Vygotsky's (1962) fundamental theory, interaction accounts for an important element in language acquisition. The major function of

Twitter is to connect people from different social groups to discuss important contemporary issues or to disseminate ideas through the tweeting platform. This capability allows users to participate in an open social scene where they can engage in conversation, organize their ideas, and respond to others' inquiries (Dunlap & Lowenthal, 2009). Twitter interaction requires concise and accurate writing due to the limitation that tweets must be composed of 140 or fewer characters. The characters in this case include spaces, punctuation, and words. Bart (2010) noted that Twitter in educational purposes requires writing and inspires users to reflect on the ideas presented in order to construct meaningful comments that pertain to the discussion. Twitterers must be more aware of the syntactic structure of their tweets so that their thoughts are understood. Commenting on Twitter could also stimulate users' organization in writing for communication purposes while users are writing to their learning groups.

From an educational technology perspective, Young (2010) noted that there is another advantage in adopting Twitter for educational purposes, which is that introverted students may feel more comfortable producing and contributing their efforts without the fear of ridicule. In addition, Twitter has features that facilitate the teacher's interaction with students, and the teacher can monitor students' feedback as well as provide corrections or suggestions.

Wright (2010) demonstrated an example of the benefits of utilizing Twitter for enhancing social presence in educational purposes. Wright asked education majors to participate in a discussion of pedagogy, curriculum planning, and teaching-related issues on Twitter. As they used Twitter, participants made progress on their reflective thinking, and the Twitter discussion activity also consolidated the students as a learning community. Furthermore, the 140-character limitation required them to make their points more precisely.

Learners' course engagement in using Twitter is one of the main research questions regarding the value of applying Twitter to the academic setting (G. M. Chen, 2011; Junco, et al., 2011). Chen (2011) found that Twitter facilitated course discussion in and out of class and allowed introverts to express their opinions with less stress. Moreover, it helped students to connect with their classmates or instructor and provided personal support. Junco et al. (2011) noted that Twitter fulfills users' needs and desire to make connections with others in that the longer users communicate through tweets, the stronger their sense of belonging will become.

Johnson's (2011) study of teachers' credibility on social networking sites also provides insight into teachers' professional quality and students' attitude toward the use of Twitter in classes. Johnson randomly assigned students into three groups. The first group could only read social tweets from the instructor. The second group only saw academic tweets from the instructor. The third group read a combination of social and scholarly tweets. Participants completed a survey on their perceptions of the instructor's competence, trustworthiness, and caring. Students who only received social tweets from the instructor gave their teacher higher rankings of credibility in terms of trust of the instructor's professionalism, suggesting that the instructor should integrate personal experiences relevant to the learning content to help distant students be more involved in this Twitter family.

The significance of Twitter in terms of educational value and its potential usage for education are discussed in the literature with findings that students are inspired to actively participate in Twitter discussions because their opinions are being noticed and critiqued (Dunlap & Lowenthal, 2009; Grosseck & Holotescu, 2008; Johnson, 2011; Stevens, 2008; Wright, 2010). Twitter provides learners an insight into multifunctional and multicultural perspectives as they exchange their opinions or interact with each other on Twitter. Moreover, Twitter is a global

phenomenon by which language learners can experience simple written communication and interaction (Grosseck & Holotescu, 2008). From the instructor's point of view, the materials posted on Twitter can vary as much as the World Wide Web, which provides many diverse options for reading material (Brown et al., 2011). Twitter immerses language learners in the target culture while exposing them to their target language environment. According to Krashen (2003), immersion in the learners' target language and culture is the key element for language acquisition.

Teaching and Learning through Asynchronous Platforms

Technology in education, especially Internet-based asynchronous approaches, incorporates different dimensions of communication, such as discussion boards, video conferencing, and chat rooms (Ajayi, 2010; Mendenhall & Johnson, 2010; Palmer & Holt, 2010). E-learning is commonly assisted by structured instructional design that is aimed to accommodate learners' needs and different learning styles (Hsu, Chang, & Wu, 2009). In their study of online learning, Hsu and his colleagues (2009) noted that adaptive e-learning approaches facilitate learning through different media that stimulate interaction through asynchronous or synchronous platforms. Twitter for educational purposes shares the characteristics of e-learning which are based on the theoretical framework of modeling and monitoring from a social learning theory perspective (Galagen, 2009). If an instructor is going to use Twitter to enhance social presence, it is crucial to maximize the effectiveness of modeling by utilizing the information sharing, inquiring, and academic networking capabilities of Twitter (Dunlap & Lowenthal, 2009). It is also important for instructors to set up guidelines and a clear rubric for students to follow in order for online learning activities to function correctly in the academic context (Easton, 2003).

Without any guidelines or rubric, users could be simply copying others' thoughts, or the poor quality of their writing could cause a communication breakdown.

Technology in the classroom has been shown to inspire critical thinking and stimulate course engagement (Al-Jarf, 2004; C. C. Chen & Shaw, 2006; Chuo, 2007; Junco et al., 2011). Many online courses rely on collaborative functions. Interactive platforms are used to make announcements throughout the duration of the course as well as increase participation in discussion and student collaboration. Furthermore, multimedia interfaces with the capacity to upload videos, links, and interactive discussion platforms also enhance visual effects of the course content and accessibility in which the characteristics of the medium and its functions are easy for users to grasp (Dunlap & Lowenthal, 2009).

Technology has its advantages to trigger the interest of learners to engage in more social interaction. Interaction increases social presence, which is an important aspect of language acquisition (Krashen, 2003; Powell & Kalina, 2009; Vygotsky, 1978). Social presence is the awareness of engagement to the participants in process of communication (Garrison & Anderson, 2003). Through meaningful interaction, the learners of the target language will focus on the meaning and understanding of the language instead of the form of the language. The foundation of the asynchronous learning environment is based on social interaction so that peers encourage one another to generate more efficient language communication.

Cummins (2000) mentioned that information technology can enhance learners' linguistic power and intellectual competence in terms of social relationships shared among individuals who are in that community. The popularity of Twitter and its entertaining social networking functions have the potential to trigger the interest of Taiwanese college students in using English

as a communicative tool to inspire their thinking skills, idea organizing abilities, and awareness of English written structure.

Studies on Interaction

Social interaction is an important element in language learning and cognition development theory, so it must be considered in this study of the core function of Twitter. Social interaction contributes to the development of social appropriateness, which is crucial to a child's cognitive development (Carpendale & Lewis, 2004). Knowledge is gathered through interactions and the watched behavior of others and develops from three dimensions: self-existing knowledge, knowledge from others, and knowledge gained through interaction. The process of interaction catalyzes new knowledge as a result of social cognition (Maynard, 2009; Pillow, 2008). Individuals' perceptions of knowledge can be developed through exchanging and sharing information with peers. Incorporating social interaction frameworks in the learning process through educational technology facilitates learners' cognitive development and peer collaboration (Cruces, Rodriguez, Torres, Arriaga, & Perez, 2010; Dunlap & Lowenthal, 2009; Yeh, 2010). Cooperative learning promotes individual contributions to the larger learning community. P. J. Tsai et al. (2008) found that better performance is exhibited in a cooperative learning setting. The reasons behind this result are that social interaction stimulates inquiry, observation, and consultation. These are the benefits of social learning. To take it a step further, cooperative learning promotes learners' learning to work together in order to fulfill their learning objectives.

Since learning processes and interaction theories are pertinent to this study, it is important to discuss how human beings learn. The theories that are important to this study include those related to the way children internalize knowledge and to the cognitive development processes.

Language learning is based on interaction. Technology provides the platform to catalyze the process of social interaction. Bandura (1977) and Vygotsky (1978) have described how social learning reinforces and stimulates learners' cognitive processes. In terms of language learning, social learning facilitates expected behavior by taking in modeling stimuli that will enhance the quality of reproduction in the target language (Bandura, 1971; L. Lee, 2007). Modeling occurs when a person observes and imitates another who has an influential effect on the imitator (Chiou & Yang, 2006; Pedersen & Liu, 2003). This modeling process works more efficiently with aided stimulation. With external assistance from peers with stronger ability, modeling could stimulate potential language performance that would be difficult for an individual learner to produce on his or her own (Chernela, 2004; Drager, Postal, & Carrolus, 2006).

Bandura (1977) specified three cognitive processes in the observational learning model from his social learning theory: attentional processes, retention processes, and motoric reproduction processes. The framework of cognitive mapping in language learning shares a foundational concept with Bandura's position on learners' cognitive development (Murray & Goldbart, 2009). Attention in regard to language learning can be perceived from the aspect of the environment that provides an opportunity for language learners to observe target language speakers and be stimulated by responsive communication to the context of the utterance. The retention process can be stimulated by intensive interaction with target language speakers that enables language learners to retain cognitive organization in the use of their target language. Spontaneous use of the target language in a natural setting stimulates the motoric reproduction process in language learning as learners practice responding to others' questions and constructing their ideas. Motoric reproduction involves the performance of modeled behavior by employing representational symbols from the actions observed and modeled. These observational processes

facilitate new learning behavior. For language learners, the new behavior could be perceived as learners' ability and their sense of engagement in participating in the conversation.

Modeling and observing others' behavior is a key in social learning theory. Bandura's self-efficacy theory (Hodges, 2008; Zare & Mobarakeh, 2011) also provides a useful framework for online learning and language learning in which modeling, goal setting, and attributional feedback develop language learners' cognition and behavior in the learning process. His cognitive theory indicates that exposure to the target language is not enough in the observational process. The exposure has to be relevant and direct to observers' attention in complex target language stimuli. The platform of an online learning community might be able to provide learners with hands-on experiences that could reinforce their attention in the use of their target language (Grosseck & Holotescu, 2008). The extent to which stimuli will attract observers' motivation and interpersonal interest should also be considered (Ray, 2009). Another process in observational learning is to keep the imagined and verbal observational input pertinent to the situation. Reproduction of the modeled behaviors will be most efficient after the observers recode these observed behaviors into images and verbal symbols that make sense by keeping the input pertinent.

In asynchronous learning, modeling is an important contributing factor to facilitating discussion in a distance learning environment. By observing other conversation participants, the imitator reproduces speech and incorporates this new knowledge into the thought-sharing process through writing. Imitators' improvement will depend on the attributional feedback and interactive experiences provided by their observed environment and people (Hodges, 2008). For instance, in an interactive learning process, the social activity experience integrates learners' prior cognition with new information, which inspires learners to produce new knowledge

(Lubliner et al., 2008). Moreover, new constructed knowledge is affected by cognitive progression in different modeling stages based on learners' ability to interpret the information.

Foreign language learners need effective social interaction in order to produce the actions they see being modeled. Authentic language usage that is pertinent to the contextual situation is important so language learners can recognize modeled stimuli (Lave & Wenger, 1990). The process of modeling is perceived as imitating others through positive reinforcement, which results in reproduction of the imitation in responding to external stimuli and elicitation. Bandura (1977) wrote that the complexity of responses often reflects the progress of cognitive development in social learning. Social interaction can lead to the recognition of certain social stimuli and can help develop the individual's ability to synthesize the new information (Chiou &Yang, 2006). In an asynchronous learning environment, language learners are often required to actively give meaningful and topic-related feedback in the online conversation. Therefore, interaction is based on student-to-student and student-to-teacher communication.

In the computer-assisted approach, students are asked to engage in cooperative activities in which learners have to work together on common objectives for a group benefit (P. J. Tsai et al., 2008). Social interaction maximizes the effect of cooperative learning. The process of cooperative learning needs to follow a well-planned structure so that learners can work on mutual objectives with their peers (P. J. Tsai et al., 2008). In the social context, interaction facilitates communication through planned, ordered, and cognitive learning instructional design (Eskrootchi & Oskrochi, 2010). Furthermore, an interactive learning process creates an authentic learning environment where language learners can apply and synthesize knowledge. This approach facilitates the development of problem-solving skills in real-life situations (Eskrootchi & Oskrochi, 2010).

The application of Twitter in language learning is a project-based approach in which learners are working on common objectives collaboratively in an authentic language setting. Eskrootchi and Oskrochi (2010) noted that incorporating computers in the classroom significantly improved engagement, social interaction, and contact with real-life resources and allowed peers to learn from one another and aid weaker learners through constructive, scaffolded, and collaborative learning. In their study, a project-based e-learning platform enhanced communication through peer collaboration and helped break the communication barrier for those students who tend to be more reserved. However, careful instructional design is important to maximize learning performance. Eskrootchi and Oskrochi concluded that it is the instruction and curriculum implementation that boost efficacy, not the technology itself. The quality of interaction is often influenced by the instructional design. Clear guidelines are needed so that all students must do is follow the rubric and work on their assignment collaboratively.

Learners' cognitive development is guided by the organization of the instruction that specifies the activities for different level learners. Hsu et al. (2009) examined the impact of instructional structure and interaction on achievement and satisfaction in an online learning environment and found that students achieved higher learning results with a well-organized instructional design and that interaction also accounted for the success of an online distance course. Well-organized instruction was the core element for maximizing the effect of interaction that determines learners' satisfaction and receptive learning achievement. More specifically, interpersonal interaction facilitated communication and critical thinking in the structure of a web-based learning environment (H. J. Lee & Rha, 2009). Effective interaction requires clear guidance if it is to inspire critical thinking and communicative language skills. An effective teacher must create collaboration among learners so that students can learn to build their

constructive thinking through replying to the questions on the course blogs and engaging in interaction with their peers.

Since social interaction facilitates the constructive process in learning, it is necessary to perceive learning from a constructivist point of view. Constructivists proclaim that learners should discover new knowledge themselves, and the role of instructor should be as a facilitator instead of an authoritarian figure. In a constructivist learning environment, knowledge is gained from activities that stimulate learners' ability to organize and integrate information. A constructivist environment provides opportunities to experience learning by applying the learner's past or existing knowledge. Furthermore, experience inspires learners to explore beyond the given information by building their cognition in the learning process (Bruner, 1996). Learners are encouraged to explore and to learn through positive collaboration in a social interaction scaffolding framework (Lubliner et al., 2008). The concept of social scaffolding relies heavily on Vygotsky's (1978) zone of proximal development (ZPD) theory in which stronger learners inspire weaker learners in a collaborative platform, such as a blog. The scaffolding framework stimulates learners' cognitive development through collaborative work among learners, and this process enhances individuals' original ability.

Social interaction can occur in person or through an electronic telecommunication platform. Che, Lin, Jang, Lien, and Tsai (2009) provided an example of collaborative work through social interactive writing. They discussed a study in which elementary students observed butterflies and found that students were better able to perform when they typed text on a Personal Digital Assistant (PDA) than when they wrote with a pen and paper. The experimental group with the PDAs gave more details and characteristics in their observation of the butterflies. Another study conducted by Che and her colleagues showed that university

students were able to learn vocabulary by receiving a 100-word phone text message daily from their instructor. This suggests that students who utilized text messaging learn more vocabulary compared with the other group that used paper-based materials. From the educational technology learning perspective, the ultimate goal of using cell phones in instruction at the college level is not only to learn English but also to learn new information by sharing and exchanging it. A majority of the participants in the mobile phone text message study agreed that the discussion and collaboration were more efficient with well-organized questions. In this way, students made inquiries through text messages or discussed video clips transmitted through their mobile phones. The various forms of electronic communication for this study included instant messaging, voice messaging, a global positioning system for identifying the location of participants and a Wi-Fi system for supporting multimedia functions. The investigations reported in Che et al.'s study suggest that technology has great potential to stimulate more responses through a variety of media with the assistance of electronic devices such as mobile phones and PDAs. Mobile learning facilitates constructive learning through interaction and communication. More than half of the 37 participants in the mobile learning activity expressed satisfaction and agreed that the activity enabled communication and collaboration across the participants in different locations. Those participants were using applications on the cellphone, such as text messaging, email, and Wi-Fi Internet service to engage with the tasks. The cellphone device significantly enhanced students' social interactions and stimulated each individual to work with his o her team in order to finish the requirements.

In terms of Twitter's potential advantages for enhancing social interaction, learning experiences on Twitter can be described as experiential learning. Hedin (2010) and Kemp (2010) stated that experiential learning engages learners in activities in which they have the ownership

of learning autonomy and can experience and develop social presence and problem solving abilities. Incorporating Twitter into a class creates a new way of communication that stimulates the learner's cognitive process in perceiving and handling new tasks or information. Twitter contains a constructive and positive learning community that guides students' learning objectives by encouraging them to tweet intellectually or emotionally. Student engagement is facilitated by the instructor, and performance is the result of a constructive and experiential process throughout the Twittering.

An individual's cognitive development in the social interaction process depends on his or her motivation to construct new knowledge though hands-on learning activities. In experiential learning, learners are active agents in constructing new knowledge. In language learning and acquisition theories, learners' language progress depends on the experience of learners' interactions for communicative purposes, with the focus of meaning conveyance instead of grammatical accuracy (Philp & Tognini, 2009). The change of learners' behavior is associated with social interaction through receiving accurate feedback. The progress of learners' cognition reflects their capability of responding in social and contextual settings. Behavioral change is caused by learners' competence to cope with their environments (Lines, 2005; Ponton & Rhea, 2006; Yasseen, 2010). Furthermore, Bandura's (1977) social learning theory indicates that the improvement of learners' behavior and cognition is the result of reinforcement in which interaction creates the need for learners to be reciprocal to their stimuli by giving feedback to their peers. Interactive technology provides the necessary stimuli for changing learners' behavior through its interactive asynchronous or synchronous platform.

Zone of Proximal Development and Social Learning Theory

Vygotsky (1978) regarded social interaction as a major aspect of his concept of cognitive development. By interacting with other target language learners, learners' language competence will exceed their current attainment through guidance from instructors or peers who have stronger abilities. Interaction stimulates internalization of development and eventually reflects individual growth in cognitive development (Coreil, Beliavsky, Lake, Argentina, & Yadav, 2007). The gap between lower and higher level competence is called the zone of proximal development (ZPD). The theory of ZPD measures the gap between the actual ability of the learner and the potential for achievement when others aid the individual. The aspect of social learning in the ZPD emphasizes actual mental development. Vygotsky believed that it is possible to see significant improvement when learners are assisted by more knowledgeable peers. This achievement indicates even further potential for development in the future.

A more knowledgeable other (MKO) plays a crucial role in Vygotsky's ZPD theory as a catalyst that stimulates and continues the scaffolding process for weak learners. The purpose of interacting with an MKO is to assist weaker learners in developing their ability to perceive problems and their internalization mechanisms for solving such problems (Coreil et al., 2007). The MKO is usually either a teacher or a skilled peer with a deeper understanding of the specific field. However, the MKO does not necessarily have to be a person. It could be an innovative and inspiring concept or even a computer. Learners can perform better and build competence through effective interaction with an MKO.

Vygotsky believed that the social aspect of human communication is a source of knowledge attainment, and interaction is a vehicle that facilitates the internalization (Crawford, 1996). Learners play an active role in the cognitive development process through their

interactions with others. From a social development perspective, Twitter provides students with intensive interaction and potential opportunity in the ZPD as learners model for their classmates (Dunlap & Lowenthal, 2009). Tweeting allows learners to make comments or quick responses to their audience. Moreover, students are strategically guided to answer or to respond to the class, which creates a model effect and enhances social presence (Dunlap & Lowenthal, 2009).

Studies on Adult Learning

Studies on language acquisition can be generally categorized into two areas: first language acquisition and second language acquisition. Theories that focus on adult learning are usually concerned with second language learning or learners' cognitive development (Cassidy, 2004; Ellis & Sagarra, 2010; Krashen, 2003; Merriam, 2001; Nejadansari & Nasrollahzadeh, 2011; Stewart & Waight, 2008; Woodard, 2007). It is important to understand how adults react to new information and then internalize it into their cognition (Knowles, Holton, & Swanson, 2005). Research on theories of learning delineates how adult language learners develop their language competence and eventually acquire the target language. Krashen (2003) suggested that communication in learners' target language facilitates acquisition more than grammar and vocabulary drills.

The characteristics of adults as learners model (CAL; Cercone, 2008) illuminates learners' characteristics, such as personality, age, and social experience, and how they influence the learning process. The second characteristic of the model is learning implementation, which covers time, procedures, and locations. CAL provides useful insights for educators in that they can learn to incorporate pertinent curricula for different adult learners to give them ownership of their direction in the learning process and help them learn through authentic experiences. Adult learning is mainly based on andragogy and experiential learning, which embraces learners' self-

directed learning and knowledge application through real-life circumstances. For the purpose of this study, CAL explains the participants' experiences and performances with authentic written communication and thought sharing, which are facilitated by clear guidelines and evaluation rubrics. These are crucial for accurate results because students need constructive feedback in order to facilitate continuous communication.

Other aspects are focused more on adults intrinsic motivation and extrinsic behaviors such as learning strategies. The updated perspectives of adult learning theories and their application to online learning reinforce andragogy theory in contemporary adult education and computer-mediated learning for adult learners (Cercone, 2008; Merriam, 2001). The theoretical framework of Twitter-assisted learning relies on self-directed and experiential learning concepts from the adult learning viewpoint. The main concept of adult learning theories is that adults need to know their learning goals and obtain them through experiential engagement such as problem-solving skills enhancement. More importantly, learning objectives need to be embedded in the learning goals. The purpose of the present investigation was to explore the effects of collaboration in using Twitter as a learning tool for English as a foreign language.

In their study of wiki writing collaboration, Kessler and Bikowski (2010) showed that online collaborative work is possible if students are guided through their courses throughout every phase of each learning objective. Wiki space is a web platform that allows learners to write collaboratively, promoting learners' autonomy as they create their learning context through interaction. Experiential learning through wiki involves using discussion boards, video conferencing, and comment editing. From an andragogy perspective, the learning process should be the focus rather than the content. Kessler and Bikowski looked at the learners' abilities to accomplish assigned projects through a process of peer collaboration and social interaction.

Likewise on Twitter, learners are engaged in a virtual asynchronous experience during discussions of specific topics, potentially providing a stimulating environment for users to engage through inquiry and response. Twitter users are also exposed to hands-on learning processes that are very different from in-class discussion because Twitter heavily relies on a written form of instant feedback. This allows learners to take more time to construct their thoughts before they make their contributions through tweets than if they had to speak in answer to a question. Andragogy also promotes role-playing, self-evaluation, and simulations during guided Twitter sessions. These strategies reflect the intrinsic qualities of collaboration in an asynchronous learning environment, which provides a learning domain with hands-on engagement and reflection on self-learning experiences.

Adult learning theory has a similar framework with experiential learning theory (Rogers, 1969), which focuses on the need of learners for self-initiation and self-assessment. In experiential learning theory, learners' ability to reflect on their learning processes and evaluate their experience is important (Jordi, 2011). The self-reflection ability allows learners to possess ownership of their learning processes, apply what they know, and provides the instructor with insight into the learners' capabilities. With its emphasis on the effectiveness of communication and collaborative work, the asynchronous learning environment catalyzes experiential learning because participants are required to be actively involved in monitoring others in order to modify their behavior to that which is appropriate for a cyber-community. Hedin (2010) indicated that teachers are facilitators in experiential learning in which the learning contents are structurally arranged as they establish clear goals and maintain a positive learning environment.

As for Twitter's value in an academic setting, learners need positive and constructive feedback from teachers and their peers. Experiential learning using Twitter requires that teachers

act as observers rather than dominate communication. Furthermore, teachers need to cultivate

learners' ability to monitor themselves so they can become aware of their own achievements.

Studies on the Effects of Using Discussion Boards and Blogs for Learning

Knowledge exists throughout the Internet, and blogs provide education within an online

community. Not only can a person make comments and share ideas on a blog, but this form of

communication also expresses the personality of each participant. Hou et al. (2009) discovered

that blogs offer teachers a space to develop their personal styles. The settings of blogs allow

learners to collect ideas and to share their insights and inquiries (Lu & Yeh, 2008). Moreover,

learners who create blogs have their own spaces to share information or create a learning journal.

Blogs provide an aspect of personalization because forums in blogs are mainly for sharing and

commenting. Twitter is considered a microblogging social network. It is different from regular

blogs in terms of the length of comments, but otherwise serves a similar purpose of expressing

the user's thoughts, ideas, and personality.

Technology has transformed in-class communication to cyber-interaction in which the

limitations of time and space are broken. Although social interaction exists in the traditional

classroom setting, Saeed et al. (2009) argued that technology has altered the relationship between

students and teachers. Multimedia, real-time communication, asynchronous discussion, and

website sharing assist instructors by providing tools for distributing knowledge in a

contemporary way. For example, computer-assisted learning approaches provide a lot of visual

effects, such as video clips or animation.

Online written discussion is a characteristic of asynchronous learning in which learners

with low motivation could be inspired to become involved in using technology for learning (Al-

Jarf, 2004). In a study conducted by Al-Jarf (2004), she found an asynchronous collaborative

learning-assisted approach resulted in better learning performance in writing when learners combined a traditional approach with an asynchronous mediated platform called Blackboard. Moreover, learners in the asynchronous activities were more engaged in learning discussions in the use of their target language.

These functions and the environment of computer-assisted learning provide learners with opportunities to collaborate with their partners. More importantly, the characteristics of computer-mediated learning also enhance self-directed learning, linguistic ability, communication strategies, personal creation, and feeling expression in an autonomous setting (Kessler & Bikowski, 2010). In the wiki study conducted by Kessler and Bikowski (2010), group engagement activities facilitated target language use for conveying thoughts. Moreover, group collaborative activities required strategies for learners participating in collaborative work and editing on a wiki space. Learners needed to synthesize the information that they learned and edit their peers' writing content on a wiki, requiring them to monitor their actions to produce constructive results in a social setting under the surveillance of the instructor. The framework of autonomous learning and collaborative work in computer-mediated learning incorporates some similar aspects of Vygotsky's ZPD theory in that individuals are engaging in discussion through group cooperation and this process of teamwork results in better performance (Li, Dong, & Huang, 2009). Furthermore, an asynchronous computer-mediated setting contributes to self-monitoring and modeling by involving learners in discussion and idea sharing. Kessler and Bikowski noted that the use of the target language in negotiation is improved by reaching mutual semantic understanding. This process has greatly enhanced learners' linguistic strategies in computer-mediated communication. The participant learners meticulously view the discussion contents and negotiate for editing. This process facilitates scaffolding in terms of building up

learners' knowledge of the topics discussed. This phenomenon indicates that technology in the educational setting can emphasize a learner's knowledge sharing and idea construction in a social environment (Hou et al., 2009).

Lu and Yeh (2008) carried out a study of collaboration on blogs and found that collaboration and interaction often occur online within a blogging system where users can engage in the activities that require a lot of communication through the blog. Their study demonstrated the varied ways to utilize a blog as a medium to facilitate collaboration: "students and instructors can import the lecture course, navigate the course, ask questions, take comments, support answers, and query blog information" (p. 93).

There are several reasons that blogging contributes to collaboration among a learning community. From an instructional design perspective, productive interaction and two-channel communication can be important because they alert the teacher about parts of the course instruction that are ambiguous or need to be addressed more in detail. In addition to doing this, Twitter also provides students with a platform for quick feedback during or after class.

From a language acquisition perspective, Bandura's (1977) and Vygotsky's (1978) concepts of social learning relate to social networking site functions of communication and collaboration. For language learners, the frequency of exposure to the target language is crucial for achievement in the acquisition of the language. The characteristics of social interaction in Twitter have the potential to facilitate language acquisition. In Borau et al.'s (2009) study on using Twitter to enhance EFL students' communicative and cultural competence, the majority of the Chinese participants agreed that Twitter reinforced the function of communication in a learning community. More specifically, Twitter in the EFL setting provides learners a great chance to practice sociolinguistic competence and raises cultural awareness about racial

differences and bias in communication. It is noteworthy that cultural awareness provides an

insight for language learners to look deeper in the target language expression and idioms.

Collaboration occurred through tweets between students to complete project-based course tasks.

However, the study showed that Twitter might not be an ideal tool for strategic competence in

communication because the limitation of 140 characters and other Internet power searching

engines hindered the participants from using elaborative strategies to deal with communication

breakdowns. The study illuminated that twittering lacks efficiency, especially when students are

constantly appealing for assistance due to communication breakdown in their tweets.

Dunlap and Lowenthal (2009) noted that Twitter is time sensitive and requires users to

constantly review comments and provide timely feedback. Therefore, it creates an intensive

frequency of tweeting for the users who belong to the social group. Dunlap and Lowenthal

further suggested that Twitter could enhance the relationship between students and teacher

through active communication and facilitate collaborative work through conversation and quick

information updates in a virtual space instead of the traditional big class with face-to-face

discussion. Therefore, students could participate in meaningful interaction by becoming

involved in Twitter conversations (Borau et al., 2009). Twitter can expose learners to the target

language and stimulate them to construct comments while using the target language.

In their study of blog usage as a developmental tool, Hou et al. (2009) showed that most

blog interaction displays knowledge construction among peers. This indicates that knowledge is

being shared, compared, inquired about, discussed, and tested by users who have recently

synthesized the new knowledge. Most of the discussion occurs on the blog, and knowledge

sharing accounts for a majority of the discussion. A majority of the participants in Hou et al.'s

study were willing to contribute their perceptions and share information with others, and

reactions in opposition to others' insight or concepts rarely occurred. However, Hou et al. noted that technology applied to education will be limited if the interaction lacks a way for participants to communicate and share information.

Collaborative blog work has the potential for self-cognition and can help learners integrate new knowledge by sharing information with other virtual community members (Yeh, 2010). Cho, Cho, and Hacker (2010) noted that experienced writers focus strongly on structure and organization to communicate in more depth. Inexperienced writers do not monitor their grammatical errors as often and do not mention their conceptual structure in their writing. A well-functioned online community should inspire self-cognition and self-identity in learning through organized constructive guidelines or peer stimulation in order to produce effective online communication through collaborative work.

Learning through blogging is based on the asynchronous approach. Its purpose is to cultivate potential problem-solving abilities and critical thinking skills through online collaborative learning. Asynchronous online discussion aids learning through scaffolding as students learn to identify problems and construct their ideas through observing and modeling (Ng, Cheung, & Hew, 2010). The social interaction that occurs online serves as a catalyst for collaborative work that encourages students to solve poorly structured problems. These problems may contain multiple solutions, and learners are required to develop self-perceptions in adopting methods to deal with the problems using their own judgment (Ng et al., 2010). Learners can work on solutions collaboratively by identifying the core issues and developing strategies for finding solutions. Some studies show that most discussion participants consider the quality of asynchronous discussion higher when problems are being pointed out extensively

because asking about information occurs more frequently on blogs than in face-to-face conversation in class (Hou et al., 2009; Ng et al., 2010).

Online community members share knowledge and support individual development for mutual learning objectives or goals (Gaudet, 2005). Blogging promotes social interaction and stimulates learners to use their target language for communication in the virtual cyber environment. Without face-to-face interaction, verbal communication in written form is vital for content meaning to be understandable, and the level of participation depends on the individual's willingness to share his or her thoughts; this is important for making online discussion successful. Dunlap and Lowenthal (2009) noted that computer-mediated communication enhances social presence through learners' participation and contributions. Moreover, students' mental processes are not only monitored by their instructor but also by their peers, and this can facilitate the scaffolding process in terms of re-evaluating and elaborating shared knowledge (Mendenhall & Johnson, 2010).

Technology in education is a trend that is gradually increasing, and this increase may be attributed to students' needs. Blogging has been looked at in terms of the social learning theories of Vygotsky and Bandura in which learners are able to collaborate on their work in order to synthesize and evaluate existing and new knowledge in an asynchronous environment. Twitter provides users with the ability to view and comment upon others' tweets. The instructor plays the role of facilitator by observing and offering constructive feedback. Blogging allows users to connect with others and actively engage in discussion by utilizing the target language.

Written Communication and Learning in Microblogging

In microblogging, the instructor assigns topics so that students can actively participate. To inspire students to produce their own opinions, new information is offered and this must take

into account the learners' past or current experiences. Therefore, the social interaction stimulates the constructive process through learners' self-exploration ability (Bruner, 1996). Learners in a blogging environment feel the need to participate in the community, and learning happens during the interaction and information sharing (Borau et al., 2009). Blogging not only allows students to practice social interaction but also conveys educational value from a constructivist point of view. The value of Twitter in language learning is discussed here to eradicate a few misconceptions about technological approaches to language learning in contemporary academic environments. Grosseck and Holotescu (2008) addressed such criticisms about Twitter by disproving the notions that it is distracting to students and creates superficial engagement due to the limitation of 140 characters per tweet. Borau et al. (2009) pointed out that the significance of social involvement shows potential for Twitter as a facilitator of language learning. Twitter communication is also based on quick, spontaneous responses among the twittering groups. For instance, followers of a celebrity on Twitter can promptly respond to their idol's latest thought or update. This prompt response function could be used for course discussion in which students respond to specific questions from their instructor (Dunlap & Lowenthal, 2009). Twitter provides an environment where students can discuss articles or issues presented and guided by the teacher, learning in the process not only how to write their ideas but also how to organize their thoughts.

To make a fluent and efficient blog interaction, self-monitoring in writing involves writers comparing their current writing with their previous work. The purpose of this strategy is to identify the mismatched or incompatible parts so that writers make modifications (Cho et al., 2010). Peer evaluation could also be beneficial because students can provide suggestions for their fellow classmates. Cho et al. (2010) wrote that self-evaluation and peer evaluation can

reinforce self-monitoring efficacy and make communication on asynchronous platforms clearer and smoother.

Summary

Asynchronous cyber communication in terms of non-simultaneous messaging is an essential component of this Twitter-assisted approach to language teaching and learning. It is important to identify the characteristics of asynchronous communication and its educational value for stimulating language learning. The advantages of asynchronous communication are that learners have more time to outline their own thoughts before they are shown to the public. Moreover, the discussion thread can be reviewed and disseminated in an online learning community. With the assistance of technology, learning opportunities are increased and a stronger sense of learning community reinforced. As for language learning, asynchronous platforms allow learners to practice their target language by responding and participating in the online discussion in and after class meeting sessions.

Social learning theory has provided a foundation for understanding the cognition process in language acquisition (Krashen, 2003; Powell & Kalina, 2009). By engaging in interaction, learners can observe and model behaviors from their peers in a reinforced social environment. The development of language process relies on human verbal or written communication in social settings to stimulate cognitive growth through engagement in social activities. There are many social networking sites that promote the concept of social interaction for quick and efficient communication. For language learners, the frequency of target language exposure and opportunity to use the target language in communication are the primary keys to successful learning. Twitter, like other social network websites, provides users with an intense experience

of information disseminating, personal status updating, and thought sharing. These functions of Twitter reflect the framework of social interaction.

In Krashen's (2003) theories of language acquisition, meaningful interaction rather than a grammar-oriented approach is required to acquire a language. Twitter could be seen as a social learning environment in which learners observe and contribute to the readability of tweets. Through sharing and exchanging opinions, learners are exposed to the target language and required to utilize their abilities in the target language to express themselves.

CHAPTER 3

METHODOLOGY

Research Questions

The main goal of this study was to examine whether adopting Twitter in a reading and writing course had a significant effect on students' learning achievement. The hypothesis was that Twitter creates a constructivist learning environment that facilitates the efficiency of communication and exposes learners to their target language in the process of learning English as a foreign language. Specifically, I investigated if learners' reading comprehension and writing skills improved after using Twitter. The premise of this study was that the control group and the experimental group had the same learning materials and instructor. Three research questions regarding the efficacy of using Twitter as a supplementary tool in learning were generated to guide this study. The third research question is intended to determine whether participants' motivation and attitude were different between classes with and without using Twitter.

1. Is there a difference in reading comprehension between learners who use Twitter as a supplementary approach to discuss course materials and learners taught without using Twitter as an assistant tool?

2. Is there a difference in students' writing competence between those using a Twitter microblogging platform and those who did not use Twitter for in-class discussion?

3. Is there a difference between motivation and devotion of the experimental group and the control group?

Design of the Study

This study was designed to investigate whether Twitter enhances learners' reading comprehension as well as their writing competence in English. The results were compared with pre- and posttests. A *t*-test was used to analyze whether Twitter had significant effects on the experimental group. Twitter's effect on users' competence in reading and writing and on their motivation was also examined. A survey was assigned to participants in both the experimental group and control group to determine their motivation and attitude toward using Twitter as a learning tool and learning regularly without Twitter and the resulting differences. The purpose of the survey was to investigate whether Twitter triggered learning motivation and positive attitude in language learning.

Participants

The participants in this study were 56 college students in a four-year institute of technology in Taichung, Taiwan, who were majoring in applied English. This university was selected for convenience and because of the willingness of the school to participate in this study. The Applied English Department at this school offers core English courses with relevant subjects in reading, writing, speaking, and listening as well as several requirements in business subjects and other selected foreign languages courses. The participants in this study were in the day division, which indicates that they are full-time students whose ages range from 18 to 23. The study was conducted in two identical English reading/writing classes (i.e., control and experimental groups); each class comprised 28 students.

The academic background of these participants was relatively homogeneous in that they all passed the College Entrance Exam prior to registration in the university. These test scores determine whether they are accepted to the desired universities according to the ranking status of the school. Student registration records also indicate that their College Entrance scores on the general scholastic ability and separate subject tests required in the department are in a relatively similar range. Therefore, students' levels of English knowledge were very similar between the control and experimental group.

Procedure

Obtaining Participants

Students from the day division in the Applied English Language department at a technological university were recruited as participants in this study. All participants had the same instructor. The experimental group's class was held in a classroom with computer equipment to take advantage of the Twitter-assisted approach to learning. The students in the control group were in a traditional classroom. There were 28 students in each group. As part of the recruitment procedure, the instructor announced the research procedure and purpose of the study and gave each participant an informed consent form. The forms were collected and sorted according to students' willingness to participate in this study, then sealed in an envelope and returned to the researcher. Students who did not want to participate in this study still had to fulfill the required assignments for the course, course activities, and assessment in order to pass the basic course requirements. However, the results from those who did not want to participate in this study were not to be included in the data analysis. However, no student refused to participate in this study.

In the experimental group, the instructor helped participants to register for their own Twitter accounts. Participants were then required to "follow" (a process whereby the user identifies whose tweets she or he will receive) the instructor and their classmates. For the first two weeks, the participants were required to tweet in order to become accustomed to the functions.

Treatment

The students in the experimental group registered for a Twitter account during the course. The instructor posted pertinent questions regarding course content and supplemental articles from the students' textbook or the Internet, and the participants were required to post their answers to the questions in English on Twitter during class. All the reading assignments for both the experimental group and the control group were from the same textbook or resources for supplemental reading and discussion exercises. The control group had the same amount of instructional time as the experimental group in this research investigation.

A new article was presented every week as reading material, and students in the experimental group were asked to briefly summarize the reading materials on Twitter or answer questions posted by their instructor in order to evaluate their reading comprehension and ability to organize various essay writing styles. The reading questions were related to specific main concepts or particular sentences from the reading passages. Students' tweets were evaluated by their instructor based on pertinence to the topics, the grammatical or syntactical effectiveness of their comments, and the depth of the ideas formulated in the tweets. Interaction among the students was important, so the instructor also evaluated peer interaction on Twitter based on sociolinguistic and strategic competences from Borau et al.'s (2009) concept of communicative competence.

During the class meetings, the instructor projected all the tweets on a screen and briefly discussed them from the perspectives of content validity and grammatical accuracy. Participants were encouraged to have Twitter interactions with their peers regarding their responses to the questions posted from the instructor or from their peers. The Twitter-assisted teaching approach continued for eight weeks over eight course meetings.

Students in the control group read the same new article as the experimental group every week, but they were taught with traditional instruction (mainly lecture and in-class discussion) and without any in-class assistance with Internet media. The instructor gave paper-based copies of materials to the students and they discussed the texts orally or with paper and pencil. Students in the control group engaged in the same writing exercises as the experimental group such as writing down sentences on a piece of paper to summarize their reading assignments and discussing their essay writing orally in class. They also wrote down their opinions in essay form after discussion for each topic.

Background of the Instructor

The instructor earned her Master's degree in education from a university in the United States and has three years of teaching experience in universities around the Taichung area. The period of this study was her first time using Twitter and her first time implementing Twitter as a supplementary tool in the classroom.

The instructor reported that she usually follows the exercises in the textbook and assigns writing topics to her students based on the writing activities in class or from her supplementary reading materials from the World Wide Web. The instructor's teaching method in writing is to provide information about basic essay structure and also to elicit a scenario from the topics as writing inspiration for her students. Inspiring students' critical thinking and engaging students in

the extensive writing activities needed to respond to the reading comprehensive questions were her primary methods of instruction. The writing course requires students to participate in all course activities. Therefore, all the activities which are related to this study were counted toward the students' course participation scores.

The instructor had to keep the course content, discussion, and activities parallel in both the control and the experimental group. The assessment criteria for discussion in both courses were based on the concept of educational valuable talk (EVT) in quantity, quality, relation, and manner (Uzuner & Mehta, 2010). However, the application of EVT as an evaluation tool for participants' writing discussion and engagement in the control and the experimental group was not included in the data analysis. These criteria provide the instructor with insight and measurement for facilitating the writing discussion activities for all participants across the two groups. The only difference was the method of engaging the discussion for course writing activities: the experimental group used Twitter while the control group used paper for short essay writing activities.

Instructional Steps

For the experimental group, the instructor tweeted a link to each article and asked some questions regarding the article. All the followers tweeted their own comments in answer to the questions, and the instructor responded to each individual by the end of the week. During the course meeting sessions, the instructor pinpointed specific tweets for further comment and explanation. The participants were advised explicitly about the formulation of their ideas, communicative skills, and syntactic structure of their tweets. For the control group, the instructor handed out photocopied articles and assigned sentences and essays related to the articles. Students' essay writing exercises in the control group were also advised individually.

Four criteria were used to assess whether the students' writing in both groups achieved the expectations of EVT (i.e., quantity, quality, relation, and manner; Uzuner & Mehta, 2010), mainly focusing on the length of idea, writing criticism ability, relevance of comments to the topics, and clarity of statements.

Instruments

Reading and Writing Assessment

The General English Proficiency Test (GEPT) intermediate level preparation book called *Get the Point* was used to measure students' reading and writing skills. This book contains a reading comprehension section and a writing section as a simulation test. There are two same-level serial versions of the test simulation books. Serial 1 was used for the pretest and Serial 2 was used for the posttest. The books are published by Cave, a bookstore and distributor that has been the textbook supplier for many English instructors and universities in Taiwan. Each unit of the book contains reading comprehension with multiple-choice questions and writing exercises. There are also vocabulary, grammar, and writing analysis sections to help users to understand the questions and the answers in depth.

The English proficiency exam was originally commissioned by the Ministry of Education in Taiwan to provide a reliable measurement for English competence. Those who pass this government-based and criterion-based exam are certified to have succeeded at a specific level in the GEPT. There are four levels in the exam: beginning, intermediate, high-intermediate, and advanced. Most college English majors in Taiwan are expected to have the ability to pass at the high-intermediate level in the GEPT.

In this study, the simulated GEPT preparation materials were the instrument and assessment criteria used to evaluate the participants' reading comprehension and essay writing

competence. Since the participants have not passed the GEPT intermediate level exam, it is unlikely that they had mastered the material. Furthermore, the participants did not know which assessment tool would be used for their pretest and posttest, making it unlikely that they would have prior knowledge of the questions in the book.

Reading comprehension performance was evaluated by the scores on multiple-choice questions that determine whether the participants comprehended the reading passages. The writing essay was graded based on the holistic rubric developed by Clark (2003). There are six levels in this rubric. The criteria of the grading system are from the perspectives of writing content, grammatical errors, and organizations. Table 1 shows the rubric for this assessment.

All participants took the pretest prior to their first session. For the first section, reading comprehension, students read the passages and answered multiple-choice questions. In the second test section, the students wrote a short essay which included an introduction, body, and conclusion. The evaluation was based on Clark's (2003) holistic rubric with the criteria on the academic structure in paragraphing, organization, grammar, usage, mechanics, and writers' main concept as shown in Table 1. The intent of the pretest was to identify whether the control and experimental groups had homogenous English competence by measuring the mean of both groups. Similar reading and writing measurements were used as a posttest to identify the significance of the treatment between the control and experimental groups.

Table 1

Rubric for Writing Assessment

Range	Level of proficiency	Description
6	Excellent	The writing has substantial content and clear organization. It presents ideas clearly and even gracefully.
5	Very good	The strengths outweigh the weaknesses. It has solid development and is clearly organized and focused, but is not as strong as a 6.
4	Good	The strengths outweigh the weaknesses, but the development of ideas is not as complete, the organization and focus are not as clear, and the language is not as strong.
3	Fair	The strengths and weaknesses are about equally balanced. The writer has tried to develop ideas, focus the paper, and use effective language, but parts are underdeveloped, disorganized, or confusing. The writing may also be too general or predictable.
2	Weak	The weaknesses outweigh the strengths. The writing is weak, underdeveloped, poorly focused, and too general. However, it could be error-free.
1	Poor	The weaknesses outweigh the strengths in most ways. It is unfocused, underdeveloped, and plagued with grammatical errors that make it unintelligible.

Survey

In addition to the GEPT, all participants in both the experimental and control groups took the Motivated Strategies for Learning Questionnaire (MSLQ) at the end of the eight-week course to determine their learning motivation and attitude. This questionnaire was originally developed by the National Center for Research on Improving Postsecondary Teaching and Learning at the University of Michigan in 1986 (Garcia & Pintrich, 1995).

The questionnaire is based on social-cognitive perspectives of motivation and learning strategies. It evaluates motivational processes at the course level (Garcia & Pintrich, 1995). From 1982 to 1986, the questionnaire was used as a self-report instrument to assess students' motivation and learning strategies in the courses offered by the University of Michigan. The instrument items were continuously revised for the participants' academic performance and to measure the participants' aptitude. The MSLQ has two sections (motivation and learning strategies) with 25 questions measured on a 7-point Likert scale. The motivation measurements include intrinsic goal, extrinsic goal, and task value. The learning strategies measurements include cognitive, metacognitive, and resource management strategies (Magno, 2011).

The questionnaire has been shown to be valid in motivational and learning strategies analysis, and it has maintained a high level of internal consistency (Garcia & Pintrich, 1995). There are a number of modified versions of the MSLQ for measuring learners' motivation in learning on the Internet available as free resources, and it can be further modified to fit the needs of particular research measurements and purposes. One of the questionnaires that has been modified is from Pintrich and DeGroot's (1990) study on motivational and self-regulated learning components.

The version of the questionnaire used in this study was available on Google and contained 25 questions regarding participants' levels of motivation and attitude measured on a Likert-type scale. The original five levels of response were modified to four and include 1 = *not at all true of me*, 2 = *not true of me*, 3 = *true of me*, and 4 = *very true of me*. The option *neither not true nor true of me* was removed so the participants had to express their opinion.

The rationale for reducing the Likert scale was to make the result more distinct. Busch (1993), Garland (1991), and Reid (1990) indicated that without the neutral response items in a

survey, respondents can make a more distinguished choice in expressing their feelings or thoughts, and omitting mid-range categories could make the result more decisive. Bourke and Frampton (1992) suggested that fewer response categories in a survey might produce more consistent responses in terms of reliability and that younger respondents might feel more comfortable with less blurry options. Nevertheless, the reliability of the 4-point scale MSLQ measuring the learners' self-regulation in learning was tested after the data were collected. The reliability test of the MSLQ is described in the questionnaire analysis section in Chapter 4.

Analysis

The test scores of the control and the experimental groups were compared and analyzed after the posttest. A *t*-test analysis was used to examine the reading comprehension and essay writing scores. In this study, the independent variable is the implementation of Twitter in the experimental class. The dependent variables are the students' reading and writing performance. There were four null hypotheses for *t*-test analysis.

1. There is no significant difference in reading from pretest to posttest in the experimental group.

2. There is no significant difference in writing from pretest to posttest in the experimental group.

3. There is no significant difference in reading from pretest to posttest in the control group.

4. There is no significant difference in writing from pretest to posttest in the control group.

First, an independent *t*-test was used to compare means within the two separate groups from pretest to posttest in order to examine any significant difference from adopting Twitter as

an assistant tool. The posttest scores were used to analyze whether the experimental

manipulations made any difference compared with the control groups. More specifically, the

means of the participants' reading and writing scores from pretest to posttest were analyzed.

There were independent and dependent sample *t*-test analyses to examine the four hypotheses in

this study. First, the scores of the control group from the pretest to the posttest on reading

comprehension performance and writing performance were analyzed. Second, the scores of the

experimental group from the pretest to the posttest on reading comprehension performance and

on writing performance were analyzed.

Scores were analyzed by using dependent means *t*-tests for each group in order to see if

there was any change from the pretest to the posttest. The pretest results of the control group

identified whether their English competence was similar to that of the experimental group. The

results of Levene's test of equality of error variances suggested these two groups were

homogeneous. The posttest scores of the control group were used to compare whether the

traditional method made any difference compared with adopting Twitter as a supplementary tool.

There was a blind review for scoring the test. A third party who is a qualified Applied

English Language Department instructor who did not know the group taking the test was asked

to score the results. The scorer was an adjunct from another university and a friend of the course

instructor. The grading rubric for writing assessment was provided to facilitate the scoring

process. The scorer was not informed of either the purpose or the topic of the current study.

A questionnaire was given to each participant in the experimental group and the control

group in order to compare whether there is any difference in learners' willingness and devotion

in using Twitter and without using Twitter for identifying their motivation and attitude. The

results of the questionnaire were examined by using an independent *t*-test analysis. Moreover,

the course instructor's characteristics in terms of teaching style and experiences with Twitter were included as references for further data analysis in this study.

Assumptions

There were two assumptions in this study. The first was that the participants in the experimental group and the control group performed an equal amount of writing during the course session and that both groups performed similarly. The hypothesis guiding this study was that the experimental group was going to perform better in writing and reading when using Twitter as an extra communicative tool in the course meeting sessions because Twitter increases the chances of authentic interaction in which the target language is being used as a means of communication rather than in an assignment or grammar drills. Furthermore, tweeting provided the participants with opportunities to convey ideas in written form that facilitated their learning in syntactic structures and idea expressions. The second hypothesis was that the participants would want to use Twitter as an extra tool to express their statements or questions in producing collaborative work and opinion assessing (Grosseck & Holotescu, 2008).

Limitations

The major limitations of this study were the students' English proficiency level and their diligence to accessing Twitter and engaging in their experimental tasks. The participants' English level was unequally distributed, which made their Twitter contributions polarized in terms of English structure or vocabulary. Students with lower English proficiency could be misunderstood in making their comments, which impeded the flow of Twitter communication. Moreover, the participants' varying English proficiency impacted their performance or motivation for using Twitter, which also may have affected the result of the posttest. Interlanguage interference occurred because the participants in the study were all non-native

English learners. Thus, students' writing may have been influenced by their native language, resulting in ungrammatical sentences or even communication breakdowns.

Another limitation was students' devotion to accessing Twitter activities in response to course tasks. The main purpose of applying Twitter was to create a platform for the participants to have more intensive interaction. However, Taiwanese students tend to be more reserved in expressing their ideas in public due to the influence of Confucian philosophy, which emphasizes keeping harmony in a group (Smith et al., 2005). This traditional value has been deeply ingrained into the majority of Taiwanese. Therefore, the participants may have treated their Twitter activities as a routine for merely completing assignments.

The third limitation was that the limited number of characters used in Twitter posts confined the writing structure so that writers could not express their intended thoughts in longer paragraphs. That is, writers needed to be concise and accurate in composing tweets. This did not prove to be a problem because participants were able to break down longer opinions to several tweets. The participants in the experimental group usually had to tweet several times to complete their discussions on certain topic.

The wide variation in the students' English proficiency may have impacted the results of their reading comprehension and writing performance during the GEPT simulation test. However, the subjects in this study were majoring in applied foreign language, so it was reasonable to make the assumption that the subjects' general English ability was at least equivalent to the GEPT beginning level. This study was intended to examine whether using Twitter as an assistant tool would have an effect on college students' reading and writing comprehension. The expectation of this experiment was that there would be a significant impact on students' learning in reading and writing.

Delimitations

Using Twitter intentionally stimulated users to participate in reading and writing in their target language environment. This study mainly focused on using Twitter as a communicative tool and a microblogging platform for participants to convey their perspectives or questions. It was the interaction and the frequency of using Twitter to write and read that defined this research. This experiment was intended to examine the effect of using Twitter, which required the instructor to assess her students' tweets and to stimulate users' interaction on Twitter from time to time to encourage written communication. The validity of tweets was evaluated by the clarity of the statement and by grammatical and rhetorical usages. Although it was conceivable that some students merely adapted the templates to their responses and muddled their words through the whole experiment, a Twitter-assisted approach could trigger the participants' motivation during the activities by raising their interest in actively joining the Twitter interaction.

Clarification of writing structure and students' frequency of tweeting determined whether the communication and the discussion were carried on in a smooth and effective fashion. Therefore, systematic guidelines and evaluation of the tweets on Twitter determined the effect and the result of this study. Moreover, the participants were encouraged to actively engage in Twittering, and course requirements were constructed in order to create a social learning environment. This was a crucial element for this investigation. It was important that students felt obliged to participate in this activity and that their contributions made discussion interesting and fruitful.

CHAPTER 4

RESULTS OF THE STUDY

The purpose of this study was to explore whether applying Twitter, a popular social network microblogging website, made any impact on students' performance in English writing and reading in a college EFL writing course in Taiwan. A secondary purpose was to examine whether the application of Twitter had any influence on the students' learning motivation and strategies. The participants in the control group learned through conventional paper-and-pencil writing methods for in-class free writing and brief in-class oral discussion. The experimental group learned through Twitter-assisted learning in which the in-class writing activities were conducted through discussion on Twitter. All students' pretest and posttest reading and writing scores were analyzed using SPSS software to conduct t-tests. In addition, the mean scores of both the control and the experimental group on the MSLQ were compared to examine whether the application of Twitter had any impact on the participants' learning motivation and strategy.

A total of 56 students participated in this study; each writing class had 28 students evenly distributed in the control and the experimental groups. There were two sections in both the pretest and posttest (i.e., reading and writing). The total possible score for the reading comprehension test and the essay writing test was 100 points (i.e., 50 points for each section).

As shown in Table 2, the total mean score for the reading section of the pretest of all students in both groups was 39.07 (out of a possible 50 points), and the total mean score for the writing section of the pretest of all students in both groups was 24.93 (out of a possible 50 points). The total mean score on the reading section of the posttest of all students in both groups was 35.48 (out of a possible 50 points), and the total mean score for the writing section of the posttest of all students in both groups was 35.73 (out of a possible 50 points). Table 2 also shows the highest and lowest scores achieved on each section.

Table 2

Descriptive Statistics for Both Groups' Pretest and Posttest

Groups	N	Low	High	M	SD
Pretest Reading	56	18	50	39.07	7.084
Pretest Writing	56	10	38	24.93	7.076
Pretest Total	56	34	83	64.18	11.301
Posttest Reading	56	8	46	35.48	8.288
Posttest Writing	56	24	48	35.73	4.893
Posttest Total	56	32	92	71.21	10.981

From the descriptive statistical analysis, it is obvious that both groups had significant improvement in their writing scores. Tables 3 and 4 show the improvement of each group. The mean score of the control group on the writing pretest was 23.71, while the mean score for the experimental group was 26.14. After taking the course, the mean score of the control group on the writing posttest was 34.54, and the mean score of the experimental group was 36.93. However, there was no improvement in reading score for both groups from pretest to posttest (see Tables 3 and 4). The reading mean scores went down slightly from pretest (39.07) to

posttest (35.48). The paired sample *t*-test analysis in both the control and the experimental group

indicated that the downward reading score had no significance.

Table 3

Descriptive Statistics for Pretest

Groups	N	M	SD
Pretest Reading			
Experimental	28	37.93	7.252
Control	28	40.21	6.849
Pretest Writing			
Experimental	28	26.14	6.792
Control	28	23.71	7.267
Pretest Total Score			
Experimental	28	64.43	11.523
Control	28	63.93	11.281

Table 4

Descriptive Statistics of Posttest

Groups	N	M	SD
Posttest Reading			
Experimental	28	35.21	7.529
Control	28	35.75	9.115
Posttest Writing			
Experimental	28	36.93	3.579
Control	28	34.54	5.744
Posttest Total Score			
Experimental	28	72.14	9.664
Control	28	70.29	12.265

Test of Homogeneity of Variances

Homogeneity of the two groups was tested using a one-way analysis of variance

(ANOVA). Applying Levene's test of equality of error variances, the pretest reading score, the

pretest writing score, and the pretest total score were respectively 0.396 (p = 0.532), 0.039 (p =

0.845) and 0.024 (p = 0.878). Table 5 displays these values. Because the p values were greater

than alpha (.05), the null hypothesis was not rejected; the groups were not significantly different

from each other. The assumption that these two groups were homogeneous was confirmed.

Table 5

Homogeneity of Variances Test

Pretest Score	Levene	df1	df2	Sig
Reading	.396	1	54	.532
Writing	.039	1	54	.845
Total	.024	1	54	.878

Independent Sample *t*-Test

The purpose of using an independent sample *t*-test was to understand whether there was

any statistical significance across different groups on the students' reading and writing scores.

Differences in these scores could be due to the influence of the different learning settings. First,

any significant difference in the different groups on the pretest was analyzed. Table 6 shows the

results of this analysis. Using Levene's equality of variances test, the *F* values for the pretest

scores in reading, writing and the total score were respectively .396, .039, and .024. The *F*

values were all greater than .05, so the null hypothesis was not rejected. In other words, the

difference is not statistically significant. Furthermore, the *t* values of the reading and writing

scores and the total score were respectively -1.213, 1.292, and .164, which is not significant.

Being in different groups did not make any significant difference on reading and writing scores

in the pretest.

Table 6

Analysis of Variances in Reading and Writing Scores (Pretest)

Pretest	Score Average		*F*-Value	Sig *F*	*t*-Value (2-tailed)	Sig *t*
	Experimental (*N* = 28)	Control (*N* = 28)				
Reading	37.93	40.21	.396	.532	-1.213	.231
Writing	26.14	23.71	.039	.845	1.292	.202
Total	64.43	63.93	.024	.878	.164	.870

Note. *p* < .05; ** *p* < .01; *** *p* < .001

The second purpose of using an independent sample *t*-test was to find out whether

different groups had any impact on the students' reading and writing scores on the posttest.

Levene's equality of variances test was again used to analyze the groups. The results are shown

in Table 7. The *F* values from the analysis in reading, writing and total score were

respectively .235, 5.628, and 1.127, and the *t* values on the posttest in reading, writing, and the

total score were respectively -.240, 1.871, and .629. This shows that only the writing score had a

significant difference. However, none of these *t* values were significantly different; being in

different groups did not lead to any significant difference in score.

Table 7

Analysis of Variances in Reading and Writing Scores (Posttest)

Posttest	Score Average		F-Value	Sig F	t-Value (2-tailed)	Sig t
	Experimental (N = 28)	Control (N = 28)				
Reading	35.21	35.75	.235	.630	-.240	.811
Writing	36.93	34.54	5.628*	.021	1.871	.068
Total	72.14	70.29	1.127	.293	.629	.532

*Note. *p < .05; ** p < .01; *** p < .001*

Dependent Sample *t*-Test

The analysis also included paired sample *t*-tests using dependent means for examining any significant difference from pretest to posttest within each group. For the control group, the *t*-values in reading, writing, and the total score were respectively 2.534, -6.646, and -2.410. The writing score indicated a significant difference ($p = 0.000$). The other *t* values were greater than .05, so the null hypothesis was not rejected. This means that there was no significant difference except in writing score in the control group from pretest to posttest (see Table 8).

The second goal of using paired sample *t*-tests was to analyze whether there was any significant difference in reading and writing in the experimental group from pretest to posttest without the influence of controlled variables. As shown in Table 9, the *t* values in reading, writing and the total score were respectively 1.146, -8.235 and -2.400. Only the scores for writing reached the level of significant difference ($p = 0.000$). The other *t* values were greater than .05, so the null hypothesis was not rejected.

Table 8

Paired Analysis of Variances in Reading and Writing from Pretest to Posttest (Control Group)

	M	SD	SEM	Lower	Upper	t	df	Sig (2-tailed)
Reading	4.464	9.323	1.762	.849	8.079	2.534	27	.017
Writing	-10.821	8.615	1.628	-14.162	-7.481	-6.646***	27	.000
Total	-6.357	13.956	2.637	-11.769	-.946	-2.410	27	.023

*Note. *p < .05; ** p < .01; *** p < .001*

Table 9

Paired Analysis of Variances in Reading and Writing from Pretest to Posttest (Experimental Group)

	M	SD	SEM	Lower	Upper	t	df	Sig (2-tailed)
Reading	2.714	12.534	2.369	-2.146	7.574	1.146	27	.262
Writing	-10.786	6.930	1.310	-13.473	-8.098	-8.235***	27	.000
Total	-7.714	17.005	3.214	-14.308	-1.120	-2.400	27	.024

*Note. *p < .05; ** p < .01; *** p < .001*

Questionnaire Analysis

To evaluate their learning motivation and attitudes, all participants in both groups were asked to fill out the MSLQ at the end of the study. This instrument contained two main sections: one on motivation and one on learning strategy. The motivation section of the version of the MSLQ that was distributed to the participants contained two components with four scales. The first component under the motivation section, "value," contained three scales: intrinsic, extrinsic,

and task value. The second component under the motivation section is "expectancy," which contained a control of learning scale. The second part of the questionnaire, the learning strategy section, measured one component (resource management strategies) with four scales: time and study, effort regulation, peer learning, and help seeking. Tables 10 and 11 present the questions used to measure these components.

Table 10

MSLQ Question Items for Motivation (Questions 1-14)

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1. In a class like this, I prefer course material/design that really challenges me so I can learn new things.
2. I think I will be able to use what I learn in this course in other courses.
3. Getting a good grade in this class is the most satisfying thing for me right now.
4. It is important for me to learn the course material in this class.
5. The most important thing for me right now is improving my overall grade point average, so my main concern in this class is getting a good grade.
6. If I can, I want to get better grades in this class than most of the other students.
7. In a class like this, I prefer course material that arouses my curiosity, even if it is difficult to learn.
8. I am very interested in the content area of this course.
9. The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible.
10. I think the course material in this class is useful for me to learn.
11. When I have the opportunity in this class for choosing tasks/assignments in this course, I choose tasks/requirements that I can learn from even if they don't guarantee a good grade.
12. I like the subject matter of this course.
13. Understanding the subject matter of this course is very important to me.
14. I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.

Table 11

MSLQ Question Items for Learning Strategy (Questions 15-25)

15. When studying for this course, I often try to explain the material to a classmate or a friend.
16. I often feel so lazy or bored when I study for this class that I quit before I finish what I planned to do.
17. Even if I have trouble learning the material in this class, I try to do the work on my own, without help from anyone.
18. I try to work with other students from this class to complete the course assignments.
19. I work hard to do well in this class even if I don't like what we are doing.
20. When studying for this course, I often set aside time to discuss the course material with a group of students from the class.
21. I ask the instructor to clarify concepts I don't understand well.
22. When course work is difficult, I give up or only study the easy parts.
23. When I can't understand the material in this course, I ask another student in this class for help.
24. Even when course materials are dull and uninteresting, I manage to keep working until I finish.
25. I try to identify students in this class whom I can ask for help if necessary.

The questions on the original version of the MSLQ were measured on a 7-point Likert scale, but that scale was modified for the purposes of this study. The modified scale had four points: 1 = *not at all true of me*, 2 = *not true of me*, 3 = *true of me*, and 4 = *very true of me*. The rationale for modifying the Likert scale was to gain more distinct results (Busch, 1993; Garland, 1991; Reid, 1990). The mean scores were calculated for each question in this study. However, because the Likert scale for this questionnaire was changed, it was necessary to examine the internal consistency. The common standard for judging the acceptable value of reliability is .70 (Kline, 1986). Using Cronbach's alpha to examine the questionnaire responses, the total reliability of the questionnaire was .83 for the experimental group and .78 for the control group, both of which are considered good internal consistency.

For the first examination, the mean scores of motivation and strategy in each group were presented and compared. For the control group, the highest average on the motivation section was for belief in control of learning (Question 4, "It is important for me to learn the course material in this class." $M = 3.18$). In other words, the participants strongly believed that they could control their own learning and that they were responsible for their learning outcomes through their own hard work and effort (Garcia & Pintrich, 1995). The lowest mean score on the motivation section was 2.07 for question 10 in the task value scale ("I think the course material in this class is useful for me to learn"), which indicated the participants' perceptions of the utility level of course materials. In general, the task value scale received the lowest overall mean score (Questions 2, 8, 10, 11, $M = 2.34$), showing that the degree of participants' perception of the course materials and the activities in terms of interest, importance, and utility was relatively low. Table 12 shows the results for the motivation section for the control group.

The second section of the MSLQ measured the control group participants' learning strategies. Table 13 shows the scores for the questions in this section. Higher mean scores were given for Questions 23, 24, and 25 (3.07, 3.00, and 3.21, respectively). These three questions indicated that the students' levels of help-seeking strategies and determination to complete the course requirements were higher than for other scales in the learning strategy section. The lowest mean score was for the peer learning scale (Question 15: $M = 1.93$); most students rarely discussed course materials with their classmates or friends. It is important to note that Questions 16 and 22 are phrased negatively, so a lower mean score on these two questions indicates the students put into their learning a higher level of diligence and conscientiousness. According to

Pintrich and DeGroot (1990), effort regulation indicates learners' commitment and resolve to solve problems and complete tasks. The mean scores for Questions 16 and 22 are respectively 2.25 and 2.39.

Table 12

Control Group's Motivation Result (N = 28)

	Motivation		M	SD	Overall Mean
Intrinsic		Question 1	2.1785	.66963	2.5499
		Question 7	2.4285	.83571	
		Question 9	2.8214	.94491	
		Question 12	2.3571	.62148	
		Question 13	2.9642	.83808	
Extrinsic		Question 3	2.3214	.86296	2.7678
		Question 5	2.8571	.93151	
		Question 6	3.0714	.81325	
		Question 14	2.8214	1.05597	
Task Value		Question 2	2.4642	.79265	2.3392
		Question 8	2.0000	.60858	
		Question 10	2.0714	.66268	
		Question 11	2.8214	.72283	
Control of Learning		Question 4	3.1785	.77237	3.1785

Table 13

Control Group's Learning Strategy Result (N = 28)

	Learning Strategy		M	SD	Overall Mean
Resource Management Strategies	Time & Study	Question 20	2.1428	.70523	2.1428
	Effort Regulation	Question16	2.2500	.00461	2.5142
		Question17	2.1785	.61183	
		Question 19	2.7500	.70052	
		Question 22	2.3928	.78595	
		Question 24	3.0000	.66666	
	Peer Learning	Question 15	1.9285	.71639	1.9285
	Help Seeking	Question 18	2.5000	.88191	2.7589
		Question 21	2.2500	.79930	
		Question 23	3.0714	.66268	
		Question 25	3.2142	.62994	

Motivation and learning strategy levels in the experimental group were analyzed as well. In the motivation section, the overall mean scores for intrinsic, task value, and control of learning level (3.09, 3.14, and 3.36, respectively) were significantly higher than those in the control group. Table 14 shows the mean scores of the experimental group on the motivation section of the MSLQ.

Table 14

Experimental Group's Motivation Result (N = 28)

	Motivation	M	SD	Overall Mean
Intrinsic	Question 1	3.0357	.50787	3.0856
	Question 7	3.1071	.62889	
	Question 9	3.1428	.6506	
	Question 12	3.1428	.75592	
	Question 13	3.0000	.82649	
Extrinsic	Question 3	2.7500	.75154	2.7499
	Question 5	2.8571	.97046	
	Question 6	2.7857	.83253	
	Question 14	2.6071	.87514	
Task Value	Question 2	3.0714	.46575	3.1428
	Question 8	3.0357	.42879	
	Question 10	3.3928	.56694	
	Question 11	3.0714	.60421	
Control of Learning	Question 4	3.3571	.62148	3.3571

In the intrinsic section, the scales reflect the degree of the quest for learning, sense of challenge, and knowledge proficiency participants gain from engagement in course activities and tasks (Pintrich & DeGroot, 1990). The finding of a higher mean score for the intrinsic level in the experimental group corresponds to previous findings that Twitter-assisted learning has the potential to enhance students' interest in participating in discussion and their engagement in doing course activities. Twitter-assisted learning is based on social interaction theory in which learners will gain new knowledge from experiencing interaction with their peers. Furthermore,

the interaction will also enhance learners' learning motivation. The higher intrinsic scale in the motivation section implies that using Twitter in class could inspire the learners' discussion among peers and stimulate social interaction triggered by learners' interest or curiosity in pursuit of the answers for completing course requirements (Borau et al., 2009; Junco et al., 2011; Lu & Yeh, 2008).

The mean score on the task value scale indicates the students in the experimental group generally perceived that the Twitter-assisted learning approach and the course materials were useful, interesting, and essential to their learning. The result of the question on task value (overall mean = 3.14, Question 4, "It is important for me to learn the course material in this class") also reflected previous findings about the educational effects of the application of Twitter in learning. Twitter could enhance users' learning interest and linguistic competence through the process of tweeting in a framework of an online community (Borau et al., 2009; Dunlap & Lowenthal, 2009; Grosseck & Holotescu, 2008; Stevens, 2008). Among these participants, the Twitter-assisted learning method indeed had a positive influence on their recognition of the usefulness of course materials from the task value perspective.

According to Pintrich and DeGroot (1990), the belief of control of learning has an influence on students' sense of engagement in participating and completing the tasks. The relatively high mean score for this item (3.36) indicated that Twitter had an impact on the students' belief that they are responsible for their learning and outcomes. This phenomenon mirrors findings in the literature in which Twitter facilitates learning motivation and engagement in class. However, it has not been found that Twitter could trigger students to achieve higher

grades or to learn for rewards. The lower mean scores for the extrinsic scales (overall mean =

2.75) reflect the possibility that Twitter has less impact on learners' motivation to pursue better

grades for utilitarian purposes, such as rewards.

The second part of the MSLQ measured the participants' learning strategy. In this

section, the data also revealed some significant information about the students' learning

strategies and attitudes toward time and resource management as well as their desire to ask for

outside help in order to accomplish the course tasks. Table 15 shows the mean scores on this

section for the experimental group. The overall mean scores in peer learning (3.36) and help

seeking (3.10) were significantly higher than for time and study (2.23) and effort regulation

(2.69). Furthermore, the overall mean scores of peer learning (3.38) and help-seeking (3.10) in

the experimental group were significantly higher than in the control group; participants in the

experimental group more often sought help from their peers or instructor and exchanged

intellectual information in order to meet the requirements of course tasks. It is important to note

that Questions 16 and 22 regarding effort regulation were phrased negatively, so a lower mean

score indicates higher effort the students put into their study. The mean scores for Questions 16

and 22 were respectively 2.29 and 2.25, which is not significantly different from the scores for

the control group. However, the mean scores for the peer learning and help seeking scales in the

experimental group reflected the effects of social interaction as shown in the literature review.

The participants who learned with Twitter showed a higher average of engaging in social

interaction in class.

Table 15

Experimental Group's Learning Strategy Result (N = 28)

	Learning Strategy		*M*	*SD*	Overall Mean
Resource Management Strategies	Time & Study	Question 20	2.3214	.94491	2.3214
	Effort Regulation	Question16	2.2857	.80999	2.6928
		Question17	2.5357	.83808	
		Question 19	3.0714	.60421	
		Question 22	2.2500	.84437	
		Question 24	3.3214	.54796	
	Peer Learning	Question 15	3.3571	.69293	3.3571
	Help Seeking	Question 18	3.1071	.68525	
		Question 21	3.0357	.83308	3.0981
		Question 23	3.0714	.71639	
		Question 25	3.1785	.77237	

Independent *t*-test MSLQ Analysis

The second examination was to see whether there was any significant difference across the groups in learning motivation and learning strategy. The purpose was to analyze whether different learning approaches had any significant impact on the participants' learning motivation and strategy. Using Levene's equality of variances test, the *F* values for motivation and strategy were respectively .440 and .440, which were both greater than .05. These two variances were approximately equal. The *t* values of motivation and strategy were -4.24 and -3.83 respectively, which were both greater than -1.96. This indicates that the motivation and strategy in the experimental group were significantly different (see Table 16).

Table 16

Analysis of Variances in Learning Motivation and Strategy

	Average		F value	Sig F	t-value (2-tailed)	Sig t
	(1)Control ($N=28$)	(2)Experimental ($N=28$)				
Motivation	2.5969	3.0255	.440	.510	-4.239***	.000
Strategy	2.5162	2.8377	.440	.768	-3.834***	.000

Note：*$p<.05$; ** $p<.01$; *** $p<.001$

Summary

The first research question addressed whether using Twitter as a supplementary tool makes any difference in reading between the experimental and the control group. The results of *t*-test analysis indicate that there is no significant difference in reading between the traditional and the Twitter-assisted learning approach.

The second research question asked whether using Twitter as a supplementary tool makes any difference in writing between the experimental and the control group. According to paired sample *t*-test analysis, the writing score *t* value in each group showed a level of significance. Specifically, there was a positive significant difference in writing for both groups on the posttest. Therefore, students in both the control and the experimental group did make a significant change. Twitter-assisted learning did make a significant impact in the experimental group, but did not make the students' writing outcomes greater than those of the group who were not using Twitter.

The third question was whether using Twitter makes any difference in the participants' learning motivation and strategy. The experimental group's mean scores on the intrinsic, task value, and control of learning scales of the motivation section of the MSLQ were higher than

those of the control group. This supports previous findings that Twitter could enhance learners'

course learning engagement, curiosity, interest, and desire to engage in student-centered

activities. Furthermore, the experimental group's mean scores on the peer learning and help

seeking scales of the learning strategy section of the MSLQ were higher than those of the control

group. Most of the students engaged in Twitter-assisted learning thought they engaged in more

social interaction with either their peers or their instructor in terms of inquiry and discussion of

learning content in class. According to an independent samples *t*-test on the results of the

MSLQ, the experimental group's motivation and strategy were significantly different from the

control group. This result reinforced the findings that the application of Twitter did enhance the

participants' attitudes in their learning motivation and also stimulated the learners to adopt social

interactive strategies in learning.

CHAPTER 5

DISCUSSION

This is a study of the effects of applying Twitter as a supplementary tool on the results of EFL learners' reading and writing performance in a college writing/reading class. The two major questions in this study were analyzed using pretest and posttest outcomes to examine students' reading comprehension and writing performance including essay organization, paragraphing, syntactical accuracy, and depth of the writer's idea. The participants' learning motivation and strategies were analyzed as well. Therefore, three research questions guided this study:

1. Is there a difference in reading comprehension between learners who use Twitter as a supplementary approach to discuss course materials and learners taught without using Twitter as an assistant tool?

2. Is there a difference in students' writing competence between those using a Twitter microblogging platform and those who did not use Twitter for in-class discussion?

3. Is there a difference between motivation and devotion of the experimental group and the control group?

Technology has been used in education to facilitate course engagement and stimulate critical thinking (Al-Jarf, 2004; C. C. Chen & Shaw, 2006; Chuo, 2007; Junco et al., 2011). Theories on social learning and second language learning for adults provide the basic rationale

for the application of Twitter in the current study. Social interaction in the learning process greatly enhances learners' levels of modeling and self-monitoring and can inspire learners to generate new information of their own (Cercone, 2008). The CAL theory describes adult learners' personal traits and learning implementation that influence learning achievement, including time, procedure, and location (Cassidy, 2004; Merriam, 2001). The theories of adult learning focus on learners' ownership and experiential learning.

Twitter-assisted learning approaches have relied on these fundamental frameworks of social learning and adult learning theories and are based on the principles of social interaction theory, collaborative learning, and experiential learning. Through its platform of asynchronous interaction, Twitter offers participants learner-centered experiences with knowledge scaffolding through peer interaction (Lubliner et al., 2008) as it allows users to engage in discussion and give feedback on specific tweets either publicly or in private. When Twitter is applied to a learning community, it is crucial that the instructor be responsible for facilitating and stimulating the course discussion. The instructor will need to prepare topics that provoke students' thoughts or stimulate them to demonstrate their competence in understanding of the course content.

Twitter has been shown to enhance collaboration and social interaction in several studies (Borau et al., 2009; Dunlap & Lowenthal, 2009; Grosseck & Holotescu, 2008; Junco et al., 2011). Knowledge or information online is often promptly shared, compared, inquired about, and discussed (Hou et al., 2009). Findings from studies on asynchronous collaboration and communication for educational purposes suggest that learners often help their peers through the behavior of blogging. In this current Twitter-assisted learning study, the participants also sent

tweets to each other regarding writing drills and had numerous chances to observe their

classmates responding to the instructor's questions on Twitter. Communication that occurs

online generally stimulates a higher quality of conversation because the users have more time to

synthesize others' discussion and produce thoughtful comments (Hou et al., 2009). Using

Twitter to practice the learners' target language is considered beneficial for EFL learners because

it enhances linguistic competence and recognition of cultural difference (Borau et al., 2009).

To test those assumptions identified in the previous literature discussion regarding

Twitter's educational effects and language learning benefits, 56 participants were asked to

participate in this study. They were randomly assigned into two groups based on odd and even

numbers in their student identification serial numbers. One of the groups was chosen to be the

experimental group because of the available schedule of using the computer classroom on

campus. The control group did not use any computer or Internet device in class. To minimize

the differences between the two groups and to ensure control of the variables of the teaching

method and learning materials, the control group engaged in paper-based free writing activities

during class meeting sessions while the experimental group engaged in writing activities through

Twitter in class. The two groups were shown to be homogeneous using Levene's Test of

Equality of Error Variances. All the significance values for both groups on the reading and

writing, and total pretest scores were greater than alpha value (.05). The scores on both pretest

and posttest on reading and writing and the total scores for both groups were analyzed by

independent and dependent sample t-tests.

There were two parts of the analysis for examining the participants' reading and writing performance: independent sample and dependent sample *t*-test. The first analysis was to see whether the different groups had significantly different scores on reading and writing in the pretest. The result of the independent sample *t*-test revealed no significant difference, indicating that these two groups were homogeneous. The second part of the independent sample *t*-test was to examine whether the scores of the different groups in reading and writing in the posttest were significantly different. All of the *t*-values from reading, writing, and the total score suggested that there were no significant differences across the groups. Therefore, with the premise of the same pedagogy and same learning materials across these two groups, the writing and reading score from the Twitter group did not indicate a significant difference compared with those in the non-Twitter group. This lack of difference could be because the participants did not use Twitter long enough or the students did not write long enough in either group.

Unlike previous studies, Twitter activities in the current study were only implemented during class meeting sessions. Social interaction is the key to authentic learning for learners and enhances the scaffolding process. However, social interaction based on discussion (through Twitter) of the participants' learning materials occurred only during the weekly class meeting in this study. In other studies of asynchronous communications in education, interactive activities with online discussion occurred both in and after class meetings (Ajayi, 2010; George & Dellasega, 2011; Johnson, 2011; Junco et al., 2011; Kessler & Bikowski, 2010). This current study was designed to minimize the different variables between the control and the experimental group, so writing activities were only implemented during the class meeting period. Therefore,

the time factor could be the reason that the different learning environments with Twitter or without Twitter did not make a significant difference during this two-month investigation. The students might need more time to make progress through intensive writing and reading exercises. From the instructor's observation, the students in the Twitter group produced more tweets toward the end of the investigation and wrote more than the non-Twitter group. The experimental group would have made greater progress if the investigation had been extended according to the course instructor's suggestion. On the other hand, the students might get better performance with any interactive platform. Nevertheless, Twitter is free to anyone. For those programs that are short of funds to establish an online learning system, a Twitter-assisted learning approach would be a convenient course discussion or group activities facilitator.

In addition, both groups had interactive writing activities in class, and the students' improved writing performance could have resulted from social learning regardless of whether it was in person or through Twitter. Furthermore, the instrument used for assessing the participants' English reading and writing ability was a criterion-referenced test. Although the mean of the total posttest score in the experimental group (72.14) was higher than in the control group (70.28), the participants might have needed more prior test training for the test preparation. There have been no studies on using Twitter for improving EFL learners' performance in a criterion-referenced test; most studies related to Twitter focus on its efficacy for course engagement or social interaction or for improving the relationship of the peers in discussion and student-teacher communication. These studies suggest the positive effects of Twitter on the quality of participation in course activities through tweeting. When it comes to

language learning, writing in Twitter using the students' target language is useful for enhancing the students' linguistic competence and cultural awareness (Borau et al., 2009). Therefore, although Twitter has the potential to improve language proficiency in general writing for communication, adopting Twitter as part of a test-oriented plan and strict procedures for test preparation may be necessary in order to reflect greater performance of writing on the criterion-based test.

Paired sample *t*-tests using dependent means for examining any significant difference from pretest to posttest within each group were also used to analyze the data for this study. The *t*-value showed there was no significant difference from pretest to posttest except for the writing score in the control group. In the experimental group, the *t* value also showed a significant difference from pretest to posttest only in the writing score. In other words, the *t* values were significantly different for writing in both groups (*p* value = 0.000). The improvement of writing scores in both groups indicated that social interaction facilitated the participants' writing strategies.

The dependent sample *t*-test result indicated a significant difference in the writing scores in each group. However, the writing performance in the Twitter group was not significantly better than that in the control group. The improvement of writing performance could have resulted from socially interactive teaching methods in both groups. The instructor adopted the same teaching pedagogy through different means in the control and the experimental group, so even though the students in the control group did not use Twitter, they were still learning through free writing discussion with their peers in class. Therefore, the improved writing score in both of

the groups supported previous findings of the positive effects of applying social interaction in

learning and course engagement (Eskrootchi & Oskrochi, 2010; L. Lee, 2007; Lubliner et al.,

2008; Murray & Goldbart, 2009; Philp & Tognini, 2009; Powell & Kalina, 2010; P. J. Tsai et al.,

2008).

Interestingly, both the independent and dependent sample mean test revealed that reading

scores did not change significantly. With Twitter, users can read others' tweets and external

links, allowing them to connect their information and other sources in an asynchronous platform,

which creates inter-contextual threads of discussion. However, most studies of Twitter have

emphasized the educational value of its effects on engagement, social interaction, and learners'

scaffolding. The effects of Twitter-assisted learning on improving language learners' reading

comprehension ability have never been quantitatively analyzed. Reading comprehension

competence reflects learners' understanding of the texts through their knowledge of vocabulary

and accurate response (Zare & Mobarakeh, 2011). In this study, the participants might have

needed more time to practice reading comprehension exercises in class. Moreover, a few of the

participants in the experimental group showed very low English proficiency in reading

comprehension tests; their performance might have lowered the group's average scores in

reading on the posttest.

Although the group who used Twitter-assisted learning did not outperform the non-

Twitter group to a statistically significant degree, the Twitter users did show significant

differences in their attitudes about learning motivation and strategy. All participants were given

the MSLQ after the posttest in order to see whether there was any change in the students'

learning motivation and strategy. In the motivation part of the questionnaire, the overall mean

scores of the question items in the intrinsic scale (3.09) and task value scale (3.14) from the

experimental group were significantly higher than the mean scores in the control group ($M =$

2.55 and $M = 2.34$ respectively). Moreover, the average scores on the intrinsic, task value, and

control of learning scales in the experimental group were above 3, indicating that most of the

experimental participants felt more positive about their motivation in learning. They were also

more interested in completing the course activities and study materials. By contrast, only the

control of learning scale in the control group was above 3. Most of the participants in the control

group thought that they had the responsibility for their learning performance, but they might not

have had as strong a motivation and interest in engaging in writing activities and doing the

course materials as the Twitter-using group. The higher intrinsic and task value scores in the

experimental group suggest that the Twitter-assisted learning approach could have an influence

on the users' learning interests and their perception of course activities (Borau et al., 2009; G. M.

Chen, 2011; Dunlap & Lowenthal, 2009; Elavsky, Mislan, & Elavsky, 2011; Grosseck &

Holotescu, 2008; Junco et al., 2011; Stevens, 2008; Wright, 2010).

For the learning strategy section of the MSLQ, the version of the questionnaire that was

distributed to the participants focused on resource management strategies. The questions in this

section were meant to examine the students' learning strategies related to monitoring behavior,

peer learning, seeking help, and managing time and their learning environment. The participants

in the experimental group gave positive responses on the peer learning and help seeking scale (M

$= 3.36$ and $M = 3.10$, respectively), especially compared to participants in the control group ($M =$

1.93 and $M = 2.76$, respectively). However, the mean scores in the time/study and effort

regulation scales did not indicate any significant differences. This result coincides with the

major functions of Twitter in its potential educational application to facilitate course engagement

and discussion (Dunlap & Lowenthal, 2009; Elavsky et al., 2011; Grosseck & Holotescu, 2008;

Junco et al., 2011; Stevens, 2008). The relationship of peers communicating through Twitter

would be closer and they would be more likely to make longer comments or ask more questions

(Junco et al., 2011).

Some description of the characteristics of the course instructor and my personal

observation of the courses could reveal further information regarding the students' learning

progress in this current study. The course instructor was a first-time Twitter user, and the new

experience of incorporating Twitter in her teaching style could have had an impact on her

teaching strategies and the students' performance on reading and writing entries. The

environment of Twitter usually requires a group leader to elicit threads of tweets for discussion.

In this case, the course instructor attempted to spur discussion for the students to engage in

tweeting. If the students had produced more tweets in course sessions, there would have been

more opportunities to read others' tweets. The students' reading comprehension competence

could have improved more in the experimental group if the participants had read more tweets

from others (Elavsky et al., 2011; Krashen, 2003). The fact that the instructor was using Twitter

for the first time could have hindered the flow of tweeting progress in class.

From my observation, the participants in the experimental group often tweeted each other

to ask for answers during the in-class session. Moreover, the students behaved more

conscientiously in their task engagement. The instructor also pointed out that more students in the experimental group asked questions of her by sending their questions via tweets. On the other hand, only a few of the students in the control group showed concern about course-related activities. Most of the participants in the control group remained silent during most of the course meeting session, and they generally did not ask any questions regarding writing assignments or writing drills in class. Peer interaction was infrequent in the control group.

The mean scores on the MSLQ for motivation and strategy for both groups were also analyzed by using an independent sample t-test. The purpose of using an independent t-test was to see whether there was any significant difference on the learners' motivation and strategy across the two groups. Specifically, it was meant to find out if different learning approaches with Twitter or without Twitter had an impact on the participants' learning attitude. The t-test analysis showed that the t values on motivation and strategy (-4.24 and -3.83, respectively) reached a significant level. Therefore, we can conclude that the Twitter-assisted approach did have an impact on the learners' learning motivation and strategy. Furthermore, the overall mean scores of the experimental group for motivation and strategy were respectively 3.03 and 2.84, which were significantly higher than the mean scores in the control group (2.60 and 2.52 ,respectively).

Summary

Both of the groups showed a significant difference on their writing scores from pretest to posttest. The progress of this performance could be due to the interactive writing approach across the two groups; the implementation of social interaction in the learners' target language either in writing or speaking did have an impact on EFL learners' language proficiency. Both Twitter and free writing discussion approaches offered opportunities for the students to discuss,

compare, and share their writing with their peers in class. According to my observation, the students who used Twitter could respond faster than those students who had to write down their thoughts on a piece of paper. Furthermore, the students in the Twitter group produced more writing entries and asked more questions related to the course tasks. The students were frequently asked to exchange their writing with their classmates in class to brainstorm essay outlines or collect ideas. Therefore, intensive social interaction and practice indeed play important roles in the language learning process.

Both groups experienced the same teaching method but with different learning tools. However, there was no statistically significant difference between the different environment settings. It is reasonable to speculate that the insignificance resulted from the fact that both groups' interactive writing activities required them to engage in collaborative writing or discussion. According to the students' writing entries in both groups, the Twitter group did generate more writing entries and more actively followed the instruction, tweeting responses to questions immediately in class. In contrast, the students in the non-Twitter group did not actively participate in the course writing activities. The instructor often had to check with the students to see whether they were participating because they showed low learning motivation. Thus, the instructor had to push the students to facilitate course activities.

The reason that different learning-assistant methods did not make any statistically significant difference could be because participants did not have enough time using Twitter to train them to manage the criterion-based test. According to the participants' writing performance on the posttest, the students in the experimental group produced better paragraph structure and their phrasing had fewer grammatical errors than in the control group. Nevertheless, students who take criterion-based tests need to demonstrate their mastery in certain subject matter. In this

case, the participants were expected to show their English proficiency in reading comprehension and essay writing. Instead of being prepared with test-oriented activities in test drilling, the participants were mostly engaging in authentic learning activities in which they were asked to respond for communicative purposes or collaborate through idea sharing. According to Krashen (2003), language acquisition requires a lot of authentic interaction for meaning conveyance rather than focusing on tedious drills under high anxiety situations. The participants in this study were following the theoretical framework of social interaction for authentic communication and peer collaboration rather than studying for a test, so their performance on the test may not reflect their improved communication skill. Nevertheless, it might require more time to maximize the advantages of using Twitter as a pedagogical tool. Based on my observation of the course, the students in the experimental group took more opportunity to read in English on Twitter, and the platform of Twitter also allowed the students to read others' tweets, which stimulated a lot of brainstorming for essay outlining. The instructor also noted that the students frequently viewed other tweets while seeking inspiration for doing their essay outline. Moreover, the instructor could give instant feedback to each individual through tweeting when she saw an unclear sentence or a good idea.

The GEPT is a Taiwanese government-certified test aimed to evaluate the test takers' English proficiency. In order to obtain higher scores on the GEPT, the test takers would need training in test question analysis, time control, and a lot of drills. However, the content of the writing/reading class was intended to reinforce the concepts and the paragraph structure of different types of essays. The students learned different ways of constructing a paragraph through reading a variety of articles from the textbook or online resources. Thus, the goal of the course activities was targeted toward improving the students' overall language competence,

especially in English writing and reading proficiency rather than training the students for test preparation. Nevertheless, despite the lack of statistical significance of the results in the different learning environments, the overall mean score in writing on the posttest from the Twitter group was slightly higher than the control group's ($M = 36.93$ and $M = 34.54$, respectively). Within eight course sessions for this experiment, Twitter-assisted learning has shown positive effects on the participants' English writing proficiency. The intention of applying the Twitter-assisted method compared with the non-Twitter-assisted method was to see whether the improvement of the participants' English proficiency would be reflected in the GEPT scores. The results of the independent sample *t*-test might have been different if the curriculum implementation had been designed for both in and out of course meeting sessions. Furthermore, the Twitter group's results in reading and writing could have been different if the students were using Twitter more frequently not only for academics but also for daily chatter in their target language.

The experimental group's mean scores in the intrinsic, task value, and control of learning scales in the motivation section of the MSLQ were higher than the control group's. This result coincides with findings from the literature which reveal that Twitter has the potential to stimulate learners' motivation to engage in course activities and enhance learners' interest in exploring the answers to the questions. Moreover, Twitter also provides a platform for the students to engage in collaborative work regarding writing activities in class. The mean scores of the learning strategy section of the MSLQ also suggested that the participants in the Twitter group were willing to ask more questions and seek help from their peers or the instructor. Twitter facilitated social interaction among the peers and the instructor. From a language learning perspective, social interaction plays a vital role for language learning (Krashen, 2003). A Twitter-assisted

learning approach has substantial effects on helping language learners to produce authentic communication based on learners' intrinsic needs to use the language.

Suggestions for Future Studies

The effects of Twitter-assisted learning were limited due to the time constraints of this study. If the implementation of Twitter-assisted learning had taken place over one whole semester in the curriculum, the potential benefits of using Twitter for language learning could be magnified. Furthermore, future studies should be conducted with smaller groups in order to focus only on the Twitter users and observe each individual's change from the beginning of the study. Future studies can be designed as qualitative research with a focus on ethnographic study. Each writing entry on the tweets from every participant should be further analyzed, and the students' writing problems could be categorized into several grammatical or semantic tables. By analyzing each writing entry and providing instant feedback on Twitter, the students' writing difficulties can be pinpointed more specifically. Furthermore, tweeting should be required during and after the classes in order to develop a stronger sense of the online community and to have students practice their target language more frequently. Previous researchers have implied that the benefits of using Twitter for language learning purposes could be more effective if the students frequently use Twitter for communicative purposes. Twitter could be an effective tool for training language learners' communicative and cultural competence (Borau et al., 2009).

The Internet is a window to the world. Students who use Twitter can utilize this advantage to search for more information for their writing, exposing themselves to authentic English material. The Twitter-assisted learning approach would be more effective with more immediate reading comprehension exercises in class that require students to use Twitter to respond to questions regarding the reading. Indeed, the students in this current investigation did

not spend much time on reading exercises in class. The instructor had to explain the meaning of each article and its vocabulary in class so the students could spend less time struggling to figure out the content. In order to maximize the effects of using Twitter for reading, the students could spend more time reading new assigned materials after class and respond to it through Twitter. In addition, the results might be different in learners' motivation if using their native language can be allowed on Twitter. For some low English proficiency students, being able to use their native language to ask for translation in English could be a stronger motivation for them to tweet more. All those ideas could be considered when conducting future studies on the effects of using Twitter as an assistant tool in EFL writing/reading class.

REFERENCES

Ajayi, L. (2010). How asynchronous discussion boards mediate learning literacy methods

    courses to enrich alternative-licensed teachers' learning experiences. *Journal of Research*

    on Technology in Education, 43(1), 1-28.

Al-Jarf, R. S. (2004). The effects of web-based learning on struggling EFL college writers.

    Foreign Language Annals, 37(1), 49-57.

Bandura, A. (1971). *Psychological modeling: Conflicting theories*. New Brunswick, NJ:

    Transaction.

Bandura, A. (1977). *Social learning theory*. New York, NY: General Learning Press.

Bart, M. (2009, June 17). Using Twitter to facilitate classroom discussions. *Faculty Focus*.

    Retrieved July 3, 2011, from http://www.facultyfocus.com/articles/effective-teaching-

    strategies/using-twitter-to-facilitate-classroom-discussions/

Bart, M. (2010, July 28). Twitter in college classroom: Engaging students 140 characters at a

    time. *Faculty Focus.* Retrieved July 3, 2011, from

    http://www.facultyfocus.com/articles/trends-in-higher-education/twitter-in-the-college-

    classroom-engaging-students-140-characters-at-a-time/

Bloom, B. S. (1956). *Taxonomy of educational objectives, handbook I: The cognitive domain.*

    New York, NY: David McKay.

Borau, K., Ullrich, C., Feng, J., & Shen, R. (2009). Microblogging for language learning: Using Twitter to train communicative and cultural competence. In M. Spaniol et al. (Eds.), *Advances in web-based learning* (pp. 78-87). Berlin, Germany: Springer.

Bourke, S., & Frampton, J. (1992, November). *Assessing the quality of school life: Some technical considerations*. Paper presented at the annual Conference of the Australian Association for Research in Education, Deakin University, Geelong, Australia.

Brown, C., Hendrickson, E., & Littau, J. (2011). New opportunity for diversity: Twitter, journalists and traditional underserved communities. *International Symposium for Online Journalism.* Retrieved from http://online.journalism.utexas.edu/2011/papers/Brown2011.pdf

Bruner, J. (1996). *The culture of education.* Cambridge, MA: Harvard University Press.

Busch, M. (1993). Using Likert scales in L2 research: A researcher comments. *TESOL Quarterly*, *27,* 733-726.

Carpendale, J. I. M., & Lewis, C. (2004). Constructing an understanding of mind: The development of children's social understanding within social interaction. *Behavioral and Brain Sciences, 27,* 79-151.

Cassidy, K. L. (2004). The adult learner rediscovered: Psychiatry residents' push for cognitive-behavioral therapy training and a learner-driven model of educational change. *Academic Psychiatry, 28*(3), 215-220.

Cercone, K. (2008). Characteristics of adult learners with implications for online learning design. *AACE Journal, 16*(2), 137-159.

Che, P. C., Lin, H. Y., Jang, H. C., Lien, Y. N., & Tsai, T. C. (2009). A study of English mobile learning applications at national ChengChi University. *International Journal of Distance Education Technologies, 7*(4), 38-60.

Chen, C. C., & Shaw, R. S. (2006). Online synchronous vs. asynchronous software training through the behavioral modeling approach: A longitudinal field experiment. *International Journal of Distance Education Technologies, 4,* 88-102.

Chen, G. M. (2011). Tweet this: A uses and gratifications perspective on how active Twitter use gratifies a need to connect with others. *Computers in Human Behavior, 27,* 755-762.

Chernela, J. M. (2004). The politics of language acquisition: Language learning as social modeling in the northwest Amazon. *Women and Language, 27,* 13-21.

Chiou, W. B., & Yang, C. C. (2006). Teachers' modeling advantage and their modeling effects on college students' learning styles and occupational stereotypes: A case of collaborative teaching in technical courses. *Adolescence, 41,* 723-737.

Cho, K., Cho, M. H., & Hacker, D. J. (2010). Self-monitoring support for learning to write. *Interactive Learning Environments, 18*(2), 101-113.

Chuo, T. (2007). The effect of the WebQuest writing instruction program on EFL learners' writing performance, writing apprehension, and perception. *TESL-EJ, 11*(3), 1-27.

Clark, I. L. (2003). *Concepts in composition: Theory and practice in the teaching of writing*. Mahwah, NJ: Lawrence Erlbaum Associates.

Coreil, C., Beliavsky, N., Lake, R., Argentina, C. & Yadav, M. (2007). *Imagination, cognition & language acquisition: A unified approach to theory and practice.* Jersey City, NJ: New Jersey City University.

Crawford, K. (1996). Vygotskian approaches to human development in the information era. *Educational Studies in Mathematics, 31,* 43-62.

Cross, K.P. (1981). *Adults as learners*. San Francisco, CA: Jossey-Bass.

Cruces, A. L. L., Rodriguez, J. R., Torres, M. M., Arriaga, F. D., & Perez, R. E. (2010). Cognitive-operative model of intelligent learning systems behavior. *Interactive Learning Environments, 18,* 11-38.

Cummins, J. (2000). Academic learning, transformative pedagogy, and information technology: Towards a critical balance. *TESOL Quarterly, 34,* 537-548.

Drager, K. D. R., Postal, V. J., & Carrolus, L. (2006). The effect of aided language modeling on symbol comprehension and production in 2 preschoolers with autism. *American Journal of Speech-Language Pathology, 15*(2), 112-125.

Dunlap, J. C., & Lowenthal, P. R. (2009). Tweeting the night away: Using Twitter to enhance social presence. *Journal of Information Systems Education, 20*(2), 1-8.

Easton, S. S. (2003). Clarifying the instructor's role in online distance learning. *Communication Education, 52*(2), 87-105.

Elavsky, C. M., Mislan, C., & Elavsky, S. (2011). When talking less is more: Exploring outcomes of Twitter usage in the large-lecture hall. *Learning, Media and Technology*, *36,* 215-233.

Ellis, N. C., & Sagarra, N. (2010). The bounds of adult language acquisition: Blocking and learned attention. *Studies in Second Language Acquisition, 32,* 553-580.

Eskrootchi, R., & Oskrochi, G. R. (2010). A study of the efficacy of project-based learning integrated with computer based simulation-STELLA. *Educational Technology & Society, 13*(1), 236-245.

Galagen, P. (2009, March 23). Twitter as a learning tool. Really. *T+D*. Retrieved from

http://www.astd.org/

Garcia, T., & Pintrich, P. R. (1995). *Assessing students' motivation and learning strategies: The*

Motivated Strategies for Learning Questionnaire. Paper presented at the annual meeting

of the American Educational Research Association, San Francisco, CA.

Garland, R. (1991). The mid-point on a Likert rating scale: Is it desirable? *Marketing Bulletin, 2,*

66-70.

Garrison, D. R., & Anderson, T. (2003). *E-learning in the 21st century: A framework for*

research and practice. New York, NY: Routledge Falmer.

Gaudet, D. (2005). *Creating community in online learning environment.* Retrieved from

http://74.125.153.132/search?q=cache:s3OKU2AzZkIJ:zircon.mcli.dist.maricopa.edu/ml

x/warehouse/01601-

1700/01683/Community_article.doc+building+community+in+online+courses,+swan&c

d=4&hl=en&ct=clnk

George, D. R., & Dellasega, C. (2011). Use of social media in graduate-level medical humanities

education: Two pilot studies from Penn State College of Medicine. *Medical Teacher, 33,*

429-434.

Grosseck, G., & Holotescu, C. (2008). Can we use Twitter for educational activities? *The 4th*

International Scientific Conference eLSE: eLearning and Software for Education.

Retrieved February 15, 2010, from http://adl.unap.ro/else/

Heinrich, E., Milne, J., & Moore, M. (2009). An investigation into e-tool use for formative

assignment assessment-Status and recommendations. *Educational Technology & Society*,

12(4), 176-192.

Hedin, N. (2010). Experiential learning: Theory and challenges. *Christian Education Journal, 7*(1), 107-117.

Hou, H. T., Chang, K. E., & Sung, Y. T. (2009). Using blogs as a professional development tool for teachers: Analysis of interaction behavioral patterns. *Interactive Learning Environments*, *17,* 325-340.

Hodges, C. B. (2008). Self-efficacy in the context of online learning environments: A review of the literature and directions for research. *Performance Improvement Quarterly, 20,* 7-25.

Hsu, P. S., Chang, T.J., & Wu, M. H. (2009). A new diagnostic mechanism of instruction: A dynamic, real-time and non-interference quantitative measurement technique for adaptive e-learning. *International Journal of Distance Education Technologies, 7*(3), 85-96.

Java, A., Finin,T., Song, X., & Tseng, B. (2007). Why we Twitter: Understanding microblogging usage and communities. *Proceedings of the Joint 9th WEBKDD and 1st SNA-KDD Workshop*. Retrieved from http://ebiquity.umbc.edu/paper/html/id/367/Why-We-Twitter-understanding-Microblogging-Usage-and-Communities

Johnson, K. A. (2011). The effect of Twitter posts on students' perceptions of instructor credibility. *Learning, Media and Technology, 36,* 21-38.

Jordi, R. (2011). Reframing the concept of reflection: Consciousness, experiential learning, and reflective learning practices. *Adult Education Quarterly, 61,* 181-197.

Junco, R., Heibergert, G., & Loken, E. (2011). The effect of Twitter on college student engagement and grades. *Journal of Computer Assisted Learning, 27,* 119-132.

Kemp, S. (2010). Situated learning: Optimizing experiential learning through God-given learning community. *Christian Education Journal, 7*(1), 118-143.

Kessler, G., & Bikowski, D. (2010). Developing collaborative autonomous learning abilities in computer mediated language learning: Attention to meaning among students in Wiki space. *Computer Assisted Language Learning, 23,* 41-58.

Kline, P. (1986). *A handbook of test construction*. London, England: Methuen.

Knowles, M. S., Holton, E. F., & Swanson, R. A. (2005). *The adult learner* (6th ed.). Burlington, MA: Elsevier Butterworth-Heinemann.

Krashen, S. (2003). *Explorations in language acquisition and use: The Taipei lectures.* Portsmouth, NH: Heinemann.

Krashen, S. (2009). *Principles and practice in second language acquisition* (First Internet edition). New York, NY: Prentice-Hall International. Retrieved from http://www.sdkrashen.com/Principles_and_Practice/Principles_and_Practice.pdf

Lave, J., & Wenger, E. (1990). *Situated learning: Legitimate peripheral participation*. Cambridge, UK: Cambridge University Press.

Lee, H. J., & Rha, I. (2009). Influence of structure and interaction on student achievement and satisfaction in web-based distance learning. *Educational Technology & Society, 12,* 372-382.

Lee, L. (2007). Fostering second language oral communication through constructivist interaction in desktop videoconferencing. *Foreign Language Annuals, 40,* 635-649.

Li, T., Dong, M., & Huang, R. (2009). Toward a semantic forum for active collaborative learning. *Educational Technology & Society, 12*(4), 71-86.

Lines, R. (2005). How social accounts and participation during change affect organizational learning. *Journal of Workplace Learning, 17,* 157-177.

Lu, L. C., & Yeh, C. L. (2008). Collaborative e-learning using semantic course blog. *International Journal of Distance Education Technologies, 6*(3), 1-12.

Lubliner, D., Widmeyer, G., & Deek, F. P. (2008). Collaborative learning utilizing a domain-based shared data repository to enhance learning outcomes. *Interactive Learning Environment, 17,* 351-366.

Magno, C. (2011). Validating the academic self-regulated learning scale with the Motivated Strategies for Learning Questionnaire (MSLQ) and learning and study strategies inventory (LASSI). *The International Journal of Educational and Psychological Assessment, 7*(2), 56-73.

Matsuo, K., Barolli, L., Xhafa, F., Koyama, A., & Durresi, A. (2008). New functions for stimulating learners' motivation in a web-based e-learning system. *International Journal of Distance Education Technologies, 6*(4), 34-49.

Maynard, A. E. (2009). Context and structure in social interaction and cognitive development. *Human Development, 52,* 313-319.

Mendenhall, A., & Johnson, T. E. (2010). Fostering the development of critical thinking skills, and reading comprehension of undergraduates using a Web 2.0 tool coupled with a learning system. *Interactive Learning Environments, 18,* 263-276.

Merriam, S. B. (2001). *The new update on adult learning theory*. San Francisco, CA: Jossey-Bass.

Meskill, C., & Anthony, N. (2007). Form-focused communicative practice via CMC: What language learners say. *CALICO Journal, 25*(1), 69-90.

Murphy, P. (2007). Reading comprehension exercises online: The effects of feedback, proficiency and interaction. *Language Learning & Technology, 11*(3), 107-129.

Murray, J., & Goldbart, J. (2009). Cognitive and language acquisition in typical and aided language learning: A review of recent evidence from an aided communication perspective. *Child Language Teaching and Therapy, 25*(1), 31-58.

Nejadansari, D., & Nasrollahzadeh, J. (2011). Effects of age on second language acquisition. *Studies in Literature and Language, 3*(3), 19-24.

Ng, C. S. L., Cheung, W. S., & Hew, K. F. (2010). Solving ill-structured problems in asynchronous online discussions: Built-in scaffolds vs. no scaffolds. *Interactive Learning Environments, 18,* 115-134.

Palmer, S., & Holt, D. (2010). Students' perceptions of the value of the elements of online learning environment: Looking back in moving forward. *Interactive Learning Environment, 18,* 135-151.

Pederson, S., & Liu, M. (2003). The transfer of problem-solving skills from a problem-based learning environment: The effect of modeling an expert's cognitive process. *Journal of Research on Technology in Education, 35*(2), 303-320.

Philp, J., & Tognini, R. (2009). Language acquisition in foreign language contexts and the differential benefits of interaction. *International Review of Applied Linguistics in Language Teaching, 47,* 245-266.

Pillow, B. H. (2008). Development of children's understanding of cognitive activities. *The Journal of Genetic Psychology, 169*(4), 297-321.

Pintrich, P. R., & DeGroot, E. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology, 82*(1), 33-50.

Pohl, M. (2000). *Learning to think, thinking to learn: Models and strategies to develop a classroom culture of thinking.* Cheltenham, Victoria, Australia: Hawker Brownlow.

Ponton, M. K., & Rhea, N. E. (2006). Autonomous learning from a social cognitive perspective. *New Horizons in Adult Education & Human Resource Development, 20*(2), 38-49.

Powell, K.C., & Kalina, C.J. (2009). Cognitive and social constructivism: Developing tools for an effective classroom. *Education, 130,* 241-250.

Ray, J. M. (2009). A template analysis of teacher agency at an academically successful dual language school. *Journal of Advanced Academics, 21*(1), 110-141.

Reid, J. (1990). The dirty laundry of ESL survey research. *TESOL Quarterly, 24,* 323-338.

Rogers, C. R. (1969). *Freedom to learn*. Columbus, OH: Merrill.

Saeed, N., Yang, Y., & Sinnappan, S. (2009). Emerging web technologies in higher education: A case of incorporating blogs, podcasts and social bookmarks in a web programming course based on students' learning style and technology preferences. *Educational Technology & Society, 12*(4), 98-109.

Smith, P, J., Coldwell, J., Smith, S, N., & Murphy, K, L. (2005). Learning through computer-mediated communication: A comparison of Australian and Chinese heritage students. *Innovations in Education and Teaching International, 42*(2), 123-134.

Stevens, V. (2008). Trial by Twitter: The rise and slide of the year's most viral microblogging platform. *TESL-EJ, 12*(1), 1-14.

Stewart, B., & Waight, C. (2008). E-learning teams and their adult learning efforts in corporate settings: A cross analysis of four case studies. *International Journal on E-learning, 7*(2), 293-309.

Tsai, P. J., Hwang, G. J., Tseng, C. R., & Hwang, G. H. (2008). A computer assisted approach to conducting cooperative learning process. *International Journal of Distance Education Technologies, 6,* 49-66.

Tsai, Y., & Teng, H. C. (2007). The influences of online writing evaluation and on-site writing. *Conferences on Developmental Student Writers' Knowledge Construction*. (Conference paper, pp. 442-459). Hua-Lien, Taiwan: Tzu Chi College of Technology.

Vygotsky, L. S. (1962). *Thought and language*. Cambridge, MA: MIT Press.

Vygotsky, L. S. (1978). *Mind in society*. Cambridge, MA: Harvard University Press.

Vygotsky, L. S. (1985). *Thought and language*. Cambridge, MA: The MIT Press.

Uzuner, S., & Mehta, R. (2010, February 26). Three ways to increase the quality of students' discussion board comments. *Faculty Focus.* Retrieved July 20, 2010, from http://www.facultyfocus.com/articles/asynchronous-learning-and-trends/three-ways-to-increase-the-quality-of-students-discussion-board-comments/

Woodard, C. A. (2007). Using adult learning theory for new-hire training. *Journal of Adult Education, 36*(1), 44-47.

Wright, N. (2010). Twittering in teacher education: Reflecting on practicum experiences. *Open Learning, 25,* 259-265.

Yang, Y. F. (2011). Engaging students in an online situated language learning environment. *Computer Assisted Language Learning, 24,* 181-198.

Yasseen, B. M. B. (2010). The effect of teachers' behavior on students' behavior in the classroom. *International Forum of Teaching and Studies, 6*(1), 48-67.

Yeh, Y. C. (2010). Analyzing online behaviors, roles, and learning communities via online discussions. *Educational Technology & Society*, *13*(1), 140-151.

Young, J. R. (2010). Teaching with twitter. *Education Digest, 75*(7), 9-12.

Zare, M., & Mobarakeh, S. D. (2011). The relationship between self-efficacy and use of reading

    strategies: The case of Iranian senior high school students. *Studies in Literature and*

    Language, 3(3), 98-105.