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THE EFFECT OF APPLYING WIKIS IN AN ENGLISH AS A FOREIGN
LANGUAGE (EFL) CLASS IN TAIWAN

by

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A dissertation submitted in partial fulfillment of the requirements
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ABSTRACT

Incorporating technology into learning has brought major benefits to learners and has greatly changed higher education. Since there is limited number of experimental research investigating the effectiveness of applying wikis, this study collected experimental data to investigate its effectiveness. The purpose of the study was to examine the effectiveness of applying wikis in terms of students' learning outcomes, to investigate the changes regarding students' attitude towards language learning, to explore the communication channels in wikis that facilitate students' interaction in the e-learning environment as well as students' experience of using wikis.

Results showed that there existed statistically significant difference between the group with and without wikis, which means the group applying wikis performed better in listening and reading abilities. When compared with the non-wiki group, the wiki group had a more favorable attitude towards the class, their English ability improvement, and cooperative learning. Moreover, the students agreed that wikis helped them complete their assignment, they felt comfortable in the wiki environment, and it was easy for them to use wikis.

From the experiences of using wikis shared by the students, they provided recommendations about the interface and the edit functions in the wiki environment. Their interaction with other team members and the course material increased but they expressed that the main interaction was through face-to-face and instant message software. Finally, the wiki environment allowed students to fulfill their role duties, cooperate, negotiate, manage their contribution, and modeling from each other.

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TABLE OF CONTENTS

LIST OF FIGURES	vii
LIST OF TABLES	viii
CHAPTER ONE: INTRODUCTION	1
Background of the Study	1
Significance.....	5
Purpose of the Study	5
Statement of Hypotheses and Research Questions	6
Methodology	6
Participants.....	6
Textbook	7
Design of the Study.....	7
Data Analysis	8
Limitations	8
Role of the Researcher	8
Assumptions.....	9
Definitions.....	9
CHAPTER TWO: REVIEW OF LITERATURE	10
Online Learning	10
Diffusion of Innovations (DoI)	11
Innovation	11
Communication Channel	13
Time	16
Social Systems	17
Social Cognitive Theory	18
Collaboration and Learning	20
Cooperative Learning.....	21

Wikis and Learning.....	23
Research in Wikis	25
Wikis in EFL in Taiwan.....	26
Culture and Collaborative Work.....	26
Summary.....	27
CHAPTER THREE: METHODOLOGY.....	28
Statement of Hypotheses and Research Questions	28
Design of the Study.....	28
Study Population and Sample Selection	29
Textbook	29
Treatment	30
Data Collection	33
Weekly Test	33
Questionnaire	34
Interview	37
Data Analysis	38
CHAPTER FOUR: RESULTS.....	39
Research Question One.....	39
Listening Scores.....	40
Reading Scores.....	43
Research Question Two	46
Attitude towards Class	46
Perception of Language Skills Improvement.....	47
Attitude towards Cooperative Learning.....	47
Research Question Three	48
Questionnaire Findings	49
Interview Summary.....	52
Summary of the Chapter	59

CHAPTER FIVE: DISCUSSIONS, CONCLUSION AND RECOMMENDATIONS	62
Research Question One.....	62
Listening Comprehension	62
Vocabulary and Reading Comprehension	63
Research Question Two	63
Research Question Three	65
Conclusion	68
Recommendations.....	71
APPENDIX A. WIKISPACES SETUP	72
APPENDIX B. DICTATION SCHEDULE	83
APPENDIX C. SAMPLE CONVERSATION DIALOGUE	85
APPENDIX D. SAMPLE DISCUSSION QUESTIONS.....	87
APPENDIX E. SAMPLE STUDIO CLASSROOM WEEKLY TEST.....	89
APPENDIX F. GROUP EVALUATION FORM	91
APPENDIX G. RUBRIC FOR USING WIKIS	93
APPENDIX H. IRB APPROVAL FORM	96
APPENDIX I. PERMISSION LETTER	98
APPENDIX J. CONSENT FORM.....	100
APPENDIX K. CONSENT FORM IN CHINESE.....	102
APPENDIX L. ENGLISH LEARNING QUESTIONNAIRE	104
APPENDIX M. WIKI USE QUESTIONNAIRE.....	108
APPENDIX N. INTERVIEW QUESTIONS	111
APPENDIX O. VIDEO INTERVIEW PERMISSION FORM.....	113
APPENDIX P. RESULTS OF WIKI USE QUESTIONNAIRE.....	115
APPENDIX Q. PERMISSION LETTER FROM DR. PICK.....	117
REFERENCES.....	119

LIST OF FIGURES

Figure 1: Five Stages of the Innovation-Decision Process	12
Figure 2. Listening Scores by Treatment Type.....	41
Figure 3. Listening Scores 1, 3, and 5 by Treatment Type.....	42

LIST OF TABLES

Table 1. Roles assignment examples (Category and role are from Johnson and Johnson, 1999)	22
Table 2. Results of Principal Component Analysis	35
Table 3. Results of Principal Component Analysis	37
Table 4. Mean Scores of Listening Weekly Test 1-6.....	40
Table 5. Mean Scores of Listening Weekly Test 1, 3, and 5	41
Table 6. Mean Scores of Listening Weekly Test 2, 4, and 6	43
Table 7. Mean Scores of Reading Weekly Test 1-6	43
Table 8. Mean Scores of Reading Weekly Test 1, 3, and 5	44
Table 9. Mean Scores of Reading Weekly Test 2, 4, and 6	44
Table 10. Students' Attitude towards Language Learning	46
Table 11. Wiki Use Questionnaire Summary	49

CHAPTER ONE: INTRODUCTION

Background of the Study

Technology innovations enable the expansion of college and university curriculum to differ in geographic places. Innovations like on-line learning are major drives that dramatically change higher education (Hanna, 2003; Rockwell, Schauer, Fritz, & Marx, 2000). Online learning provides major benefits to both students and instructors (Hartman, Dziuban, & Moskal, 2000). The benefits include convenience, time and geographic flexibility. The internet makes resources more accessible at a low cost. Moreover, multimedia tools simulate real task environments which can motivate learners as well as facilitate learning. However, the adoption of technology in development, delivery, and administration is not a simple process which requires minor modification. Educators and educational institutions must be aware that it is a fundamental shift of philosophy, policy, and instruction (Bates, 2000; Blair, 1996; Hanna, 2003).

Online learning differs from traditional learning primarily in technology interface and its effect on instruction and interaction (Hirumi, 2002; Moore, 2001). Interaction is considered to be an important component for a successful learning experience so E-learning practitioners and researchers are eager to find out how much interaction an e-learning environment could provide for students (McIsaac & Gunawardena, 1996). Research (Mackey, 1999; Mackey & Philp, 1998) showed that interaction facilitates students' development in second language skills. The sense of community is essential to students in online learning and higher order thinking occurs when there is interaction connected to everyone within the community (Schrire, 2004). With the evolution of two-way technological capabilities and the need for social interaction, the opportunities for communicative actions using two-way technological innovation increase (Sumner, 2000).

Nonetheless, the quantity is often overemphasized over the quality of group interaction and social learning.

Based on Diffusion of Innovations (Rogers, 2003), most individuals communicate with others in their social systems when they encounter innovations, new ideas, objects, or practices. After the members in the group gain knowledge about a new idea, they engage in communal problem-solving to know more thoroughly about the innovation, make appropriate decisions, and fulfill a common decision (Rogers, 2003; Valente, 1999). The process through social system interaction and communal problem-solving is regarded as the innovation-decision process (Rogers, 2003). Rogers (2003) implied that for students to learn a new idea, they would communicate with others within their educational social system. To understand students' communication related to learning about new ideas, the researcher investigated the social system of their learning experience in wikis in Taiwan.

Wikis (Internet provided private online spaces) are believed to be useful in supporting collaborative activity and improving student interaction (Beldarrain, 2006). A Wiki provides an online space that allows members to collaboratively create and edit Web pages where content is emphasized over authorship (Wei, Maust, Barrick, Cuddigy, & Spyridakis, 2005). It could be used as a place for brainstorming or a place to archive shared content and link to other Web sites. Unlike blogs that are chronologically organized and can be edited by only one person, Wikis allow all members to edit web pages so they are often used to promote collaborative content creation and editing (Goodwin-Jones, 2003; Tonkin, 2005). Wikis could empower users with a sense of ownership and authority to promote student responsibility toward learning in a relaxed collaborative environment (Bold, 2006; Raitman, Augar, & Zhou, 2005). Research shows that wikis provide a flexible user friendly interface for collaboration, knowledge creation, archiving,

and student interaction (Schwartz, Clark, Cossarin, & Rudolph, 2004). Due to its ease of collaboration, wikis have become a tool for project management and collaborative writing (Raygan & Green, 2002). The most well-known and large scale wiki, Wikipedia, is an online encyclopedia that is continually updated by people around the globe across the boundaries of time and places. Until December 2007, Wikipedia had approximately 9.25 million articles in 253 languages (Wikipedia, 2008). In the education context, a wiki provides an ideal platform for learning reading and writing that encourage language awareness (Farabaugh, 2007).

This study analyzed students' communication channels in wikis and the effect on their academic performance. According to Rogers (2003), communication channels describe the way information travels from the sender to the receiver. Diffusion research (Rogers, 2003; Valente, 1999) suggested that understanding how information is communicated help the research understand how new ideas are understood, discovered, and disseminated among members of a group.

According to Bandura (1986), individuals are neither driven by inner forces nor controlled by external stimuli. Human functioning is determined by behavior, cognitive and other personal factors, and the external environment. These determinants interact with each other bidirectionally and influence each other. Therefore, Bandura (1986) asserted that people can control their behavior through this interdependent and reciprocal system. In Bandura's work (1995), he suggested that self-efficacy is a critical element of motivation. Baranowski, Perry and Parcel (1997) stated that self-efficacy is the most important component of behavioral change. Rogers (2003, p. 341) asserts that Bandura's social cognitive learning theory (1977) explains the type of learning in the diffusion of innovation by looking "outside of the individual at a specific type of information exchange with others." Both theories describe learning among group

members in a social system. Besides, according to both theories, cognitive processes and decision-making skills are essential to learning and behavioral change (Pick, 2006).

The study was conducted in an English as a Foreign Language (EFL) class. English has been one of the important subjects in the curriculum in Taiwan. With the emphasis on transforming the country into an essential one in transportation and economics within the Asian-Pacific area, English has become a foreign-language with higher priority in Taiwan's school system. To meet the future challenges of globalization and internationalization, Taiwan's Minister of Education has extended compulsory English education downward nationwide by beginning from the fifth grade in 2001 and Taipei, the capital city of Taiwan, has extended English education to begin in the third grade.

Educators have acknowledged listening to be a crucial skill in second-language learning. Language teachers has been encouraged to devote more time on listening practice activities (Celce-murcia, 1991; Chastain, 1988; Kiany, & Shiramiry, 2002). Among the techniques to improve listening comprehension, dictation is recommended by many studies in English as a Foreign Language (EFL) teaching and listening comprehension teaching (Celce-Murcia, 1996; Gilbert, 1996; Davis, 1995; Rost, 1991; Ur, 1991). Research also showed that dictation has been a useful technique for language learning (Kiany & Shiramiry, 2002; Vesali, 2003).

In view of previous literature on the benefits of using wikis in different subject areas, the present study attempted to apply wikis in an EFL class in a technological university setting in Taiwan to examine whether incorporating wikis is beneficial to students' learning, to document the changes of students' attitude towards language learning, and to investigate students' experience using wikis as well as the communication channels they use.

Significance

There is very a limited number of experimental research studies that support the effect of applying wikis to learning (Mattison, 2003). The investigation of communication channels used in wikis is also very limited. This study collected experimental data to investigate the effect of using wiki technology in an EFL college course, to document the changes of student attitudes toward language learning within the wiki environment, and to determine the communication channels used in wiki-based learning that could then benefit students' learning.

This study provides instructors with more options in choosing suitable communication channels in the wiki environment. It is hoped that students may benefit from using wikis in improving their academic performance and strengthen their interaction with others in the online learning environment.

Purpose of the Study

The purpose of this study was to understand the social learning aspects of the diffusion of innovations theory with regard to the communication channel employed in the wiki-based instruction. Through an investigation of participants' communication experience, the researcher examined the effect of wiki use on students' academic performance and the communication channels they used. Diffusion of innovations is the study of communication processes within channels used over time to achieve understanding related to new ideas, objects, or practices (Rogers, 2003; Valente, 1999). Communication channels connect members in a social system and facilitate development of personal networks for advice, communication, and support (Rogers, 2003; Valente & Davis, 1999). Investigating communication channels help identify personal and

social networks to understand which communication channel facilitate students' learning and their decision making about new ideas (Rogers, 2003; Valente, 1999).

The purpose of this study was: (1) to examine the effectiveness of a wiki environment in terms of students' learning outcomes as compared to those with no wiki-applied classes (2) to investigate the extent to which wiki-based classes differ from non-wikis classes regarding students' attitude towards language learning, and (3) to explore the communication channels used in wikis that facilitate students' interaction in e-learning environment.

Statement of Hypotheses and Research Questions

The hypotheses and questions in this study are:

- (1) There is no significant difference in weekly listening and reading tests scores between the control (non-wiki) group and treatment (wiki) group during a six week period.
- (2) There is no significant difference in attitudes towards language learning in the control (non-wiki) and treatment (wiki) groups during a six week period.
- (3) What are students' communication channels, experience and attitudes toward integrating wikis to their learning following a six week treatment?

Methodology

Participants

This study was conducted at Hsing Wu College in Taipei, Taiwan. The participating students were two classes of undergraduate students taking General English courses. There was a total of 97 students including one class with 47 and the other with 50.

Textbook

Both classes used the same magazine as their textbook— *Let's Talk in English*. The magazine is published by Overseas Radio and Television Incorporated and has the most recent publication date of 2007. *Let's Talk in English* is one of the most popular English-teaching magazines in Taiwan. The magazine accompanied by its radio and TV programs has won numerous awards including Taiwan's famous Golden Bell Award.

Design of the Study

This was a quasi-experimental research study in which purposeful sampling was used on intact classes as the experimental and control groups. A General English class was randomly selected to be the treatment group, or wikis class. The other class was the control group, or non-wikis class.

All students in both treatment and control groups were required to take weekly tests as part of the *Let's Talk in English* curriculum used in both EFL classes at the Hsing Wu College in Taipei County, north Taiwan. The entire treatment lasted for six weeks. A questionnaire regarding students' attitude towards language learning was administered to both groups at the end of the study. A questionnaire regarding students' attitude towards wiki use was administered in the treatment group only at the end of the study. Interviews were conducted at the end of the study regarding students' interaction experience in the treatment group trying to find out students' communication channels

Quantitative data consisted of weekly test scores and responses from the questionnaires. Qualitative data was collected from interviews.

Data Analysis

Scores collected from the weekly tests was analyzed through Repeated Measure ANOVA. The researcher coded the class identifier into treatment. Variable treatment refers to the treatment group with the wiki experimental group being 1 and the non-wiki control group being 2. Descriptive analysis was performed on the data collected by the questionnaire and from the interview.

Limitations

Due to practical issues, the researcher identified the following limitations: First, the duration of treatment was approximately six weeks and may not have been sufficient time to show significant learning progress after the treatment. Second, students in the wikis learning groups may not be familiar with using wikis, thus interfering with their learning. Third, students in the non-wikis learning groups may have access to learning through wikis on their own outside of the wiki environment provided in the study, thus influencing the results of the study. Fourth, the study was quasi-experimental in nature so the researcher had no control over subjects' gender, personalities and motivation toward learning which might, to some extent, affect the students' performance in learning.

Role of the Researcher

The researcher's role in the study was both as an intervention provider for a period of six weeks and a data collector to (1) collect statistical data from participants' weekly test scores evaluating their listening and speaking skills; survey data regarding their attitude toward language learning and wiki use experience and (2) capture the phenomenon by having

participants comprehensively describe their communication experience in the wiki environment. The researcher didn't have previous experience using wikis or integrating wikis into instruction.

Assumptions

The researcher provided the intervention in the treatment group and followed the Let's Talk in English protocol in the control group. It is assumed that she remained true to the procedures in both groups.

Definitions

Collaboration— an action conducted by two or more people working together to create a concept, a discussion, an essay, or a classroom technique (Fakler & Perisse, 2004).

Cooperative Learning—“the instructional use of small groups so that students work together to maximize their own and each other's learning” (Johnson & Johnson, 1999, p.5).

EFL—“English as a Foreign Language: the study of English by non-native speakers living in a non-English speaking environment (Flexner, 1993, p. 623).”

ESL—“English as a Second Language: the study of English by non-native speakers in an English-speaking environment (Flexner, 1993, p. 661).”

Wiki—“a wiki is a collective website where a large number of participants are allowed to modify or create pages using their Web browser (Desilets, Gonzalez, Paquet, & Stojanovic, 2006, p.19).”

CHAPTER TWO: REVIEW OF LITERATURE

Online Learning

Information technology has had a major impact on classroom design in recent years. Rapid advances in information technology have set the stage for the migration of lecture from traditional classroom to the network. Digital course content is becoming richer, deeper, and more interactive with the use of animation, multimedia, and programming languages. Information technology facilitates the popularity of online learning, which eliminates the limitations of time and distance. Students today have grown up in a world filled with technology such as television, computer, internet, and videogames and they expect technology to be integrated into instruction to enrich their learning experience (Frey & Birnbaum, 2002). The environment of online learning has become appealing to students both on and off campus (Waschull, 2001). In such environments, students enjoy learning at their own pace, are more independent in their learning, feel that it is more convenient than attending face-to-face classes, and find it an interesting way to learn (Upton, 2006). However, the effectiveness of learning online is controversial. Some studies report both positive and negative responses from students toward internet enhanced learning (Steele, Palensky, Lynch, Lacy, & Duffy, 2002; Buckley, 2003). Some researchers suggested students' performance in online courses may be better than (e.g., Dewhurst, Macleod, & Norris, 2000), similar to (e.g., Stocks & Freddolino, 1998), or worse than (e.g., Waschull, 2001) those in face-to-face courses. To improve performance, research has suggested that providing an environment or interactive materials that could engage students to motivate their learning (Upton, 2006). Educators attempt to improve students' independent use of the Internet

as well as students' Internet-based communication and interaction skills is also recommended by researchers (Peng, Tsai, & Wu, 2006).

Diffusion of Innovations (DoI)

Diffusion of Innovations is a communications theory that identifies elements of the process of making decisions about adoption or rejection of an innovation (Rogers, 2003). Communication takes effect in an interactive process for participants to “create and share information” about a new idea, object, or practice (Rogers, 2003, p. 5). Roger’s theory helps explain and analyze how a new idea, object, or practice is communicated and accepted by others (Johnson, 2004). The study of diffusion of innovations theory is valuable in the field of instructional technology since instructional technology is an innovation-based discipline and most instructional technologists have limited knowledge regarding how and why their products are or are not adopted (Surry, 1997). It is further stated that the study of diffusion theory could develop a systematic model of adoption and diffusion. Rogers defines diffusion as “the process by which an innovation is communicated through certain channels over time among the members of a social system” (Rogers, 2003, p.5) so he organizes the diffusion process into four primary elements. They are (a) the innovation, (b) communication channels, (c) time, and (d) the social system. (see Figure 1).

Innovation

Rogers (2003) defines an innovation as “an idea, object, or object that is perceived as new by an individual or other unit of adoption” (p. 12). Most innovations are technological innovations and he defines technology as “a design for instrumental action that reduces the uncertainty in the cause-effect relationships involved in achieving a desired outcome” (p. 13). The characteristics

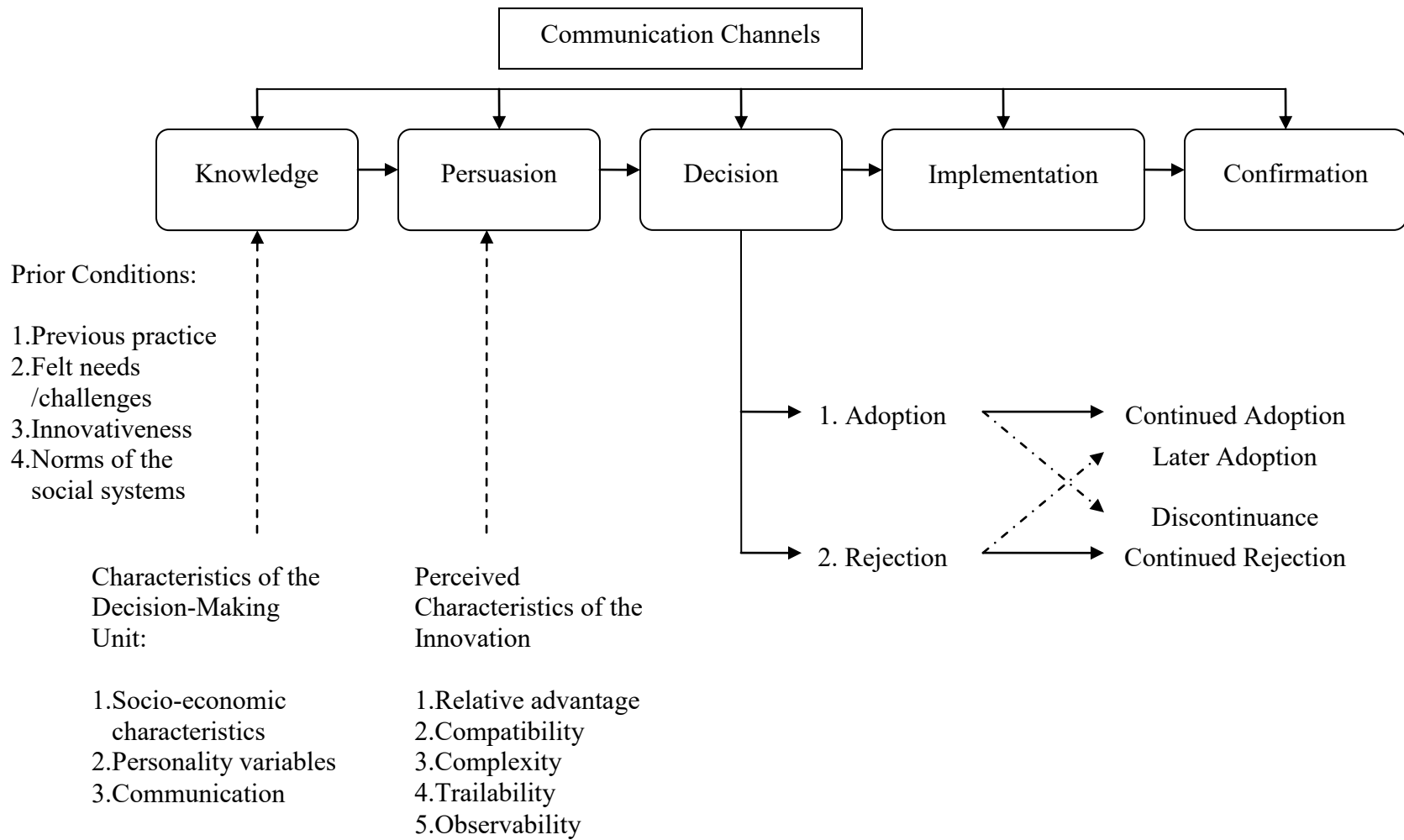


Figure 1: Five Stages of the Innovation-Decision Process
(adapted from Pick, 2006, p. 24)

of innovations are (a) relative advantage, or the perceived superiority of the innovation as compared with the existing values practices; (b) compatibility, or “the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and the needs of potential adopters” (p. 15); (c) complexity, or the perceived difficulty to understand and use the innovation; (d) trialability, or the degree to which the adoption of an innovation is experimented without making long-term commitments or incurring significant costs; and (e) observability, or the degree to which the results of an innovation are visible to others. The innovations that are perceived as having greater relative advantage, compatibility, trialability, observability and less complexity will be adopted more quickly and easily than other innovations (Rogers, 2003).

Communication Channel

Very few diffusion research studies investigate communication within a higher educational environment due to the complexity of interdependencies among the variables within a school (Ready, 1992; Rogers, 2003). Rogers (2003) defines communication as the process in which participants create and share information with one another in order to reach a mutual understanding. This definition implies that communication is a process of convergence (or divergence) as two or more individuals exchange information in order to move toward each other (or apart) in the meanings that they give to certain events. (p. 5). He further explained that “diffusion is a special type of communication, in which the messages are about a new idea... The newness means that some degree of uncertainty is involved in diffusion” (p. 6). Rogers (2003) stated that communication requires a channel connecting the sender(s) with the receiver(s) of a message. Mass media and interpersonal channels are the two

primary communication methods to inform individuals of an innovation (Lundblad, 2003; Rogers, 2003). Mass media, according to Rogers (2003), represents the kind of communication devices enable one or a few individuals transmit information to an audience of many. They usually are magazines, newspapers, radio, television, and the internet. Interpersonal channels describe the face-to-face process of sharing information between two or more individuals. The communication channels is believed to work best when the information of innovations is diffused through two-way exchange or in the situation of persuading individuals to form or change strongly held attitudes (Rogers, 2003).

Word-of-mouth (WOM) expands the scope of interpersonal communication channels to include face-to-face and written sharing of information (Godes & Mayzlin, 2004; Lee, Lee, & Schumann, 2002; Minsky & Marin, 1999). WOM communication is believed to increase individual knowledge and awareness, increase higher information credibility to influence individual preferences and decision on adoption (Godes & Mayzlin, 2004). Selection of communication channels depends on both the type of message, which means the degree to which interaction between sender and receiver to effectively disperse communication, and the individuals' preference of communication channel (Lee et al., 2002; Minsky & Marin, 1999; Rogers, 2003). According to media richness theory, face-to-face communication could bring richer content to the audience than through written communication since the former is two-way communication and provide visual signals and physical presence (Lee et al, 2002). The selection of communication channels should be based on the degree of interaction required in the content. Individual preference also plays an important role in selecting communication channels. Rogers (2003) stated that many people prefer interpersonal communication channels for obtaining new ideas. Although Rogers narrowly describes interpersonal communication channels as face-to-

face interactions, Gibbons's (1996) study of the propensity of different interpersonal ties enlarges the interpersonal channels to encompass electronic communication. Godes & Mayzlin (2004) further enhance the definition of written interpersonal communications by adding word-of-mouth electronic communication tools such as chat, discussions, electronic mail (e-mail), and online public postings. The electronic communication devices enables communication beyond the constraints of time and space, however, research found that individuals with close physical proximity significantly influence preference and adoption behavior (Godes & Mayzlin, 2004).

Characteristics and perceptions of individuals discussing new ideas, objects, and practices also influence selection of communication channels (Rogers, 2003). Information can be available from diverse sources. Key sources are individuals including opinion leaders and change agents. Both of them often communicate or model the social network values and influence the process of communication and innovation-decision. Rogers (2003) stated that change agents are those who influence clients' innovation decision in a direction deemed desirable by a change agency. The change agent usually seeks to obtain the adoption of new ideas, but may also attempt to slow down diffusion and prevent the adoption of undesirable innovations. Change agents use opinion leaders in a social system as their lieutenants in diffusion campaigns. (p. 27).

It is shown that opinion leaders closely relate to rapid behavior change (Valente & Davis, 1999) and change agents with specialized knowledge also influence the management process (Rogers, 2003).

In Pick's (2006) research examining communication channels used by teachers discussing teaching online in a state university, face-to-face communication was used most often by teachers, followed by communication through e-mail. The reason behind this conclusion was

the close relational or spatial proximities within their personal network providing high level accessibility to each other.

Time

There are three measures of time related to the diffusion research. They are (a) innovation decision process, which refers to the time individuals spend on going through the process of making the decision to adopt or reject an innovation; (b) innovativeness, which describes the time an individual needs to adopt an innovation compared to other individuals; and (c) rate of adoption, which expresses the overall rate of adoption of an innovation within a system. Further details are provided as follows:

Innovation decision process includes five stages according to Rogers (2003). The first stage is “knowledge.” It refers to the time when an individual is first presented to an individual and starts gaining an understanding of how it works. The second stage is “persuasion” and this is when an individual forms a positive or negative attitude towards the innovation. According to Rogers (2003), the persuasion stage is crucial for an individual to be committed to adopt an innovation. The third stage is “decision.” This is the stage when an individual express his/her willingness to experiment an innovation and make the decision of accepting or rejecting an innovation. The following stage is “implementation,” when an individual takes action to accept or reject an innovation and in the last stage “confirmation,” when the decision of using an innovation is reinforced but the decision can be reversed, which leads to discontinuance of the innovation. The primary goal of this stage is to minimize dissonance so the individual’s behavior will be consistent with beliefs and attitudes (Rogers, 2003).

The innovativeness of an individual has received much attention and it is most commonly understood by the general population within the diffusion theory. Innovativeness describes the

point of time an individual accept an innovation earlier or later than other individuals in the system (Rogers, 2003). The classifications of adopters from the earliest to the latest are innovators, early adopter, early majority, late majority, and laggards. Innovators are most likely to be exposed to new ideas while laggards are the least likely to be aware of changes.

Rogers (2003) stated that “When the number of individuals adopting a new idea is plotted on a cumulative frequency basis over time, the resulting distribution is an S-shaped curve” (p. 23). There is usually relatively small number of early innovators followed by increasing number of later adopter and the number of remaining adopters begins to drop. Different innovations have different rates of adoption and leads to more or less steep curves. He further expressed that one of the important issues in diffusion research is to figure out the reason some innovations have a rapid rate of adoption while others are adopted slowly (Rogers, 2003).

Social Systems

Rogers defines social system as “a set of interrelated units that are engaged in joint problem-solving to accomplish a common goal” (p.23). The unit is referred to as “individuals, informal groups, organizations, and/or subsystems” (p.23). Rogers (1995) identifies two types of social systems structures. They are social structure and communication structure. The structure is defined as “the patterned arrangements of the units in a system” (p.24). The social structure can be described as a formal arrangement of units, methods of communication, or hierarchies and communication structure refers to informal arrangements of circumstances and connections in the communication. Both structures can be used to facilitate or impede the diffusion of innovations in the social system (Rogers, 2003). Rogers (2003) further asserted that the nature of the social system and the characteristics of individuals influence individual innovativeness.

Researchers emphasize the importance of the social context of technological innovations in instructional technology by stating that “technology and society are inseparable...Technology impacts, shapes, and redefines society and, in turn, a variety of social factors affect the development, implementation, and spread of technology” (1996, para. 1). Research also shows the importance of social systems concerns of changing patterns in social interaction (Gayeski, 1997). The research asserted that “even when media have been proven to be effective substitutes for classroom instruction, both instructors and students report that they don’t like to learn in isolation” (p. 7). It was further added that the lack of attention to societal factors and over reliance on technological innovation often results in the difficulty in adopting instructional products even though the products is technically abundant and instructionally sound (Surry & Farquhar, 1996).

Social Cognitive Theory

According to Rogers (2003), a social psychological theory with direct applicability is social cognitive theory. Social cognitive theory provides a theoretical framework to describe and predict behaviors (Bandura, 1986). Social cognitive theory looks outside of the individual and explains how human behavior changes by exchanging information with others (Roger, 2003). The theory explains that individuals’ behavior is determined by interactions among behavior, personal factors, and environmental influences. It should be noted that the theory was titled social learning theory until Bandura named the theory as the current title in 1986.

Based on social cognitive theory (Bandura, 1986), the heart of the diffusion process is through observational modeling. Unlike just imitation or blind mimicry, the observer extracts the key elements to perform similar behaviors. Modeling provides an opportunity for observers to

learn and to adapt the observed behavior. Individuals do not have to spend time and effort going through the process of trial and error but learn from the models they observe (Baronowski, et al., 1997). Through modeling, each individual does not have to necessarily exchange information with others verbally because nonverbal communication also influences behavior change. Since social cognitive theory recognizes that external factors impact on behavior change, communication can be viewed as an important factor from this social aspect (Rogers, 2003). Moreover, an individual learns by observing another individual's behavior in person or through a public display using mass media. Rogers (2003) asserted that both social learning and the diffusion of innovations emphasize communication with others as important to behavior change. Both theories try to describe how exchanging information contributes to individual behavior change.

According to Bandura's social cognitive theory (1986), self-efficacy will affect the diffusion process. Self efficacy provides the foundation for human motivation (Bandura, 1995) and is the most important factor resulting in behavioral change (Baranowski, et al., 1997).

Self-efficacy is defined as "a person's judgment of their capabilities to organize and execute courses of actions required to attain designated types of performances" (p. 391). Self-efficacy is a belief about one's confidence in his/her abilities to succeed certain tasks but not one's actual abilities of knowing what to do. The more a person has the belief to be capable of doing something, the more likely he/she will actually succeed. Self-efficacy has been a useful predictor of students' achievement (Bandura, 1997; Multon, Brown, & Lent, 1991; Pajares, 1997). Research also shown that self-efficacy has been highly related to student achievement in online courses (Jourdan, 2003; Pan, et al., 2005; Spence, 2004). A self-efficacy instrument becomes effective when it is used to assess the specific skills necessary for performing an

activity (Bandura, 1986). Computer self-efficacy refers to a person's belief of his or her ability to use computers in prospective situations (Compeau & Higgins, 1995). The efficacy belief has shown to be associated with individual's willingness to use computers (Webster & Martocchio, 1992).

Collaboration and Learning

Vygotsky (1978, 1986) asserts that optimum cognitive development occurs in a social context and learning results from collaboration with other people. Collaboration enables learning to be student centered and focuses on the process of working together. Such collaboration empowers students with the responsibility to build on their cognitive knowledge (Myers, 1991).

However, not all the studies showed that collaboration positively contribute to improving learning performance. McConnell (1994) found that MBA students in the study were considerably resistant to work in groups especially in older groups. The enmity especially exists in older groups due to the experience of "freeloaders" and "social loafers." Freeloaders are those has limited contribution to the group and the issue of freeloaders and social loafers is a major concern in working in groups (Doolan & Barker, 2001). As a result, Underwood (2003) said students prefer being allocated to a specific work with subtasks in the process of collaborating others in a group to ensure every member in the group contribute equally. Besides lack of commitment by individuals, not sufficient knowledge in working in groups may reduce the effectiveness of learning as a group (Benbunan-Fich & Arbaugh, 2006).

In the field of online learning, it has been recommended that social activities should not be neglected because it is related to learning satisfaction (Kleiner, 2000; Richardson & Swan, 2003; Stonebraker & Hazeltine, 2004). Collaboration becomes an important component in online learning and collaborative projects are widely used across higher education (Carr, Morrison, Cox

& Deacon, 2007). Web tools that facilitate collaboration become indispensable in the online learning context to reduce feelings of isolation or alienation (Dickey, 2004).

Cooperative Learning

Johnson and Johnson (1999) defined cooperative learning as “the instructional use of small groups so that students work together to maximize their own and each other’s learning” (p.5). In cooperative learning, a heterogeneous group is formed and each member assigned a duty to complete their tasks. Through the process of group discussion and peer interactions, group members seek to accomplish the assigned goal (Kessler, 1992).

Number Heads Together is one of commonly used cooperative learning activities. Kagan (1994) explained the activity in four steps: (1) Students number off: each student in the group is assigned a number; (2) Teacher asks a question: teachers pose a question and ask everyone in the group to find out the answer; (3) Heads together: students are required to discuss the question and make sure everyone knows the answer; and (4) Teacher calls a number: The teacher calls out a team number at random to answer the question. If the response given by the student is not complete, the teacher will go on calling another number until the question is fully answered. Numbered Heads together can be applied in a wide range of educational objectives and with the increased frequency of practice, academic achievement will be improved (Kagan, 1994).

Johnson and Johnson (1987, 1999) asserted roles assignment in the group help achieve learning goals and maintain positive relationships among members. Assigning roles will strengthen positive interdependence among members and make sure the group functions properly. According to Johnson and Johnson (1987), roles could be—

- (1) A “summarizer-checker” to ensure every member in the group master the material thoroughly;

- (2) A “researcher-runner” to obtain necessary materials for the group and responsible for communicating with teacher and other groups;
- (3) A “recorder” to keep track of decisions made in the group and edit reports created by the group;
- (4) A “encourager” to reinforce and praise members’ contribution; and
- (5) An “observer” to record how well the group is collaborating.

Johnson and Johnson (1999) later identify roles into four categories—forming, functioning, formulating, and fermenting-- by different types of skills needed.

Table 1.
Roles assignment examples (Category and role are from Johnson and Johnson, 1999)

Category	Role	Responsibilities
Forming	Turn-taking monitor	Make sure every member contributes
Functioning	Recorder	Write and edit reports
	Encourager of participation	Praise members for their contribution
	Clarifier or paraphraser	Express material or work in their own words
	Consensus seeker	Look for agreement among members
Formulating	Summarizer	Summarize ideas in the group
	Generator	Generate alternative answers
Fermenting	Asker for justification	Ask for reasons or justification
	Rationale giver	Provide facts and reasons

Kagan (1994) provided some other roles such as materials monitor, question commander, coach, encourager, reflector, quiet captain, praiser, cheerleader, checker, gatekeeper, taskmaster, and recorder.

Wikis and Learning

Wikis are collaboratively created websites where users can create a series of web pages, edit and revise their and others' work, provide feedback, keep track of the changes and publish information online. The first wiki was created and developed by Ward Cunningham and was used as a composition system, a discussion medium, and a collaborative tool (Leuf & Cunningham, 2001). Cunningham believes wiki technology will facilitate the evolution of knowledge creation and publishing, claiming that "wiki is inherently democratic" (p. 17). The word wiki comes from the Hawaiian word for "quick" to represent that a wiki web site could be quickly created for a collaborative team (Bold, 2006; Lamb & Johnson, 2007). The advantages of using wikis include:

- (1) Promoting collaborative writing: Collaborative writing skills are most widely believed to be acquired in the wiki environment (Engstrom & Jewett, 2005; Keith, 2006; Lamb & Johnson, 2007). The collaborative context provided by wikis enhances users to negotiate, collaborate with others as well as learn from others' work (Keith, 2006). Wikis emphasize on the process of learning while discourage outcome oriented learning (Lamb, 2004).
- (2) Providing open-editing: Users can change their own and others' work. Wikis provide an easy way for completing collaborative projects, extending group work by continuing it

asynchronously outside the course, and encourage learners to participate discussions on their own in the online environment (Lamb, 2004; Farabaugh, 2007);

- (3) Allowing non-linear text structure: Wikis enable associative web pages with non-linear navigation structures which provide easy connection of meaning making previously unknown to learners and increase the speed and variety of content developing (Ebersbach, Glaser, & Heigl, 2006; Farabaugh, 2007; Keith, 2006);
- (4) Encouraging multiple modalities: Wikis are able to incorporate graphics, audio, video, and animation that allow learners to express themselves and communicate the meaning may not be fully expressed in the text format (Jewitt, 2005; Kress, 2003); and
- (5) Providing a simple editing environment: Little navigation and clicking are required. The easy editing process enables non-technical users to participate in the collaborative work (Chang, 2004; Raitman, Augar, & Zhou, 2005).

On the other hand, researchers believe there are some drawbacks using wikis such as:

- (1) Students may not be comfortable or familiar with collaborative writing: Students may have difficulties share their works in a public space and concern deleting or making changes to others' work (Keith, 2006; Raitman, Augar, & Zhou, 2005).
- (2) Online texts may increase challenges in learning: Researchers asserted the concern that online text incorporating multimedia tools may lack recognizable text structures that found in formal printed text formats and reduce learners' opportunities in improving such comprehension and learning (Cairo, 2003; Literacy Matters, 2006).

Research in Wikis

In a study conducted by Engstrom and Jewett (2005), eleven teachers and approximately 400 students were involved. Students were organized into groups of four to six students to make the wiki web pages more manageable. Participating teachers agreed that their technology knowledge and skills improved after the project and most students became independent about their learning by researching the project content without much support and facilitation from them. The results showed that groups with three to five students expressed the most satisfaction with their learning. Besides, students working in cooperative groups with assigned roles such as “wiki recorder,” “research note-taker,” “discussion facilitator,” had the most positive experience without being locked out by their wiki page. Encouraging and managing two-way communications were recommended to promote learning.

Augar, Raiman, and Zhou (2004) implemented an icebreaker exercise using wikis in Deakin University in Australia. The purpose of the study was to explore new ways to help students get to know each other in their online learning groups. Four hundred and fifty one students participated in the study and they were asked to answer 15 questions posted online related to students’ characteristic, habits, and interests. Students had two weeks to update the postings and participated in the discussion. The results showed that the wiki proved to be a useful tool for online collaboration. The wiki technology supported 451 users over two weeks without service outages. The number of pages increased each day to a final of over 1000 pages. The wiki had between 1000 and 2000 page views or hits each day. Approximately 150 times of editing every day and over 2000 wiki edits in total.

Wikis in EFL in Taiwan

The usage of wikis in an EFL course in Taiwan is in the beginning stage. Researchers proposed applying wiki system to improve learners' writing skills for senior high school students in Taiwan because wikis provide an environment that they could easily obtain immediate feedback from the peers (Chang, & Schallert, 2005). Wang, Lu, Yang, Hu, Chiou, Chiang, and Hsu (2005) conducted an empirical study focusing on integrating wikis in an ESL course in Taiwan and there were 43 students participated in the study. The experiment lasted for two weeks and the participants were asked to edit their writing assignment in wikis. They were then assigned into high and low groups according to their frequency of editing their wiki pages. The results demonstrated negative relationship between frequency of editing pages and performance of writing. The researchers asserted that the inverse relation didn't suggest a causal connection between usage and scores. Possible reason included different learning styles, internet usage, and short experimental period for improving writing skills.

Culture and Collaborative Work

Chinese culture is highly collective and long-term oriented (Thompson & Ku, 2005). They further asserted that Chinese students are visual and holistic learners. Chinese students tend to observe and then obtain competence of certain tasks. Due to collectivism, Chinese students value the importance of working in a group (Carson, 1992). In the collectivist culture, a group rather than an individual is regarded to be the smallest unit of survival (Carson & Nelson, 1996). Students in the collectivist culture view learning as a responsibility to their families and societies over personal satisfaction and individual success (Thompson & Ku, 2005). Moreover, they seek their best achievement to bring honor to their communities and feel they shame their families if they don't perform well. In order to work in a group, collectivists will work on maintaining a

balanced relationship in the group and the harmony among group members over the importance of being right (Hofstede, 1991; Triandis, 1988, 1989; Varner & Beamer, 2001). Research has shown that Chinese students concerned more on maintaining a positive group climate rather than providing useful feedback commenting others' essay writing (Carson & Nelson, 1996). Chinese students were shown to be more likely to give conservative critiques and prefer to agree with others when commenting others' work (Hofstede, 2001; Thompson & Ku, 2005). However, when faced with individuals in other groups, collectivists can be impolite (Triandis, 1989). Moreover, in the Chinese culture, the hierarchy of power or leadership depends on age, gender, or status (Thompson & Ku, 2005). Questioning individuals with higher hierarchy such as teachers would be regarded as questioning their knowledge competence (Pratt, Kelly, & Wong, 1998).

Summary

This chapter reviewed the theoretical foundation of implementing wiki technology in supporting learning under different educational settings. The interactive process of diffusion and collaboration results in learning within the social context. The chapter also reviewed research on the use of wikis in second language learning and acquisition. Due to lacks of depth and scope in investigating the effectiveness of applying wikis, students' attitudes toward wikis and communication channels that contribute to learning, further research is warranted.

CHAPTER THREE: METHODOLOGY

In this chapter, the research design, procedures of data collection and data analysis are presented. The design of the study, population, instrument, data collection procedure and data analysis procedure are addressed in detail.

The purpose of this study was three fold: (1) to examine the effectiveness of wikis in terms of students' learning outcomes as compared to those of no wikis applied classes, (2) to investigate the extent to which wiki classes differ from non-wiki classes regarding students' attitude towards language learning, and (3) to explore students' communication channels, experience and attitudes towards integrating wikis to their learning.

Statement of Hypotheses and Research Questions

The hypotheses and questions in this study are:

- (1) There is no significant difference in repeated measure scores between the control (non-wiki) group and treatment (wiki) group.
- (2) There is no significant difference in attitudes towards language learning in the control (non-wiki) and treatment (wiki) groups.
- (3) What are students' communication channels, experience and attitudes toward integrating wikis to their learning?

Design of the Study

This was a quasi-experimental research study in that purposeful sampling was used in the study and used intact classes as the experimental and control groups. The study investigated

students learning outcomes in English as a foreign language using wikis in the Hsing Wu College in Taipei County, north Taiwan. Hsing Wu College is a technical college that offers four-year programs and two-year programs to vocational school graduates. The two-year programs are for senior college students and the four-year programs admit senior high school and vocational school graduates. There are four departments included in the college: Department of Business Management, Department of Hospitality and Tourism Management, Department of Information Science, and Department of Humanities and Social Science.

Study Population and Sample Selection

Permission was granted for this study by Institutional Review Board (IRB) at the University of Central Florida and Approved by the department chair of Hsing Wu College, two General English classes from Hsing Wu College participated in this study. General English was a two-credit course that became part of a requirement of the curriculum. The class met for two hours once a week. Both classes consisted of students from the four-year program. These classes were purposefully selected to be included as the target population. One of the classes was randomly chosen to be the control group and the other class was the experimental group. The control group consisted of 47 students with 23.4% male and 76.6% female. The experimental group included 50 students with 13.95% male and 86.05% female. The entire treatment lasted for six weeks. All students were required to take weekly tests in both English as a foreign language (EFL) classes. The study was conducted in the fall 2007 semester.

Textbook

Both classes used the same magazine as their textbook— *Let's Talk in English*. Let's Talk in English is designed specifically for learners wanting to improve their English listening

and speaking skills. It is the most popular English-teaching magazine in Taiwan. The magazine accompanied by its radio and TV programs has won numerous awards including Taiwan's famous Golden Bell Award.

Treatment

During the six weeks of treatment, the researcher designed the lesson plans and established the wiki environment. Wikispaces was chosen to be the wiki environment due to its low cost, ease of use, and variety of features. Details about setting up the wiki environment are available in Appendix A. For both control and treatment groups, five to six participants were assigned to a heterogeneous group. The researcher used test scores from their first weekly test and selected two top students, two students that had the lowest grades, and one or two students of middle grade to become one group. The other groups followed the same procedure.

Prior to the treatment, the researcher provided a list of conversation dialogues needed to be dictated by participants available in the CD-ROM attached to the textbook (see Appendix B). Each participant was assigned a section of dialogue of thirty to sixty seconds length. Each participant was assigned a different section from others' within the class (see Appendix C.). Each was also assigned one of other member's sections of dialogue to critique. Each student in the groups was assigned a specific role and was asked to fulfill the role. The role assignment stayed the same throughout the treatment. The responsibility for each role was explained by the researcher. They were:

Checkers of understanding: They were the students with the highest test score in the first weekly test and they served as leaders of their groups. They led group discussions and ensured everyone in the group masters learning materials ("Do you understand?")

Recorders: They recorded and ensured the required assignments were accomplished by members. They recorded weekly test scores and reminded group members to complete their assignments.

Elaborators: They elaborated and explained important or unclear concepts and vocabularies.

Encouragers: They encouraged each group members' contribution and asked silent members to participate in discussions.

Praisers: They praised individuals in the group when they made progress. ("Good job!", "Great idea!", "That's right").

For the control group, participants were required to listen to the assigned dialogue, dictate the dialogue and provide the document to the one that was responsible for critiquing his/her work 4 days before the class meeting each week. The files were required to be saved as a word document and be sent to the member that was responsible to critique the work. Each participant was asked to correct the document and save the revised document as a word document. They were asked to print out both documents and bring the printed and electronic documents to the class. In the class, they shared their documents with other group members and discussed with others to determine the correct answer. Members took turns accumulating all the documents together in a word document and submitted the document to the instructor. The correct answer was then presented to the participants by researcher. The researcher graded this group assignment and provided feedback. Each group assignment was graded 100 points and each word graded equally. Every member within the group received the same score. To avoid freeloaders, students were asked to fill out group evaluation forms at the end of the course (see

Appendix F). The arrangement of class time (totaling 100 minutes) was: (1) Critique and accumulate dictation assignment (20 minutes); (2) Present correct answer to the participants and discuss if they had any questions (10 minutes); (3) Number-head-together activity (50 minutes); (4) weekly test (20 minutes). To be sure everyone participated in the classroom group activities, the teacher posed a question, pick a role, and asked the ones serving that role to answer the question. This was a cooperative structure modified according to Number Heads Together. For example, the teacher asked a question and chose who were “recorders” to answer the question. Only recorders in each group could volunteer to answer the question so the individual must concentrate on their learning to earn points for his/her group. Afterwards, the weekly test was administered on the content covered in the class including listening comprehension and reading comprehension. The student had to take the test on their own without the help of others. Their scores contributed to the group for a group score. The average group scores were announced and the group with the highest score was greeted in class.

For the treatment group, participants were required to listen to the assigned dialogue and recorded the dialogue in written format word by word. A clip providing directions of how to use the wiki was given to the students prior to the treatment and an introduction of the wiki was given in the previous class. The rubric of working in the wiki was also provided (see Appendix G). Participants were required to post their dictation in the wiki 4 days before the class meeting. Each participant in the group was asked to critique one of his/her group member’s assigned work by revising others’ posting in the wiki. The correct answer was then presented to the participants after the assignment was submitted. The researcher graded this group assignment and provided feedback. Each group assignment was graded 100 points and each word graded equally. Every member within the group received the same score.

To avoid freeloaders, students were asked to fill out group evaluation forms at the end of the course (see Appendix F). In each week, the participants within the group were required to respond to discussion questions designed by researcher related to course material (see Appendix D). The arrangement of class time (totaling 100 minutes) was: (1) Reflect on what they've learned from the dictation process and discussed in the wiki, and report to the class (20 minutes); (2) Present the correct answer to the participants and discuss if they have any questions (10 minutes); (3) Number-Head-Together activity (50 minutes) as described in the control group; (4) weekly test (20 minutes) as described in the control group.

Data Collection

Permission to conduct the present research study was granted by University of Central Florida Institutional Review Board (UCFIRB) (see Appendix H) and permitted by the chair of the Department of Applied English in Hsing Wu College (see Appendix I). Each participant was asked to sign a consent form approved by UCFIRB (see Appendix J and Appendix K). The study was executed from December 2007 to January 2008 and lasted for six weeks. The data were collected through the following methods:

Weekly Test

The weekly tests were provided by Let's Talk in English. The test consists of two parts: (A) Listening comprehension, and (B) Reading comprehension. The Listening comprehension portion included: (1) Pictures: Listen to the question and choose the best answer according to each picture; (2) Best Response: Listen to the questions and choose the best response to each question or statement; and (3) Short Conversation: Listen to the conversations then answer the

questions. The Reading comprehension portion includes: (1) Vocabulary and Phrases: Choose the best answer to fill in the blank; and (2) Cloze test: read a paragraph and fill in the blanks with correct choice.

Questionnaire

The English Learning Questionnaire (see Appendix L) investigating participants' attitude towards language learning was administered at the end of the treatment. The questionnaire included 21 questions with a five-point Likert scale, i.e. "Strongly Disagree," "Disagree," "Neither Agree nor Disagree," "Agree," and "Strongly Agree." The questions were adopted from Chien (2004) with her permission. The questionnaire used by Chien (2004) obtained a reliability coefficient of .9230.

The 21 questions covered in the questionnaire asking students' attitude towards English learning and included (a) eight questions about attitude towards class; (b) six questions regarding perception of language skills improvement; (c) six questions related to students' attitude towards cooperative learning; and (d) one open-ended question asking for their opinions and comments about the instruction. Sample questions included statements such as "I find the structure of the class useful to my English learning," "I feel I have improved my English skills," "cooperating with other students is conducive to learning English," (See Appendix L).

The questionnaire had a response rate of 83.51%. A five-point Likert scale was used with 1 as "Strongly disagree," 2 as "Disagree," 3 as "Neither disagree nor agree," 4 as "Agree," 5 as "Strongly Agree."

To determine the validity of the questionnaire, principal component analysis was performed on the first 20 questions. Three factors were yielded by factor analysis. Factor one included questions 1 to 6, 8 and 9 and was named "attitudes towards class." Factor two comprised of

questions 7, 10 to 14 and was named “students’ perception of language skills improvement.”

Factor three consisted of questions 15 to 20 and was called “attitude towards cooperative learning.” The results of principal component analysis are shown in Table 2. The total variance accounted for by three factors was 70.32%. Respondent ratings of attitude towards class obtained from the questionnaire were judged to be fairly reliable with an internal consistency reliability coefficient of 0.931. Respondent ratings of perception of language skills improvement obtained from the questionnaire were judged to be fairly reliable with an internal consistency reliability coefficient of 0.912. Respondent ratings of attitude towards cooperative learning obtained from the questionnaire were judged to be fairly reliable with an internal consistency reliability coefficient of 0.905.

Table 2.
Results of Principal Component Analysis

Items	1	2	3
Q3: interesting structure	.853		
Q2: comfortable with structure	.845		
Q5: activities help learning	.782		
Q4: interesting class	.750		
Q9: motivation to learn English	.724		
Q8: activities motivate English learning	.679		
Q1: structure useful to English learning	.652		
Q6: clear instructions	.555		
Q16: cooperation conducive learning English		.820	
Q15: groups facilitate learning		.783	
Q20: helping others helped me learn		.736	
Q19: members helped me learn		.735	
Q18: studied harder		.721	
Q17: encouraged to speak up		.713	
Q10: vocabulary expanded			.797
Q12: writing improved			.759
Q11: listening improved			.753
Q14: speaking improved			.667
Q13: grammar improved			.621
Q7: English skills improved			.565

The Wiki Use Questionnaire (see Appendix M) regarding participants' attitude towards applying wikis was also given to the treatment group at the end of the treatment. The questionnaire consisted of 21 questions asking students general experience on using wikis, including (a) six questions about attitude towards using wikis; (b) four questions regarding technology self-efficacy; (c) eight questions related to sociability in wikis; and (d) three questions about students' actual use of wikis. Sample questions included statements such as "Using wikis increases my productivity in writing group assignment," "Using wikis helps my English learning," "The wiki environment enables me to easily contact with others," "In the wiki environment, I obtain encouragement and support in my learning experience" (See Appendix M).

The questionnaire had a response rate of 90.0%. The five-point Likert scale was used with 1 as "Strongly disagree," 2 as "Disagree," 3 as "Neither disagree nor agree," 4 as "Agree," 5 as "Strongly Agree."

To determine the validity of the questionnaire, principal component analysis was performed on the first 18 questions. Three factors were yielded by factor analysis. Factor one included questions 1, 2, and 5 and was named "benefit of using wikis." Factor two comprised of questions 4, 6 to 10 and was named "technology self-efficacy." Factor three consisted of questions 3, 11 to 18 and was named "sociability in wikis." The results of principal component analysis are shown in Table 3. The total variance accounted for by three factors was 74.91%. Respondent ratings of benefit of using wikis obtained from the questionnaire were judged to be fairly reliable with an internal consistency reliability coefficient of 0.864. Respondent ratings of technology self-efficacy obtained from the questionnaire were judged to be fairly reliable with an internal consistency reliability coefficient of 0.906. After the deletion of question 6. Respondent

ratings of sociability in wikis obtained from the questionnaire were judged to be fairly reliable with an internal consistency reliability coefficient of 0.938.

Table 3.
Results of Principal Component Analysis

Items	1	2	3
Q18: Real persons in discussions	.885		
Q17: Real persons in wiki pages	.882		
Q14: Feel not lonely in wikis	.807		
Q11: Wikis enable contact	.788		
Q13: Wikis enable work in groups	.779		
Q15: Obtain support in wikis	.757		
Q3: Wikis help English learning	.710		
Q12: Wikis enable interaction	.695		
Q16: Comfortable in wikis	.596		
Q9: know posting messages		.936	
Q8: know reading messages		.900	
Q7: know posting assignment		.799	
Q10: know replying messages		.758	
Q4: easy to use		.475	
Q6: intend to use wikis		.469	
Q2: Wikis make doing assignment easier			.839
Q1: Wikis increase productivity			.832
Q5: Beneficial to learning			.661

Interview

An interview was conducted regarding participants' interaction experience in the wiki environment to investigate the communication channels they usually used and their experience of using wikis. The semi-structured questions were shown in Appendix N. Twelve volunteers in the treatment group were participated in the interview. The interviews were conducted face-to-face at the Hsing Wu College after the six-week treatment. Each volunteer signed a consent form approved by UCFIRB (see Appendix O) and prepared by researcher prior to the video interview. The interviews were video-recorded and transcribed.

The study evaluated the effect of applying wikis in an English as a foreign language class by the following instruments:

Control and treatment groups:

- (1) quantitative data from the Let's Talk in English weekly test;
- (2) quantitative data from the questionnaire on attitude towards language learning;

Treatment group only:

- (1) Quantitative data from the questionnaire on attitude towards using wikis;
- (2) Qualitative data from interview regarding participant's communication channels, interaction experience and attitudes of using wikis in EFL classroom.

Data Analysis

Scores collected from the weekly tests was analyzed through Repeated Measures ANOVA. The researcher coded the class identifier into treatment. Variable treatment refers to treatment groups with wikis experimental groups being 1 and non-wiki control group being 2. Descriptive analysis was performed on the data collected by the questionnaire and from the interview. The data was decoded into different kinds of interactions and communication channels such as face-to-face or electronic communications through learners, peers, group members, instructor, and course materials, etc.

CHAPTER FOUR: RESULTS

The purpose of this study was to determine if wikis could be used to improve students' learning outcomes in an EFL class in Taiwan; investigate how use of wikis affected students' attitude towards language learning; and explore students' attitude towards wikis and interaction experience in the wiki environment. Three research questions were constructed: Research question one, "Is there a significant difference in weekly test scores between the control (non-wiki) group and treatment (wiki) group?" was answered using Repeated Measure ANOVA on weekly test scores. Research question two, "Is there a significant difference in attitudes towards language learning in the control (non-wiki) and treatment (wiki) groups?" was answered using an independent t-test on data collected through the questionnaire. Research question three, "What are students' communication channels, experience and attitudes toward integrating wikis to their learning?" was answered descriptively using the questionnaire and interview data.

The weekly test scores consisted of two sections: The listening section (the listening part of the test) and the reading section consisted of the vocabulary and reading part of the test. Test scores for both sections were calculated separately, a perfect score for each section was 100 points. For hypothesis one, the listening and reading sections were analyzed separately to obtain more accurate results, demonstrating the specific skills students have acquired from the study.

Research Question One

Is there a significant difference in weekly test scores between the control (non-wiki) group and treatment (wiki) group?

Listening Scores

A Repeated Measures Analysis of Variance was employed to look at the listening part of the weekly test scores by treatment types. The results showed that there was a statistically significant change in the six listening weekly test 1-6 ($F_{1,44}=8.06$, $p<.01$). The mean scores of test 1 ($M=59.28$, $s=21.34$), test 2 ($M=55.96$, $s=15.99$), test 3 ($M=76.98$, $s=16.61$), test 4 ($M=53.85$, $s=18.74$), test 5 ($M=59.28$, $s=25.46$), and test 6 ($M=75.39$, $s=20.80$) are shown in Table 4.

Almost 16% of the variance in score was attributed to time.

Table 4.
Mean Scores of Listening Weekly Test 1-6

	Experimental	Control	Total
Listening 1	58.52	60.37	59.28
Listening 2	62.96	46.00	55.96
Listening 3	83.93	67.11	76.98
Listening 4	60.78	44.00	53.85
Listening 5	68.89	45.63	59.28
Listening 6	82.85	64.79	75.39

Note: Total n=46, experimental group n= 27, control group n= 19. Data was collected in fall 2007.

There was a statistically significant difference between the experimental group ($M=69.65$) and control group ($M=54.65$) scores ($F_{1,44}=14.50$, $p<.01$). Almost 25% of the variance in score was explained by group differences. There was also a statistically significant interaction effect between treatment group and score change ($F_{1,44}=8.66$, $p<.01$). The interaction effect explained 16% of the variance in score. Although both groups began at approximately the same level (see Table 2), after the first week, the experimental group scores were always higher than the control group as shown in Figure 1.

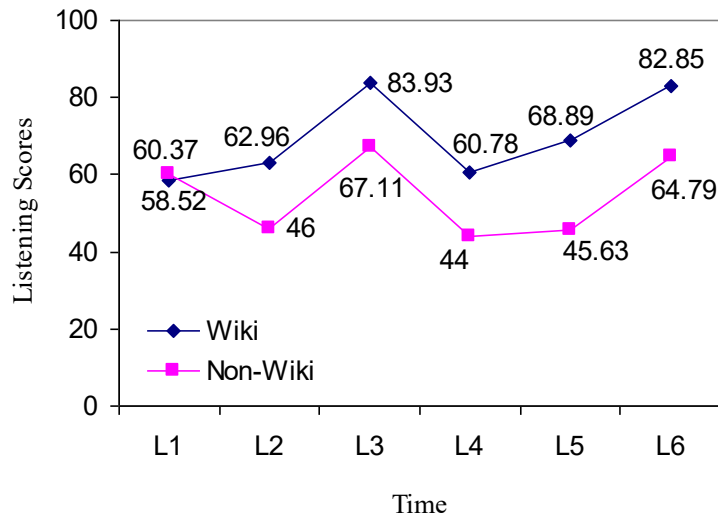


Figure 2. Listening Scores by Treatment Type

In order to include more participants, a repeated measure analysis was also applied on weekly test 1, 3, and 5 by treatment types. The results showed that there was no statistically significant change in reading weekly test scores 1, 3, and 5 ($F_{1,60}=1.66, p>.05$). The mean scores of test 1 ($M=59.48, s=20.37$), test 3 ($M=75.06, s=19.43$), and test 5 ($M=58.44, s=25.94$) are shown in Table 5. Almost 3% of the variance in score was attributed to time.

Table 5.
Mean Scores of Listening Weekly Test 1, 3, and 5

	Experimental	Control	Total
Listening 1	61.00	57.24	59.48
Listening 3	82.27	64.40	75.06
Listening 5	69.89	41.48	58.44

Note: Total n=62, experimental group n=37, control group n= 25. Data was collected in fall 2007.

There was a statistically significant difference between experimental group ($M=71.05$) and control group ($M=54.37$) scores ($F_{1,60}=15.36, p<.01$). Almost 20% of the variance in score was explained by group differences. There was also a statistically significant interaction effect

between treatment group and score change ($F_{1,60}=21.42, p<.01$). The interaction effect explained 26% of the variance in score. The result is shown in Figure 2. Beginning scores were essentially the same for the experimental and control group. For week 3 and 5, however, the experimental group was always higher than the control group.

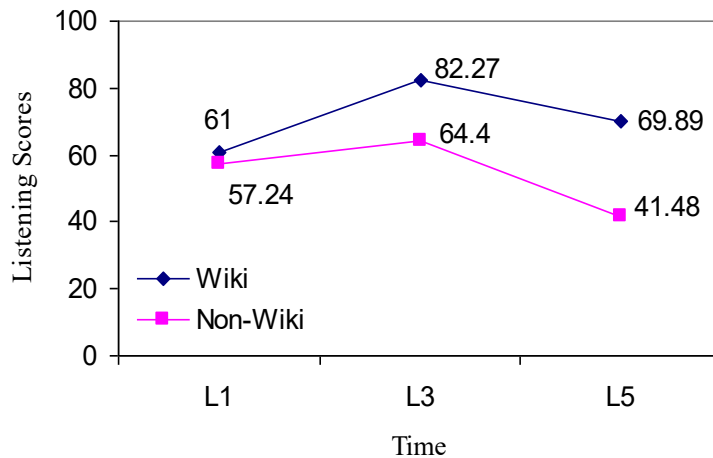


Figure 3. Listening Scores 1, 3, and 5 by Treatment Type

A Repeated Measures Analysis of Variance was also applied to examine weekly test 2, 4, and 6 by treatment types. The results showed that there was a statistically significant change in listening weekly test 2, 4, and 6 ($F_{1,53}=57.83, p<.01$). The mean scores of test 2 ($M=53.84, s=16.23$), test 4 ($M=53.13, s=20.44$), and test 6 ($M=72.95, s=20.91$) are shown in Table 6. Almost 52% of the variance in score can be attributed to time.

There was a statistically significant difference between experimental group ($M=68.48$) and control group ($M=48.97$) scores ($F_{1,53}=31.87, p<.01$). Almost 38% of the variance in score can be explained by group differences. There was no statistically significant interaction effect between treatment group and score change ($F_{1,53}=0.08, p>.05$). The interaction effect explained 0.1% of the variance in score.

Table 6.
Mean Scores of Listening Weekly Test 2, 4, and 6

	Experimental	Control	Total
Listening 2	61.48	43.96	53.84
Listening 4	62.77	40.67	53.13
Listening 6	81.19	62.29	72.95

Note: Total n=55, experimental group n=31, control group n= 24. Data was collected in fall 2007.

Reading Scores

For the reading section, a Repeated Measures Analysis of Variance was also used to examine the weekly test scores by treatment types. The results showed that there was a statistically significant change in six reading weekly tests ($F_{1,43}=47.00$, $p<.01$). The mean scores of test 1 ($M=50.67$, $s=18.84$), test 2 ($M=56.04$, $s=16.49$), test 3 ($M=73.51$, $s=20.32$), test 4 ($M=63.87$, $s=17.22$), test 5 ($M=68.00$, $s=14.56$) and test 6 ($M=69.60$, $s=17.66$) are shown in Table 7. Almost 52% of the variance in score was attributed to time.

There was a statistically significant difference between experimental group ($M=68.27$) and control group ($M=56.63$) scores ($F_{1,43}=8.85$, $p<.01$). Almost 17% of the variance in score was explained by group differences. There was no statistically significant interaction effect between treatment group and score change ($F_{1,43}=1.94$, $p>.05$). The interaction effect explained 4% of the variance in score.

Table 7.
Mean Scores of Reading Weekly Test 1-6

	Experimental	Control	Total
Reading 1	52.59	47.78	50.67
Reading 2	59.04	51.56	56.04
Reading 3	81.56	61.44	73.51
Reading 4	69.74	55.06	63.87
Reading 5	70.93	63.61	68.00
Reading 6	75.78	60.33	69.60

Note: Total n=45, experimental group n=27, control group n=18. Data was collected in fall 2007.

As mentioned earlier, in order to include more participants, a repeated measure analysis was applied to look at weekly test 1, 3, and 5 by treatment types. The results showed that there was a statistically significant change in reading weekly test scores 1, 3, and 5 ($F_{1,61}=44.48$, $p<.01$). The mean scores of test 1 ($M=50.14$, $s=18.72$), test 3 ($M=71.38$, $s=20.19$), and test 5 ($M=67.19$, $s=16.05$) are shown in Table 8. Almost 42% of the variance in score was attributed to time.

There was a statistically significant difference between experimental group ($M=67.87$) and control group ($M=55.36$) scores ($F_{1,61}=12.94$, $p<.01$). Almost 18% of the variance in score was explained by group differences. There was no statistically significant interaction effect between treatment group and score change ($F_{1,61}=2.24$, $p>.05$). The interaction effect explained 4% of the variance in score.

Table 8.
Mean Scores of Reading Weekly Test 1, 3, and 5

	Experimental	Control	Total
Reading 1	52.26	46.92	50.14
Reading 3	79.13	59.60	71.38
Reading 5	72.21	59.56	67.19

Note: Total n=63, experimental group n=38, control group n=25. Data was collected in fall 2007.

A repeated measure analysis was used to look at weekly test 2, 4, and 6 by treatment types. The results showed that there was a statistically significant change in reading weekly test scores 2, 4, and 6 ($F_{1,60}=1.66$, $p>.05$). The mean scores of test 2 ($M=54.65$, $s=16.93$), test 4 ($M=63.04$, $s=16.43$), and test 6 ($M=67.59$, $s=18.22$) are shown in Table 9. Almost 40% of the variance in score can be attributed to time.

Table 9.
Mean Scores of Reading Weekly Test 2, 4, and 6

	Experimental	Control	Total
Reading 2	59.19	48.52	54.65
Reading 4	68.48	55.70	63.40
Reading 6	74.68	58.04	67.59

Note: Total n=54, experimental group n=31, control group n= 23. Data was collected in fall 2007.

There was a statistically significant difference between experimental group (M=67.45) and control group (M=54.09) scores ($F_{1,52}=13.39, p<.01$). Almost 21% of the variance in score can be explained by group differences. There was no statistically significant interaction effect between treatment group and score change ($F_{1,52}=1.95, p>.05$). The interaction effect explained 4% of the variance in score.

Research Question Two

An independent t-test was used to answer research question two “Is there a significant difference in attitudes towards language learning in the control (non-wiki) and treatment (wiki) groups?” A questionnaire regarding students’ attitude towards language learning was administered to the students at the end of the six weeks of study in order to answer this research question. There were three sections in the questionnaire: (1) Attitude towards class (items 1-6, 8, and 9); (2) Perception of language skills improvement (items 7 and 10-14); (3) attitude towards cooperative learning (items 15-20).

Attitude towards Class

A composite score from questions 1-6, and 8, 9 was used to determine students’ attitude toward the class. Composite score ranged between 8 and 40. There was a statistically significant difference in attitude towards class between the experimental and the control group ($t=4.66$, $df=79$, $p<.01$). The 95% Confidence Interval indicates the true mean difference (5.65) may range from 3.24 to 8.07. On average, the composite score for the experimental group was 27.96 (SD=5.24). The composite score for the control group was 22.31 (SD=5.65). Results are shown in Table 10.

Table 10.
Students’ Attitude towards Language Learning

Condition	Experimental		Control	
	Mean	SD	Mean	SD
Attitude towards class	27.96 ^a	5.24 ^a	22.36 ^a	5.65 ^a
Perception of language skills improvement	19.64 ^b	3.99 ^b	16.50 ^b	3.95 ^b
Attitude towards cooperative learning	20.22 ^c	4.44 ^c	18.00 ^c	3.88 ^c

Note: ^a ($t=4.66$, $df=79$, $p<.01$). ^b ($t=3.54$, $df=79$, $p<.01$). ^c ($t=2.37$, $df=79$, $p<.05$). Data was collected in fall 2007.

Perception of Language Skills Improvement

A composite score from questions 7 and 10-14 was used to determine students' perception of their improvement in language skills. Composite score ranged between 8 and 30. There was a statistically significant difference in students' perception of improvement in language skills between the experimental and control group ($t=3.54$, $df=79$, $p<.01$). The 95% Confidence Interval indicates the true mean difference (3.14) may range from 1.38 to 4.91. On average, the composite score for the experimental group was 19.64 (SD=3.99). The composite score for the control group was 16.50 (SD=3.95). Results are shown in Table 10.

Attitude towards Cooperative Learning

A composite score from questions 15-20 was used to determine students' attitude toward cooperative learning. Composite score ranged between 6 and 30. There was a statistically significant difference in students' attitudes toward cooperative learning between the experimental and control group ($t=2.37$, $df=79$, $p<.05$). The 95% Confidence Interval indicates the true mean difference (2.22) may range from 0.35 to 4.09. On average, the composite score for experimental group was 20.22 (SD=4.44). The composite score for control group was 18.00 (SD=3.88). Results are shown in Table 10.

In the written feedback question, some students provided their reflection after the six-week treatment. The themes were presented below:

(a) Control group: Four students expressed that the process of submitting assignments was bothersome to them. A student stated: "I felt that turning in assignments was inconvenient and revising others' work was a waste of my time." Three students felt that the dictation

assignment was too much to them. A student wrote: “The dictation assignment was too difficult and too much to me.” Two students stated it was unfair when some members in their group didn’t complete their assignments. A student stated: “It became unfair when somebody didn’t do their work and affected our group grade.” Two students expressed that the dictation assignment didn’t help improve their listening ability. A student wrote: “I didn’t learn much from the dictation assignment.”

(b) Experimental group: Eight students expressed that the instruction was interesting and that interaction was promoted. A student wrote that “This class was the most interesting class I’ve ever had. The [number-heads-together] activity increased the interaction and improved my motivation to learn.” Three students commented that the class motivated them to learn more. A student noted that “I had more motivation to learn than in the previous classes and the class was interesting.” Three students specified the convenience of submitting their assignments. A student stated that “It was easier and faster to submit my assignment.” Two students mentioned that the assignment was difficult but helpful to them. A student stated that “Course assignment was a little too overloaded to me but it was very helpful.”

Research Question Three

In order to answer research question three “What are students’ experience and attitudes toward integrating wikis to their learning?”, both quantitative and qualitative data were collected from the experimental (wiki) group only. Quantitative data was collected using a questionnaire administered to the students at the end of the six weeks of study. A total of twelve face-to-face interviews were conducted on campus at the Hsing Wu College to collect qualitative data.

Questionnaire Findings

The questionnaire consisted of 21 questions asking students' experience of using wikis, including (a) 3 questions about benefit of using wikis; (b) 6 questions related to technology self-efficacy; (c) 9 questions regarding sociability in wikis; and (d) 3 questions about students' actual use of wikis (see Appendix H). The questionnaire had a response rate of 90.0%. Five-point Likert scale was used with 1 as "Strongly disagree," 2 as "Disagree," 3 as "Neither disagree nor agree," 4 as "Agree," 5 as "Strongly Agree."

Wiki Use Questionnaire—Benefit of Using Wikis

In the first portion of the questionnaire, questions 1, 2, and 5 were used to determine benefits of using a wiki. The average score was 10.2. Mean scores ranged from 3-15. The average score of question 1 was 3.61. Most participants agreed (n=21, 47.73%), 34.09% (n=15) neither disagreed nor agreed, 11.36% (n=5) of them strongly agreed, 4.55% (n=2) disagreed and 2.27% (n=1) strongly disagreed. The average score of question 2 was 3.50. Most participants agreed (n=20, 45.45%), 34.09% (n=15) neither disagreed nor agreed, 9.09% (n=4) of them strongly agreed, 9.09% (n=4) disagreed and 2.27% (n=1) strongly disagreed. Both question 1 and 2 were related to whether wikis help students complete group assignments and the average score was 3.56. The average score of question 5 was 3.24. Most participants neither disagreed nor agreed (n=26, 57.78%), 31.11% (n=14) agreed, 6.67% (n=3) disagreed, 2.22% (n=1) of them strongly agreed, and 2.22% (n=1) strongly disagreed. The result is shown in Table 11 and the details are available in Appendix P.

Table 11.
Wiki Use Questionnaire Summary

Question	M	SD
Benefit of Using wikis	10.20	2.41

Technology Self-efficacy	23.78	4.19
Sociability in Wikis	28.62	6.47

Note. Data was collected in fall 2007.

Wiki Use Questionnaire—Technology Self-Efficacy

The average score from questions 4, 6-10 was used to determine students' technology self-efficacy. The average score was 23.78. Mean scores ranged from 7 to 30. The average score of question 4 was 3.44. Most participants agreed (n=19, 42.22%), 35.56% (n=16) neither disagreed nor agreed, 11.11% (n=5) disagreed, 8.89% (n=4) of them strongly agreed, and 2.22% (n=1) strongly disagreed. The average score of question 6 was 3.40. Most participants neither disagreed nor agreed (n=22, 48.89%), 26.67% (n=12) agreed, 13.33% (n=6) strongly agreed, 8.89% (n=4) of them disagreed, and 2.22% (n=1) strongly disagreed. The average score of question 7 was 4.44. Most participants agreed (n=20, 44.44%), 51.11% (n=23) strongly agreed, 2.22% (n=1) neither disagreed nor agreed, and 2.22% (n=1) disagreed. The average score of question 8 was 4.31. Most participants agreed (n=21, 46.67%), 44.44% (n=20) strongly agreed, 6.67% (n=3) neither disagreed nor agreed, and 2.22% (n=1) strongly disagreed. The average score of question 9 was 4.29. Most participants agreed (n=21, 46.67%), 44.44% (n=20) strongly agreed, 4.44% (n=2) neither disagreed nor agreed, 2.22% (n=1) disagreed and 2.22% (n=1) strongly disagreed. The average score of question 10 was 3.98. Most participants agreed (n=20, 45.45%), 31.82% (n=14) strongly agreed, 15.91% (n=7) neither disagreed nor agreed, 4.55% (n=2) strongly disagreed and 2.27% (n=1) disagreed. The result is shown in Table 11 and the details are available in Appendix P.

Wiki Use Questionnaire—Sociability in Wikis

The average score from questions 3, 11-18 was used to determine students' level of sociability in wikis. The average score was 28.62. Mean scores ranged from 9 to 45. The average

score of question 3 was 3.16. Most participants neither disagreed nor agreed (n=21, 46.67%), 33.33% (n=15) agreed, 13.33% (n=6) of them disagreed, 4.44% (n=2) strongly disagreed and 2.22% (n=1) strongly agreed. The average score of question 11 was 3.18. Most participants neither disagreed nor agreed (n=24, 54.55%), 27.27% (n=12) agreed, 9.09% (n=4) of them disagreed, 4.55% (n=2) strongly agreed and 4.55% (n=2) strongly disagreed. The average score of question 12 was 3.27. Most participants neither disagreed nor agreed (n=22, 48.89%), 31.11% (n=14) agreed, 8.89% (n=4) of them disagreed, 6.67% (n=3) strongly agreed and 4.44% (n=2) strongly disagreed. The average score of question 13 was 3.38. Most participants neither disagreed nor agreed (n=23, 51.11%), 28.89% (n=13) agreed, 11.11% (n=5) of them strongly agreed, 4.44% (n=2) disagreed and 4.44% (n=2) strongly disagreed. The average score of question 14 was 3.09. Most participants neither disagreed nor agreed (n=26, 57.78%), 24.44% (n=11) agreed, 11.11% (n=5) of them disagreed, 4.44% (n=2) strongly disagreed and 2.22% (n=1) strongly agreed. The average score of question 15 was 3.13. Most participants neither disagreed nor agreed (n=23, 51.11%), 26.67% (n=12) agreed, 13.33% (n=6) of them disagreed, 4.44% (n=2) strongly agreed and 4.44% (n=2) strongly disagreed. The average score of question 16 was 3.53. Most participants agreed (n=25, 55.56%), 24.44% (n=11) neither agreed nor disagreed, 11.11% (n=5) of them disagreed, 6.67% (n=3) strongly agreed and 2.22% (n=1) strongly disagreed. The average score of question 17 was 2.96. Most participants neither disagreed nor agreed (n=20, 44.44%), 26.67% (n=12) agreed, 17.78% (n=8) of them disagreed, 8.89% (n=4) strongly disagreed and 2.22% (n=1) strongly agreed. The average score of question 18 was 3.00. Most participants neither disagreed nor agreed (n=20, 44.44%), 28.89% (n=13) agreed, 15.56% (n=7) of them disagreed, 8.89% (n=4) strongly disagreed and 2.22% (n=1) strongly agreed. The result is shown in Table 11 and the details are available in Appendix P.

Wiki Use Questionnaire—Actual Use

Question 19-21 discussed students' actual use of wikis. From question 19, the majority of the participants used the course wiki website twice a week (n=19, 44.19%) while 2.33% (n=1) of the participants logged in to wikis less than once a week, 23.26% (n=10) of them use wikis once a week, 11.63% (n=5) of students used wikis three times a week, and 18.6% (n=8) of students used wikis more than three times a week. In question 20, the majority of the participants spent less than 30 minutes (n=20, 46.51%) or 30-60 minutes (n=20, 46.51%) each time on the course wiki website while 6.98% of the participants spend 60-90 minutes on wikis. In question 21, most of the participants used wikis at home (n=39, 90.70%) and 46.51% (n=4) of them used wikis on campus.

Interview Summary

A total of twelve face-to-face interviews were conducted at the end of the treatment on campus at the Hsing Wu College. Interviewees were voluntarily participated in the study. The main themes from students' comments during the interviews are as follows:

Low Complexity in Wikis

Students generally expressed the opinion that wikis provided an open-editing and simple editing environment. A student mentioned that "Wikis allowed me to revise as many times as I needed. I directly work on my assignment in the wiki website so I didn't need to use any other software such as Microsoft Word. It was very convenient." Students felt that they didn't need to upload or send their assignments to other members. A student stated that "Wikis helped me complete the assignment. I didn't have to upload or send the files anymore. I even didn't need to upload or send it when I made any changes. It saved me a lot of time and effort." Students also

felt that wiki was a simple environment. A student mentioned that “Wiki was easy to use and the layout of the web pages was clear to me. I could easily find the resources such as bulletin board, group assignment page, feedback from instructors, and discussion page, etc.”

Using Resources to Help Complete Assignments and Learn

Before working on their assignments, students usually checked bulletin boards to get information about the course such as dialogues assigned, instructors’ feedback, and assignment rubric, etc. They felt that they were updated regarding the course. Students stated that “I went to bulletin board and weekly news before doing my homework.” “I paid attention to the bulletin board, assignment scores, assessment rubric, the dialogues assigned to me, and weekly test reminder to keep me updated.” In the process of doing their dictation assignment, students referred to dictionaries and text book. A student mentioned that “I read through the text book when I was doing my assignment. When I had any vocabulary, I check it up in yahoo dictionary or portable digital dictionary. I checked them because sometimes I wasn’t able to spell the word or I was not sure I spelled the word correctly.” Another student said “I checked the word up in the dictionary when I had any word I didn’t know. I also checked the usage and wanted to make sure the grammar was correct. I learned new words in the process.”

Interact with Others to Complete the Assignments

Students also referred to other members or even friends, families, and instructor to complete their assignments. Students mentioned that “When others were revising my portion of the assignment, I learned from them if they dictate something that I missed.” “When I had questions about the assignment, I asked other team members, families and friends.” “I checked back after others revised the assignment and I discussed with them when we had disagreement.” “After I posted my questions, other team members answered my questions and gave me advice, which

helped me in my learning.” “The instructor responded to our questions and usually encouraged me.” Wikis also provided an environment for emotional support. Students stated: “One of the benefits wikis provided was that it enabled us to remind others as well as encourage others to complete assignments and fulfill course requirements. If anyone dictated the wrong paragraph, I was able to tell them.” Wikis were regarded as an environment that could improve interaction among users. A student said that “The discussion board and assignment page increased the interaction between me and others.”

Observability Results in Learning through Modeling

The content in Wikis was available to everyone so students expressed that they could learn from others’ work. A student mentioned that “The advantage of wikis was that I could read through others’ work and learned from the mistakes they made. It is very possible that I would make the mistakes others had.” Students also stated “The work we presented on wikis was accessible to everyone so the positive competition enforced me to improve my work.” “I browsed through others’ group work and discussion and I learned from the students that worked hard.” “Wikis enabled me to learn different vocabularies from others’ work.” Wikis also enabled students to manage their group work and helped them to communicate. A student said that “Without logging into the website, I could check whether other team members finished submitting their work. I could remind others to fulfill their responsibilities and check the progress of other groups as well.” Another student said “I felt more comfortable to talk in wikis and communicated online helped me to urge others to do their homework, which made me feel bad if I talked to them face-to-face.”

Students Felt Comfortable to Revise Others' Work and Expressed Themselves in Discussions

Student generally expressed that they felt comfortable modifying others' work directly in wikis. A student mentioned that "I could comfortably revise others' work because I just wanted to make our group assignment look better. I think others wouldn't feel bad about it." Another student said that "Because we were friends so I didn't have any pressure changing others work. I didn't feel embarrassed or uncomfortable when others revised my work." They also felt comfortable to express their ideas in discussions. A student said "I felt comfortable to say what I want to say in the discussions and I learned from others."

Wikis Enabled Each Role to Fulfill His/Her Duty

Wikis provided an environment for students to fulfill their role responsibilities and role assignment provided a guideline for students to follow what they should do in wikis. A student stated that "In wikis, everyone in our group achieved his/her duties. Our group leader made sure everyone understand the material each week, elaborators shared key words and phrases for us to learn. Encourager encouraged us to participate in the discussion." Another student mentioned that "Each week, someone in our group pointed out important key words, another encouraged group members, still another reminded group members to hand in assignments, everyone concentrated on our assignment."

Listening Ability Improved and Vocabularies Increased

Almost all students agreed that their listening ability was improved. Student said that "I spent about an hour to finish my assignment but I needed only 20-30 minutes in the last few assignments. I felt that my listening ability was getting better." "The assignments at the beginning were not very complete but I felt that I was able to dictate more complete sentences."

“At first, I didn’t understand most of the content that I dictate but I understood more later on.” “I felt that my vocabulary increased due to the assignment.”

Problems of Wikis and Recommendations

Interface

Many students expressed that they didn’t have any prior experience using wikis and the interface was in English so most of them felt confused in using wikis at the first time and recommended to provide more practice. Students stated that “At first I didn’t feel comfortable using the wiki because it was brand new to me. The interface was all English so I felt frustrated at the beginning. However, it became pretty easy after some practices.” “The interface was in English so I hesitated to try what other functions were available to me. If it was in Chinese, I would be more willing to explore more.” “I didn’t quite understand how to use wikis at the first time because the interface was in English. I even checked the words up in the dictionary and learned some vocabularies.” I recommended to provide more practices and gave us more chance to ask questions.” Another problem of wikis was that somebody’s work was written over because others updated the same page simultaneously. A student said that “Somebody removed my assignment so I had to repost my work. However, the record was available in the history tab so I could approve that I submitted the work on time. This was quite annoying when we edited the webpage at the same in the class.” A restriction of wikis was the speed of network. A student said that “I usually used wikis at home because the speed of network on campus was pretty slow.”

Some students felt that the interface of wikis was too serious to them and there was limited learning material in wikis so they regarded the wiki as a place to do their assignments. They mentioned that they didn’t want to spend a lot of time after completing their work. More

animated and interactive learning materials as well as tools were recommended. A student stated that “There weren’t much learning material in wikis so I didn’t want to check very often after completing the assignment. It was just a place for doing course assignment to me.” “I felt that more supplemental materials such as online listening, important sentence patterns, online dictionary and interactive materials could be added to the website to motivate learning.”

Editing Functions, and Synchronous Discussions

Some students expressed that more powerful editing functions should be provided in wikis. Students said that “The wiki was convenient but there was no different color to choose from. Sometimes I needed more colors to help editing my assignment.” “Sometimes underline didn’t show properly in wikis after I clicked save.” Besides more powerful editing functions, providing synchronous discussion was recommended to facilitate group discussions. Students expressed that the interaction with other team members was limited in wikis. They usually used instant messages to discuss questions and for reminding purpose after the class. Students mentioned that “Most of the interaction with other team members was through face-to-face discussion in the class and we used Microsoft MSN Messenger to remind others as well as discuss with each other after the class.” “In wikis, I had to wait for others’ response. Sometimes others responded two days after I posted my questions, which passed the due date and I may forget asking the questions. I preferred to discussion synchronously so the questions could be solved immediately.” “The synchronous conference room would be useful to discuss questions. All group members could set a specific time to discuss verbally to increase interaction.”

Difficult to Avoid Free-loaders

Some students expressed that some free-loaders existed in the group and the quality of their assignment was affected. A student mentioned that “I felt that sometimes some students didn’t checked and revised the assignment they were supposed to validate. They directly put a sentence showing that they checked the paragraph and it was correct. Of course it was possible that they didn’t find any mistakes but sometimes they didn’t do their work. The score of our assignment may be influenced by them.”

Summary of Interviews

Students generally enjoyed the convenience and simplicity of wikis in their learning experience. They felt that they were able to edit as many times as they want directly in wikis without the burden of uploading and sending files to other group members. The layout of the web pages was clear and simple to operate. Students with basic computer skills were able to use wikis. The process of writing assignments enabled students to understand the course material. They referred to text book, dictionaries, group members, friends, family members, and instructor to solve their questions. The students learned from these resources and gained emotional support from others in the wiki environment. Because the wiki was available to all students, they were provided the chance to learn from others’ work and the positive competition urged them to improve their work. Students expressed that wikis made managing their group work easier and provided a comfortable environment for them to communicate. When asked their attitude toward modifying others’ work, students were comfortable revising others’ assignment and they also felt comfortable to express their ideas in discussions. In wikis, students fulfilled their role responsibilities and role assignment

provided a guideline for students to follow what they should do in wikis. Finally, students perceived their listening ability had been improved and their vocabularies increased.

Students reported that there were some problems of using wikis and provided recommendations for future use. Student felt frustrated when they first used wikis because most of them didn't have prior experience of using wikis and the interface was in English. More practices were recommended for them to get used to the learning environment. Another problem of wikis was that someone's work was removed by other members because they update the same page at the same time. Although their work was kept in the history page in wikis, it was still annoying for them. The speed of network was another restriction of using wikis. Most students use wikis at home because the internet speed was too slow on campus. Students also asserted that the interface of wikis was too serious and the learning material was limited in wikis so they were not willing to spend much time in wikis after they finished the work required. A more interactive and animated environment providing more learning materials was recommended. Students also recommended providing more powerful editing tools make their online editing easier. Students expressed that they used instant message software after the class for reminding and discussion purpose. Synchronous discussion in the wiki environment was recommended to increase interaction. Working in a group assignment, students felt that some students were free-loaders and their score may be affected by them.

Summary of the Chapter

The study investigated whether the wiki environment was a feasible tool for teaching English to college students in Taiwan. The study was conducted during the Fall 2007 semester at the Hsing Wu College, Taipei County, Taiwan. Data was collected using six weekly test scores, one common questionnaire for both control and treatment groups and one questionnaire for

treatment group only. The study also involved interviews with the students at the end of the treatment.

The findings of the study are as follows: There was a significance difference in the test scores between treatment and control groups in both listening and reading sections of the tests when comparing their week 1 to 6 test scores, week 1, 3, 5, and week 2, 4, 6 test scores.

In addition, students' attitude towards class, their perceived improvements in English language skills such as vocabulary, listening, reading, writing and speaking, as well as their attitude towards cooperative learning differed significantly by treatment.

Moreover, the Wiki Use Questionnaire indicated that students agreed that Wikis helped them finish their assignment, they felt comfortable in the wiki environment, and it was easy to use wikis.

Students shared their experiences of using wikis in the exit interviews. The interaction within wikis indicated that: (1) They didn't have any experience of using wikis and the interface in English made them frustrated when they first used wikis. After some practice and experience, they felt that the wiki environment was simple and convenient to use. They referred to resources such as text book and dictionary and learned from them in the process of working on their assignment in the wiki. Due to the serious interface, students regarded the wiki website to be a tool or place to do their assignment so more animated material was recommended. Students interacted more with their team members through instant message software after the class so synchronous discussion tool was also recommended. More powerful editing tools were regarded as important in wikis; (2) Students asked and discussed with their team members, friends, family members, and instructor to complete their assignment; (3) The wiki provided a comfortable and simple environment for students to revise others' work and express their ideas; (4) Wikis enabled

cooperative roles to fulfill their responsibilities; (5) Students expressed that their listening ability improved and vocabularies increased.

CHAPTER FIVE: DISCUSSIONS, CONCLUSION AND RECOMMENDATIONS

This research investigated the effect of applying wikis in an EFL class in Taiwan. A summary of the results from the data analysis in chapter four is presented along with discussions of the importance of the findings. In addition, suggestions based on the study findings are provided for teachers and researchers who intend to conduct future research.

Research Question One

In order to answer question one “Is there any significant difference in weekly test scores between the control (non-wiki) group and treatment (wiki) group?”, both listening sections which examine listening comprehension and reading sections which examine vocabulary and reading comprehension in the tests were used to determine differences in six weekly test scores.

Listening Comprehension

In the listening comprehension section, the results indicated that there was a significant difference among six weekly test scores. Both experimental and control groups had improvement in their listening comprehension as time went by. Besides, there was a significant difference between scores of the experimental group and the control group in listening comprehension. The experimental group improved their scores more noticeably than did the control group. After analyzing weekly test 1, 3, and 5, the results indicated that there was no significant difference among three weekly test scores. Both experimental and control groups performed better from week 1 to week 3 but the average scores decreased in week 5. The reason can be accounted for is that since the mean scores of listening weekly test 1 to 6 varied and didn't form an increasing or decreasing pattern, the difficulty level of each test may not be consistent. However, there was a

significant difference between scores in the experimental and the control groups. The weekly test 2, 4, and 6 were also analyzed. The results showed that there was a significant difference in time and there was also a significant difference between scores in the experimental and the control groups. Overall, the most significant differences in Listening scores were attributable to the type of treatment no matter their scores improved over time.

Vocabulary and Reading Comprehension

In the reading section, the results indicated that there was a significant difference among six weekly test scores. Both experimental and control groups had improvement in their vocabulary and reading comprehension over time. Moreover, there was a significant difference between scores of the experimental group and the control group in vocabulary and reading comprehension. The experimental group had more improvement in their scores than did the control group. After analyzing weekly test 1, 3, and 5, the results indicated that there was a significant difference among three weekly test scores and there was a significant difference between scores in the experimental and the control groups. In weekly 2, 4, and 6, the results also indicated that there was a significant difference among three weekly test scores and there was a significant difference between scores in the experimental and the control groups. To sum up, there were significant differences in reading scores in both different treatment types and over time.

Research Question Two

To answer question two “Is there a significant difference in attitudes towards language learning in the control (non-wiki) and the treatment (wiki) groups?”, a questionnaire regarding participants’ attitudes towards language learning was used. The questionnaire included three

sections: (1) Attitude towards class; (2) perception of language skills improvement; and (3) attitude towards cooperative learning.

The results indicated that there was a significant difference in their attitude towards class between the experimental and the control groups. The experimental group had a more favorable attitude toward the idea that the instruction benefited their learning than did the control group. Moreover, the results showed that there was a significant difference in their perceptions of language skills improvement between the experimental and the control groups. The result was consistent with their weekly test scores discussed in research question one indicating that there was a significant difference in their listening and reading test scores between two groups. Additionally, there was a significant difference in their attitude towards cooperative learning between the experimental and the control groups. The experimental group had a more positive attitude towards the idea that cooperative learning improved their learning.

Participants' feedback in the questionnaire may reveal some of the factors resulted in the difference between groups. Although the participants in both groups regarded the dictation assignments to be overloaded, some students in the control group did not work very hard on their assignments due to the inconvenience in submitting them while the participants in the experimental group were more willing to do and submit their dictation assignments on the wikis. Besides difference in convenience, from the results of interviewing students in the experimental group, they asserted that the wiki provided a very useful environment for them to share their work and manage their assignments. The wiki was useful in determining who hasn't submitted the assignment and how well each one performed. The finding supported the idea that the wiki empowers users with a sense of ownership and authority, which promote students' responsibility to their learning (Bold, 2006; Raitman, et al., 2005). Students were encouraged to complete their

assignments and put more effort to the assignment due to expectation from other team members and sense of honor of their own. Since the content in the dictation assignment was highly related to the face-to-face instruction and class activities, students with better preparation may have more positive attitude towards class, language improvement, and cooperative learning.

Research Question Three

To answer this question “what are students’ communication channels, experience and attitudes toward integrating wikis to their learning?”, a questionnaire regarding participants’ attitudes towards wikis were used to collect quantitative data and exit interviews were used for qualitative data.

The “Wiki Use Questionnaire” was composed of three sections: (1) benefit of using wikis; (2) technology self-efficacy; and (3) sociability in wikis. In the first section, most participants agreed that wikis increased their productivity in writing group assignment while most students had a neutral attitude towards the idea that wikis helped their learning. They regarded the wiki as an environment that facilitate completing their group assignment rather than a learning environment. This is quite consistent with what was found in the exit interview. The possible reason was that there was limited course material in the wiki website. In the technology self-efficacy section, most participants agreed that they had the skills to use the functions in wikis easily. This is consistent with the idea that the easy editing process provides a friendly environment for non-technical users to participate in the collaborative work (Chang, 2004; Raitman, et al., 2005). According to Bandura (1995), self-efficacy refers to a person’s confidence in his/her ability to complete certain tasks and it is a critical cause to motivation. The finding is consistent with the result in the open ended questions in the questionnaire and in the exit interview. The students felt the wiki environment was simple

and convenient to use. Students with high technology self-efficacy regarded wikis to be less complex and the belief motivated them to use wikis. Moreover, participants on average had a neutral to positive attitude social interaction in wikis. This is also consistent with the result in the interview. The literature review defined the study's focus on interpersonal communication channels or word-of-mouth (WOM), which includes face-to-face and written communication no matter in print or electronic format (Gibbons, 1996; Godes & Mayzlin, 2004; Lee et al., 2002; Minsky & marin, 1999). Due to the class was a mixed-mode course, students felt that most commonly used communication channel was face-to-face interaction and they usually used instant message software, a electronic communication tool to discuss with and remind other team members after the class. Finally, most participants had a neutral attitude towards the idea that they dealt with real persons and not with abstract anonymous persons.

The findings from the interview included: (1) The wiki environment was simple and convenient to use. Researchers (Grudin, 2001; Massy & Wilger, 1998, Rogers, 2003) suggest that when a new technology or system is simpler to learn, understand, and use, it will be more rapidly to be adopted than those require new understanding and skills. Less complexity results in speeding up adoption of an innovation; (2) participants used resources such as text book, dictionary, friends, family members, and group members to complete assignments and learned from them; (3) the content in wikis was available to everyone so participants learned from others' work. They could manage their group work and increased interaction with others. Rogers (2003) described observability as "the degree to which the results of an innovation are visible to others" (p. 16). It is used to evaluate to what extent users can observe or communicate results to others. According to Rogers (2003), the higher the

observability, the easier for individuals to adopt an innovation. Bandura (1977, 1986) added that most human behavior is learned from observing others through modeling. Due to the process of modeling, individuals could decrease the costs and the risk of failure. People will be able to expand their knowledge from the basis of information presented by others; (4) participants had a comfortable attitude toward revising others' work in the assignment and expressed their ideas in discussions. This is consistent with Schwartz et al. (2004) that wikis provide a user friendly environment for collaboration, knowledge creation, and student interaction. Nevertheless, Keith (2006) and Raitman et al. (2005) expressed that students may have difficulties share their works in a public space and concern revising others' work; (5) Wikis enabled the assigned roles to fulfill their responsibilities and role assignment provided a guideline for participants to follow; (6) Participants felt that their listening ability was improved and their vocabularies increased.

The problems of using wikis and recommendations included: (1) the interface of wikis was totally in English and the wiki was a very new environment to students in Taiwan. Participants felt confused in their first use of wikis. More practices and explanation were recommended; (2) updating the same webpage simultaneously wrote over another's work and caused frustration. Engstrom and Jewett (2005) recommended assigning roles to avoid being locked out by their wiki page; (3) the efficiency of updating wiki pages relied on the speed of internet; (4) the serious interface and limited learning material in wikis resulted in students' perception that the wiki was mainly for doing group assignments instead of a learning environment. This is consistent with the result in Wiki Use Questionnaire discussed above. More interactive learning materials were recommended; (5) more editing function was recommended to facilitate collaborative writing; (6) participants interacted mainly using

instant message software. Wikis increased their interaction but instant communication was needed. Synchronous discussion function was recommended; and (7) students complained that there were students who didn't fulfill their responsibilities of critiquing on another student's work. Research has shown that in the Chinese culture, student values more on maintaining the harmony and cohesion among group members than on sharing useful comments improving the performance (Carson & Nelson, 1996; Hofstede, 2001). However, the results from the interview showed that learners felt comfortable revising others' work posted on the wikis. Further research is needed to investigate the reasons behind acting like a free-loader in the group.

Conclusion

The purpose of this study was to investigate and explore the effectiveness of applying wikis. The results discussed above extend our understanding of wiki application. The study provided insights of the effectiveness of implementing wikis in an EFL class in Taiwan and disclosed their communication channels, attitudes and experience as well as recommendations for integrating wikis into class setting. Based on the findings and discussions, the conclusions in this study can be summarized as follows:

1. The reading weekly test scores in experimental and control groups improved over time. The experimental group outperformed control group academically in terms of listening comprehension and reading comprehension.
2. Participants in the experimental group were more satisfied with the instruction, improvement of language skills, and cooperative learning in terms of support their learning.

3. The wiki had a simple, convenient, low complexity, and user friendly atmosphere for completing group projects. Students in general had a high technology self-efficacy in the wiki environment. Researchers asserted that wikis provide an easy way for completing collaborative project and little navigation and clicking are required (Chang, 2004; Lamb, 2004; Farabaugh, 2007).
4. Interpersonal communication channels including face-to-face and electronic communications such as instant message tool was commonly used by learners to discuss group work and for reminding purpose. Integrating synchronous communication was recommended to promote academic and personal interaction in wikis.
5. Wikis allowed students to fulfill their role duties, negotiate, cooperate, manage contribution, and learn from each other. Keith (2006) asserted that wikis enables users to negotiate, collaborate with others and learn from others' work. A wiki provided an observational learning or modeling environment for students to learn from others' work.
6. Learning material, vivid interface and interactive activities were recommended to prepare a wiki website as a learning environment rather than merely a useful place for completing group assignments.

Forman (1994) asserted that simply adding technology into the curricular does not by itself improve students' learning outcome and on the other hand, may cause complexity.

Practitioner mentioned that the success of integrating new technology into pedagogy relies not only on software configuration but on social norms and practice around the wikis ("My Brill

Failure,” 2007). Instructional designers or instructors should provide clear guidelines for students to follow in the wiki environment. The research has implemented one of the techniques in cooperative learning, role assignment and provided rubrics in the wiki setting. The results indicated that integrating wikis into an EFL class facilitated students’ academic performance in listening, reading and expanding vocabularies. Besides, students became more satisfied with their EFL class in general, perceptions of language skill improvement, and had a more positive attitude towards learning in groups.

Inman (2004) argued that the process of meaning making consisted of not only attention to technologies but the interactions among individuals, technologies, and other elements in the environment shared with others. In this mixed-mode learning environment, wikis may still be relatively new to students. Most communications took place through interpersonal channels such as face-to-face communication and instant message tools. Besides, the study discovered that the interactions within wikis was mainly on completing group assignments rather than viewing the wiki as a complete learning environment. Several recommendations extracted from the questionnaire and interview such as offering more learning material, interactive environment, and timely communication are beneficial to researchers and practitioners for future research and practice.

Richardson (2006) concluded that wikis facilitate a collaboration environment, which provides students opportunities to learn how to work with others, create knowledge, and operate in a world that values group effort. He asserted that using wikis show our students to be part of the process. The study indicated that students learned from others’ work and from the process of working on their group assignments because a wiki is an open-editing and collaborative writing environment. Students were encouraged to fulfill their responsibilities and improved the quality

of their work. Finally, since wiki technology is relative new to most students, the instruction should be carefully designed and more opportunities of practice using wikis should be given. Besides, students should be clearly notified the purpose of their work assigned and the expectation of their end products.

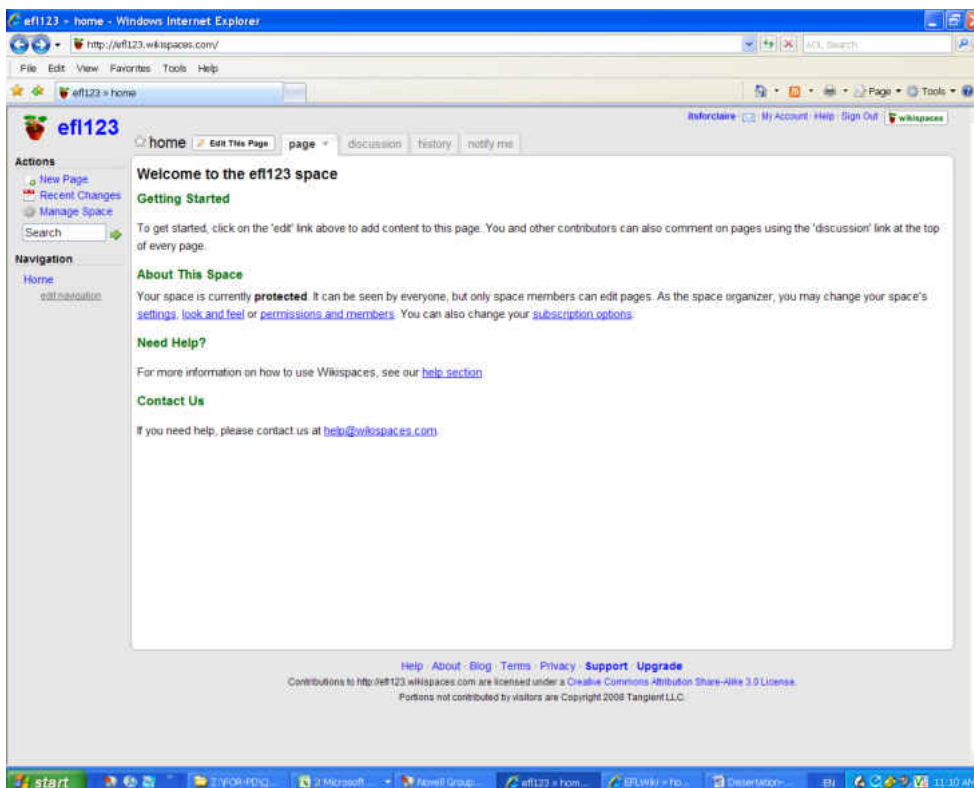
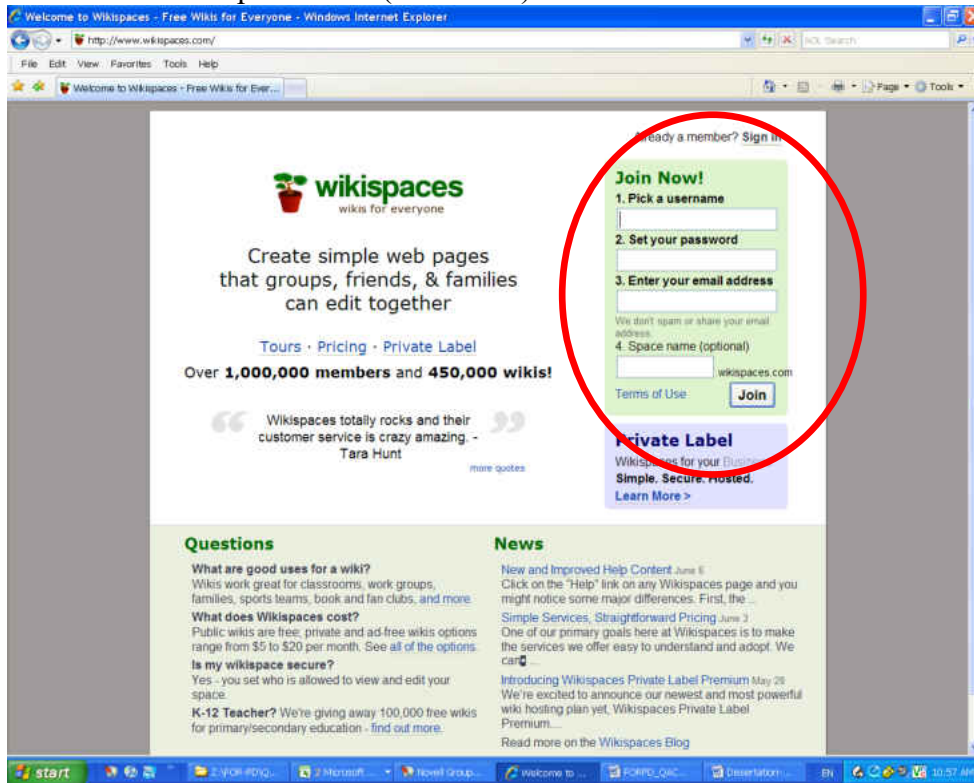
Recommendations

1. The study was limited in length of the treatment. Six weeks may have been too short a time for students to become comfortable interacting with each other in wikis. A longer treatment period for better results was suggested so the interactive process itself rather than technical issues can be more deeply and clearly studied.
2. The wiki is a relative new tool for instructional purposes in Taiwan and the interface is still in English. The unfamiliarity of the new technology may influence users' willingness to use wikis. Having more time and experience with the new technology as well as translating the interface into Chinese may improve interaction with each other.
3. An experimental study could be conducted on fully web-based class using wikis. The different interaction environment may reflect different results from those obtained in this study.
4. Similar studies could be conducted to examine the effects on different levels of EFL learners such as primary, junior high, senior high, etc.
5. A bigger sample size with more participants is suggested. The present study only included two classes.

APPENDIX A. WIKISPACES SETUP

1. Create a Wiki space:

- a. Go to www.wikispaces.com and register a space by entering username, password, email address and space name (ex: efl123).



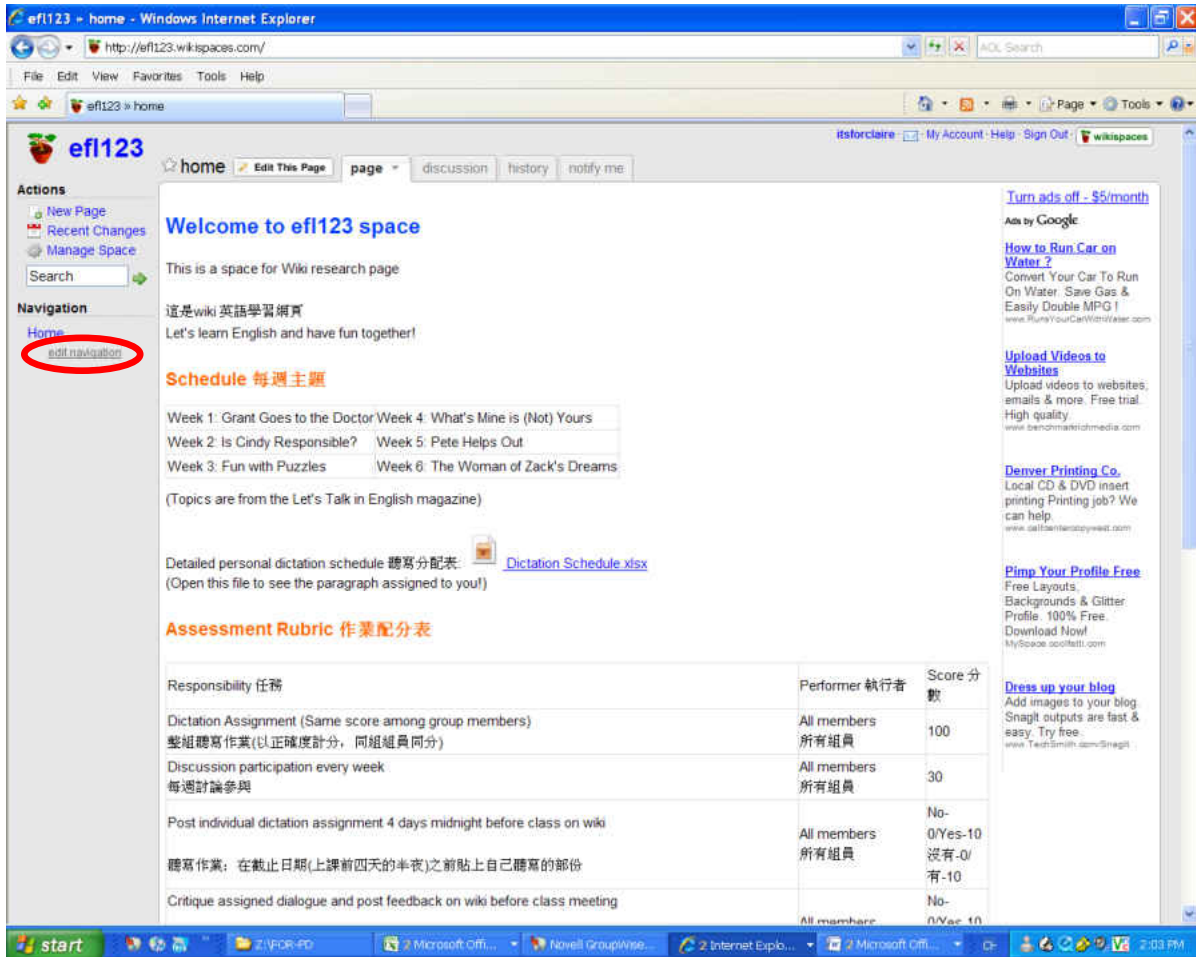
2. Edit Homepage:

Click on “Edit This Page” on the top to start editing homepage. Post welcome message, weekly schedule, detailed personal dictation schedule (uploading excel file) and assessment rubric, etc.

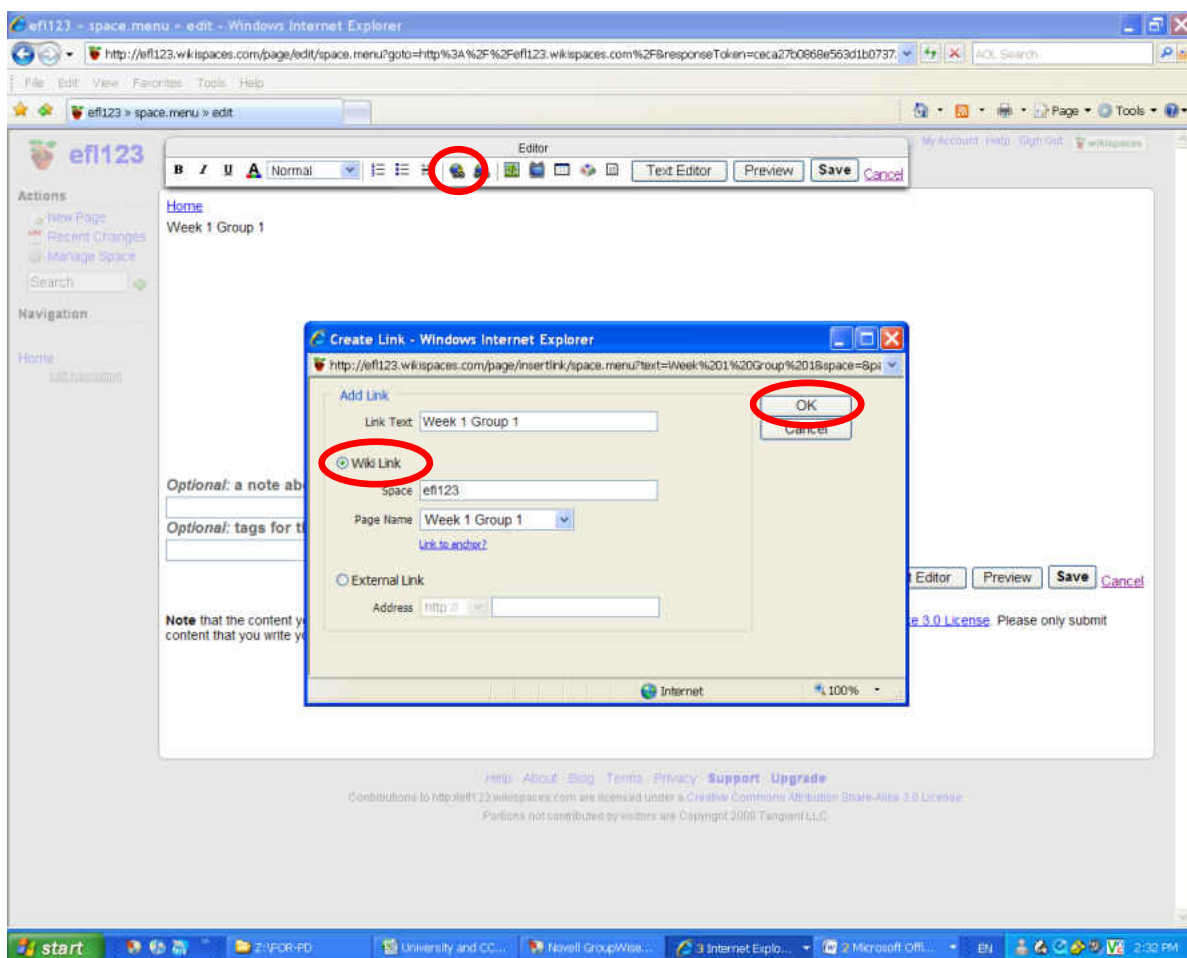
The screenshot shows a Windows Internet Explorer browser window displaying a Wiki page for 'efl123'. The page title is 'Welcome to efl123 space'. The 'Edit This Page' button is circled in red. Below the welcome message, there is a 'Schedule' section with weekly topics. A link to 'Dictation Schedule.xlsx' is also circled in red. Below that is an 'Assessment Rubric' table.

Responsibility 任務	Performer 執行者	Score 分數
Dictation Assignment (Same score among group members) 整組聽寫作業(以正確度計分, 同組組員同分)	All members 所有組員	100
Discussion participation every week 每週討論參與	All members 所有組員	30
Post individual dictation assignment 4 days midnight before class on wiki 聽寫作業, 在截止日期(上課前四天的半夜)之前貼上自己聽寫的部份	All members 所有組員	No-0/Yes-10 沒有-0/ 有-10
Critique assigned dialogue and post feedback on wiki before class meeting	All members	No-0/Yes-10

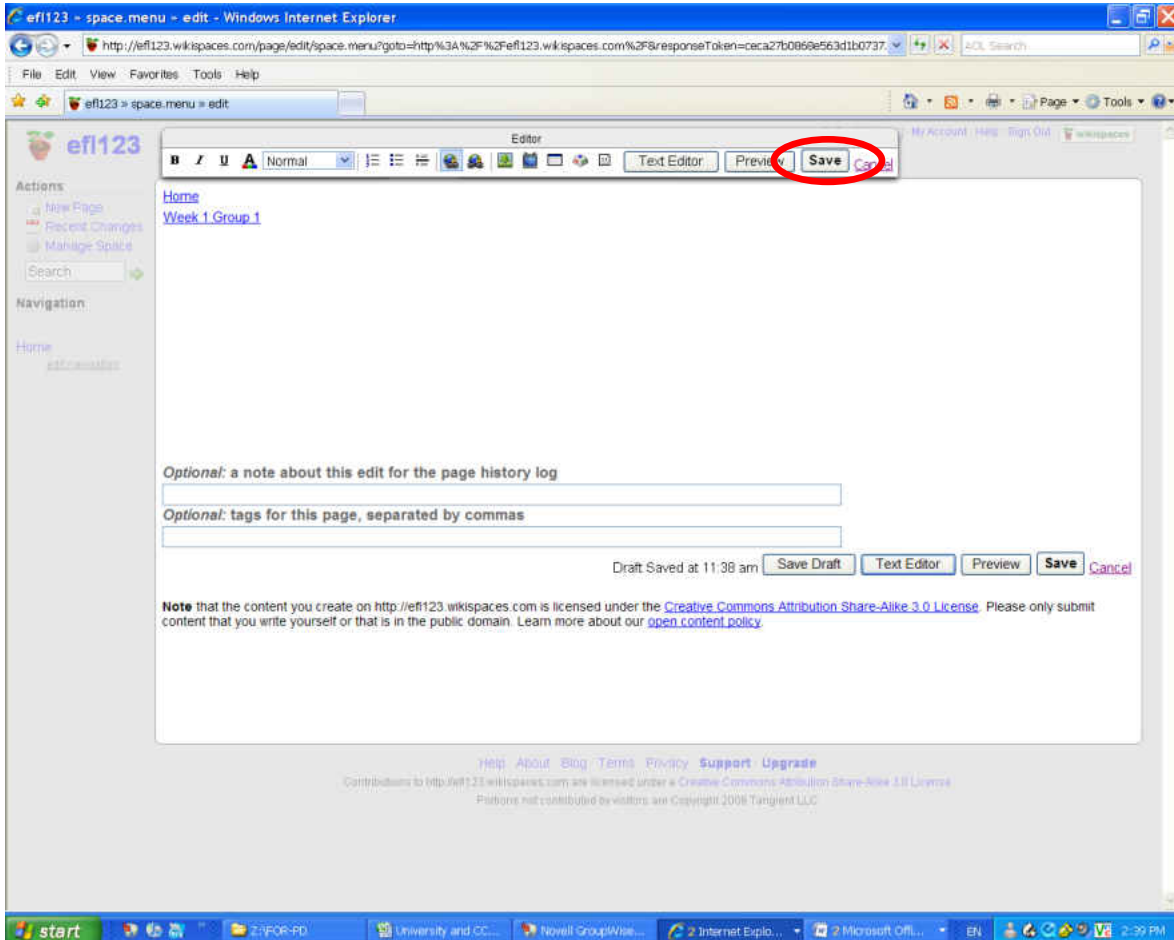
3. Create wiki pages for each group
 - a. Click “edit navigation” on the left.



- b. Enter the name of the new page for each group (ex: Week 1 Group 1) and click “Insert link” icon on the top. Choose “Wiki Link” and click “OK”



c. The Week 1 Group 1 page has been created. Keep creating for other groups and click “Save” when finish.



d. Complete creating wiki pages for all groups

efl123 - home - Windows Internet Explorer

http://efl123.wikispaces.com/

File Edit View Favorites Tools Help

efl123 » home

itsforclaire My Account Help Sign Out wikispaces

efl123

home Edit This Page page discussion history notify me

Actions

- New Page
- Recent Changes
- Manage Space
- Search

Navigation

- Home
- Week 1 Group 1
- Week 1 Group 2
- Week 1 Group 3
- Week 1 Group 4
- edit navigation

Welcome to efl123 space

This is a space for Wiki research page

這是wiki 英語學習網頁
Let's learn English and have fun together!

Schedule 每週主題

Week 1: Grant Goes to the Doctor	Week 4: What's Mine is (Not) Yours
Week 2: Is Cindy Responsible?	Week 5: Pete Helps Out
Week 3: Fun with Puzzles	Week 6: The Woman of Zack's Dreams

(Topics are from the Let's Talk in English magazine)

Detailed personal dictation schedule 聽寫分配表: [_Dictation Schedule.xlsx](#)
(Open this file to see the paragraph assigned to you!)

Assessment Rubric 作業配分表

Responsibility 任務	Performer 執行者	Score 分數
Dictation Assignment (Same score among group members) 整組聽寫作業(以正確度計分, 同組組員同分)	All members 所有組員	100
Discussion participation every week 每週討論參與	All members 所有組員	30
Post individual dictation assignment 4 days midnight before class on wiki 聽寫作業: 在截止日期(上課前四天的半夜)之前貼上自己聽寫的部份	All members 所有組員	No-0/Yes-10 沒有-0/ 有-10
Critique assigned dialogue and post feedback on wiki before class meeting	All members	No-0/Yes-10

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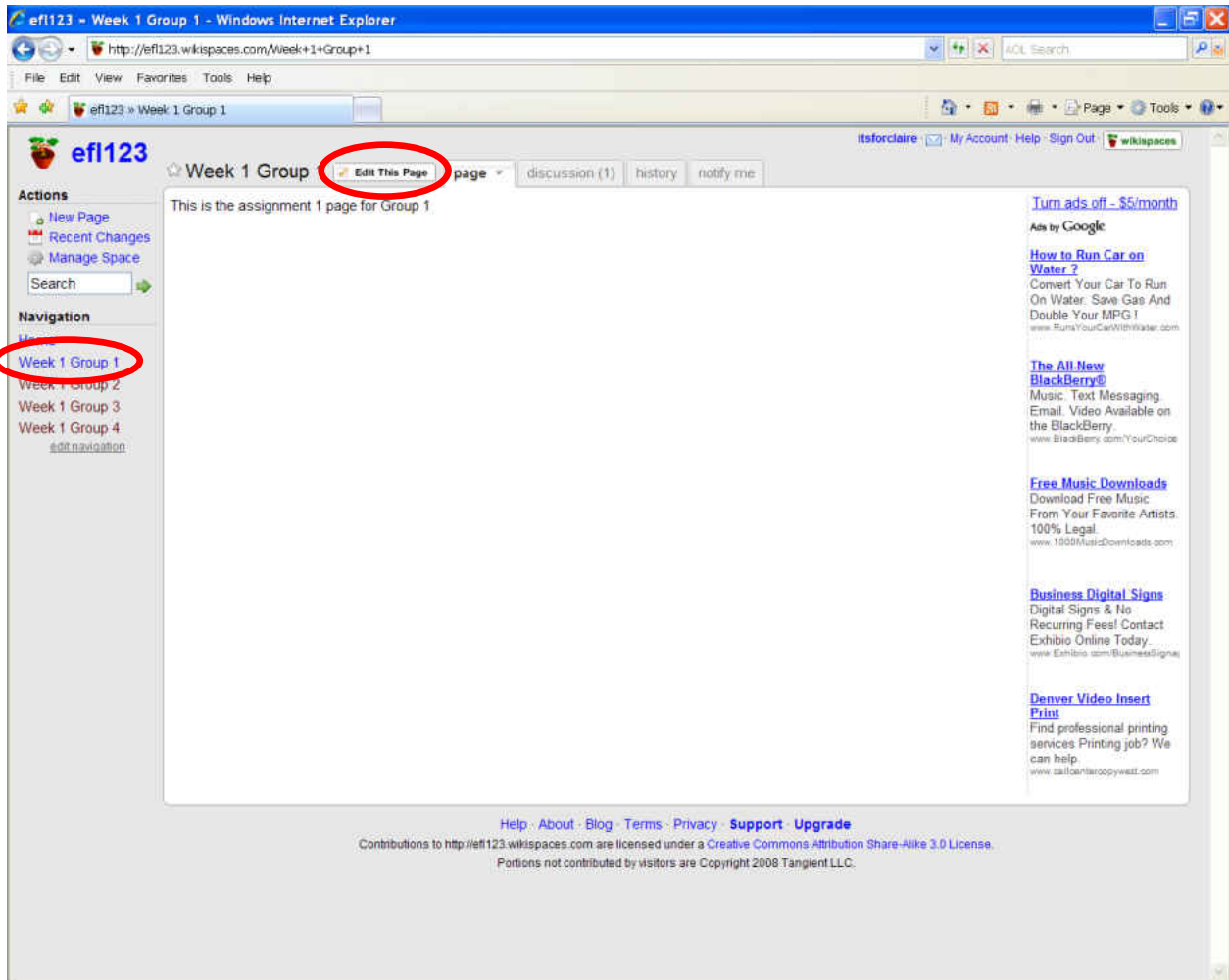
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www.TechSmith.com/Snagit

[Insert Image](#)
Find more sources/options for insert image
webcrawler.com/insert_image

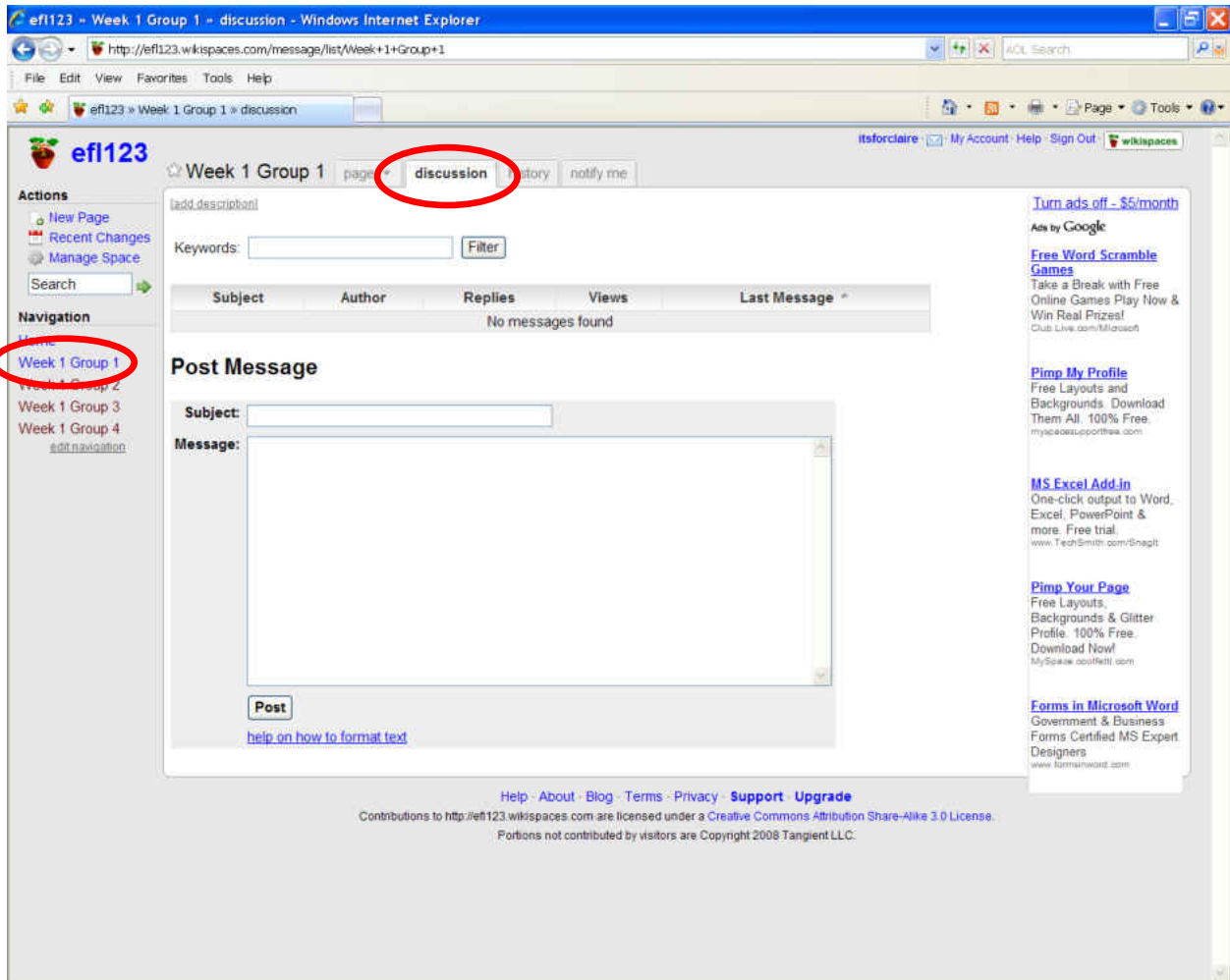
start

2:45 PM

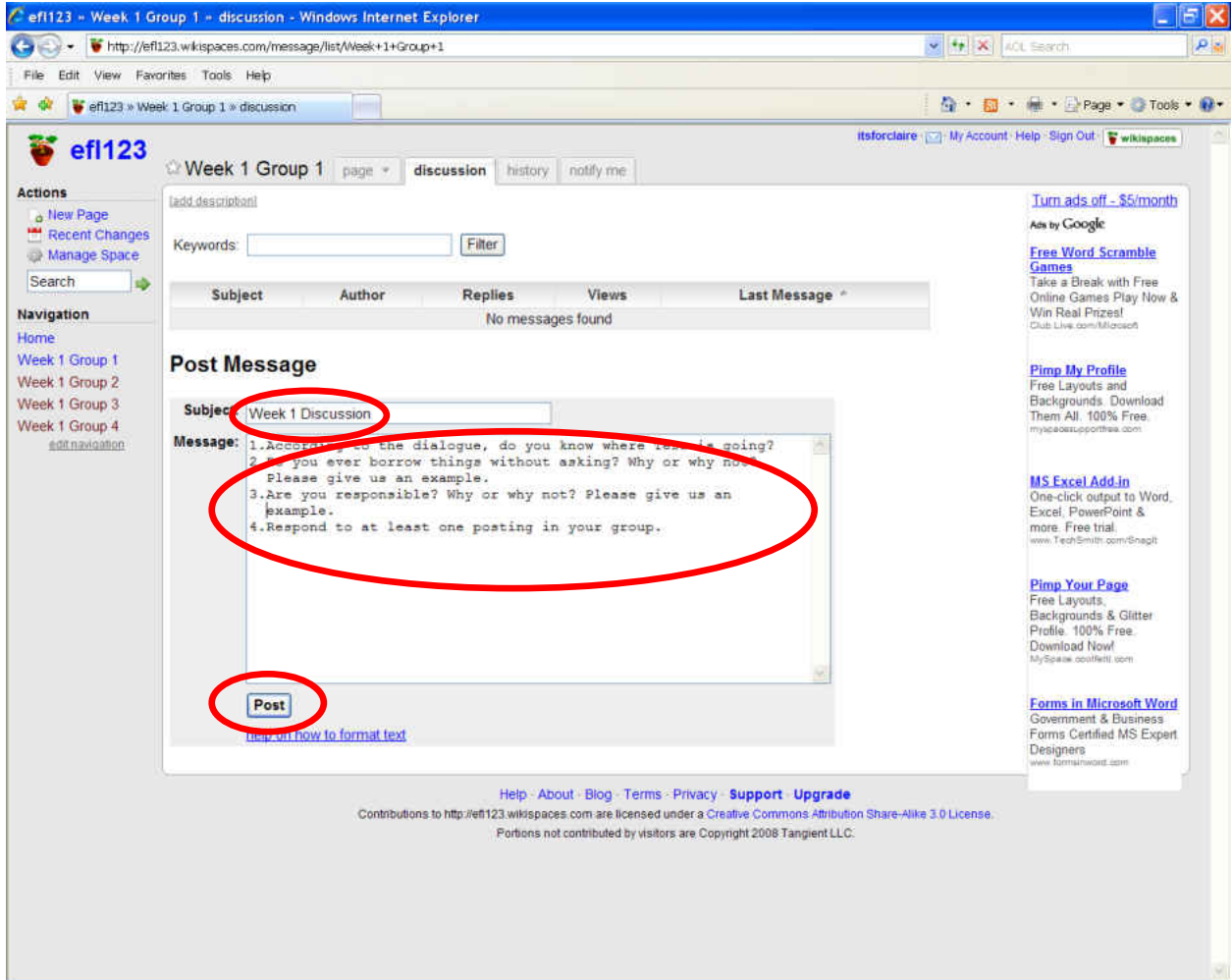
4. Editing each wiki group page
Click each group page (ex: Week1 Group1) on the left and click “Edit This Page” on the top. After editing, click “Save.” Students just have to follow the same procedure to post and revise their assignments.



5. Create discussion forum for each group
 - a. Click group page (ex: Week 1 Group 1) on the left and click “discussion” on the top.



b. Enter “Subject” and “ Message” into the boxes and click “Post”



- c. The discussion 1 forum has been set up. Students just have to follow the same procedure to reply to the discussion topic.

The screenshot shows a web browser window displaying a Wikispaces discussion forum. The browser's address bar shows the URL: <http://efl123.wikispaces.com/message/list/Week+1+Group+1>. The page title is "Week 1 Group 1" and the current page is "discussion (1)".

On the left side, there is a navigation menu with the following items:

- Home
- Week 1 Group 1
- Week 1 Group 2
- Week 1 Group 3
- Week 1 Group 4
- [edit navigation](#)

The main content area features a "Post Message" form with the following fields:

- Subject:
- Message:
- Post button
- [help on how to format text](#)

Below the form is a table with the following columns: Subject, Author, Replies, Views, and Last Message. The table contains one entry:

Subject	Author	Replies	Views	Last Message
Week 1 Discussion	itsforclaire	0	0	just now by itsforclaire

At the bottom of the page, there is a footer with the following text:

[Help](#) [About](#) [Blog](#) [Terms](#) [Privacy](#) [Support](#) [Upgrade](#)
Contributions to <http://efl123.wikispaces.com> are licensed under a [Creative Commons Attribution Share-Alike 3.0 License](#).
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APPENDIX B. DICTATION SCHEDULE

Week	Dialogue Topic (From the <i>Let's Talk in English</i> magazine)
1	Grant Goes to the Doctor
2	Is Cindy Responsible?
3	Fun with Puzzles
4	What's mine is (Not) Yours
5	Pete Helps Out
6	The Woman of Zack's Dreams

APPENDIX C. SAMPLE CONVERSATION DIALOGUE

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APPENDIX D. SAMPLE DISCUSSION QUESTIONS

The discussion questions this week are:

1. According to the dialogue, do you know where Tess is going?
2. Do you ever borrow things without asking? Why or why not? Please give us an example.
3. Are you responsible? Why or why not? Please give us an example.
4. Respond to at least one posting in your group. (for treatment group only)

APPENDIX E. SAMPLE STUDIO CLASSROOM WEEKLY TEST

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APPENDIX F. GROUP EVALUATION FORM

Group Evaluation Form

Name:

Member 1 name: 組員一姓名

1. The extent to which the member contributes to our group work (1-10) 這位組員對於整組作業的貢獻度
2. The extent to which the member get along with others in the group (1-10) 這位組員和其他人相處和睦的程度
3. The extent to which the member submits his/her work before due date (1-10). 這位組員在截止日期前交出作業
4. Recommendation or comments: 你對他的建議及意見

Member 2 name: 組員二姓名

1. The extent to which the member contributes to our group work (1-10) 這位組員對於整組作業的貢獻度
2. The extent to which the member get along with others in the group (1-10) 這位組員和其他人相處和睦的程度
3. The extent to which the member submits his/her work before due date (1-10). 這位組員在截止日期前交出作業
4. Recommendation or comments: 你對他的建議及意見

Member 3 name: 組員三姓名

1. The extent to which the member contributes to our group work (1-10) 這位組員對於整組作業的貢獻度
2. The extent to which the member get along with others in the group (1-10) 這位組員和其他人相處和睦的程度
3. The extent to which the member submits his/her work before due date (1-10). 這位組員在截止日期前交出作業
4. Recommendation or comments: 你對他的建議及意見

Member 4 name: 組員四姓名

1. The extent to which the member contributes to our group work (1-10) 這位組員對於整組作業的貢獻度
2. The extent to which the member get along with others in the group (1-10) 這位組員和其他人相處和睦的程度
3. The extent to which the member submits his/her work before due date (1-10). 這位組員在截止日期前交出作業
4. Recommendation or comments: 你對他的建議及意見

Member 5 name: 組員五姓名

1. The extent to which the member contributes to our group work (1-10) 這位組員對於整組作業的貢獻度
2. The extent to which the member get along with others in the group (1-10) 這位組員和其他人相處和睦的程度
3. The extent to which the member submits his/her work before due date (1-10). 這位組員在截止日期前交出作業
4. Recommendation or comments: 你對他的建議及意見

APPENDIX G. RUBRIC FOR USING WIKIS

Assessment Rubric 作業配分表

Responsibility 任務	Performer 執行者	Score 分數
Dictation Assignment (Group members in one group get the same score) 整組聽寫作業(以正確度計分，同組組員同分)	All members 所有組員	100
Discussion participation every week 每週討論參與	All members 所有組員	30
Post individual dictation assignment 4 days midnight before class on the wiki 聽寫作業：在截止日期(上課前四天的半夜)之前貼上自己聽寫的部分	All members 所有組員	No-0/Yes-10 沒有-0/ 有-10
Critique assigned dialogue and post feedback on the wiki before class meeting 聽寫作業：在上課前修改所負責的聽寫部分，對於不是自己負責的部分也可以修改，而且貼在 wiki 該組的網頁上	All members 所有組員	No-0/Yes-10 沒有-0/ 有-10
Make sure members understand the course content by asking members on the wiki discussion area if anyone has any questions 每週討論：在 wiki 的討論區內詢問是否所有的組員都了解課程內容，對於內容是否還有疑問？並且盡力回答組員所提的問題	Checker of Understanding 組長	0-20
Make sure the required assignment are accomplished by members on time and remind members if any assignment is not accomplished by posting reminder on the wiki discussion area 確認所有該交的聽寫作業及每週討論都已經按時完成，在截止前在討論區發文提醒，倘若沒有按時完成，在 wiki 討論區發文提醒該繳交的同學繳交	Recorder	0-20
Elaborate and explain at least 3 important vocabularies and 1 phrase or unclear concepts and vocabularies if any member asks. 在 wiki 討論區發文解釋該週至少三個重要單字及一個片語的	Elaborator	0-20

<p>涵義</p>		
<p>Encourage group members' contribution and ask members who participate in discussions less than twice every week by posting request on the wiki</p> <p>觀察同學參與 wiki 聽寫作業及每週討論情形，若 wiki 聽寫作業修改少於兩次或每週討論發文少於兩次則在討論區發文鼓勵同學參與作業及討論</p>	<p>Encourager</p>	<p>0-20</p>
<p>Praise individuals in the group when they make progress by posting on the wiki discussion area such as "Good job!" "Great idea!" "That's right"</p> <p>觀察同學參與 wiki 聽寫作業及每週討論情形，若有人寫聽寫作業或參與每週討論很認真或有進步時給予讚美 (很好! Good job!)</p>	<p>Praiser</p>	<p>0-20</p>

APPENDIX H. IRB APPROVAL FORM



University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901, 407-882-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Notice of Expedited Initial Review and Approval

From : UCF Institutional Review Board
FWA00000351, Exp. 5/07/10, IRB00001138

To : Yu-Ching Chen

Date : December 13, 2007

IRB Number: SBE-07-05346

Study Title: **The Effect of Applying Wikis in EFL Class in Taiwan**

Dear Researcher:

Your research protocol noted above was approved by **expedited** review by the UCF IRB Vice-chair on 12/12/2007. **The expiration date is 12/11/2008.** Your study was determined to be minimal risk for human subjects and expeditable per federal regulations, 45 CFR 46.110. The category for which this study qualifies as expeditable research is as follows:

7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

The IRB has approved a **consent procedure which requires participants to sign consent forms.** Use of the approved, stamped consent document(s) is required. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Subjects or their representatives must receive a copy of the consent form(s).

All data, which may include signed consent form documents, must be retained in a locked file cabinet for a minimum of three years (six if HIPAA applies) past the completion of this research. Any links to the identification of participants should be maintained on a password-protected computer if electronic information is used. Additional requirements may be imposed by your funding agency, your department, or other entities. Access to data is limited to authorized individuals listed as key study personnel.

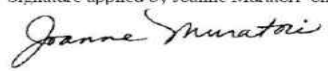
To continue this research beyond the expiration date, a Continuing Review Form must be submitted 2 – 4 weeks prior to the expiration date. Advise the IRB if you receive a subpoena for the release of this information, or if a breach of confidentiality occurs. Also report any unanticipated problems or serious adverse events (within 5 working days). Do not make changes to the protocol methodology or consent form before obtaining IRB approval. Changes can be submitted for IRB review using the Addendum/Modification Request Form. An Addendum/Modification Request Form **cannot** be used to extend the approval period of a study. All forms may be completed and submitted online at <http://iris.research.ucf.edu>.

Failure to provide a continuing review report could lead to study suspension, a loss of funding and/or publication possibilities, or reporting of noncompliance to sponsors or funding agencies. The IRB maintains the authority under 45 CFR 46.110(e) to observe or have a third party observe the consent process and the research.

On behalf of Tracy Dietz, Ph.D., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 12/13/2007 09:04:09 AM EST

IRB Coordinator



IRB Coordinator

APPENDIX I. PERMISSION LETTER
FROM CHIAR OF DEPARTMENT OF APPLIED ENGLISH IN HSING WU COLLEGE

醒吾技術學院
HSING WU COLLEGE
LINKOU, TAIPEI COUNTY, TAIWAN
REPUBLIC OF CHINA

Research Permission Letter

I, Josephine Fan Yen, Associate Professor and Chair of the Applied English Department at Hsing Wu College, give permission to Yu-ching Chen, Ph.D. Candidate in the University of Central Florida, to conduct research on Hsing Wu campus including giving treatment as well as collecting quantitative and qualitative data.



Josephine Fan Yen
Associate Professor and Chair,
Department of Applied English
Hsing Wu College

2007/11/15

244 台北縣林口鄉粉寮路 1 段 101 號
No. 101, Sec. 1, Fenliao Rd., LinKou Township, Taipei County 244, Taiwan (R.O.C)
TEL: (886)-02-26015310

APPENDIX J. CONSENT FORM

Dear Students:

I would like to invite your participation in my study related to English as a foreign language (EFL) classroom. I am doing research at the University of Central Florida in the United States of America as part of my doctoral studies. Please note that you must be 18 years of age or older to participate. If you choose not to participate in the research, an alternative assignment of equal time and effort for equal class/extra credit will be provided.

I would like you to complete two questionnaires on your experiences of using wikis in your English class. Each questionnaire will take around 10 minutes to complete. I would also like to interview some of you to obtain further information. Attached is an interview permission form if you would like to participate in the interview. The interview will be around 30 minutes on campus. The interview will be video/audio tapes upon participants' approval.

Your experience will be very helpful for the teacher to improve the class instruction in the future. Your response will not affect your grades and will be confidential. There are no consequences to not participating and there are no direct benefits to you in participating in the study. You have the right to withdraw from the study at anytime without consequences. You do not have to answer any question that you do not wish to answer. Please answer the items truly based on your learning experience.

Research at the University of Central Florida involving human participants is carried out under the oversight of the Institutional Review Board. Questions or concerns about research participants' rights may be directed to the UCF IRB office, University of Central Florida, Office of Research & Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246, or by campus mail 32816-0150. The hours of operation are 8:00 am until 5:00 pm, Monday through Friday except on University of Central Florida official holidays. The telephone numbers are (407) 882-2276 and (407) 823-2901.

Please feel free to contact me or my dissertation advisor, Dr. Witta if you have any questions. The contact information is provided below:

Yu-ching Chen
Doctoral Candidate, College of Education
University of Central Florida, Orlando, Florida, U.S.A.
(001) 407-580-3648
itsforclaire@hotmail.com

I appreciate the opportunity to use your answers to the questionnaire items for obtaining data for my research. Thank you for your time.

Signature of Participant

Date

APPENDIX K. CONSENT FORM IN CHINESE

參與同意書

各位同學好:

在此我想邀請你們參與我在台灣使用 wiki 輔助英語教學上的研究，這份研究是爲了完成我在中佛羅里達州大學的博士論文，請注意你必須滿十八歲才能參與這個研究，若你無意願參加，將提供替代的作業以補足上課時間的差異

這份研究包括兩份有關於英語課上課經驗的問卷，每份問卷大約需要 10 分鐘填寫，同時我將選取一些同學進行簡短的訪談以獲得更完整的資訊，再此附上一份訪談同意書，請願意參與訪談的同學能夠填寫簽名，訪談長度大約爲 30 分鐘且會在學校進行，訪談內容將依據參加的意願被錄影或錄音

你的參與將會幫助我們改善教學，你的回答將不會影響你的成績而且是不記名的，你的參與也不會有直接的利益，你有權利在任何時候拒絕參與這個研究，你也不需要回答任何你不想回答的問題，請按照你真實的學習經驗回答問卷即可

任何在中佛羅里達大學有成員參與的研究都會由 Institutional Review Board 所管理，任何有關研究參與人員的權利問題可以跟 UCF IRB office, University of Central Florida, Office of Research & Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246 聯絡，或利用校園郵箱 32816-0150，營業時間爲禮拜一到禮拜五上午 8:00 到下午 5:00，UCF 例假日除外，聯絡電話爲 (001) 407-882-2276 和(001) 407-823-2901

若有問題請跟我或我的指導老師 Dr. Witta 連絡，聯絡方式爲:

陳又菁
博士候選人，教育學院
中佛羅里達大學 (University of Central Florida)
(001) 407-580-3648
itsforclaire@hotmail.com

Eleanor L. Witta, Ph.D.
副教授
中佛羅里達大學 University of Central Florida, Orlando, Florida,
U.S.A.
(001) 407-823-3220
lwitta@mail.ucf.edu

謝謝你的參與和時間

簽章 _____ 日期 _____

APPENDIX L. ENGLISH LEARNING QUESTIONNAIRE

Permission Letter From Chien

Dear Yu-ching,

I give permission to Yu-ching Chen to use and modify the English Class Questionnaire to conduct her research.

Ya-chen Chien

chienjane@hotmail.com

Dec/03/2007

English Learning Questionnaire

<p>Please read each statement and indicate the extent to which you agree or disagree, with 5 being strongly agree and 1 being strongly disagree.</p> <p>請依照你同意的程度圈選出最適合的選項, 1 是非常不同意, 5 是非常同意</p> <p>Circle your responses. 請圈選你的答案</p> <p style="text-align: center;"><i>Continue Here</i></p>	↓	1—Strongly Disagree 非常不同意	↓	2—Somewhat Disagree 不同意	↓	3—Neither Agree Nor Disagree	↓	4—Somewhat Agree 同意	↓	5—Strongly Agree 非常同意
--	---	---------------------------	---	-------------------------	---	------------------------------	---	---------------------	---	-----------------------

- | | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|
| 1 I find the structure of the class useful to my English learning.....
課堂上教學方法對我英文學習有幫助。 | | | | | |
| 2 I feel comfortable with the structure of the class.....
老師課堂上教學方法令我感到自在。 | 1 | 2 | 3 | 4 | 5 |
| 3 The class structure makes learning English interesting
老師上課方式讓學習英語過程愉快。 | 1 | 2 | 3 | 4 | 5 |
| 4 I feel that the class is interesting.....
我認為這門課相當有趣。 | 1 | 2 | 3 | 4 | 5 |
| 5 I feel that the class activities help me learn.....
我認為課堂上的活動能幫助我學習。 | 1 | 2 | 3 | 4 | 5 |
| 6 The instructions the teacher gave was clear.....
老師上課給的指示清楚明瞭。 | 1 | 2 | 3 | 4 | 5 |
| 7 I feel I have improved my English skills.....
我認為我的英文能力有進步。 | 1 | 2 | 3 | 4 | 5 |
| 8 The class activities motivated me to study English.....
課堂上的活動讓我有學習英文的動機。 | 1 | 2 | 3 | 4 | 5 |
| 9 The class assignments motivated me to study English.....
課堂上的作業讓我有學習英文的動機。 | 1 | 2 | 3 | 4 | 5 |
| 10 My English vocabulary has expanded.....
我的英語字彙有增加。 | 1 | 2 | 3 | 4 | 5 |
| 11 My English listening skills have improved
我的英語聽力有進步 | | | | | |
| 12 My English writing skills have improved.....
我的英語寫作有進步。 | 1 | 2 | 3 | 4 | 5 |

Continue Here

1—Strongly Disagree 非常不同意	2—Somewhat Disagree 不同意	3—Neither Agree Nor Disagree	4—Somewhat Agree 同意	5—Strongly Agree 非常同意
---------------------------	-------------------------	------------------------------	---------------------	-----------------------

- | | |
|---|---|
| <p>13 My knowledge of English grammar has improved.....
我的英語文法有進步。</p> <p>14 My English speaking ability has improved.....
我的英語口語能力有進步。</p> <p>15 Learning groups facilitate English learning.....
小組學習對學英語有幫助。</p> <p>16 Cooperating with other students is conducive to learning English.....
與同學合作學習對學習英語有幫助。</p> <p>17 I am encouraged to speak up more because of my group.....
因為分組合作學習，我比較勇於在課堂上發言。</p> <p>18 I studied harder because I did not want to disappoint my group.....
我不想讓組員失望所以我學習更認真。</p> <p>19 The other members of my group actively helped me learn more.....
我的組員幫助我學的更多。</p> <p>20 Helping the other members of the group to learn also helped me to learn more.....
幫助其他組員學習等於幫助自己學更多。</p> | <p>1 2 3 4 5</p> <p>1 2 3 4 5</p> <p>1 2 3 4 5</p> <p>1 2 3 4 5</p> <p>1 2 3 4 5</p> <p>1 2 3 4 5</p> <p>1 2 3 4 5</p> <p>1 2 3 4 5</p> |
|---|---|

21. Please feel free to express your opinion about the last six weeks of English class.
請在此填寫任何意見。

Thank You!

APPENDIX M. WIKI USE QUESTIONNAIRE

Wiki Use Questionnaire

Please read each statement and indicate the extent to which you agree or disagree, with 5 being strongly agree and 1 being strongly disagree.

請依照你同意的程度圈選出最適合的選項, 1 是非常不同意, 5 是非常同意

Circle your response.

請圈選你的答案

Continue Here

	1—Strongly Disagree 非常不同意	2—Somewhat Disagree 不同意	3—Neither Agree Nor Disagree	4—Somewhat Agree 同意	5—Strongly Agree 非常同意
1 Using wikis increase my productivity in writing group assignment. 使用 wiki 增加完成作業的效率	1	2	3	4	5
2 Using wikis make it easier to do my course assignment 使用 wiki 讓我更容易完成課堂作業	1	2	3	4	5
3 Using wikis help my English learning 使用 wiki 幫助我學習英語	1	2	3	4	5
4 The wiki is easy to use 使用 Wiki 是容易的	1	2	3	4	5
5 It is beneficial to use wikis in terms of my learning 我認為使用 Wiki 能幫助我的學習	1	2	3	4	5
6 I intend to use wikis to facilitate my learning 我會想要使用 wiki 來幫助我的學習	1	2	3	4	5
7 I know how to post my assignment to the wiki web page 我知道如何把作業貼在組內的 wiki 網頁上	1	2	3	4	5
8 I know how to read a message posted on the discussion area in wikis 我知道如何閱讀貼在 wiki 討論區上的留言	1	2	3	4	5
9 I know how to post a new message to the discussion area in wikis. 我知道如何在 wiki 討論區上留言	1	2	3	4	5
10 I know how to reply to a message posted on the discussion area in wikis 我知道如何回覆別人貼在 wiki 討論區上的留言	1	2	3	4	5
11 The wiki environment enables me to easily contact with others. Wiki 的環境能讓我輕鬆得跟其他人聯絡	1	2	3	4	5
12 The wiki environment enables me to fully interact with others. Wiki 的環境能讓我與其他人有充分的互動	1	2	3	4	5
13 The wiki environment enables me to easily work in a group with my members. Wiki 的環境讓我能輕鬆得跟組員一起合作	1	2	3	4	5
14 I do not feel lonely in the wiki environment.	1	2	3	4	5

- 在 wiki 的環境中我並不覺得孤單
- 15 In the wiki environment, I obtain encouragement and support to in my learning experience** 1 2 3 4 5
在 wiki 的環境中學習能獲得別人的鼓勵與支持
- 16 I feel comfortable in the wiki environment** 1 2 3 4 5
我覺得我在 wiki 的環境中感到很自在
- 17 When I have non real-time interactions on the wiki webpage, I also feel that I deal with very real persons and not with abstract anonymous persons.** 1 2 3 4 5
當利用 wiki 網頁和同學討論聽寫作業時，我認為我是和真實的人交談而非和虛擬的人物互動
- 18 When I have non real-time conversations on the discussion board, I also feel that I deal with very real persons and not with abstract anonymous persons.** 1 2 3 4 5
當利用 wiki 討論和同學討論課程內容時，我認為我是和真實的人交談而非和虛擬的人物互動

Actual use (Please check only one 請勾選當中最符合你使用情形的一個選項)

19. In general, how often do you log on to the course wiki website?

大致上你多久會使用一次課堂的 wiki 網頁？

- Less than once a week 一週少於一次
- Once a week 一週一次
- Twice a week 一週兩次
- Three times a week 一週三次
- More than three times a week. 一週多於三次

20. On average, how long do you stay in the course wiki website each time you login?

平均說來你每次會花多少時間使用課堂的 wiki 網站？

- Less than 30 minutes 少於 30 分鐘
- Between 30-60 minutes 介於 30-60 分鐘
- Between 60-90 minutes 介於 60-90 分鐘
- Between 90-120 minutes 介於 90-120 分鐘
- More than 120 minutes 多於 120 分鐘

21. Please feel free to express your opinion about the last six weeks of English class.

請在此填寫任何意見。

APPENDIX N. INTERVIEW QUESTIONS

Interview Questions

A: Dictation assignments—聽寫作業

1. What's your experience of using wikis in this class?
你在這堂課中使用 wiki 的經驗是什麼？
2. Do you think using wikis to edit assignments increases the interaction between you and others? Why or why not?
你認為使用 wiki 來編輯作業能增加你跟其他人的互動嗎？為什麼或為什麼不？
3. Do you think using wikis to edit assignments helps your language learning? Why or why not?
你認為使用 wiki 來編輯作業能增進你的語言學習嗎？為什麼或為什麼不？
4. Do you feel free to express your ideas when using wikis to edit assignments? Why or why not?
在討論作業的過程中，你可以自在地使用 wiki 來表達你的想法嗎？為什麼或為什麼不？
5. Using wikis help you edit the assignment?
使用 wiki 能幫助你完成作業嗎？為什麼或為什麼不？

B: Discussion—討論區

1. What's your experience of using discussion board function in this class?
你在這堂課中使用 wiki 的討論區的經驗是什麼？
2. Do you think participating in discussions increases the interaction between you and others?
你認為參與討論區的討論能增加你跟其他人的互動嗎？為什麼或為什麼不？
3. Do you think participating in discussions helps your language learning?
你認為參與討論區的討論能增進你的語言學習嗎？為什麼或為什麼不？
4. You feel free to express your ideas when participating in discussions?
在參與討論區的過程中，你可以自在地表達你的想法嗎？為什麼或為什麼不？

C: Wikis in general—使用 wiki 一般問題

1. What are the advantages of using wikis in your learning experience?
你認為使用 wiki 來學習語言的優點是什麼？
2. What are the disadvantages of using wikis in your learning experience?
你認為使用 wiki 來學習語言的缺點是什麼？
3. What do you recommend in using wikis in your learning?
你對於使用 wiki 來幫助學習有什麼建議？

APPENDIX O. VIDEO INTERVIEW PERMISSION FORM

錄影訪談同意書
Video Interview Permission Form

Name 姓名:

Email:

本人_____於民國____年____月____日同意接受錄影訪談並且授權給研究單位使用並剪輯內容所含一切影像,聲音與文字,為其內容須維持本人原有的意見,並僅限於使用在與該研究相關之範圍,錄影帶及錄音帶上不會有識別的資料而且和其他研究資料分開,帶子會放在個有鎖的櫃子中,訪談長度大約為 30 分鐘且會在學校進行,訪談內容將與你課堂中學習英語及使用 wiki 有關

本人同意錄影及錄音

(I, _____ on this date _____ give my permission to conduct a video interview of me and to use the picture and words in support of the research as explained to me by the researcher. I agree that my image and words may be edited to be included as part of a larger video record but that all efforts be made to truthfully and accurately portray my comments in the context in which they were given. The tapes will be stored in a locked cabinet, with no identifying information, separate from all other study materials. The interview will last around 30 minutes on campus. The interview questions will be related your experience of English learning and using wikis in the class)

I agree to be video/audio taped.

簽章 Signature _____ 日期 Date _____

APPENDIX P. RESULTS OF WIKI USE QUESTIONNAIRE

Results of Wiki Use Questionnaire

Question	Strongly Disagree		Disagree		Neither		Agree		Strongly Agree	
	N	%	N	%	N	%	N	%	N	%
Benefit of Using wikis										
Q1. Wikis increase productivity	1	2.3	2	4.6	15	34.1	21	47.7	5	11.4
Q2. Wikis make doing assignment easier	1	2.3	4	9.1	15	34.1	20	45.5	4	9.1
Q5. Beneficial to learning	1	2.2	3	6.7	26	57.8	14	31.1	1	2.2
Technology Self-efficacy										
Q4. easy to use	1	2.2	5	11.1	16	35.6	19	42.2	4	8.9
Q6. intend to use wikis	1	2.2	4	8.9	22	48.9	12	26.7	6	13.3
Q7. know posting assignment	0	0	1	2.2	1	2.2	20	44.4	23	51.1
Q8. know reading messages	1	2.2	0	0	3	6.7	21	46.7	20	44.4
Q9. know posting messages	1	2.2	1	2.2	2	4.4	21	46.7	20	44.4
Q10. know replying messages	2	4.6	1	2.3	7	15.9	20	45.5	14	31.8
Sociability in Wiki										
Q3. wikis help English learning	2	4.4	6	13.3	21	46.7	15	33.3	1	2.2
Q11. wikis enable contact	2	4.6	4	9.1	24	54.5	12	27.3	2	4.6
Q12. wikis enable interaction	2	4.4	4	8.9	22	48.9	14	31.1	3	6.7
Q13. wikis enable work in groups	2	4.4	2	4.4	23	51.1	13	28.9	5	11.1
Q14. feel not lonely in wikis	2	4.4	5	11.1	26	57.8	11	24.4	1	2.2
Q15. obtain support in wikis	2	4.4	6	13.3	23	51.1	12	26.7	2	4.4
Q16. comfortable in wikis	1	2.2	5	11.1	11	24.4	25	55.6	3	6.7
Q17. real persons in wiki pages	4	8.9	8	17.8	20	44.4	12	26.7	1	2.2
Q18. real persons in discussions	4	8.9	7	15.6	20	44.4	13	28.9	1	2.2

APPENDIX Q. PERMISSION LETTER FROM DR. PICK

Re: Permission request regarding the figure in your dissertation

寄件者： Dorothy Pick
寄件日期： 2008 年 6 月 20 日 14:44:45
收件者： chen claire
[Figure 1 ...doc \(64.1 KB\)](#)

Hi Yu-ching,

Thank you for requesting to use my figure for your research. I attached a Word 2003 version of Figure 1. If you want to meet to discuss Rogers' theory or your research, please feel free to e-mail me.

Good luck!
Dorothy

Dorothy Pick, Ed.D., P.M.P.

----- Original Message -----

From: "chen claire"
To: "dorothy pick"
Sent: Thursday, June 19, 2008 12:10:11 PM GMT -05:00 US/Canada Eastern
Subject: Permission request regarding the figure in your dissertation

Dear Dr. Pick,

How are you? I'm a doctoral student in the Instructional Technology program. Dr. Holt advised me to use Diffusion of Innovation theory in my dissertation. The figure of Five Stages of the Innovation-Decision Process in your dissertation (p.24, Figure 1) is an excellent reference regarding this theory. May I have your permission to adopt this figure in my dissertation? Thank you!

Yu-ching Chen

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