

# **The Relationship between Internet Activities and Chinese Language Proficiency of International Students in Taiwan**

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*This study aimed to investigate the relationship between international students' participation in Internet activities and their Chinese language proficiency. The research results demonstrate that the frequency with which international students browsed websites on Chinese social and cultural activities is positively associated with their Chinese listening ability; the frequency with which international students exchanged information/files/opinions with other Internet users on Chinese social and cultural activities websites is positively associated with their Chinese composition ability; and the frequency with which international students searched or bought books on the Internet for Chinese learning is positively associated with their Chinese language proficiency.*

## **INTRODUCTION**

### **Background and Research Motivation**

Internationalization is a major issue that concerns global governments, institutions of higher education, and researchers. The successful development of international study plays an important role in the global environment. According to the statistical data of the Organization for Economic Cooperation and Development (OECD, 2006), the number of international students has increased by 41% from 2000 to 2004. Such a swift increase in the percentage of international students is expected to bring the host country huge economic benefits, business opportunities, and cultural exchange and to develop the students' international perspectives (Arthur, 2004). Hence, most countries perceive the importance of international students and seek solutions to the potential problems and challenges experienced by international students overseas. The most effective way to help international students overcome these challenges and those related to cultural adoption is to promote the students' local language proficiency. Mestenhauser and Ellingboe (1998) formulated the imperative to integrate the intercultural perspective into all university courses and programs. In other words, internationalization of the curriculum requires sufficient intercultural sophistication on the part of faculty. Universities and colleges in Taiwan should find ways of creating both opportunities for professional development and incentives that would motivate the faculty to internationalize their courses and instructional methods.

In recent years, Chinese has become one of the most popular languages studied by international students. The fast economic growth of China has contributed to this phenomenon.<sup>1</sup> Taiwan, whose official language is Mandarin Chinese, also attracts many international students who are learning Chinese. In 2002, Taiwan joined the World Trade Organization (WTO), which regulates its members' higher

education industries in accordance with the General Agreement of Trade in Services (GATS). As a result, Taiwan's government encourages its higher education institutions to increase their academic interchange with foreign countries and improve their quality of education to recruit outstanding international students. The high-quality Chinese language classes offered by Taiwanese schools give them a major competitive edge in attracting international students. Taiwanese government official statistics show that the total number of international students has tripled from 2000 to 2009.<sup>2</sup> In the Tainan metropolitan area itself, there are students from 67 different countries. Before 1987, less than 4,000 people came to Taiwan annually for learning Chinese, and most were overseas Chinese; currently, the number of international students studying Chinese in Taiwan is growing. Table 1 examines student distribution by place of origin across the five continents to show the obvious changes in the demographics of international students in recent years (Executive Yuan, 2009).

**TABLE 1**  
**NUMBER OF INTERNATIONAL STUDENTS WHO STUDY CHINESE IN TAIWAN (1997-2009)**

Year	Total	Asia	Americas	Europe	Africa	Oceania
1997	4,731	3,112	915	526	72	88
1998	4,511	2,906	881	564	65	95
1999	4,337	2,863	773	569	51	81
2000	5,724	4,137	887	551	48	101
2001	6,579	4,821	942	614	63	139
2002	5,263	3,568	1,008	506	63	118
2003	6,048	4,093	1,071	664	85	135
2004	6,276	4,219	11,115	680	108	154
2005	7,647	4,986	1,512	845	138	166
2006	8,182	5,063	1,768	954	140	257
2007	9,135	5,417	2,010	1,325	163	220
2008	10,177	5,834	2,417	1,484	187	255
2009	10,651	6,247	2,510	1,489	148	257

The development of Internet technology is a major indicator of a country's development. In academia, research on Internet technology has covered extensive subjects, topics, areas, and variables. Using Internet technology, learners can study according to their own demands and schedules at any time and in any location.<sup>3</sup> Schools and educational institutions in many countries have invested extensive human capital and money to establish online learning websites or online teaching material. Online Chinese teaching and learning is extremely valuable because it overcomes the limitations of time and location. As Li (2008) mentioned, an effective curriculum for foreign language should be "highly communicative, cognitively appropriate, linguistically challenging, culturally relevant, and academically sound." Thus, learners can interact/communicate with each other and share their learning experiences at any time through the Internet. Therefore, it is important to develop online learning models in the future. Currently, most Chinese learning websites are in the initial stage. Their content and function are very limited and have significant room for improvement. Moreover, the final goal of Chinese language teaching should be to develop students' cross-cultural communication abilities; therefore, "Chinese social culture" should be embedded into the "Chinese language teaching" activities.

### **Research Purpose and Expected Contributions**

This study investigated the international students from three universities in the Tainan metropolitan area. This study further analyzed the relationship between the international students' participation in Internet activities and their Chinese language proficiency and analyzed how different demographic variables affect their Chinese language proficiency. The results of this study are expected to provide

useful information for (1) Chinese language teachers developing online teaching strategies, (2) higher education institutions offering online Chinese language courses, and (3) governments that plan to offer online Chinese language courses to meet the future demands of potential international students and overseas learners. In addition, this study enhanced the very limited body of literature discussing online learning and the increasing trend towards online teaching of the Chinese language.

### **Related Literature**

As educational technology moves closer to eliminating the practice of traditional classroom teaching, online teaching and learning will become a more practical and viable solution to meeting global learners' educational needs (Paloff & Pratt 2003). Butler-Pascoe (1997) stated that, the role of technology in language learning increased when language teachers recognized its ability to create both independent and collaborative learning environments for students to acquire and practice a new language. Hanson-Smith and Rilling (2007) stated, "technology can support teachers in making language learning faster, easier, less painful, and more engaging, and helps create an optimal language learning environment." Many language teachers recognize the abundant resources provided to language learners by technology and are currently integrating computers and the internet into their teaching. Zheng (2005) indicated that one of the areas of greatest growth in online teaching is foreign language teaching or LOTE (Languages Other Than English) due to the impact of educational globalization. Many websites offering LOTE courses have been developed to address this growing demand. Previous findings also show that students were generally satisfied with the design of online learning environment (Liaw, 2007). Language education in the twenty-first century focuses on using language and cultural knowledge as a way to communicate and connect with others around the globe (Eaton, 2010). According to Hellstén (2002), educational reform and implementation must first understand and explore instructional materials suitable for international students. Li (2008) noted that another major challenge faced by language educators is how "to enable students to express sophisticated or mature ideas with limited language skills." For this reason, modern technology might be an effective way to help language learners to immerse themselves in language study. Online language-learning technology would help in developing communication and interaction models between schools, teachers, and international students and in taking into account the original ethnic and cultural characteristics of international students when evaluating their learning issues. Recently, on the field of language education in the twenty-first century has focused on using language and cultural knowledge as a way to communicate and connect with others around the globe (Eaton, 2010).

Prior studies related to international students mostly focused on the problems faced by these students in life, culture, and language acquisition. Huang (2007) indicated that the stress of Chinese language learning for international students in Taiwan is associated with instructional methods, classroom interactions, course content, and peer competition. Jiang (2009) suggested that a student's age and years of residency abroad are relevant to studying in a foreign country. Younger international students are more unstable in emotion and psychology than are their older counterparts. Uehara (1988) found that the greatest challenges for international students in Japan are learning the Japanese language, economic issues, and homesickness. Socio-cognitive approaches have emphasized an understanding of language acquisition as a process of apprenticeship or socialization into particular discourse communities (Gee, 1996). Accessing and using web pages to learn a foreign language "supports a socio-cognitive approach by helping immerse students in discourses that extend well beyond the classroom, their immediate communities, and their language textbook." (Warschauer & Meskill, 2000) Moreover, the longer students stay in the host country, the more likely they are to become accustomed to a cross-cultural life, especially in terms of their understanding of the language and culture. In recent years, the process of and barriers to the acclimation to cultural differences have been emphasized, and language learning plays a vital role in this process. Learning a second language implies learning a second culture, and this is the cultural adoption process formulated by the Acculturation Theory. Because web pages are authentic cultural materials, students can use them to conduct research on culture and current events when learning foreign language (Osuna & Meskill, 1998). Furthermore, Abe, Talbot, and Geelhoed (1998) argued that the

cultural adoption process undertaken by international students also benefits local students. Local students can study with international students and help them resolve cultural and language problems. At the same time, these local students can learn from the process and develop their international vision. Apart from problems relating to cultural differences, the stress of international study has also been widely discussed (Sam 2001; Bochner, McLeod, & Lin, 1997).

## METHOD

### Research Model

The study utilized the following OLS regression model to investigate the relationship between the international students' participation in Internet activities and their Chinese language proficiency and to control for demographic variables that may affect the international students' Chinese language proficiency.

$$CLA = \alpha + \beta_1 * \text{Home country} + \beta_2 * \text{Gender} + \beta_3 * \text{Age} + \beta_4 * \text{Educational background} + \beta_5 * \text{Marital Status} + \beta_6 * \text{Living arrangements} + \beta_7 * \text{Average monthly consumption} + \beta_8 * \text{Number of years resident in Taiwan} + \beta_9 * \text{Internet\_Act\_1} + \beta_{10} * \text{Internet\_Act\_2} + \beta_{11} * \text{Internet\_Act\_3} + \beta_{12} * \text{Internet\_Act\_4} + \beta_{13} * \text{Internet\_Act\_5} + \varepsilon \quad (1)$$

The variables are defined as follows:

CLA = Chinese language proficiency, measured by the scores on the Scale of Chinese Language Proficiency Self-Assessed. A lower score indicates better Chinese language proficiency.

Home country = 1 if in Asia, otherwise = 0;

Gender = 1 if female;

Age = 1 if under 20, = 2 if 21-30, = 3 if 31-40, = 4 if 41-50, = 5 if 51-60, = 7 if > 61;

Educational background = 1 if graduate;

Marital Status = 1 if married;

Living accommodation type = 1 if at school;

Average monthly consumption = 1 if < NT\$5,000, = 2 if NT\$5,000-NT\$10,000, = 3 if NT\$10,000-NT\$15,000, = 4 if NT\$15,000-NT\$20,000, = 5 if NT\$20,000-NT\$25,000, = 6 if > NT\$25,000;

Length of residence in Taiwan = 1 if < 1 year, = 2 if 1-2 years, = 3 if 2-3 years, = 4 if 3-4 years, = 5 if 4-5 years, = 6 if > 5 years;

The Internet Addiction Scale (Griffiths, 1998; Young, 2004) has measured the following Internet activities. A higher score indicates a higher frequency of Internet activity participations.

Internet\_Act\_1 = Score of browsing websites on Chinese social and cultural activities;

Internet\_Act\_2 = Score of exchanging information/files/opinions with other Internet users on Chinese social and cultural activities;

Internet\_Act\_3 = Score of participation in online interactions in Chinese;

Internet\_Act\_4 = Score of joining the online Chinese language learning community, sharing of resources and cultural exchange;

Internet\_Act\_5 = Score of searching or buying books on the Internet for Chinese learning.

This model controls for the following variables that may potentially influence international students' Chinese proficiency: (a) Home country: Because of cultural similarities, Asian students may find it easier to learn Chinese than students from other continents may. (b) Differences in gender, age, and marital status may affect international students' proficiency are controlled. (c) Educational background: International students with stronger backgrounds in Chinese language are likely to have superior Chinese language fundamentals and higher expectations for their academic performance. Hence, their self-

evaluations may be less positive. (d) Living arrangements: International students who live on campus are more likely to talk with other students from the same country. This probably has a negative impact on their Chinese language proficiency. (e) Average monthly consumption: Wealthier international students can afford more formal language classes and are less likely to rely on online learning. (f) Length of residence in Taiwan: The longer an international student resides in the country, the more likely he/she is to use the Internet for Chinese language learning.

### **Sample**

The research sample consists of 204 international students from three universities in the Tainan metropolitan area of Taiwan.<sup>4</sup> This comprises 44.4% of the sampled population, or 72% of the recollection rate.

### **Data Collection and Designation of Questionnaire**

The questionnaire used in this study was available in both Chinese and English.<sup>5</sup> This study investigated the distribution of international students, as announced by the Taiwanese government, and selected three universities to take part in its survey. Subsequently, this study contacted the administrative offices of these three universities, obtained their permission, and accessed detailed information (student contact information and the exact number of international students enrolled) on international students at each university. The researchers met with these international students, provided them with both the Chinese and English forms, and promptly collected the questionnaires when the international students had completed them.

The questionnaire is comprised of three parts. Part I pertains to “Personal Information,” which covers the international students’ home country,<sup>6</sup> gender, age, educational background, marital status, living arrangements, average monthly consumption, and number of years living in Taiwan. Part II is the “Scale of Chinese Language Proficiency Self-Assessed,” which was developed based on the Test of Proficiency-Huayu (TOP) principle authorized by Taiwan and created by the Mandarin Testing Center, Mandarin Graduate School, and Psychology Education Testing Center of National Taiwan Normal University (Steering Committee for the Test of Proficiency-Huayu, 2010). This questionnaire incorporates several individual sections designed to measure the international students’ Chinese proficiency, including their ability of Chinese phonetic transliteration system application, Chinese listening ability, Mandarin speaking skills, Chinese literacy, Chinese character writing ability, Chinese language reading ability, and Chinese composition ability. The Likert 5-point scale was applied as follows: very poor = 5, poor = 4, not bad = 3, good = 2, excellent = 1. A lower score thus implies better Chinese language learning ability. Part III is the “Scale of Activities on the Internet,” revised from the Internet Addiction Scale (Griffiths, 1998; Young, 2004). Likewise, the study used the Likert 5-point scale to measure the frequency with which students participated in Internet activities. A higher score implies a higher frequency of participation in Internet activity.

### **Pretest of Questionnaire and Completion of Survey**

To ensure the accuracy of this survey, we conducted a pretest from April 1–10, 2010.<sup>7</sup> We revised the questionnaire based on the results of the pretest, and the formal survey was conducted from May 20–June 5, 2010. Our sample consists of international students from three universities in the Tainan metropolitan area. In all, 285 copies of the questionnaires were distributed and 204 were collected. The ratio of recollection was 0.72.

## **RESULTS**

### **Reliability and Validity**

Table 2 demonstrates the reliability and validity of the questionnaire used in this study. Cronbach’s  $\alpha$ <sup>8</sup> for Parts I and II are both 0.879, demonstrating that the questions are highly related to each other and

reliable for providing useful data. The Kaiser-Meyer Olkin Measure of Sampling Adequacy (KMO)<sup>9</sup> values for Parts I and II are 0.880 and 0.792, respectively, showing high validity.

**TABLE 2**  
**RELIABILITY AND VALIDITY OF PART I AND PART II QUESTIONNAIRES**

		Part I	Part II
Reliability	Cronbach's $\alpha$	0.879	0.879
Validity	KMO	0.880	0.792

### Analyses of Demographic Variables

Table 3 shows the home countries of the international students selected as the sample population for this study. Southeast Asia dominates (31.4%) the list, probably because of its geographical and cultural nearness to Taiwan. The proportion of male to female international students is 54.4% to 45.6%. Most international students were between 21 and 30 years old (69.6%), a demographic that we consider to be in the young range and typically able to learn languages more quickly than older demographics. Most of the international students had college degrees (67.6%) and were single (90.7%). A percentage of international students lived off campus (42.2%). The average monthly consumption was around NT\$5,000 to NT\$10,000. Most international students stayed in Taiwan for less than a year (53.4%), implying that their major purpose was to learn the Chinese language and gain an understanding of the local culture during a short time period.

**TABLE 3**  
**DEMOGRAPHIC VARIABLES OF INTERNATIONAL STUDENTS**

Variable	Distribution
Home country	Of the international students, 31.4% were Southeastern Asians.
Gender	There was a roughly even distribution between male and female students. Of the international students, 54.4% were male and 45.6% were female.
Age	Of the international students, 69.6% were aged between 21-30 years old.
Educational background	Of the international students, 67.6% were pursuing Bachelor's degrees.
Marriage status	Of the international students, 90.7% were single.
Living arrangement	Of the international students, 42.2% rented private accommodations.
Monthly consumption	Of the international students, 28.9% spent between NT\$5,001 and NT\$10,000 (NT: New Taiwanese Dollar) per month.
Length of residence in Taiwan	Of the international students, 53.4% had been in Taiwan for less than one year.

### International Student Participation in Internet Activities

Table 4 shows the Internet activities in which international students usually participate. They are (1) browsing websites on Chinese social and cultural activities ( $\underline{M} = 2.66$ ), (2) exchanging information/files/opinions with other Internet users on Chinese social and cultural activities websites ( $\underline{M} = 2.57$ ), and (3) searching or buying books on the Internet for Chinese learning ( $\underline{M} = 2.26$ ).

**TABLE 4**  
**INTERNATIONAL STUDENTS' PARTICIPATION IN INTERNET ACTIVITIES**

Dimension	Internet Activities	<u>Mean</u>	<u>Standard deviation</u>
Internet Activities	Browsing websites on Chinese social and cultural activities	2.66	1.095
	Exchanging information/files/opinions with other Internet user on Chinese social and cultural activities websites	2.57	1.131
	Participation in online interactions in Chinese	2.19	1.160
	Joining the online Chinese language learning community, sharing of resources and cultural exchange	2.08	1.148
	Searching the internet or buying books for Chinese learning	2.26	1.104
	Total mean	2.34	

Table 5 presents the frequencies in which international students participate in various Internet activities. The more popular activities include browsing websites on Chinese social and cultural activities and exchanging information/files/opinions on these websites with other Internet users. The frequency with which the international students joined the online Chinese language learning community, shared resources, and participated in Chinese cultural exchange was 3.4%.

**TABLE 5**  
**FREQUENCIES WITH WHICH INTERNATIONAL STUDENTS PARTICIPATED IN INTERNET ACTIVITIES**

Internet Activities	Never	Seldom	Sometimes	Frequently	Always
Browsing websites on Chinese social and cultural activities	13.2	37.3	25.0	19.1	5.4
Exchanging information/files/opinions with other Internet user on Chinese social and cultural activities websites	17.2	37.3	22.1	18.1	5.4
Participation in online interactions in Chinese	38.2	22.5	24.0	12.3	2.9
Joining the online Chinese language learning community, sharing of resources and cultural exchange	43.6	19.1	26.0	7.8	3.4
Searching the internet or buying books for Chinese learning	29.9	31.9	23.0	12.3	2.9

### International Students' Chinese Language Proficiency

Table 6 reports the international students' Chinese language proficiency as scored by the Likert 5-point scale (in this survey, lower scores indicate higher ability). The international students scored highest in ability of Chinese phonetic transliteration system application ( $\bar{M} = 2.65$ ). The second-best section was Chinese listening ability ( $\bar{M} = 2.80$ ), and the third best was Mandarin speaking skills ( $\bar{M} = 3.01$ ). International students may have scored higher in these areas because Taiwanese instructors usually teach the Chinese phonetic transliteration system first and then provide training on listening and speaking. Reading and composition are more advanced language skills and are introduced last.

**TABLE 6**  
**INTERNATIONAL STUDENTS' CHINESE LANGUAGE PROFICIENCY**

Chinese language proficiency	Mean	Standard deviation
Ability of Chinese phonetic transliteration system application	2.65	1.105
Chinese listening ability	2.80	0.906
Mandarin speaking skills	3.01	0.812
Chinese literacy	3.14	0.986
Ability to write Chinese characters	3.25	0.985
Chinese language reading ability	3.15	0.957
Chinese composition ability	3.43	0.946

Table 7 shows that the international students' Chinese language proficiency ranged from excellent to very poor. In particular, 89 (43.6%) international students indicated that they possessed poor or very poor proficiency in writing Chinese characters. In contrast, 36 (17.6%) international students reported excellent skills in Chinese phonetic transliteration system application, which is the first required unit of any beginning Chinese course.

**TABLE 7**  
**INTERNATIONAL STUDENTS' ACQUISITION OF VARIOUS ASPECTS OF CHINESE LANGUAGE PROFICIENCY**

Chinese language proficiency		Very poor	Poor	Not bad	Good	Excellent
Ability of Chinese phonetic transliteration system application	number	10	35	70	53	36
	distribution	4.9%	17.2%	34.3%	26%	17.6%
Chinese listening ability	number	8	32	86	67	11
	distribution	3.9%	15.7%	42.2%	32.2%	5.4%
Mandarin speaking skills	number	9	36	115	38	6
	distribution	4.4%	17.6%	56.4%	18.6%	2.9%
Chinese literacy	number	16	63	63	55	5
	distribution	7.8%	30.9%	31.9%	27.0%	2.5%
Ability to write Chinese characters	number	18	71	68	40	7
	distribution	8.8%	34.8%	33.3%	19.6%	3.4%
Chinese language reading ability	number	16	59	73	52	4
	distribution	7.8%	28.9%	35.8%	25.5%	2.0%
Chinese composition ability	number	4	26	80	66	28
	distribution	2.0%	12.7%	39.2%	32.4%	13.7%



## Regression Analyses of the Relationship Between International Students' Participation in Internet Activities and Their Chinese Language Proficiency

Table 8 presents regression analyses of the relationship between the international students' participation in Internet activities participation and their Chinese language proficiency. First, Chinese listening ability is negatively associated with Internet\_Act\_1 ( $-0.16, p = 0.04$ ). This result demonstrates that the frequency with which international students browse websites on Chinese social and cultural activities or news is positively associated with their Chinese listening ability. These websites usually provide real-time news and interesting movies that introduce the Chinese social culture, and these resources greatly benefit the international students' Chinese listening abilities.

Second, Chinese composition ability is negatively associated with Internet\_Act\_2. This result shows that the frequency with which international students exchange information/files/opinions on Chinese social and cultural activities websites with other Internet users is positively associated with their Chinese composition ability. Therefore, it is important for Chinese language instructors to help international students develop learning strategies and interact with student peers through the Internet. Currently, the "Chinese Characters Website"<sup>10</sup> provides comprehensive online information and teaching materials. In addition, the websites "Speak Mandarin in Five Hundred Words"<sup>11</sup> and "E-learning of Chinese"<sup>12</sup> both emphasize how to use Internet interactions to promote international students' reading and composing abilities, by providing the opinions expressed by Chinese language professors.

Third, international students' ability of Chinese phonetic transliteration system application and Chinese reading abilities are negatively associated with Internet\_Act\_5 ( $-0.20$  and  $-0.16, p < 0.10$ ). This result demonstrates that the frequency with which international students search or buy books for Chinese learning on the Internet is positively associated with Chinese language learning. This finding is consistent with a prior study, which showed that online interactive learning materials can foster greater rapport between software developers and users (both students and teachers), as well as help bridge the gap between second language acquisition experts and software developers (Cushion, 2006). Prior studies have also demonstrated that there are connections between the use of specific computer tools, such as concordances, dictionaries, cloze-builders, hypertext, and a database with interactive quizzes, and improvements in language proficiency (Horst *et al.*, 2005). Recently, the National Taiwan University (2009) has cooperated with TutorABC to establish a global Chinese learning website, "NTUtorMing,"<sup>13</sup> which provides an e-learning platform to instantaneously correct students' Chinese pronunciation, accent, and intonation via interactive live video. The finding tallies with the argument made by Hanson-Smith *et al.* (2007) that foreign language teachers should use technology (the Internet "in making language learning faster, easier, less painful."

Chinese listening and composition abilities are positively associated with Internet\_Act\_4 ( $0.14$  and  $0.14, p < 0.10$ ). The results show that international students who join the online Chinese language learning community to share resources and engage in cultural exchanges experience negative effects on their Chinese listening and composition abilities. This might imply that international students might try to alleviate the pressure of their studies or immersion in an unfamiliar culture by joining the online Chinese language learning community to make friends. However, this may take time away from their formal study of Chinese listening and composition and, therefore, negatively affect their Chinese language proficiency.

In terms of these international students' demographic variables, the results show that, as expected, Asian nationality and long-term residence in Taiwan have a positive influence on Chinese language proficiency. On the contrary, graduate education, on-campus residence, and higher monthly consumption are negatively associated with Chinese language proficiency, as discussed earlier in the paper. The results also reinforce Hellstén's (2002) results, which show that, to effectively conduct international education, the international students' diversity and cultural background should be considered. Such differences can be incorporated into the design of teaching materials and learning environments.



## CONCLUSION

This study explored the relationship between international students' participation in Internet activities and their Chinese language proficiency and analyzed, through descriptive statistics and regression analyses, how different demographic variables affect their Chinese language proficiency. The empirical results demonstrate that (1) the frequency with which international students browse websites related to Chinese social and cultural activities is positively associated with their Chinese listening ability; (2) the frequency with which students exchange information/files/opinions on Chinese social and cultural activities websites with other Internet users is positively associated with their Chinese composition ability; and (3) the frequency with which students search or buy books for Chinese learning on the Internet is positively associated with their Chinese language proficiency. In addition, this study also found that Asian nationality and long-term residence in Taiwan have a positive influence on international students' Chinese language proficiency. Conversely, graduate education, on-campus residence, and higher monthly consumption are negatively associated with Chinese language proficiency.

The results of this study demonstrate that browsing websites on Chinese social and cultural activities is positively associated with their Chinese listening ability. These findings tallied with Li's (2008) argument that incorporating modern technology into the curriculum might be an effective way to help language learners to immerse themselves in language practice. Furthermore, the study demonstrates that the frequency with which international students search or buy books for Chinese learning on the Internet is positively associated with Chinese language proficiency; these results correlate with both Hanson-Smith's et al. (2007) and Osuna and Meskill's (1998) theory. These scholars found that technology can support teachers in making language learning faster and easier and that, by using web pages to conduct research on culture and current events, students can learn foreign language more efficiently (Osuna et al., 1998).

Through the results and discussions detailed above, this study offers the following suggestions to the government, higher education institutions, Chinese language teaching institutions, and Chinese language teachers: (1) Internet activity can be embedded in the design and planning of Chinese online learning courses. This online learning also provides teachers with various teaching avenues beyond traditional teaching styles. (2) Educational institutions can help international students overcome cross-cultural adaptation problems by utilizing online Chinese language learning. Hence, the government should offer adequate training in online Chinese language teaching to improve instructors' proficiency in this area. (3) Professional Chinese language teachers are encouraged to cooperate with multimedia learning experts in developing digital Chinese language and social culture teaching materials that can meet the demands of international students, as suggested by the socio-cognitive theories. (4) Using advanced technology, the government should establish an online, interactive Chinese learning environment in order to support the learning efforts of international students. (5) The government should also consider providing additional support for educational institutions offering online Chinese language courses. (6) Finally, this study suggests that future teachers of the Chinese language should balance their teaching between the language itself and social culture, both of which are the key elements of successful cross-cultural communication.

## ENDNOTES

1. In 2009, nearly 30 million people from 85 countries and regions were learning standard Chinese. (See Free Chinese Lessons at <http://www.freechineselessons.com/story.php?id=8>)
2. According to the Department of Statistics, Ministry of Education (<http://www.edu.tw/statistics/content>), there were 16,909 international students studying in Taiwan in 2009; the number increased by 10,299 from that of 2000, when there were 6,610 international students. Most of the international students came from Asian countries, with the five major countries listed, in order, as follows: Japan (2,182), Indonesia (2,056), the US (1,986), Vietnam (1,779), and Korea (1,541).
3. Current trends in the creation of online learning courses, with a focus on the area of foreign and second

- language learning, are explored (Paloff and Pratt 2003).
4. According to the Ministry of Education in the Tainan metropolitan area (2009), only these three universities registered all their international students. The number of international students in these universities totaled 459.
  5. More than 90% of the international students completed the questionnaire in English, and a few Japanese students completed the questionnaire in Chinese because they could not read English.
  6. The item concerning the home country was designed based on the seven continents, their countries, and the relevant regional and cultural characteristics of the majority of the international students in the Tainan metropolitan area. Homeland was categorized into the US, South America, Canada, Europe, Southeast Asia, Japan, Korea, Australia, and others.
  7. After the questionnaire was translated, two foreign teachers from the Taiwan Normal College confirmed that the content was correct and fluent. Ten international students then completed the pretest of the questionnaires. Finally, two professors, with related academic expertise and experience, reviewed the questionnaire and suggested further supplements and modifications to it.
  8. The dimensions and the contents of items were tested using Cronbach's  $\alpha$  coefficient, showing that the questions are highly related and reliable.
  9. The value of the Kaiser-Meyer Olkin Measure of Sampling Adequacy (KMO), ranging from 0 to 1, can be used to determine appropriateness. When the KMO value is greater than 0.50, the content validity is high and the scale is representative.
  10. See <http://taiwan99.tw/>
  11. The e-learning resources of the Overseas Chinese Affairs Commission's "Speak Mandarin in Five Hundred Words" (<http://edu/ocac.gov.tw/home.htm/>) provide online information.
  12. See <http://cel.wtuc.edu.tw/>
  13. See <http://www.NTUtorMing>

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