Effects of the Internet on Students' Reading Comprehension in Classrooms of English as a Foreign Language

Rapeepat So-in*

ABSTRACT

The purpose of this study was to investigate the effects of the Internet as a supplementary resource on the students' reading comprehension. Three hypotheses were tested to see if the posttest mean scores of the experimental group experiencing the Internet-based reading as a supplementary resource were significantly higher than those of the control group experiencing the book-based reading as a supplementary resource, if the posttest mean scores of the student rating themselves as having a high computer knowledge were significantly higher than those rating themselves as having a low computer knowledge, and if a positive relationship between the students' final grades in an English reading course and their posttest mean scores on the reading section of the Chulalongkorn University's Test of General English Proficiency (CU-TEP) existed. Fifty-one non-English major students enrolled in an English reading course offered at Srinakharinwirot University participating in this study. Twenty-one students were randomly assigned into the experimental group and thirty students were in the control group and were in a semester treatment. The results revealed that the students in the Internet group did not outperform the students in the non-Internet group on the test, and no significant difference was found on the students having a high computer knowledge and those having a low computer knowledge. An analysis of correlation coefficient indicated that there was a positive relationship between the students' final grades in the English reading course and their posttest mean scores on the reading section of the CU-TEP

Keywords : *Internet, Reading, Comprehension*

* Contract teacher, English as an International Communication Department,
Tawan-ok Rajamankala University of Technology (Chakabonse Bhuvanart Campus),
122/41 Viphavadee Road, Dindang District, Bangkok 10400

ผลของอินเตอร์เน็ตต่อการอ่านของนิสิตที่ใช้ภาษาอังกฤษเป็นภาษาต่างประเทศ

รพีพัฒน์ โสอินทร์

บทคัดย่อ

การวิจัยครั้งนี้มีจุดมุ่งหมายเพื่อศึกษาผลของอินเตอร์เน็ตต่อการอ่านของนิสิตที่ใช้ภาษาอังกฤษเป็นภาษาต่างประเทศ การวิจัยนี้ได้ดำเนินการขึ้นโดยอาศัยพื้นฐานของข้อสมมติฐาน 3 ข้อ คือ 1) ผลสัมฤทธิ์ด้านการอ่านของกลุ่มนิสิตที่เรียนการอ่านโดยอาศัยอินเตอร์เน็ตเป็นแหล่งความรู้เสริมมีประสิทธิภาพมากกว่าผลสัมฤทธิ์ด้านการอ่านของกลุ่มนิสิตที่เรียนการอ่านโดยไม่อาศัยอินเตอร์เน็ตเป็นแหล่งความรู้เสริม 2) ผลสัมฤทธิ์ด้านการอ่านของกลุ่มนิสิตที่มีความสามารถด้านคอมพิวเตอร์สูงกว่ามีมากกว่าผลสัมฤทธิ์ด้านการอ่านของกลุ่มนักสิตที่มีความสามารถด้านคอมพิวเตอร์ต่ำกว่า 3) มีความสัมพันธ์เกิดขึ้นระหว่างระดับคะแนนของนิสิตที่เรียนวิชาการอ่านภาษาอังกฤษ กับผลสัมฤทธิ์ด้านการอ่านจากแบบทดสอบศักยภาพทางวิชาการด้านภาษาอังกฤษแห่งจุฬาลงกรณ์ด้านภาษาอังกฤษแห่งจุฬาลงกรณ์

ผู้วิจัยได้คัดเลือกนิสิตที่ไม่ได้เรียนวิชาอังกฤษเป็นวิชาเอกจำนวน 51 คนเป็นกลุ่มทดลองในงานวิจัยครั้งนี้ โดยแบ่งกลุ่มนิสิตออกเป็น 2 กลุ่มทดลองได้แก่ กลุ่มนิสิตที่ได้รับการเสริมการอ่านจากอินเตอร์เน็ตซึ่งเป็นกลุ่มทดลองและ กลุ่มนิสิตที่ได้รับการเสริมการอ่านจากหนังสือเพียงอย่างเดียวซึ่งเป็นกลุ่มควบคุม นิสิตทั้งสองกลุ่มทดลองใช้เวลาเรียนการอ่าน 1 ภาคการศึกษา โดยใช้แบบทดสอบวัดผลสัมฤทธิ์ศักยภาพด้านการอ่านภาษาอังกฤษแห่งจุฬาลงกรณ์มหาวิทยาลัยทั้งก่อนและหลังการเรียนของนิสิต

ผลการทดลองพบว่า

1. ผลสัมฤทธิ์ทางการเรียนระหว่างกลุ่มนิสิตที่ได้รับการเสริมการอ่านจากอินเตอร์เน็ตและกลุ่มนิสิตที่ไม่ได้รับการเสริมการอ่านจากอินเตอร์เน็ตไม่แตกต่างกันอย่างมีนัยสำคัญทางสถิติ
2. ผลสัมฤทธิ์ด้านการอ่านระหว่างกลุ่มนิสิตที่มีความสามารถด้านคอมพิวเตอร์สูงกว่าและกลุ่มนิสิตที่มีความสามารถด้านคอมพิวเตอร์ต่ำกว่าไม่แตกต่างกันอย่างมีนัยสำคัญทางสถิติ

คำสำคัญ *: อินเตอร์เน็ต ความเข้าใจ การอ่าน*

RATIONALE

One of the important foreign languages that Thai students are expected to learn in order to communicate with foreigners is English. In Thailand, not only is English included in the national curriculum from elementary to university levels as a required course for all Thai students (Ministry of Education, 2002) but it is also used as a tool to access and transfer a variety of different foreign knowledge sources. The fact that most foreign knowledge sources originate from the English language in journals, articles, magazines, books, and research reports makes it inevitable for the Thai students to retrieve those foreign information, they, then, are required to be familiar with the language by reading. Although three other skills of the English language, writing, speaking, and listening are considered important to English communication, and are widely taught, reading is the most important skill that Thai students need to master in order to access sources written in English, to overcome academic difficulties, and to become independent lifelong learners. Additionally, because this skill is a very important tool and an essential component of input for Thai students in foreign language acquisition (Tang, 2000), an ability to read effectively is more required than other language skills (Hirunburana & Opanon-amata, 2003).

However, there appears to be many problems and related factors that impede Thai student's reading abilities: for example, a lack of vocabulary, insufficient knowledge of grammatical structures and background knowledge, outdated text books, inappropriate reading skill and activities, and instructional methods (Adunyarittigun, 2002; Chandhavimol, 1998; Changpueng, 2005; Intarasombat, 2002; Jesdapornpun, 2001; Mingsakoon, 2003; Reanjaroensuk 1999; Sonsiri, 1999; Tanghirunwat, 2003). Therefore, to avoid these obstacles from happening and to encourage a students' reading skill development leading to successful comprehension, Internet-based reading as a supplementary resource, one form of computer-assisted language learning (CALL), is likely to be introduced and applied in a foreign language

classroom (Kern & Warschauer, 2000). Kern and Warschauer (2000) discussed the positive impact of the Internet-based language teaching on language learners. They pointed out that, with the integrated multimedia features such as hypertext, video, pictures, graphic, sound, and hypermedia available as the Internet resource or the World Wide Web which makes it a powerful new medium of interaction in the classroom, the language learning would be facilitated. The learners are able to interactively access to those authentic materials, gain autonomy, and become empowered learner. That is multimedia help them expose to integrative, authentic language enhancements that corresponds to their individual needs, (Evelyn, 2004). This interactive environment not only provides abundant comprehensible input vital to effective language output, but it also facilitates second language acquisition (Warschauer & Whittaker, 1997; Evelyn, 2004). Apparently, such an innovative way of learning could help make language input easier to understand, more comprehensible, and accessible which at last leads to developed reading abilities of Thai students as asserted by Nakorntam (2000) that teachers need to maximize the education system by exploiting the advantage of powerful technology to build competent Thai learners.

RESEARCH HYPOTHESES

The hypotheses of the study are:

1. On the posttest administration on the reading section of Chulalongkorn University's Test of General English Proficiency (CU-TEP) controlled for prior English performance, the mean scores of the experimental group (the students experiencing Internet-based reading as a supplementary resource) would be significantly higher than the mean score of the control group (students experiencing book-based reading as a supplementary resource).

2. On the posttest administration on the reading section of Chulalongkorn University's Test of General English Proficiency (CU-TEP) controlled for prior English performance, the mean scores of the students who, on the *Students Demographic Survey*, rated themselves as being highly knowledgeable in computer background would be significantly higher than the mean scores of those who have a low computer knowledge.

3. There is a positive relationship between students' final grades in an English reading course*, Reading Techniques*, and their posttest mean scores on the reading section of the Chulalongkorn University's Test of General English Proficiency (CU-TEP).

PURPOSE OF THE STUDY

This study was conducted to examine the effects of the Internet-based reading as a supplementary resource on students' reading comprehension. Three hypotheses were tested to reassure the implementation of Internet as a supplementary reading resource in foreign language classrooms.

PARTICIPANTS

As the researcher was granted permission from the Department of Western Languages and the Department of Political Sciences of Srinakharinwirot University, a convenient sampling method was chosen. Fifty-one non-English major undergraduate students enrolled in *Reading Techniques* (EN 221) in the second academic year 2006 at Srinakharinwirot University (SWU), Bangkok, Thailand were participants in this study. Many reasons to use SWU students as participants were that firstly, if achieved, the desired result of the study would be applied to SWU students who might be in need of reading improvement by technological means. Secondly, SWU is a well-known public university in which all of its students are selected by a national examination. This national test would partly guarantee their abilities to

use English in an undergraduate level. Finally, SWU is one of the public universities that high school students chose for their academic favor to further in their undergraduate study level (Thailand's Commission on Higher Education, 2006). As SWU students could be said to represent all Thai university students, the results could be generalized to students in other Thai universities as well. The students enrolled in *Reading Techniques* (EN 221) were randomly assigned regardless of their gender into the control group experiencing a traditional text-based instruction supplemented with book-based reading and the experimental group experiencing text-based instruction supplemented with Internet-based reading.

INSTRUMENTS

The instruments in this study were the English proficiency test (CU-TEP), the main reading material, *Reading Connections* used for both groups, supplementary reading materials *For Your Information 2* used for control group, and an Internet Web site, *BBEworldservice.com*, used for experimental group, and a S*tudents Demographic Survey*. The reading section of the CU-TEP was used to measure the achievement level between two treatments of language supports on both pre-posttest of students' reading proficiency. The contents of the test materials were drawn from different genres and were appropriate for higher education. Specialists on the content of English tests also approved, edited, and tested it before it was officially accepted and administered. The reliability coefficients of the test range from .86 to .91. Its concurrent validity can be equated with the Test of English as Foreign Language (TOEFL), and its correlation coefficient with TOEFL is .80. Additionally, the results can also be used to predict English academic success at the graduate level (Prapphal, 2003).

Reading Connections was used as the main text book for the two treatment groups of students. It was designed to help intermediate international students with their college or university studies. It incorporated a variety of skill practices, activities, and strategies for purposeful reading (Ediger & Pavlik, 2000). A variety of interesting readings drawn from

different registers were given to teach, drill, and test necessary reading skills for academic success. Challenging tasks and activities furnished students with actual process of reading leading them to process the information they needed for purposeful reading. Additionally, various other essential techniques needed to polish students' reading abilities were integrated such as, determining the meaning of words from context and word structures, scanning and skimming, recognizing topic sentence, the main idea, the implied main idea and the supporting details, understanding logical transitions.

For Your Information 2, a supplementary reading material for the control group, was used to develop and supplement students' essential reading abilities in the main reading. It aimed to assist students learning English as a second or foreign language at the college level to become competent and proficient readers. Apart from many similar reading activities and practices given in the main text, other features not found in the main text such as games and crosswords, were provided to help improve students' overall reading abilities.

BBCworldservice.com was selected as supplementary reading materials for the experimental group because it provided the students with continuous and free accessibility, and autonomy to their language learning. Additionally, it integrated a rich communication and easier information transfer in the form of multimedia into *Learning English* page, which included three sections for reading practices: *News English*, *Business English*, and *Watch and Listen*. This page offered students a variety of English reading activities such as multimedia reading drills and vocabulary enhancement, as well as other essential language learning features to help promote their reading ability.

Students Demographic Survey developed by Chumpavan, Lorber, and AL-Bananieh (2005) to investigate individual student data and general attitudes towards students' computer literacy was adapted into this study. Not much change had been made to the contents and questions of that of Chumpavan and others because those were used with a similar purpose.

DATA COLLECTION PROCEDURES

This study was conducted in the second semester of academic year 2006. For this study, the students enrolled in an English reading course (Reading Techniques) were randomly assigned regardless of gender into a control group who experience a traditional text-based instruction supplemented with book-based reading and the experimental group experiencing text-based instruction supplemented with Internet based reading. They were all required to take Chulalongkorn University's test of General English Proficiency (CU-TEP) as the pretest and posttest at the beginning and at the end of the semester to measure their reading proficiency. After that, the *Students Demographic Survey* to investigate the students' necessary data and computer literacy was given one week after the pretest was administered.

DATA ANALYSIS

The data obtained from the experimental and control groups' pre- and post-test measurements on the reading section of CU-TEP were analyzed quantitatively. Two statistical tools were used in this study. An analysis of covariance, ANCOVA, was used to see any significant differences of the pretest and posttest mean scores of the students' reading proficiency and spearmen rho correlation coefficient was used to investigate an existence of relationship. Additionally, the responses to the survey questionnaire investigating the students' personal background, computer knowledge, and their attitudes towards the Internet-based reading environment as well as its learning potentials were analyzed.

RESULTS

To test hypothesis one that in the posttest administration on the reading section of Chulalongkorn University's Test of General English Proficiency (CU-TEP) controlled for prior English performance, the mean scores of the experimental group would be significantly higher

than the mean scores of the control group, the findings derived from ANCOVA, a statistical tool to evaluate the interaction between the covariate and the factor in the prediction of the dependent variable, revealed that this research hypothesis was rejected. There was no significance on group effect, $F(1, 48) = 3.69$, $MSE = 14.97$, $p = .06$. , Additionally, with the control of the pretest scores, there was no significant difference on the adjusted mean scores between the students in the Internet group ($M = 17.51$, $SE = .83$) and those in the non-Internet group ($M = 15.31$, $SE = .70$) on the posttest administration of the CU-TEP (see Appendices).

To test hypothesis two that in the posttest administration on the reading section of Chulalongkorn University's Test of General English Proficiency (CU-TEP) controlled for prior English performance, the mean scores of the students who, on the *Students Demographic Survey*, rated themselves as being high computer knowledge would be significantly higher than the mean score of those who have lower computer knowledge, the findings showed that research hypothesis two was rejected. There was no significant difference on the knowledge of computer of the students, $F(1, 47) = .19$, $MSE = 15.68$, $p = .67$. Furthermore, there was no significant difference, with the control of the pretest scores, on the adjusted mean scores between students having high computer knowledge ($M = 16.41$, $SE = .72$) and students having low computer knowledge ($M = 15.92$, $SE = .89$) on the posttest administration of the CU-TEP measurement (see Appendices).

To test hypothesis three to find out if there is an existence of a positive relationship between the students' final grade in an English reading course (*Reading Techniques*) and their posttest mean scores on the reading section of the CU-TEP, the findings derived from an analysis of a one-tailed Spearman rho correlation revealed this research hypothesis was accepted. There was a positive correlation between the students' final grade in *Reading Techniques* and their posttest scores on the reading section of the CU-TEP (posttest, $\underline{r}_s(49) = .67$, $p = .00$) (see Appendices).

The answers from a *Students Demographic Survey* regarding their personal data, computer literacy behaviors, and attitudes towards computer potentials in a language learning process indicated that the majority of students in both groups had their own computer at home. Although most of them had computer and Internet use at home, Internet students used it for e-mails, Internet, game, CD, program installing, and word processing respectively while non-Internet students rather used it for Internet, e-mails, word processing, game, program installing and CD. Regarding the amount of Internet use, only half of Internet students had a moderate and extensive use. Conversely, over half of the non-Internet students used it moderately but extensively. The survey also showed that almost all of the students from the two groups said that it was appropriate for them to learn English via the Internet because they thought that the Internet would help them improve English language skills. Moreover, surfing the Internet was enjoyable only for the Internet group students but not for the non-Internet group because of its multimediality. On the contrary, the help of Internet to increase and retain vocabulary was less likely found in both groups. This might result in the internet students' discontinuation of the Internet use after the termination of the course. However, the majority of two groups of students thought that Internet use could help them in their computer skills and English language improvement in general (see Appendices).

DISCUSSION AND CONCLUSION

This paper presented the effects of the Internet as a supplementary resource on students' reading comprehension. It was found from the findings that Internet-based reading as a supplementary resource yielded not so much statistically significant difference from book-based reading as a supplementary resource, although a pilot study conducted in the same year with many more participants yielded fruitful results, based on raw scores, in gains of reading comprehension on Internet over book-based reading.

Although the results of this study were not consistent to many other studies conducted earlier which found positive gains from the use of computer to enhance students' reading abilities, there were some plausible explanations to the findings of this study and its possible pedagogical implications, in particular, reading instruction by means of technological supplements. That is, in this study, the students sometimes experienced many technical problems which were unavoidable such as loss of Internet connection, Internet connection failure, and a slower flow of Internet multimedia features transfer which caused them to have lower amount of input and practices in reading. As a result, they had less linguistic interactions vital to the internalization of language rules in a language learning process. In previous studies, most of the instruments used were computer programs packaged in the CD-ROM, which might have been more stable in operations and convenient for the students to operate and access than the Web site used in this study. This might have lessened the students' motivation to continue their language exposure in this environment.

Additionally, as revealed on the CU-TEP pre-test raw scores of the students' language proficiency, their scores on the test were low. This could result in an inability of the students to extract overall intended meaning from the texts being read which led to low ability in reading, and finally, resulted in unsuccessful comprehension as pointed out by Carrell (1991) that overall second or foreign language proficiency had a significant impact on reading ability. In other words, although students were furnished with lots of multimedia features as supplements to promote reading comprehension, they still could not overcome their limited language capability because of lower language proficiency. As a result, the beneficial gains in reading comprehension they could have taken in this environment were likely less.

More importantly, because of the nature of the class which was autonomous, while working out through the Web site, some students were spending some time paying attention to something else like talking to one another and giving less concentration to **what they were** practicing. Other students paid less attention to the assigned work either by keeping missing classes or coming late. Therefore, this might cause them not to be able to catch up with what had been assigned in each period of class time, and finally, not getting enough language practices, which could have led them to an ineffective language performance, to a reduction on the expected outcome, and an undesired effect on the overall means scores on the reading performance of the whole class. This result yielded statistically insignificant difference on gains between reading in technology enhanced environment and reading in a non-technology enhanced environment.

RECOMMENDATIONS FOR FUTURE RESEARCH

1. This study was limited to second-year university students. It is recommended that additional studies should be conducted with students of even higher levels of study to find out if the Internet use as a supplementary resource would help better enhance their command of English.

2. This study was conducted with non-English major students. It is suggested that additional studies should be carried out with English majors to explore if Internet-based supplement would better help enhance their command of English reading skills than book-based supplement.

3. It is advisable that comparative studies should be conducted with English and non-English majors to investigate if the Internet supplement would help promote a command of English and be beneficial to both types of these students.

4. This study was limited to a few instruments. To find out more on students' views and motivation on the Internet use, additional qualitative studies should be conducted using other measurements, such as in-depth interviews, questionnaires with open-ended questions, and observations.

5. This study was limited to *www.BBCworldservice.com*. Additional studies using other English learning websites such as www.*cnn.com* which provides similar extensive supplementary reading activities and *www.ilcgroup.com/exercise.html* are advisable so that the potential of Internet supplement in helping learners learning a foreign language could be investigated.

REFERENCES

Adunyaritigun, D. 2002. An investigation of factors affecting English language reading success: A case study of an EFL college reader. *Thammasat Review*, 7(1), 244-271.

Carrell, P. 1991. Second language reading: Reading ability or language proficiency? *Applied Linguistics*, 12(2), 159-179.

Chandavimol, M. 1998. Reading Comprehension: An active engagement or a passive experience? *PASAA,* 28, 31-42.

Changpueng, P. 2005. The power of narrow reading. *Journal of English Language and Studies*, 1(2), 88-99.

Chulanlongkorn University Language Institute, 2002. *Chulalongkorn University's Test of General English Proficiency (CU-TEP).* Bangkok: Chulalongkorn Printing House.

Chumpavan, S., Lorber, M., and AL-Bananieh, A. 2005. The effectiveness of e-mail communication in EFL classroom. *Paper presented at California Teachers of English to Speakers of Other Languages 36th Annual State Conference,* March 3-6, 2005.

Ediger, A. and Pavlik, C. 2000. *Reading Connections*. NY: Addison Wesley Inc.

Evelyn, L. M. 2004. *Exploring the use of CALL in a content-based ESL college course*. Unpublished doctoral dissertation, University of Puerto Rico.

Hiranburana, K. and Opanon-amata, P. 2003. The assessment of the reading speed and reading ability of Thai university commerce and accountancy students who are trained by using a computer reading program. *PASAA*, 34, 103-113.

Intarasombat, P. 2002. *The effect of vocabulary development approach on Mathayomsuksa 4 students' English reading comprehension*. Unpublished master's thesis, Khon kaen University, Khon kaen, Thailand.

Jesdapornpun, N. 2001. **A** *study of English reading proficiency of the technical staff at Samart Comtech Company Limited, Thailand*. Unpublished master's thesis, Ramkhamhaeng University, Bangkok, Thailand.

Kern, R. and Warchauer, M. 2000. Theory and practice of network-based language teaching. In M. Warchauer & R. Kern (Eds.), Network-based language teaching: *Concepts And Practice*. New York: Cambridge University Press.

Mingsakoon, P. 2003. *A comparative study of vocabulary learning strategies between Mattayomsuksa six students in science and arts programs at Hunkhapittayakom school,Chainat Province*. Unpublished master's thesis, Mahidol University, Bangkok, Thailand.

Ministry of Education, 2002. *Basic education curriculum BEX 2544*. (A.D. 2001). Bangkok: The Express Transportation Organization of Thailand.

Nakorntam, A. 2000. The education reform on higher education level. *The lecture in Academic Seminars of the Educational Reform Education Fair 2000***,** March, 2000 at Muang Thong Thani, Nontaburi.

Prapphal, K. 2003. English proficiency of Thai learners and directions of English teaching and learning in Thailand. *Journal of English Language and Studies*, 1(1), 6-12.

Reanjaroensuk, P. 1999. *An investigation into the English vocabulary proficiency in a natural science context of first year arts and science oriented university students*. Unpublished master's thesis, Mahidol University, Bangkok, Thailand.

Songsiri, S. 1999. *A case study of English reading skills of grade 12 students*. Unpublished master's thesis, Ramkhamhaeng University, Bangkok, Thailand

Tanghirunwat, C. 2003. *The reading difficulties faced by Thai engineers in telecommunication industry in reading English technical textbooks and manuals*. Unpublished master's thesis, The University of Thai Chamber of Commerce, Bangkok, Thailand.

Tang, H. 2000. Using cooperative concept mapping skill to teach ESL reading. *PASAA*, 30, 77-92.

Thailand's Commission on Higher Education, 2006. *Entrance information*. Retrieved June 10, 2006, from http://entrance.mua.go.th.

Warschauer, M. and Whittaker, P. Fawn. 1997. The Internet for English Teaching: Guidelines for teachers. *The Internet TESL Journal*, 3(10), 25-30.

APPENDICES

Research Hypothesis One

On the posttest of the reading section of Chulalongkorn University's Test of General English Proficiency (CU-TEP) controlled for prior English performance, the mean scores of the experimental group experiencing the Internet-based reading as a supplementary resource will be significantly higher than the mean score of the control group experiencing the book-based reading as a supplementary resource.

Results

Table 1 presents the pretest and posttest mean scores and the standard deviation scores of all the participants in the Internet and non-Internet groups. The total number of the participants was 51 (N = 51); the experimental group counted 21 students (n = 21), while the control group counted 30 students (n = 30).

Table 1

Pretest/Posttest Mean and Standard Deviation Scores of Internet and Non-Internet Participants

	Pretest			Posttest		
Group	M	SD	n	M	SD	n
Internet	15.52	5.34	21	17.71	4.35	21
Non-Internet	14.13	4.66	30	14.97	4.44	30

It should be noted that the participants were randomly assigned into their Internet and non-Internet groups and that at the time of the pretest, they were limited in number and that the groups were unequal in size. For this reason, it was important to determine if the pretest measures of the participants from the two groups were similar. Therefore, to note the

differences, if any, between the pretest mean scores of the two groups, the independent *t* test for groups with unequal variance was conducted at the time of the pretest. The findings did not show any significant difference between the pretest mean score of the participants in the Internet group and the one of the participants in the non-Internet group, at $t(39.2) = .96$, and $p = .34$ (see Table 2).

Table 2

T-Test Comparison of Pretest Scores between Internet (n = 21) and Non –Internet Participants (n = 30)

Group	M	SD	t	p*
Internet	15.52	5.34	.96	.34
Non-Internet	14.13	4.66		

*$p < .05$

Although the *t* test did not uncover any significant difference between the groups, it was vital to test the homogeneity of slopes assumption prior to conducting a one-way analysis of covariance (ANCOVA). According to Green & Salkind (2002), the purpose of conducting ANCOVA was to "evaluate the interaction between the covariate and the factor in the prediction of the dependent variable" (p. 212). In such a test, if the interaction is significant, the results from ANCOVA are not meaningful, and ANCOVA does not need to be conducted. The Internet and non-Internet groups themselves were the independent variables and their achievement on the posttest was the dependent variable, while the pretest was treated as the covariate.

The results of the test of homogeneity of slopes between the Internet and non-Internet groups indicated that the interaction was not significant, with $F(1, 47) = 2.78$, $MSE = 14.43$, and $p = .10$. Table 3 shows the results of the test of homogeneity of slopes.

Table 3

The Results of the Test of Homogeneity of Slopes between Internet and Non-Internet Groups

Source	Sum of Square	df	Mean square	F	p*	Eta Squared
Intercept	493.07	1	493.00	34.16	.00	.42
Group	70.01	1	70.01	4.85	.03	.09
Pretest	223.32	1	223.32	15.47	.00	.25
Interaction	40.17	1	40.18	2.78	.10	.06
Error	678.26	47	14.43			

*$p < .05$

Because of the results pointing to an insignificant interaction of the groups as seen in Table 3, ANCOVA could be applied. Table 4 presents a summary of the analysis of the covariance of the differences between the Internet and non-Internet groups.

Table 4

Summary of Analysis of Covariance Results of Group Differences

Source	Sum of Square	df	Mean square	F	p*	Eta Squared
Intercept	472.05	2	472.06	31.53	.00	.39
Pretest	232.81	1	232.81	15.55	.00	.24
Group	55.20	1	55.20	3.69*	.06	.07
Error	718.44	48	14.97			

*$p < .05$

The result of the search for differences in the posttest measures between the Internet and non-Internet participants was reached through an analysis of the covariance of the posttest scores using the pretest as a covariate. As seen in Table 4, no significant difference was found between these two groups of participants, with $F(1, 48) = 3.69$, $MSE = 14.97$, and $p = .06$. With the control of the pretest scores, no significant difference was found between the adjusted mean scores of the participants in the Internet group ($M = 17.51$, $SE = .83$) and those in the non-Internet group ($M = 15.31$, $SE = .70$) on their posttest CU-TEP measures. The partial η of .07 suggested a weak relationship between the group effect and the participants' posttest scores on the CU-TEP. Thus, it can be concluded that the research result does not support research hypothesis one.

Research Hypothesis Two

On the posttest of the reading section of Chulalongkorn University's Test of General English Proficiency (CU-TEP) controlled for prior English performance, the mean score of the students who on the *Student Demographic Survey* rated themselves as high proficient in computer knowledge will be significantly higher than the mean score of those who rated themselves as low proficient in computer knowledge.

Results

Table 5 presents the mean and standard deviation scores for both the pretest and posttest measures of the participants with more and less computer knowledge, regardless of their group type. One male participant, who said did not have a computer at home, did not complete some parts of the *Student Demographic Survey* and gave no other information regarding his knowledge of computers. Therefore, parts of his data on this matter were considered missing and were excluded.

Table 5

Pretest/Posttest Mean and Standard Deviation Scores of Participants with High and Low Computer Knowledge.

Degree of computer knowledge	Pretest			Posttest		
	M	**SD**	**n**	**M**	**SD**	**n**
High	14.46	4.35	30	16.30	4.30	30
Low	15.10	5.92	20	16.10	4.97	20

It is important to note that the participants were not selected based on their computer knowledge. Therefore, it was necessary to determine if the participants who, on the *Student Demographic Survey,* rated themselves as highly proficient in computer knowledge and those who rated themselves as low proficient were equal on the pretest measures. To confirm differences between the mean scores, on the pretest measures, of the participants with high and low computer knowledge, the independent *t* test for groups with unequal variance was conducted at the time of the pretest. The findings revealed no significant difference on the pretest mean scores between the participants with high computer knowledge and those with low computer knowledge, with $t(32.3) = .41$ and $p = .69$ (see Table 6)

Table 6

T-Test Comparison of Pretest Scores of Participants with High Computer Knowledge (n = 30) and Participants with Low Computer Knowledge (n = 20)

Degree of computer knowledge	M	SD	t	p*
High	14.46	4.35	.41	.69
Low	15.10	5.92		

*$p < .05$

The homogeneity of slopes was tested before conducting a one-way analysis of covariance (ANCOVA) to compare the achievement, with the control of the pretest scores, on the posttest between the participants with high and low computer knowledge. High and low computer knowledge were the two independent variables, the posttest achievement was the dependent variable, while the pretest was treated as the covariate.

The results of the test of homogeneity of slopes did not indicate any significant interaction, with $F(1, 46) = .24$, $MSE = 15.93$, and $p = .62$. Table 7 shows the results of the test of homogeneity of slopes between the participants with high and low computer knowledge.

Table 7

The Results of the Test of Homogeneity of Slopes between Participants with High and Low Computer Knowledge

Source	Sum of Square	df	Mean square	F	p*	Eta Squared
Intercept	430.20	1	430.20	26.99	.00	.37
Com skills	5.71	1	5.71	.36	.55	.00
Pretest	260.68	1	260.68	16.36	.00	.26
Interaction	3.76	1	3.76	.24	.62	.00
Error	732.99	46	15.94			

*$p < .05$

As shown in Table 7, the results of the homogeneity of slopes between the participants with high and low computer knowledge suggested that the interaction was not significant, and that it could be possible to proceed with ANCOVA. Table 8 presents the summary results of the analysis of covariance on the differences of computer knowledge between the two groups.

Table 8

Summary of Analysis of Covariance on Computer Knowledge Differences

Source	Sum of Square	df	Mean square	F	p*	Eta squared
Intercept	426.64	1	426.64	27.22	.00	.37
Pretest	269.35	1	269.35	17.18	.00	.27
Computer skills	2.96	1	2.96	.19	.67	.00
Error	736.75	47	15.68			

*$p < .05$

As seen in Table 8, the results of ANCOVA did not reveal any significant difference in the participants' knowledge of computers, with $F(1, 47) = .19$, $MSE = 15.68$, and $p = .67$. Using the pretest scores as control, no significant difference was found in the adjusted mean scores of the posttest CU-TEP between the participants with high computer knowledge ($M = 16.41$, $SE = .72$) and the participants with low computer knowledge ($M = 15.92$, $SE = .89$). In addition, the η partial of .00 suggested the absence of relationship between the participants' computer knowledge and their posttest scores on the CU-TEP. Thus, research hypothesis two was rejected.

Research Hypothesis Three

There is a positive relationship between the students' final grade in the English reading course *Reading Techniques* (EN 221) and their posttest mean scores on the reading section of the Chulalongkorn University's Test of General English Proficiency (CU-TEP).

Results

A one-tailed Spearman's rho correlation coefficient was used to test the degree of relationship between the final grade the participants in the two groups earned on the English reading course *Reading Techniques* (EN 221) and their posttest scores on the reading section of Chulalongkorn University's Test of General English Proficiency (CU-TEP).

Table 9 presents the coefficients of correlation between the participants' final grades in *Reading Techniques* and their scores on the posttest administration of the reading section of the CU-TEP.

Table 9

Coefficients of Correlation between Participants' Final Grades in the English Reading Course Reading Techniques (EN 221) and their Posttest Scores on the Reading Section of CU-TEP

Student Achievement	**Posttest results**		
	n	r_s	***p****
Final grades in *Reading Techniques*	51	.67	.00

*$p < .05$

The analysis of the one-tailed Spearman's rho correlation revealed, as seen in Table 9, that the participants' final grades on the English reading course *Reading Techniques* were significantly correlated to the scores they earned on the posttest administration of the reading section of the CU-TEP (posttest, $r_s(49) = .67$, $p = .00$). Therefore, research hypothesis three was confirmed.

Table 10 shows the Results from the Survey of Two Group Participants in Percentage.

Demographic Characteristics of Participants	**Internet (*n* = 21) (%)**	**Non-Internet (*n* = 30) (%)**
Years of English learning		
Three years	1 (4.8%)	1 (3.3%)
Four years		1 (3.3%)
Five years		2 (6.7%)
More than five years	20 (95.2%)	26 (86.7%)
Having computer at home	18 (85.7%)	27 (90%)
Having no computer at home	3 (14.3%)	3 (10%)
Computer Use		
For game	16 (76.2%)	22 (73.3%)
For e-mails	17 (81.0%)	25 (83.3%)
For CD-ROMs	14 (66.7%)	20 (66.7%)
For Internet	16 (76.2%)	27 (90%)
For word processing	11 (52.4%)	23 (76.7%)
For program installing	14 (66.7%)	21 (70%)
Internet use		
Rarely	1 (4.8%)	1 (3.3%)
Moderately	10 (47.6%)	18 (60%)
Extensively	10 (47.6%)	10 (33.3%)
Appropriate to learning English via Internet as a supplement	21 (100%)	21 (70%)
Internet use to improve English language	21 (100%)	23 (76.7%)
Reading through Internet has helped me increase my English vocabulary	10 (47.6%)	9 (30%)

Table 10 (Continued)

Demographic Characteristics of Participants	Internet (n = 21) (%)	Non-Internet (n = 30) (%)
Reading through the Internet has helped me increase my English vocabulary	8 (38.1%)	5 (16.7%)
I enjoy surfing the Internet because it offers multimediality.	14 (66.7%)	14 (46.7%)
I will continue using the Internet after the course.	9 (42.9%)	8 (26.7%)
In general, I think that the Internet has helped me improve my English and computer skills.	11 (52.4%)	18 (60%)