

The development and evaluation of a web-based college English outside reading system for EFL freshmen

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The main purpose of this study was to design a web-based English outside reading learning system for college students to study English reading outside the classroom by themselves. In addition to the main purpose, we explored the web-based learning system's effects on students by comparing it with the reading of traditional printed materials. This web-based learning system included nine units whose topics were the life stories of nine contemporary celebrities. This study adopted a pretest-posttest nonequivalent group design. Control group students conducted English outside reading by studying paper materials on their own. Experimental group students studied the same materials in an asynchronous web-based learning system. The results of this research were that the group using the web-based learning system had significantly better English reading comprehension, higher English learning motivation, and greater learner satisfaction. Furthermore, most of the web-based learning students held very positive views of the design, presentation and functions of this web-based learning system.

Introduction

Experts consider reading ability one of the most important components of performance in a second language, especially in academic settings (Huckin, Haynes, & Coady; 1993). As such, good English reading skills have become essential to Taiwanese college students. In Taiwan, every university offers some form of English as a foreign language (EFL) course for their students, with English Reading as the most common EFL course, nearly always a requirement. The traditional instruction method for English

Reading comprises lectures focusing on students' syntax and semantic competence, but often neglecting students' synthesis comprehension (Wu, 2004). In addition, in-class instruction time for an English Reading course usually has a limit of two or three hours per week, and instructors spend most of the time teaching from textbooks. Therefore, it leaves little room in the schedule for extensive topic-related reading. Moreover, in larger English classes, teachers have difficulty addressing variations in students' learning tempos, and necessarily forego promoting self-directed study. Overcoming these drawbacks to broaden students' reading areas and improve their English reading ability constitute monumental challenges for university English teachers in Taiwan.

Assigning English reading homework for students to study outside the classroom seems like an efficient approach to extend students' reading areas. In traditional English outside reading assignments, teachers usually give students paper materials, and ask them to study by themselves. In doing so, both teachers and students avoid the restriction to available class time. However, the available learning materials, that likely offer limited information, and which developers cannot easily adapt to every student's ability, impose other restrictions on this method.

Outside reading is a self-directed learning activity that emphasizes independent study. Web-based learning (**WBL**) offers learners an independent learning environment, tailored learning material fitting individual needs, and is suitable for outside reading supplemental learning, in particular. Consequently, we decided to adopt the promising features of **WBL** to set up the Web-Based English Outside Reading System (**WBEOR**) to offer students a more adaptive English learning environment.

Web-based Learning (**WBL**) has distinct features such as hyperlinks, interactive group discussions, and a multimedia approach that constructs an open and attractive learning system. The benefits of attending **WBL** consist of its flexible accessibility, individual pace, assistive resources and absence of social labels. Learners can log into **WBL** class on a flexible schedule from anywhere and at any time. Learners can revisit course materials whenever they need, and pace the learning progress at their own convenience. Moreover, an abundance of study aid resources exist online, and this usually results in a higher learner motivation. Last but not least, lower-achieving learners will not feel labeled as less capable during their online learning process (Chen & Hirumi, 2004). All in all, **WBL** consists of a flexible learning environment with abundant information and multi-interactive mechanisms for learners to accomplish self-directed learning.

Web-based instruction's inviting features have made it a well-known option for application in English instruction. Much research has been conducted to study the applications of web-based **EFL** learning systems in primary schools, middle schools and universities. In university-based studies, most web-based **EFL** learning systems focused on writing courses (Chang et al., 2008; Chen, 2004; Daemmrlich, 2007; Napolitano & Stent, 2009; Sue, 2006). Some found use in the teaching of English conversation and discussion (AbuSeileek, 2007; Chang, 2006; Chiu et al., 2007; Hsu, 2002; Liu, 2009). Some research analyzed how its presence affected the English learning achievement (Yang, 2006) and how the web-based learning environment affected learners' motivation and learning achievement (Chuang, 2002; Tanyeli, 2008).

Research regarding applications of **CALL** for **EFL** student English reading focused on two aspects: the use of glossing format and the acquisition of vocabulary (Liu, Moore, Graham, & Lee, 2002). By far the largest number of studies comprised the learning of vocabulary (Hubbard, 2009). However, some research explored the **WBL** system's effectiveness in **EFL**

reading instruction, and found that would improve college students' reading comprehension and increase their motivation and confidence (Bartini, 2008; Tanyeli, 2008; Wang, 2005). On the other hand, some research found on-line **EFL** learning systems did not benefit students' English reading comprehension (Liu, 2007; Yang et al., 2008).

Review of existing studies comparing the academic performance of web-based learners to that of traditional learners reveals that no significant difference exists between the two (Liu, 2007; Kelly & Schorger, 2002; Navarro & Shoemaker, 2000; Thirunarayanan, 2001). However, some research indicated web-based English learning could promote learner achievement and satisfaction (Bartini, 2008; Tanyeli, 2008). As Liu (2007) pointed out, a majority of **WBL** on **EFL** reading system studies consisted of descriptive survey studies; however, experimental studies appear necessary. Therefore, the current study develops the **WBEOR** learning system to promote extensive reading among students, and also investigates its effectiveness on student reading performance, motivation and satisfaction in comparison to a traditional outside reading method.

Reading comprehension comprises a complex and active process of meaning construct-ing resulting from the reader's interacting with the text (Anderson & Pearson, 1984). This study adopted the interactive reading model to guide the **WBEOR** learning system's design. Heilman, Blair, and Rupley (1990) proposed the interactive model of reading, that readers employ bottom-up and top-down reading processes interactively and simultaneously during the entire reading process. The central notion of the bottom-up model regards reading as "a process of exact identification of letters, words, and ultimately sentences" (Lynch & Hudson, 1991). The top-down model describes reading as "a psycholinguistic guessing game." The reader's schemata – knowledge, experience, and concepts – construct meaning when brought to the text (Goodman, 1976: 498).

The interactive model of reading provided some implications for design of the **WBEOR** learning system. First, reading material should have closeness to students' background knowledge about the content and language. Second, the system should offer some mechanisms to activate students' prior knowledge. Third, in order to achieve reading comprehension, the system must offer some materials, practices or activities to help students connect their old knowledge with newly learned information.

Additionally, Hsu (2005) figured out the seven key components required to construct an **EFL** web-based reading system: (1) inquiring users' needs; (2) selecting appropriate materials, providing translations, designing interactive text, and supplying related hypertext links; (3) activating motivation by providing multimedia and predicting questions about texts; (4) providing learning guidance and the assistance of technology; (5) eliciting interactions by offering multiple communication channels with peers and instructors; (6) assessing performance by providing alternative tests and giving feedback in time; (7) enhancing retention and transfer by supplying related resources.

"What do we mean **CALL** improves his or her language?" Beatty (2003) suggested evaluation of learning efficiency, learning effectiveness, access, convenience, motivation and institutional efficiency of a given **CALL** system. We adopted Hubbard's criteria to evaluate the **WBEOR** learning system.

The present study

This study tried to integrate the advantages of **WBL** in developing a Web-based English Outside Reading Learning System (**WBEOR**), and set up an on campus e-learning platform

for English Reading course students, enabling them to log in and fulfill their English outside reading, using online information. In addition, we wanted to explore the effect of the **WBEOR** learning system on users' English reading comprehension, motivation, and satisfaction, by comparing students using the **WBEOR** with those who only employed traditional paper materials in the outside reading method.

Four research questions represent the foci of this study:

1. Do students who adopt the **WBEOR** learning system perform better on English reading comprehension examinations than those who adopt the traditional paper material learning method?
2. Do the two learning methods affect students' English learning motivation differently?
3. Do the two learning methods affect students' English learning satisfaction differently?
4. How satisfied are students who adopt the **WBEOR** learning system with this system?

Methodology

Participants and procedure

This study had the purpose of constructing a web-based English outside reading learning system (**WBEOR**) for university students, enabling them to access the system and learn by themselves. We hoped to shed some light on the instructional potential of this **WBEOR** learning system, as well as identify how the **WBEOR** learning system affects students' learning motivation and satisfaction. Four classes, comprising about 166 university students, who took English Reading courses participated in this study. Two classes were assigned to the experimental group (n = 87), and two were assigned to the control group (n = 79). Table 1 shows the number and details of the participants.

Table 1: The number and details of participants in the two groups

	Department	Male	Female	Total
Experimental group	Medical informatics	31	16	47
	Public Health	19	21	40
	Total	50	37	87
Control group	Nursing	15	29	41
	Social Work	12	26	38
	Total	37	55	79

This study adopted the pretest-posttest nonequivalent group design. Researchers conducted the study in Freshmen English Reading courses at a university in Taiwan. Both groups had the same learning materials, schedule and tests, with nine units assigned for study. The control group adopted the traditional outside reading method, wherein the teachers handed out paper reading materials to the students, and asked them to finish reading the assignments after class. If students had questions, they could make appointments to come and privately discuss them with their teachers. Researchers required experimental group students to access the **WBEOR** learning system for their study, and to hand in their assignments online. If they had questions, they could ask and discuss them with teachers or other classmates by e-mail or in a chat room. Both groups of students underwent unit tests and midterm exams in their classrooms.

To assess possible homogeneity of students from the two groups, researchers used a t-test to check results of the students' University Entrance English Exam and English learning motivation scale, which they had given both groups at the beginning of the study. The results are displayed in Table 2 and Table 3.

Table 2: t-test results on the scores of the University Entrance English Exam between the two groups (N=166)

	Experimental group			Control group			t	df	p
	n	M	SD	n	M	SD			
UEEE scores	87	39.70	15.12	79	42.86	12.51	-1.46	164	.326

Table 3: t-test results on English learning motivation between the two groups (N=166)

	Experimental group			Control group			t	df	p
	n	M	SD	n	M	SD			
Liking	87	19.09	4.18	79	18.96	3.52	.215	164	.830
Commitment	87	23.87	5.93	79	22.67	3.61	1.560	164	.121
Competency	87	21.25	4.16	79	21.57	3.48	-.529	164	.597
Intensity	87	31.11	6.19	79	30.08	4.17	1.207	164	.229
Intrinsic	87	14.51	4.08	79	14.97	3.46	-.794	164	.428
Extrinsic	87	47.02	7.25	79	45.53	6.29	1.409	164	.161
Requirement	87	12.24	4.32	79	12.57	3.84	-.515	164	.607
Total score	87	169.10	19.96	79	166.35	18.13	.925	164	.356

Based on the analysis shown in Table 2 and Table 3, we found no statistically significant difference between the two groups on reading comprehension competence and learning motivation, thus indicating that homogeneity of the two groups existed at the beginning of this study.

Material: The WBEOR learning system

Here, we present the **WBEOR** learning system whose address is: <http://learn.tcu.edu.tw/1000110062/index.html>

Researchers adopted two web-authoring tools, Dreamweaver and FrontPage, to create the learning system. The principles for a good web page design demanded simplicity, clarity, and easy-access.

Figure 1 illustrates the learning system environment that contained four hyperlinks connected to: 1) the course introduction, 2) an online dictionary, 3) a list of the nine individual unit themes, and 4) the teacher's e-mail. The web page for each unit included a picture of the famous person the student had to study, reading text, a vocabulary list, features of the celebrity, some related links, and homework questions.

In each unit, the text consisted of an article that introduced the life story of a celebrity. Each paragraph had an appended recitation voice file; through this feature, students could listen and practice verbal English, and by clicking on underlined words, they could connect to the vocabulary list to catch their meanings and usage. Each unit offered the celebrity's picture album and some video excerpts to tempt students to do further exploration (see

Figure 2). We also offered some related links connected to other web pages. The system contained access to a public discussion area and an announcement board, making multiple communication avenues available for students and teachers. We used the course management system to process students' registration, access logs, assignment delivery, and feedback.



Figure 1. The WBEOR learning system homepage

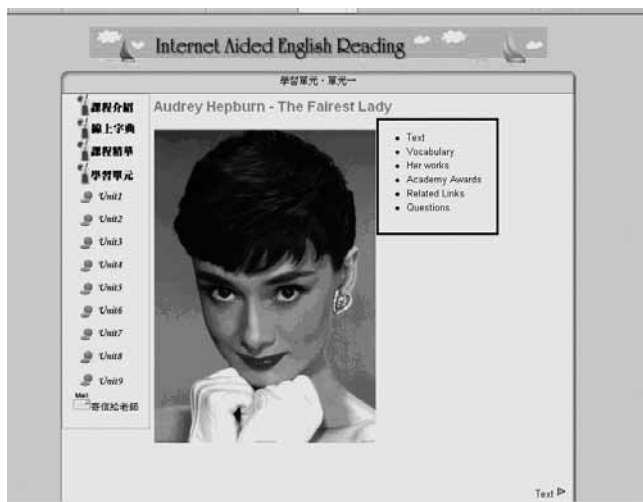


Figure 2. The homepage for Unit One

8 We chose one of nine famous contemporary persons as the theme of each unit (see Table 4 and Figure 3).

Table 4: The content and features of each unit

Unit	Content	Featured person	Unit feature
1	Audrey Hepburn – The Fairest Lady	A famous movie star, beautiful and wise, in 2003 was chosen the second most beautiful woman in the world.	Albums and excerpts of her most successful movies: <i>Roman Holiday</i> , <i>My Fair Lady</i> and <i>Breakfast at Tiffany's</i> .
2	Abraham Lincoln – The Gettysburg Address	The great American president and his famous speech: “The Gettysburg Address”	Lincoln’s manuscript and his speech of “The Gettysburg Address,” the Lincoln Memorial, and his house in Illinois.
3	Walt Disney – The Man Behind the Magic	Walt Disney pursued perfection and strictly monitored the composition of his cartoons and movies that created many successful animated films.	Excerpts of movies <i>Snow White and the Seven Dwarfs</i> , <i>Lady General Hua Mulan</i> , <i>Toy Story</i> , etc.
4	Coco Chanel – Woman of Fire and Ice	A fashion designer who was shrewd, chic, and on the cutting edge. The clothes she created changed the way women looked and how they looked at themselves.	Famous Chanel products, including Chanel No. 5, “the world’s most legendary fragrance.”
5	Henry Ford – Wheels for the World	Henry Ford was the founder of Ford Motor Company and father of modern assembly lines used in mass production. His introduction of the Model T automobile revolutionized transportation and American industry.	Introduces Ford’s famous cars of the last one hundred years, and some of its stylish ads.
6	Mother Teresa – A Saint in Life	A nun who dedicated all her life to by providing some dignity in death for the diseased and desperate. Her beatification beginning 15 months after her death is believed to be the fastest in the modern history of the Roman Catholic church.	Some movie excerpts of <i>Mother Teresa</i> and the places where she dedicated herself in service to others.
7	J. K. Rowling – The Wizard of Harry Potter	Author of the best-selling <i>Harry Potter</i> series.	Some movie excerpts of <i>Harry Potter</i> books and scenes from the movies.
8	Yo Yo Ma – The Diverse Musician	The most creative and internationally successful Chinese cellist.	Yo Yo Ma’s music albums and the background music for the movie <i>Crouching Tiger Hidden Dragon</i>
9	Charles Schulz – The Man Who Made us Laugh, Snoopy’s Writer	A cartoonist with a sharp sense of humor and a keen understanding of alienation, who drew more than 18,250 <i>Peanuts</i> comic strips.	The Memorial of Charles Schulz, the Snoopy Restaurant in Singapore, and a selection of Snoopy comic strips.

Unit Two Lesson Two Abraham Lincoln—The Gettysburg Address



- Text 1
- Text 2
- Chinese Translation
- Message
- Vocabulary
- The Lincoln Memorial
- His Life

As the 16th president of the United States, Abraham Lincoln helped keep the Union together during the American Civil War and abolished slavery in the United States. Remembered for his honesty, compassion, and strength of character, Lincoln remains one of the most respected presidents in American history.

Unit 1 | Unit 2 | Unit 3 | Unit 4 | Unit 5 | Unit 6 | Unit 7 | Unit 8 | Unit 9

Unit 2 | 管理台老師

Unit Three Walt Disney



- Text
- Vocabulary
- His works
- The chronology of Walt Disney
- Related Links

Unit 1 | Unit 2 | Unit 3 | Unit 4 | Unit 5 | Unit 6 | Unit 7 | Unit 8 | Unit 9

Unit 3 | 管理台老師

Unit Four The Designer Coco Chanel



- Text
- Vocabulary
- Her Products
- Related Links

Unit 1 | Unit 2 | Unit 3 | Unit 4 | Unit 5 | Unit 6 | Unit 7 | Unit 8 | Unit 9

Unit 4 | 管理台老師

Unit Five Henry Ford—Wheels for the World



- Text
- Vocabulary
- His Diesel Cars
- About his Advertisement(廣告)
- Related Links

Unit 1 | Unit 2 | Unit 3 | Unit 4 | Unit 5 | Unit 6 | Unit 7 | Unit 8 | Unit 9

Unit 5 | 管理台老師

Unit Six Mother Teresa—A saint in life



- Text
- Vocabulary
- Her Life Stories
- Related Links

Unit 1 | Unit 2 | Unit 3 | Unit 4 | Unit 5 | Unit 6 | Unit 7 | Unit 8 | Unit 9

Unit 6 | 管理台老師

Unit Seven Joanne K. Rowling



- Text
- Vocabulary
- Something about Harry Potter
- Related Links

Unit 1 | Unit 2 | Unit 3 | Unit 4 | Unit 5 | Unit 6 | Unit 7 | Unit 8 | Unit 9

Unit 7 | 管理台老師

Unit Eight Yo Yo Ma - The diverse musician



- Text
- Vocabulary
- Something about Yo Yo Ma and Music
- Listening
- Related Links

Unit 1 | Unit 2 | Unit 3 | Unit 4 | Unit 5 | Unit 6 | Unit 7 | Unit 8 | Unit 9

Unit 8 | 管理台老師

Unit Nine Charles Schulz-The man who made us laugh Snoopy's writer



- Text
- Vocabulary
- Something about Snoopy's strips
- Related Links

Unit 1 | Unit 2 | Unit 3 | Unit 4 | Unit 5 | Unit 6 | Unit 7 | Unit 8 | Unit 9

Unit 9 | 管理台老師

Figure 3. The homepages of Unit 2 to Unit 9

Measures

1. Reading Achievement Tests: Reading achievement tests have the purpose of assessing whether online and off-line learning methods induced different performance levels of reading comprehension for each unit. To accomplish this, reading achievement tests included nine separate unit reading comprehension quizzes, along with two mid-term examinations and one final examination. We developed nine unit quizzes based on unit content, with each having five to seven open-ended questions, to determine students' understanding of the unit. After completing a block of three units of study, teachers gave students a mid-term examination or final examination which assessed students' overall reading comprehension, with item formats, including assessments of vocabulary, cloze, translation, short-answer questions, etc. In order to retain good inter-scorer reliability, two teachers independently rated all tests and quizzes.

2. English Learning Motivation Scale: The researchers revised the English Learning Motivation Scale from Wu's scale (2004). Seven factors comprised it, including liking, commitment, competency, motivational intensity, intrinsic motivation, extrinsic motivation, and requirement motivation (see Appendix A). This 5-point Likert-type scale has forty-nine items, in which a higher score meant greater student motivation. It had a Cronbach's α reliability coefficient of 0.92. We gave both groups this assessment at the beginning of the semester, and again at the end of the semester.

3. English Learning Satisfaction Scale: The researchers composed this scale to evaluate students' satisfaction with outside reading material, learning activities, and their academic achievement (see Appendix B). It includes seventeen 4-point Likert-type items; again, a higher score meant higher student satisfaction. Teachers gave both groups this assessment at the end of the semester.

4. Web-based Learning Satisfaction Scale: This scale underwent revision from Hsu and Liao's scale (2002). It involved three factors, including outside reading material design and presence, system functions, and an overall view of web-based learning – a 4-point Likert-type scale with thirteen items and three open-ended questions (see Appendix C). Only the experimental group received this scale at the end of the semester.

Results

The WBEOR learning system's potential for promoting English reading achievement

Researchers collected results of the reading comprehension quizzes for all nine units, two midterm examinations, and one final examination. Using the pre-test, University Entrance English Exam scores, as the covariate, they employed One Way **ANCOVA** to compare the 12 test means of both the experimental group and the control group. The results are summarized in Table 5.

Table 5: ANCOVA results for comparing reading comprehension achievements between the experimental group and the control group

Unit Quizzes, Midterms & Final	Experimental group			Control group			F	p
	n	Adj. M	SD	n	Adj. M	SD		
Audrey Hepburn	85	87.78	3.32	79	83.70	3.12	64.323	.000***
Abraham Lincoln	83	86.24	1.58	69	84.41	1.77	45.308	.000***
Walt Disney	83	87.70	1.87	73	84.34	2.21	108.743	.000***
Coco Channel	84	87.68	2.15	70	83.41	3.41	90.884	.000***
Henry Ford	86	89.20	1.97	77	84.65	2.72	152.300	.000***
Mother Teresa	86	88.51	2.87	74	83.08	2.90	140.196	.000***
J. K. Rowling	83	87.79	3.35	79	83.97	2.48	66.127	.000***
Yoyo Ma	83	88.83	3.02	77	87.35	2.05	12.765	.000***
Charles Schulz	83	88.81	3.02	79	84.59	3.36	69.658	.000***
1st Mid-term Exam	81	71.11	9.87	79	64.23	14.81	11.901	.001**
2nd Mid-term Exam	80	93.44	6.46	82	80.56	12.64	75.277	.000***
Final Exam	78	72.94	6.73	81	60.60	11.56	67.902	.000***

** p<.01, *** p<.001

Clearly, the ANCOVA results shown in Table 5 reveal the experimental group achieved significantly higher scores than the control group on the nine unit reading comprehension quizzes, two midterms and one final examination. We can therefore conclude that students who adopted web-based learning methods had better reading comprehension than students who only read paper materials. The results provided positive evidence to support our conviction the WBEOR learning system had a positive effect on students' English reading comprehension.

Motivation of the learning tasks

Using students' pre-test scores of the English Learning Motivation Scale, as the covariate, researchers employed One Way ANCOVA to compare the seven factors and the total scores of both groups. The result was summarized in Table 6.

Table 6 shows that the experimental group performed significantly better than the control group on each factor except intrinsic motivation and requirement. The results suggest that a web-based learning method can better promote students' liking of English reading, and that they willingly commit more time to study, thus reinforcing their extrinsic motivation and motivational intensity, and increasing their English reading competence. Consequently, we can infer that using the web-based learning method to accomplish outside reading study can promote students' English learning motivation more than paper materials reading methods.

Table 6: ANCOVA result for comparing learning motivation between the experimental group and the control group (n=146)

	Experimental group			Control group			F	p
	n	Adj. M	SD	n	Adj. M	SD		
Liking	75	19.87	4.25	71	17.67	3.45	13.89	.000***
Commitment	75	23.85	4.20	71	21.14	3.65	19.050	.000***
Competency	75	22.87	4.43	71	19.33	3.80	35.82	.000***
Intensity	75	29.28	4.33	71	27.08	4.52	9.807	.002**
Intrinsic	75	14.80	3.80	71	13.88	3.50	2.965	.087
Extrinsic	75	47.40	6.87	71	43.61	7.25	12.118	.001**
Requirement	75	13.18	4.27	71	14.23	4.34	2.582	.110
Total score	75	171.08	19.31	71	157.12	19.32	22.456	.000***

** p<.01, *** p<.001

Learning satisfaction

Researchers utilized two scales to interpret students' learning satisfaction. They first used the "English Learning Satisfaction Scale" to investigate both groups of students' opinions on outside reading materials, learning activities, and academic achievement. They used the other, the "Web-based Learning Satisfaction Scale," to investigate the experimental group's opinions on learning material design and presence on the web pages, functions of the web system, and overall view of the **WBEOR** learning system.

English Learning Satisfaction. Table 7 shows that the experimental group had significantly higher satisfaction with reading materials, learning activities, and academic achievement. Compared to reading paper materials, we can conclude students feel more satisfied with the web-based learning environment.

Table 7: t-test result on English learning satisfaction between the two groups (n=142)

	Experimental group			Control group			t	df	p
	n	M	SD	n	M	SD			
Material content	77	18.42	2.26	65	13.98	3.11	9.559	140	.000***
Learning activities	77	12.47	1.48	65	9.06	1.92	11.919	140	.000***
Academic achievement	77	20.22	3.10	65	14.75	3.21	10.296	140	.000***
Total score	77	51.10	5.81	65	37.80	6.56	12.811	140	.000***

***p<.001

Web-based Learning Satisfaction. The scale required that the experimental group compare their experiences with the web-based learning method they presently used to those from the paper materials reading method used before.

On material design and presence, more than 94% of the students believed web-based

learning offered users more abundant, richer, and more varied content, and more suitability for individual learning. They especially noted that pictures, audio and video materials encouraged learning and memorization, and also made the courses more active and interesting (See Table 8 for details).

Table 8: Comparisons between web-based learning and traditional paper reading in regards to reading material design and presence

Material design and presence	Agree	Disagree
1. Compared to reading traditional paper materials, web-based learning can offer more abundant content.	96.1%	3.9%
2. Compared to reading traditional paper materials, web-based learning can offer richer and more varied content.	98.7%	1.3%
3. Compared to reading traditional paper materials, web-based learning offers pictures, audio and video materials that make me more impressed with the material.	94.8%	5.2%
4. Compared to reading traditional paper materials, web-based learning is more active and interesting.	96.1%	3.9%
5. Compared to reading traditional paper materials, web-based learning makes learning more individualized.	94.8%	5.2%

According to Table 9, more than 93% of the experimental group agreed that the system platform and web page had clear and easily usable interfaces, and related links had broadened their knowledge. More than 84% of the experimental group agreed the on-line dictionary and recitation made their study more convenient.

Table 9: The satisfaction with the functions of the web-based learning system

System functions	Agree	Disagree
6. The interface of system platform and web page are clear and easy use.	93.5%	6.5%
7. The on-line dictionary makes my reading more convenient.	94.8%	5.2%
8. The online recitation makes my reading more convenient and interesting	84.4%	15.6%
9. The related links extend my reading outside the course materials, and broaden my knowledge.	96.1%	3.9%

According to Table 10, 81.8% of the experimental group believed they needed more time to do web-based learning than reading paper materials, but more than three-fourths thought web-based learning enabled them to have better understanding of the reading materials and learn more. Over all, 83% of the students enjoyed web-based learning more than reading paper materials.

Table 10: Overall view of the WBEOR learning system

Overall view of the WBEOR learning system	Agree	Disagree
10. Compared to reading traditional paper materials, web-based learning requires more study time	81.8%	18.2%
11. Compared to reading traditional paper materials, web-based learning makes me interpret the text content more profoundly.	77.9%	22.1%
12. Compared to reading traditional paper materials, I think I learned much more through web-based learning.	87.0%	13.0%
13. Compared to reading traditional paper materials, I had greater joy using web-based learning for studying my English outside reading.	83.1%	16.9%

To conclude, the experimental group's members felt highly positive toward the **WBEOR** learning system's design, functions and demonstration. They appreciated the **WBEOR** learning system.

Discussion and conclusions

The researchers geared this study toward designing and developing a web-based learning system, the **WBEOR** learning system, which enabled students to do their English outside reading studies online. Meanwhile, we maintained our overall hypothesis, that the **WBEOR** learning system would promote those users' reading performance, motivation and satisfaction.

Web-based learning satisfaction

Jordanov (2001) found that learners preferred various learning styles on the Internet to learning in general situations, which made students move toward more active learning, when using the Internet. The same result emerges from the investigation of the "Web-based Learning Satisfaction Scale" in this study. In Table 7, we find over 80% of the students in the web-based learning group felt satisfied with material presence, functions, and interfaces offered by the **WBEOR** learning system. The experimental group reflected that, when compared to reading traditional paper materials, greater benefits of the **WBEOR** learning system consisted of extensive reading much easier to accomplish, allowing them to willingly surf and read more information, with its colorful pictures and audio-video information, which had attracted them to study actively, and given them a profound impression of the celebrities they studied. Here, we find not only the web-based learning group has high satisfaction with the **WBEOR** learning system, but also satisfaction with the **WBEOR** learning system has caused most users to more willingly and actively interact with the learning system.

Motivation of learning

In addition, according to Table 6, the **WBEOR** learning system promoted learner motivation, enjoyment, commitment and competency to a greater degree. In fact, the topics of reading materials consist of the biographies of contemporary celebrities with whom students already had some familiarity. Therefore, they enjoyed reading these life stories, and eagerly exploring their footprints and philosophies of life. The **WBEOR** learning system, which offers ample and desirable information about learning topics, combined with a colorful

presentation of reading materials and various links to extended reading areas, has also attracted most students to enjoy interacting with it, and believe that will broaden their reading and knowledge acquisition. The liking, enjoyment and competency stemming from the **WBEOR** learning system have promoted web-based learning students' motivation and induced them to stay with the system longer, as well as engaging in reading the materials more profoundly.

English reading achievement

Based on Table 5, the researchers noted that the **WBEOR** learning system had significantly promoted users' reading comprehension achievement. Chen and Hirumi, (2004) indicated that students' motivation and engagement in the web-based learning environment contributed to improvement in reading comprehension. Jordanov (2001) also pointed out the active learning had a positive impact on students' attitudes toward, and performance on, web-based learning tasks. The inviting characteristics of the **WBEOR** learning system, attracting students to spend more time to engage with the reading materials actively, have heightened students' learning interest, motivation, and promoted student reading performance. As an associated benefit, users of the **WBEOR** learning system had to write and hand in their assignments online, reducing the occurrence of plagiarism. These results clearly further supported previous research findings in this area, as described previously.

To sum up, compared with learning by reading traditional paper materials, students felt more satisfied using the **WBEOR** learning system to study. They thought they learned more and gained more benefits from it. Therefore, they gave the **WBEOR** learning system a high approval rating. Furthermore, compared with other web-based courses on the campus e-learning platform, students thought the **WBEOR** learning system offered more abundant content and more attractive demonstrations. They expressed eager anticipation at the idea of having similar English reading courses in the future.

Limitations

Based on the successful manner in which this system has been utilized within the university, we have planned further developments to expand the range and nature of support the system affords its users. However, some disappointments have also emerged in the new **WBEOR** learning system. Researchers found frequencies of teacher-student and student-peer communications fell far short of expectations. Moreover, due to web-based learning occurring outside the classroom, these interactions have some importance (Prose, Narciss, & Korndle, 2007). Even though the system offered several ways to communicate, in the future, instructors may need to set up some kinds of interaction mechanisms to impel users to participate, and respond in public discussions, so as to increase the frequency of interactions.

Additionally, the computer tracking mechanism, another shortcoming in the **WBEOR** learning system, can only monitor student's online learning behaviors, without creating student profiles, which record individual student learning modeling and performance. In the future, we should enhance this part, it will not only allow students to monitor their own online reading behaviors and stimulate their self-directed learning, but also help instructors understand students' learning status, and adjust their instruction accordingly.

16 Some lower English reading achievers responded that all the hyperlinks connected to English-language web pages, and this had made their reading load heavy, thus reducing

their motivation to surf. In order to keep lower achievers, we plan to append some simple Chinese remarks next to English icons, and offer some related Chinese-language web pages to incite user interest.

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Appendix A

English learning motivation scale

For each of the following questions, please *circle* the number that corresponds with your opinion.

1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree.

Liking

- | | | | | | |
|---|---|---|---|---|---|
| 1. English is my favorite subject. | 1 | 2 | 3 | 4 | 5 |
| 2. I feel glad to attend English classes. | 1 | 2 | 3 | 4 | 5 |
| 3. When I attend English classes, the time seems to fly by quickly. | 1 | 2 | 3 | 4 | 5 |
| 4. I am satisfied with my performance in English classes. | 1 | 2 | 3 | 4 | 5 |
| 5. I like to discuss the English troubles I have with my classmates. | 1 | 2 | 3 | 4 | 5 |
| 6. I feel fulfilled when I finish my English assignment successfully. | 1 | 2 | 3 | 4 | 5 |

Commitment

- | | | | | | |
|--|---|---|---|---|---|
| 7. I believe it's worthwhile to arrange more time to study English. | 1 | 2 | 3 | 4 | 5 |
| 8. I hope I can learn more English. | 1 | 2 | 3 | 4 | 5 |
| 9. I use more effort in English classes than in any other subject. | 1 | 2 | 3 | 4 | 5 |
| 10. The time I spend absorbed in English classes is more than in other subjects. | 1 | 2 | 3 | 4 | 5 |
| 11. I always study hard in English whether my English grades are high or low. | 1 | 2 | 3 | 4 | 5 |
| 12. I take finishing my English assignments quite seriously. | 1 | 2 | 3 | 4 | 5 |

Competency

- | | | | | | |
|--|---|---|---|---|---|
| 13. I can participate in the discussions in English classes. | 1 | 2 | 3 | 4 | 5 |
| 14. When encountering a problem in learning English, I will try my best to solve it. | 1 | 2 | 3 | 4 | 5 |
| 15. I can understand all the content taught in English classes. | 1 | 2 | 3 | 4 | 5 |
| 16. I believe I am capable of helping others in English classes. | 1 | 2 | 3 | 4 | 5 |
| 17. In discussing English materials with my classmates, I can offer valuable ideas. | 1 | 2 | 3 | 4 | 5 |
| 18. I can learn from discussions with teachers and peers in English classes. | 1 | 2 | 3 | 4 | 5 |
| 19. I can fully present what I have learned in English classes. | 1 | 2 | 3 | 4 | 5 |

Intensity of motivation

- | | | | | | |
|---|---|---|---|---|---|
| 20. If an English class isn't offered by my school, I still do my best to take it elsewhere. | 1 | 2 | 3 | 4 | 5 |
| 21. I am lazy about doing my English homework. | 1 | 2 | 3 | 4 | 5 |
| 22. Honestly, in English, I spend just enough time studying to get by. | 1 | 2 | 3 | 4 | 5 |
| 23. Beyond the English material I'm assigned to learn, I don't spend time working on extracurricular items. | 1 | 2 | 3 | 4 | 5 |
| 24. After tests or homework are returned to me, I try my best to correct every error. | 1 | 2 | 3 | 4 | 5 |
| 25. I do my best to seek out any chance to practice English. | 1 | 2 | 3 | 4 | 5 |
| 26. I spend extra-time improving my English ability. | 1 | 2 | 3 | 4 | 5 |
| 27. Besides attending English classes, I use various methods to learn English, such as listening to English broadcasts, watching English TV programs or movies, and reading English magazines and newspapers. | 1 | 2 | 3 | 4 | 5 |

Intrinsic motivation

- 28. I like learning English very much. 1 2 3 4 5
- 29. Learning English is one of my hobbies. 1 2 3 4 5
- 30. Learning English is my favorite challenge. 1 2 3 4 5
- 31. I don't like English, but I know learning English is important. 1 2 3 4 5
- 32. Learning English brings me lots of pleasure. 1 2 3 4 5

Extrinsic motivation

- 33. Learning English can expand my vision. 1 2 3 4 5
- 34. In order to earn my parents' approval, I do my best to study English. 1 2 3 4 5
- 35. I think it's essential that everyone in Taiwan should speak some English. 1 2 3 4 5
- 36. I think speaking good English can promote my social status. 1 2 3 4 5
- 37. The reason I study English is that it's helpful when traveling abroad. 1 2 3 4 5
- 38. The reason I study English is to make friends with foreigners. 1 2 3 4 5
- 39. The reason I study English is to promote my professional ability. 1 2 3 4 5
- 40. The reason I try to study English well is that it's helpful in finding a good job. 1 2 3 4 5
- 41. I try to learn English well in order to understand Western culture. 1 2 3 4 5
- 42. I try to learn English well in order to study English textbooks. 1 2 3 4 5
- 43. I try to learn English well in order to get some economic benefit. 1 2 3 4 5
- 44. I try to learn English well in order to use the computer and surf on the Internet. 1 2 3 4 5

Requirement

- 45. If my teacher doesn't assign homework or give tests, I won't study English at all. 1 2 3 4 5
- 46. In order to avoid failing English courses, I spend time studying English. 1 2 3 4 5
- 47. The reason I take English courses is because they are compulsory. 1 2 3 4 5
- 48. If my teacher didn't demand it, I wouldn't study English at all. 1 2 3 4 5
- 49. I study English hard because my teacher gives exams. 1 2 3 4 5

Appendix B

English learning satisfaction scale

For each of the following questions, please *circle* the number that corresponds with your opinion.

1 = strongly disagree; 2 = disagree; 3 = agree; 4 = strongly agree.

The contents of English reading material

- 1. I think the contents of the English reading material are abundant. 1 2 3 4
- 2. I've been enlightened by the contents of the English reading material. 1 2 3 4
- 3. The amount of the English reading material is appropriate. 1 2 3 4
- 4. The difficulty of the English reading material is appropriate. 1 2 3 4
- 5. The presentation modes of the English reading material are good. 1 2 3 4

Learning activities

- 6. The topics of the English reading materials are so attractive that I'll do further study. 1 2 3 4

- | | | | | |
|---|---|---|---|---|
| 7. Doing the assignment of each unit enhances my reading comprehension. | 1 | 2 | 3 | 4 |
| 8. The vocabulary lists help me better comprehend the reading material. | 1 | 2 | 3 | 4 |
| 9. The difficulty of most assignments is appropriate. | 1 | 2 | 3 | 4 |

Academic achievement

- | | | | | |
|---|---|---|---|---|
| 10. I learn lots of English vocabulary by studying the English reading material. | 1 | 2 | 3 | 4 |
| 11. Studying the English reading materials has broadened my vision and knowledge. | 1 | 2 | 3 | 4 |
| 12. Studying the English reading materials has improved my English reading ability. | 1 | 2 | 3 | 4 |
| 13. The activities of this course have raised my interest in English reading. | 1 | 2 | 3 | 4 |
| 14. I spent a lot of time on studying the English reading materials. | 1 | 2 | 3 | 4 |
| 15. I'm satisfied with the effort I've made in this course. | 1 | 2 | 3 | 4 |
| 16. Overall, I'm satisfied with my academic achievement in this course. | 1 | 2 | 3 | 4 |

Appendix C

Web-based learning satisfaction scale

There are two parts of this scale. The first part includes 13 close-ended questions; the second part includes 3 open-ended questions.

Part I:

For each of the following questions, please *circle* the number that corresponds with your opinion.

1 = strongly disagree; 2 = disagree; 3 = agree; 4 = strongly agree.

- | | | | | |
|--|---|---|---|---|
| 1. Compared to reading traditional paper materials, web-based learning can offer more abundant content. | 1 | 2 | 3 | 4 |
| 2. Compared to reading traditional paper materials, web-based learning can offer richer and more varied content. | 1 | 2 | 3 | 4 |
| 3. Compared to reading traditional paper materials, web-based learning offers pictures, audio and video materials that make me more impressed with the material. | 1 | 2 | 3 | 4 |
| 4. Compared to reading traditional paper materials, web-based learning is more active and interesting. | 1 | 2 | 3 | 4 |
| 5. Compared to reading traditional paper materials, web-based learning makes learning more individualized. | 1 | 2 | 3 | 4 |
| 6. The interface of system platform and web page are clear and easy use. | 1 | 2 | 3 | 4 |
| 7. The on-line dictionary makes reading more convenient. | 1 | 2 | 3 | 4 |
| 8. The online recitation makes reading more convenient and interesting | 1 | 2 | 3 | 4 |
| 9. The related links extend my reading outside the course material, and broaden my knowledge. | 1 | 2 | 3 | 4 |
| 10. Compared to reading traditional paper materials, web-based learning requires more study time. | 1 | 2 | 3 | 4 |
| 11. Compared to reading traditional paper materials, web-based learning makes me interpret the text content more profoundly. | 1 | 2 | 3 | 4 |

12. Compared to reading traditional paper materials, I think I learned much more through web-based learning. 1 2 3 4
13. Compared to reading traditional paper materials, I had greater joy using web-based learning in studying English outside reading. 1 2 3 4

Part II

1. For me, the greater benefits of using the WBEOR learning system are _____
2. For me, the reasons I like (or dislike) using the WBEOR learning system are _____
3. What are your opinions or suggestions about the WBEOR learning system? _____