Comparison of Web-enhanced Learning Environments in an E-learning Age

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According to an e-readiness ranking survey conducted by the Economist Intelligence Unit and IBM in 2003, Taiwan (20th), outranked by Hong Kong (10th), Singapore (12th), and South Korea (16th), took 4th place in Asia. The report also points that “South Korea (16th) is making the largest strides, spurred by an ambitious government and heavy infrastructure spending.” Should we worry that we may lag behind even more if we do not make the best use of our e-readiness environment? The fully developed Internet-friendly environment in Taiwan shows that we have entered an era of e-learning age. This study is mainly comparing the five learning environments and styles of web-enhanced English lessons in a public university in northern Taiwan: (1) traditional classroom with LCD projector and Internet access, (2) computer lab, (3) cutting-edge digital language lab, (4) web-based asynchronous communication, and (5) computer-mediated synchronous interaction. More and more universities in Taiwan have offered e-learning platform for their students as a supplementary learning aid, but critics of web instruction have suggested that web-based courses at university are just counterfeit education (Noble, 1997). A survey will be given to find out students’ opinions about this web-enhanced English course mainly in terms of interaction, interest, and effectiveness. Suggestions about effective CMC learning environment with high levels of interactivity will also be provided.

INTRODUCTION

It is no doubt that Taiwan has fully developed Internet-friendly learning environment, especially among higher education. All the universities and colleges in Taiwan have convenient, high-speed, and Internet-ready computer labs; most universities also have Internet access in their classrooms and dormitories. Some even have wireless Internet connection covering most corners of the campus. In addition, more and more higher education institutes here in Taiwan offer asynchronous web-based learning platform as a teaching aid to their professors. Even though I always have entertained doubt about synchronous e-learning, especially about online English learning which needs more teacher-student interaction than other non-language courses, the recent boom in e-learning has triggered me to reconsider the use of asynchronous and synchronous communication in English teaching.

It is needless to say that e-learning has great advantages over classroom learning (c-learning). For example, Warschauer (1997) stressed five features that distinguish computer-mediated communication (CMC) from other communication media; one of which is time and place independent. Because of asynchronous communication, the instructor and students can exchange messages from different locations at different times. In a two-year project conducted by Hawkes and Romiszowski (2001) to explore the professional development of 28 practicing teachers, they found that CMC could greatly facilitate professional collaboration between teachers. Conducting a fifteen-week research on the quantitative differences in attitudes and writing performance of 38 intermediate ESL students at the University of Puerto Rico, Sullivan and Pratt (1996) concluded that writing quality improved in the computer-assisted classroom.

However, knowing that web-enhanced learning environment can benefit our language teaching is one thing; integrating it into our course syllabus and applying it to our classroom...
teaching is another thing. Supported by a project of Ministry of Education, a website named *Freshman English Online Units* with the function of discussion forum has been created to encourage freshmen at National Tsing Hua University (NTHU) to use this website and post their responses online. At the same time, NTHU also built a cutting-edge digital language lab with a set of computer in each seat booth. Finally, after reluctant to use instant message program for quite a long time because of the immediate time pressure to reply, I tried to use MSN Messenger from the beginning of 2004 to communicate with my students at NTHU, which makes computer-mediated synchronous interaction possible.

The present study surveyed my students of Freshman English class who had been taught by me in five different web-enhanced learning environments or styles in one semester. A questionnaire was given to find out students’ opinions about this web-enhanced English course mainly in terms of interaction, interest, and effectiveness.

**LITERATURE REVIEW**

A large number of studies have shown that computer and Internet are effective media of communication in language teaching and learning (Lunde, 1990; Warschauer, Turbee, & Roberts, 1996; Van Handle & Corl, 1998). Many researchers and professionals comparing traditional versus computer mediated instruction also stressed that computer mediated learning formats can usually facilitate greater students’ participation, create mutually supportive learning environments, and maintain higher attention levels (Sullivan & Pratt, 1996; Warschauer, 1996).

A more recent comparative study on web-based instruction has mixed results. Johnson, S., Aragon, S. R., Shaik, N., & Palma-Rivas, N. (2000) compared the totally online delivery of a graduate degree course in Human Resource Development (HRD) to the traditional face-to-face lecture format of an equivalently structured course. The same instructor taught both courses of nineteen students in each class using the same content, activities, and project assignments. This quantitative study results revealed no significant difference between the traditional and the online formats in the quality of the instruction and the course. Students in the traditional class tended to be more satisfied with the quality of learning than did their online counterparts. Glenn, L. M., Jones, C. G., & Hoyt, J. E. (2003) carried out a similar quantitative research but in a much larger scale. Comparing the impact of interaction on student learning and satisfaction among 522 students of eight courses – 266 in the traditional courses and 256 *WebCT* online courses, Glenn et al. found that students who rated traditional courses as having more student-student and student-instructor interaction performed academically as well as those students who used *WebCT* as the online course platform. In other words, the findings showed that, regardless of the instruction medium, “interaction levels do not have a statistically significant impact on student learning” (p.297).

**FIVE DIFFERENT WEB-ENHANCED LEARNING ENVIRONMENTS AND STYLES**

In order to convincingly compare these five different web-enhanced learning environments, variable elements such as students, curriculum, teacher, and technology should be strictly controlled. Luckily, among these five elements, only the use of technology had some changes due to different venues of class during this one-semester project.

**Traditional Classroom with LCD Projector and Internet Access**

Since *Freshman English Online Units* website, part of official website for the project of Ministry of Education, only offered web-based asynchronous communication – a discussion board, most of the Freshman English lessons were still taught in brick-and-mortar classroom. Fortunately, the classroom that I used has Internet access and an LCD projector fixed on ceiling.
Therefore, it is quite convenient for me to use PowerPoint slides and project them to a big screen. Internet access is also very handy.

Computer Lab

In order to demonstrate how students can log in and use *Freshman English Online Units* website effectively, we moved four times to computer lab to have our English class there. Also, I gave students some time to read those online materials, answer questions, and respond to others’ comments. The first computer room that I used doesn’t have teacher-controlled, hardware-based broadcasting system. Instead, it only has software-based broadcasting system, which is not very reliable. Another option was a computer room equipped with an LCD projector, but teachers then didn’t have the control of their students’ screen.

Digital Language Lab

Equipped with Pentium 4 computers, an LCD monitor, high-speed Internet connection, and a set of powerful language lab software, the digital language lab at NTHU can bring students totally refreshing learning experience if an instructor knows how to make the best use of the machine. An instructor can prepare a listening quiz in advance, transferring the files to teacher’s console. Then, students can take a listening quiz on their monitor while the teacher is playing a CD or audiotape. The quiz result will come out immediately. All the computers are also pre-installed 100 units of *Interactive CNN*, *Office English*, and *Business English* published by Hebron Soft, Inc.

Web-based Asynchronous Communication

Because most Freshman English teachers at NTHU are part-time teachers coming from different parts of Taiwan, it is not easy for them to meet regularly to exchange teaching ideas and materials. To solve this problem, the Freshman English Program Team at NTHU built a website named *Freshman English Online Units* under the official website of the project of Ministry of Education. Given a model example and standardized formats, part-time teachers at NTHU were required to submit supplementary materials and suggested projects or assignments related to our uniform textbook for all Freshman English classes by the spring semester of 2004. A full-time project assistant then organized these materials and put them to *Freshman English Online Units* website. These materials are grouped according to the following headings: warm-up discussion questions, interesting background information, jokes, puns, quotes related to the topic, and related readings. Suggested students projects are divided into group projects and individual projects. One of the most exciting components of this website is discussion board where students can log in with their own user name and password. This discussion board, a more interactive element of this website, is a kind of web-based asynchronous communication among students and teachers. What makes this discussion board a useful tool for teaching is that teachers can not only designate particular dates for students to post answers to the discussion questions but also download students’ login records. In addition to posting comments online, students can also review vocabulary they have learned by playing the online crossword puzzles or do exercises of multiple-choice questions related to each unit of the textbook.

One of the difficulties most e-learning facilitators will face is how to motivate learners to actively use online materials (Chen & Xu, 2004); grades are usually used as an incentive to prompt students to do online assignments. Throughout the spring semester of 2004, Freshman English teachers at NTHU are required to use at least two online units which are suggested to take about 10% of students’ final score.
Computer-mediated Synchronous Interaction

More and more instant message software such as MSN Messenger, Yahoo Messenger, and ICQ offers user-friendly, computer-mediated synchronous interaction. Because Microsoft Windows operating system has overwhelmingly dominated the PC world in Taiwan, MSN Messenger has also been one of the most popular instant message software. I started using MSN Messenger from the spring semester of 2004 and also asked my students to get it if they hadn’t had MSN Messenger yet. In the beginning, I just put all my students’ name and account into my MSN Messenger so that I would be notified whenever they logged in. According to “Procedural Rules Governing Distance Learning at the Junior College and Higher Levels” issued by Ministry of Education on June 29, 2001, “Schools offering synchronous distance learning shall set up distance delivery classrooms or reception classrooms equipped with related audio-visual, networking, and communications systems.” I was not trained to use all the equipments needed to offer synchronous distance learning. Therefore, I settled for MSN Messenger with a webcam and a microphone as tools for computer-mediated synchronous interaction.

MSN Messenger can automatically keep a history of a user’s conversations as an XML format which is useful for instructors and researchers to retrieve their own chat log. XML chat logs, stamped with date and time, would be saved into individual files and could not be easily altered. Three clearly-explained emails were sent in advance to all participating students to tell them step-by-step procedures and details that they had to pay attention. Altogether four hours were arranged for this MSN online virtual class. Twenty students were arranged to “chat” with me on the first day while eighteen students were scheduled to take this virtual lesson on the second day. Two to four of them were formed as a small group to “chat” with me, from ten to twenty minutes depending on how many students in a group. Those students who were not arranged to chat with me on the first day had to chat with members of their own small group; the same regulations applied to those students who didn’t chat with me on the second day. One representative of each group had to email me the chat log in XML format by noon of the day they were assigned to chat with their partners. Students were also asked to answer discussion questions and reply others’ comments from 8:00 a.m. to 10:00 a.m. on either of those two days to make sure they didn’t fool around when not attending c-learning. Finally, they were all required to use English in their “chat” with me or with their partners.

SURVEY RESULTS AND DATA ANALYSIS

Thirty-eight science and engineering majors, most of whom are freshmen, participated in this study. One survey consisting of questions of Likert scale about their opinions on these five web-enhanced learning environments and styles was conducted in the end of spring semester of 2004. Only 33 students showed up and turned in their survey.

Out of 33 respondents, 13 (39%) replied that computer-mediated synchronous interaction (i.e. MSN online virtual class) is most interesting out of these five web-enhanced learning environments and styles was conducted in the end of spring semester of 2004. Only 33 students showed up and turned in their survey. Only one mentioned that web-based asynchronous communication (i.e. online supplementary units) is most interesting. The breakdowns of the opinion survey about these five web-enhanced learning environments were elaborated as follows:

Traditional Classroom with LCD Projector and Internet Access

Twenty seven (82%) respondents strongly agreed or agreed that the traditional classroom with LCD project and Internet access is an effective learning environment while 18 (54%) of them agreed that they could learn most and had a better interaction with teacher and his or her classmates in a traditional classroom.
It seems that the vast majority of students still agree that a traditional classroom is still essential to their learning. It is understandable that no matter how convenient virtual classroom is, a brick-and-mortar classroom is still inevitable. After all, a traditional classroom is still the best place for students to have a real-time interaction with teachers.

One student suggested that we could play some interesting games in the classroom. To most freshmen at NTHU who have more than 32 hours of class a week, interesting games may motivate them to get up earlier to attend English classes at 8:00 a.m.

Computer Lab

Twenty two (66%) students either strongly agreed or agreed that a computer lab is an effective learning environment. However, just 16 (48%) of them agreed that they can learn most and have a better interaction with teacher in a computer lab. A couple of students in my class do not have a computer in their place. Therefore, some times were given for them to answer questions on discussion board. Some of them also complained that they had password problems and couldn’t log in the discussion board.

Digital Language Lab

Twenty five (76%) respondents agreed that an effective learning environment and twenty one (64%) of them agreed that they can learn most and have a better interaction with teacher in digital language lab. Surprisingly, thirty one (94%) respondents strongly agreed or agreed that self-study English materials such as Interactive CNN, Office English and Business English in the digital language lab are useful and interesting. Most students gave positive comments on digital language lab and its English materials, such as “It’s interesting.”, “It’s my favorite part.”, and “It’s pretty useful.” Some students suggested that we could use sit-com series like Friends to be teaching materials.

Equipped with advanced and sophisticated hardware and software, the digital language lab has been a powerful and useful machine but also a formidable challenge to instructors who are not familiar with it. Even though an instructor has adequate computer literacy, it can not guarantee that he or she can perform all the main functions properly and smoothly. After all, this complicated audio-video equipment does not have the same user’s interface as Microsoft Windows system. It’s time-consuming for an instructor to master this machine.

Web-based Asynchronous Communication

Only sixteen (48%) respondents thought that they learned a lot from the online supplementary material website. Fourteen (42%) students mentioned that they logged in Freshman English Online Units website four to six times throughout the whole semester; six (18%) respondents logged in six to eight times and 5 (15%) fewer than four times. It seems that they were reluctant to spend time outside of class to use those online materials.

Most respondents who answered open-ended questions about web-based asynchronous communication did give encouraging remarks. Some of them complained about invalid password and date limitation to answer questions of discussion board.

Computer-mediated Synchronous Interaction

Just fifteen (45%) students thought that they learned a lot from the MSN online virtual class while nine (27%) of them didn’t think that they learned a lot from this kind of learning environment and nine (27%) respondents had no opinions about this statement. Nevertheless, when it comes to teacher-student interaction, 22 (67%) respondents agreed that they had a better interaction with teacher in this MSN online virtual class. In the learning environment of
computer-mediated synchronous interaction, students have been “forced” to respond to others’ text message as soon as possible. Similar to web-based asynchronous communication, most respondents answering open-ended questions like this kind of simultaneous interaction. A couple of them, however, complained time is too short for me to chat with them and some regretted that they couldn’t type English fast enough to answer my questions.

LIMITATIONS AND PROBLEMS OF THE STUDY

Strictly speaking, among these five web-enhanced learning environments, only the discussion board of Freshman English Online Units website and MSN online virtual class belong to distance learning or e-learning. However, these two kinds of distance learning, one asynchronous and one synchronous, need a lot of technical support.

First, take Freshman English Online Units website for example. Freshman English teachers offered supplementary teaching materials, but only one group of three teachers with one native speaker of English provided an audio clip and just one teacher offered a Java-based interactive game. No one gave a video clip, not to mention a video clip with synchronized PowerPoint slides. In other words, this Freshman English Online Units website doesn’t present enough interactive and real-time learning materials for its learners, which may partially explain why only sixteen (48%) respondents thought that they learned a lot from the online supplementary material website. It is helpful for instructors to have a discussion board with a function of keeping track of login record. Nevertheless, the security check to enter this website also needs technical support, especially when we have more than 1,500 freshmen. In the beginning of spring semester of 2004, a couple of students in my class complained about incorrect default password.

Second, NTHU does have the distance delivery classrooms and needed equipments to offer courses by means of distance learning. However, I was not trained to use those equipments. Therefore, MSN Messenger was improvised for synchronous distance learning. Microphone, earphone, and webcam can work perfectly with MSN Messenger, but it can be only used in a one-to-one not one-to-may basis. It’s not helpful for me to have a virtual class with a couple of students simultaneously.

Third, most students can’t type English fast enough to chat with me. A lot of precious time was wasted when I was waiting for their responses. In addition, some students overslept while they were supposed to chat with me in the virtual class, which also messed up the carefully planned schedule. Then, traditional brick-and-mortar classes still dominated the educational landscape. Most students either complained that time assigned for them to answer questions in the discussion board is too short or the chat time with teacher in the virtual class is not enough.

Finally, only thirty three learners in my class joined this study; the subjects of sample in the survey were obviously not enough.

DISCUSSION AND CONCLUSION

The e-readiness rankings written by the Economist Intelligence Unit in cooperation with IBM “provide an established benchmark for countries to compare and assess their e-business environments.” In its 2003 white paper report, it indicates that “Hong Kong and South Korea have moved up four and five places, respectively, as the effects of state-of-the-art infrastructure and ambitious government plans come to fruition.” (p.2) On the contrary, Taiwan (20th), outperformed by Hong Kong (10th), Singapore (12th), and South Korea (16th), took only the 4th place in Asia. It also mentions “South Korea (16th) is making the largest strides, spurred by an ambitious government and heavy infrastructure spending.” (p.3) Although e-business environments may not have directly relations with the application of e-learning to education,
they somehow reveal the level of education and Internet literacy of their people. According to the United States Distance Learning Association, reported by CNN on August 13, 2004, the e-learning movement is pretty common in higher education in USA, where “90 percent of four-year public schools and more than half of four-year private schools offer some form of online education.” It is no doubt that e-learning or distance learning is a growing trend in higher education field. However, the move from the traditional lecture hall to the cyber-classroom has not only created grave anxiety for some English experts who do not have adequate computer literacy but also raised controversial questions regarding instructional effectiveness and efficiency. For instance, critics of web instruction like Noble (1997) argued that education is prone to become a commodity controlled by administrators once faculty put their course materials online. He also suggested that offering web-based courses at the college level will make universities digital diploma mills, a step backward not forward toward quality higher education.

The results of the web-enhanced learning environment survey brought about an interesting point. When asked which learning environment was the most interesting one, students favored computer-mediated synchronous interaction. However, when individual learning environments were asked in more details in terms of effectiveness, the MSN Messenger online virtual class was the least effective learning style, although most learners agreed that it is a highly interactive learning environment. An interesting and highly interactive class is not necessarily equal to an effective one. Appropriate course design of web-based or web-enhanced courses can produce very effective learning environments with high levels of interactivity (Lavooy & Newlin, 2003).

A web-based learning environment is not an educational mecca. A user-friendly website with adequately interactive exercises, feedback, and design may attract more loyal repeated learners. Nevertheless, passive learners who lack motivation may still ignore the websites that are designed for them. Twenty six out of thirty three students confessed in the survey that they are passive English learners. Enhancing students’ English learning motivation can transfer their passive English learning attitude to active one. Once they become more active learners, an interactive cyber-class will not only become an interesting but also an effective learning environment. Web-based asynchronous or synchronous learning environments can not replace brick-and-mortar classrooms in the near future. However, interactive web-based materials are definitely effective teaching and learning supplements if they are properly used.

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APPENDIX

Survey of Five Web-enhanced Learning Environments

During this semester we had different classroom formats: (1) a traditional classroom with LCD projector and Internet access, (2) a computer lab, (3) a digital language lab, (4) web-based asynchronous communication, and (5) computer-mediated synchronous interaction (i.e. MSN online virtual class). What are your opinions about these five different class formats?

Personal background:

1. Gender: _____ Male _____ Female
2. What’s your level of computer and Internet literacy?
   _____ Very good   _____ Good   _____ Fair
   _____ Not Good   _____ Low
3. Generally speaking, how many hours do you spend in using computer every day?
   _____ more than 8 hours   _____ 6~ 8 hours   _____ 4~ 6 hours
   _____ 2 ~ 4 hours   _____ fewer than 2 hours
4. When you are using computer, what do you usually do? (You can choose more than one item.)
   _____ search some information related to your schoolwork
   _____ surf websites to read current affairs
   _____ type your report
   _____ watch movies
   _____ read BBS
   _____ download shareware
   _____ download MP3 music
Comparison of Web-enhanced Learning Environments in an E-learning Age

_____ burn CDs
_____ play computer games
_____ “chat” with your friends by MSN or Yahoo messenger
_____ other (please specify ________________________________________________)

5. I am a technologically-oriented person.
   _____ strongly agree  _____ agree    _____ no opinion
   _____ disagree   _____ strongly disagree

6. Do you think that you are an active learner or a passive learner in terms of English learning?
   _____ active learner       _____ passive learner

Class Format Survey:
1. Which of the following class formats do you think is most interesting? (choose one item)
   _____ a traditional classroom with LCD projector and Internet access
   _____ a computer lab
   _____ a cutting-edge digital language lab
   _____ web-based asynchronous communication (online supplementary units)
   _____ Computer-mediated synchronous interaction (i.e. MSN online class).

Traditional classroom with LCD projector and Internet access
1. Do you agree that a traditional classroom with PowerPoint slides, LCD projector, and Internet access is an effective learning environment?
   _____ strongly agree  _____ agree    _____ no opinion
   _____ disagree   _____ strongly disagree

2. Do you agree that you can learn most and have a better interaction with teacher and your classmates in the traditional classroom?
   _____ strongly agree  _____ agree    _____ no opinion
   _____ disagree   _____ strongly disagree

3. Write down any suggestions about the traditional classroom?
   __________________________________________________________________________

Computer lab
1. Did you ever attend this English class in a computer lab this semester?
   _____ Yes, I did.   _____ No, I didn’t. (Skip the following 3 questions.)

2. Do you agree that a computer lab is an effective learning environment?
   _____ strongly agree  _____ agree    _____ no opinion
   _____ disagree   _____ strongly disagree

3. Do you agree that you can learn most and have a better interaction with teacher you’re your classmates in a computer lab?
   _____ strongly agree  _____ agree    _____ no opinion
   _____ disagree   _____ strongly disagree

4. Write down any suggestions about the computer lab?
   __________________________________________________________________________

Digital language lab
1. Did you ever attend this English class in our digital language lab this semester?
   _____ Yes, I did.   _____ No, I didn’t. (Skip the following 4 questions.)

2. Do you agree that a digital language lab is an effective learning environment?
   _____ strongly agree  _____ agree    _____ no opinion
   _____ disagree   _____ strongly disagree

3. Do you agree that you can learn most and have a better interaction with teacher and your classmates in a computer lab?
   __________________________________________________________________________
4. Do you think that the self-study English materials (Interactive CNN, Business English, and Office English, etc) in our digital language lab are useful and interesting?

5. Write down any suggestions about the digital language lab?

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**Web-based asynchronous communication (online supplementary material website)**

1. I think that I learned a lot from the online supplementary material website.

2. Do you remember how many times you logged in the online supplementary material website?

3. Generally speaking, when you logged in the online supplementary material website, how long did you stay there?

4. Please specify the section(s) you used most frequently:

5. Write down any suggestions about the online supplementary material website?

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**Computer-mediated synchronous interaction (i.e. MSN online class).**

1. I think that I learned a lot from the MSN online class.

2. Do you agree that you can learn most and have a better interaction with teacher and your classmates in MSN online class?

3. Write down any suggestions about the MSN online class?

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