97年人文教育革新中綱計畫

子計畫三 人文領域人才培育國際交流計畫

【補助類型-海外專題研習】

【計畫名稱：數位化英語教學中的跨文化學習】

期末成果報告

指導暨補助單位：教育部

指導單位：教育部顧問室人文領域人才培育國際交流計畫辦公室

執行單位：臺中教育大學英語學系

計畫主持人: 廖美玲 教授

執行日期：中華民國 97 年 7 月 14 日至中華民國 97 年 12 月 31 日

中華民國 97 年 12 月 12 日

目　次

一、 計畫名稱

數位化英語教學中的跨文化學習

二、 計畫目標

本海外專題研究的目標主要在吸取學習目前於美國執行的跨文化教學成功案例的經驗，且進一步建立跨文化英語為外語的跨國合作教學及研習計畫。本專題研究預期計畫目標擬定為下列各項:

（一）實地觀摩 UCI Digital Learning Lab 所發展的語言學習計畫之執行。

（二）與知名科技輔助語言學習學者 Dr. Warschauer 互動、交流，從旁聽其課程與共同合作策劃研究中學習各種相關新知與實務操作技能，並建立夥伴關係。

（三）規劃適合於我國執行的跨文化英語為外語的教學及研究計劃模式。

（四）提供國內學生提昇跨文化交流與英語學習的機會。

（五）以研習所得經驗，提昇研習人員的學術研究能力，發表學術著作。

（六）於研習完成後，舉行工作坊，分享數位化英語教學與跨文化學

習的各種實務經驗。

三、 執行情形

主持人於七月十三日搭機前往 University of California, Irvine. 抵達後即與 Dr. Mark Warschauer 聯繫。與其討論計畫之執行與合作項目。在經過討論後，雙方達成共識，將就以下各項進行：

（一）參與 UCI Digital Learning Lab 每週所舉行的例行會議，以得知 UCI 教授及博士生所執行過或正在進行的研究計畫，並且參與討論及分享研究興趣。

（二）旁聽 Dr. Mark Warschauer 於每週五早上講授的課程 Technology and Literacy，並於課堂上作 presentation。

（三）與 Dr. Mark Warschauer 討論跨文化交流研究計畫的內容及規劃，並參與於十一月六、七日兩天在 UCI 所舉行的 The Future of Writing 學術研討會。

（四）與 Dr. Mark Warschauer 共同撰寫專書一冊。書名暫訂為 *Technology and Language Learning 2.0.*

（五）與 Dr. Mark Warschauer 共同為美國 National Institute of Technology 執行一小型研究計畫，撰寫 *Technology in Adult Literacy and English Language Learning Programs* 一文。

（六）參與 University of California, Irvine 國際中心的國際學者研究發表會。

以上六項執行的任務，計畫主持人在七月至十二月間已陸續完成。第一項，主持人於九月份 University of California, Irvine 開學之後，即於每週準時參加 DLL 的定期開會，並加入 DLL 的 Wiki 及 blog (Papyrus News)。也在 DLL 於 11/21 的會中分享個人最近的研究論文，論文題目為 Understanding telecollaboration through an analysis of intercultural discourse. 以下為 Papyrus News 的首頁。DLL 的議程以及主持人與 DLL 的成員所分享的論文摘要請見附錄一。

第二項，主持人全程參與 Dr. Mark Warschauer 的課程 Technology and Literacy，於每週閱讀所指定的書籍及其他閱讀材料，並參與課堂上的討論。由於所閱讀的論文涵蓋範圍相當廣泛，受益良多，再加

上課堂上的討論與辯證，對許多新興的研究議題有了更精確的瞭解。每一位上課的同學都依課程規定，必須就額外閱讀材料作一場 presentation 及說明，我也不例外的就兩篇列為十一月二十一號的閱讀教材以 PTT 作主要內容介紹。Technology and Literacy 課程綱要及主持人所做 PTT 介紹的內容見附錄二。

第三項，主持人除與 Dr. Mark Warschauer 討論研究內容外，也參加 The Future of Writing Conference 向更多的學者專家學習。The Future of Writing Conference 的議程於附錄三。

第四項，共撰寫專書目前已完成提案書，將尋求適當的出版社商議出版的可能性。提案書草案見附錄四。

第五項，與 Dr. Mark Warschauer 共同為美國 National Institute of Technology 執行一小型研究計畫，撰寫 *Technology in Adult Literacy and English Language Learning Programs* 一文，目前已完成第二稿的修訂。二次修訂稿請見附錄五。

第六項，受 University of California, Irvine 的 International Center 邀請，主持人已於十一月十九日參與國際中心所舉辦的 International Scholar Poster Presentation。以下為展示現場的照片。

機會充實研究視野及能力，也希望促成校對校間的可能合作與研究。為爭取較長的時間，完成更多目標，計畫主持人另向傅爾布萊特基金會申請資深訪問學者補助十個月。很幸運的也獲得通過。因此，在九十七年十二月三十一日，本計畫結束後，仍可留在 University of California, Irvine，繼續執行傅爾布萊特基金會資深學者的研究計畫。接下來的計畫，將希望能完成專書的共同撰寫，並建立跨文化語言教學及研究機制。

六、 結論與建議

此次赴美研習獲益良多，從剛開始的適應，到逐漸上了軌道，能和合作的教授取得共識，並學習善用 University of California, Irvine 的各種資源，這些過程都必須在有限的時間內完成，其實挑戰性不小。現在回想起來，事先與 Dr. Mark Warschauer 取得聯繫並且瞭解 UCI 的情形，對研習任務的執行相當重要。在七月份學校尚未開學及抵達也很重要，因為學校各單位較不忙碌，合作教授也較有時間共同商討合作事宜，較容易取得協助，開學後才能按既定規劃研究執行進程。這段期間非常的忙碌，較沒有機會體會校園外的生活，是較為可惜之處。此外，加州爾灣地區的房價相當驚人！計畫所補助的經費是無法負擔各項開支的。個人這次另外申請了傅爾布萊特基金會

的補助，才不至於經濟負擔太重。以過來者的經驗，謹誠摯的建議，將來宜鼓勵申請教育部中網計畫海外專題研究補助者，也一併申請其他經費，以免即使獲得教育部補助，仍須個人負擔沈重經費壓力，或者被迫縮短研究期限，影響研習成效。

七、 附錄

（一）Digital Learning Lab 會議議程及與 DLL 成員分享的論文摘要

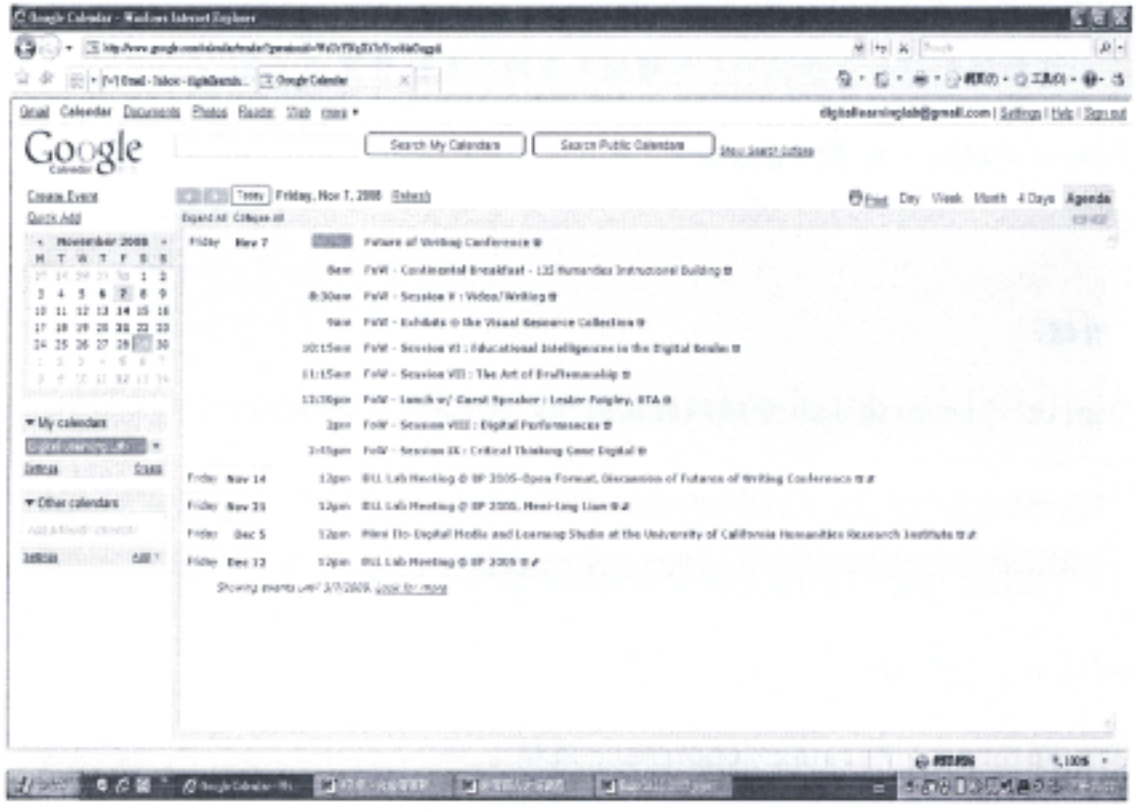
（二）Technology and Literacy 授課大綱即於課堂中所做 presentation 的 PPT 檔。

（三）The Future of Writing Conference 議程

（四）共同撰寫專書提案。

（五） 共同為美國 National Institute of Technology 撰寫 *Technology in Adult Literacy and English Language Learning Programs* 一文二校稿。

附錄一　Digital Learning Lab 會議議程及與 DLL 成員分享的論文摘要



Understanding telecollaboration through an analysis of intercultural discourse

Meei-Ling Liaw

Abstract

This study examines if and how collaboration and intercultural learning took place during telecollaboration by exploring the linguistic features of the discourse used by the participants, as well as the patterns and types of interactions between intercultural interlocutors. Thirty-three freshman students majoring in English at a university in central Taiwan were paired up with an equal number of pre-service teacher education students in the U.S. for the project. The data collected for the study included online forum entries written by participants from both sides after they read two articles and the end-of-project reports written by the Taiwanese participants. Three different types of data analysis were employed on the forum entries. First, linguistic interaction patterns of the two groups of participants were analyzed using the automatic text analysis software, LIWC. Second, a content analysis of the forum entries was performed by means of a modified version of Garrison, Anderson, and

Archer's (2001) Practical Inquiry Model. Third, the intercultural competence of the two groups was analyzed by applying guidelines for the assessment of intercultural experience (Byram, 2000). In addition, the final reports written by the Taiwanese participants were read and analyzed qualitatively.

The findings from the analysis of the forum entries show that the participants' intercultural communication was interactive and interpersonal. The use of pronouns, social words, affective words, and cognitive words reveals that positive rapport between partners grew as the communication continued. An analysis of the collaborative interaction between e-partners with the Critical Inquiry Model tells a similar story: most of the students found that they had common views and beliefs about the topics they discussed. When disagreements arose, the participants were polite and cautious; instead of critically questioning their partners or engaging in heated debates, they expressed and exchanged their own opinions. As for intercultural competence, the participants started with showing interest in each other's culture and then moved on to describing their own culture with detailed descriptions about their own friends, family, and school lives. Both groups of students displayed their ability to engage in intercultural communication; their intercultural competence deepened as they engaged in online communication. Finally, the Taiwanese students' end-of-project reports explicate the Taiwanese students' view of how the project helped them to grow interculturally, linguistically, and interpersonally.

The findings of this study add to the small but increasing body of literature about online learning and collaborative behaviors. In particular, the linguistic-grounded examination of intercultural discourse adopted by this study echoes Belz's (2003) assertion that this approach could provide insights into the complex and multi-layered social interactions in telecollaboration. The new and unexpected findings about intercultural learning between Asian and U.S. university students deserve further study.

附錄二 Technology and Literacy 授課大綱及於課堂中所做 presentation 的 PPT 檔

Literacy and Technology

Education 212
Friday, 9:00 to 11:50 am (Fall 2008)
Berkeley Place 2005
University of California, Irvine

Instructor: Mark Warschauer
Office: Berkeley Place 3000C
Office Hours: per appointment
Phone: 949 824-2526
E-mail: markw@uci.edu
Class e-mail list: lit-tech-F08@classes.uci.edu
Course website: https://eee.uci.edu/08f/12260/

Course Overview

I. Introduction

The way people read, write, and make meaning is intimately tied to the tools they use for doing so. Recently, with the development and diffusion of computers, the Internet, and other forms of digital media, the tools and practices of literacy are changing more rapidly than anytime in the past few centuries, and perhaps in human history.

This course will provide an overview of how new digital technologies are transforming literacy practices, and literacy development, both in and out of school. It will consider a wide range of technological tools and environments, from blogs, wikis, video games, multimedia, and other forms of online interaction, as accessed in society and schools.

II. Organization

The field of technology and literacy is changing rapidly as new digital tools, environments, and resources are developed. University students such as those of you enrolled in this course have a great deal of practical expertise on the topics at hand that can be combined with the theoretical and research perspectives you'll encounter in readings and lectures. In order to best combine this practice, theoretical and research expertise to promote understanding and knowledge, this course will be taught in a highly interactive manner. Students will be expected to read material in an active and engaged manner and come to class prepared; to participate actively in class discussions, whether through face-to-face communication or using various digital

tools; and to otherwise contribute as actively as possible to class.

III. Readings

Readings are listed in the weekly schedule below. Readings should be completed by the class on the date they are listed, as they will be discussed on that day.

***Book (available in bookstore)*:**

Warschauer, Mark (2006). *Laptops and literacy: Learning in the wireless classroom.* New York: Teachers College Press. [LL]

***Articles (available online; optional readings are marked with an asterisk)*:**

Black, R. W. (2006). Language, culture, and identity in online fanfiction. *e-Learning*, 3(2), 170-184.

Bloch, J. (2007). Abdullah's blogging: A generation 1.5 student enters the blogosphere. *Language Learning & Technology*, 11(2), 128-141.

*Chesher, C. (2005). Blogs and the crisis of authorship. Paper presented at the Blogtalk Downunder conference. Retrieved June 7, 2007, from http://incsub.org/blogtalk/?page_id=40

Coiro, J., & Dobler, E. (2007) Exploring the online reading comprehension strategies used by sixth-grade skilled readers to search for and locate information on the Internet. *Reading Research Quarterly, 42* (2), 214-257.

Cummins, J. (2005) Technology, literacy, and young second language learners: Designing educational futures. Downloaded September 25, 2008 from http://www.ucop.edu/elltech/cumminspaper012005.pdf. [An edited version later published as Cummins, J. (2008). Technology, literacy, and young second language learners: Designing educational futures. In L. L. Parker (Ed.), Technology-mediated learning environments for young English learners: Connections in and out of school. (pp. 61-98). New York: Lawrence Erlbaum Associates.]

Dynarski, M., Agodini, R., Heaviside, S., Novak, T., Carey, N., Campuzano, L., et al. (2007). Effectiveness of reading and mathematics software products: Findings from the first student cohort. Washington, DC: U.S. Department of Education. (p. 17-35)

Gee, J. P. (2006). Games and learning. Issues, perils, and potential. Downloaded September 23, 2008 from http://www.instituteofplay.org/content/Gee_Spencer_report_2006.pdf. [Note: a revised version is published as chapter 20 of Gee, J. P. (2007). Good video games and good learning: Collected essays on video games, learning, and literacy. New York: Peter Lang]

*Guth, S. (2007). Wikis in education: Is public better? Proceedings of the International Symposium on Wikis, p. 61-68. Downloaded September 25, 2008 from http://portal.acm.org/citation.cfm?doid=1296951.1296958.

*Herring, S. C., Scheidt, L. A., Bonus, S., & Wright, E. (2005). Weblogs as a bridging

genre. *Information, Technology & People, 18*(2), 142-171.
*Jenkins, H. (2006). Confronting the challenges of participatory culture: Media education for the 21st century. Retrieved March 12, 2007, from http://preview.tinyurl.com/ydvcvo
*Kress, G. (2004). Reading images: Mulitmodality, representation and new media. *Information Design Journal + Document Design, 12*(2), 110-119.
Kulik, J. A. (2003). Effects of using instructional technology in elementary and secondary schools: What controlled evaluation studies say. Arlington, VA: SRI.
*Lam, W. S. E. (2005). Second language socialization in a bilingual chat room. Language Learning and Technology, 8(3), 44-65.
Lam, W. S. E. (2000). Second language literacy and the design of the self: A case study of a teenager writing on the Internet. TESOL Quarterly, 34, 457-482.
*Lemke, J. L. (1998). Metamedia literacy: Transforming meanings and media. In D. Reinking, M. McKenna, L. Labbo, & R. D. Kieffer (Eds.), *Handbook of literacy and technology: Transformations in a post-typographic world.* (pp. 283-301). Hillsdale, NJ: Erlbaum.
*Leu, D.J., Jr., Kinzer, C.K., Coiro, J., & Cammack, D.W. (2004). Toward a theory of new literacies emerging from the Internet and other information and communication technologies. In R.B. Ruddell, & N. Unrau (Eds.), *Theoretical models and processes of reading*, 5th ed. (pp. 1570-1613). Newark, DE: International Reading Association. Available at: http://www.readingonline.org/newliteracies/lit_index.asp?HREF=leu/.
*Moran, J., Ferdig, R. E., Pearson, P. D., Wardrop, J. & Blomeyer, R. L. (2008). Technology and Reading Performance in the Middle-School Grades: A Meta-Analysis with Recommendations for Policy and Practice. *Journal of Literacy Research, 40* (1), 6-58.
*Pearce, C. (2002). Emergent authorship: The next interactive revolution. *Computers & Graphics*, 26.
*Russell, M., & Plati, T. (2002, May 29). Does it matter with what I write? Comparing performance on paper, computer and portable writing devices. *Current Issues in Education* [On-line], 5 (4). Available: http://cie.ed.asu.edu/volume5/number4/
*Shaffer, D. W., Squire, K. D., Halverson, R., & Gee, J. P. (2005). Video Games and the Future of Learning. Phi Delta Kappan, 87(2), 104-111.
Steinkuehler, C. (2007). Massively multiplayer online gaming as a constellation of literacy practices. *E-Learning*, 4(3).
*Thorne, S. L., & Black, R. (2007). Language and literacy development in computer-mediated contexts and communities. *Annual Review of Applied Linguistics, 27*, 133-160.

*Warschauer, M. (1998). Online learning in sociocultural context. Anthropology & Education Quarterly, 29(1), 68-88.
*Warschauer, M. (1999). *Electronic literacies: Language, culture, and power in online education*. Mahwah, NJ: Lawrence Erlbaum Associates. (Chapter 1: Surveying the terrain of literacy)
Warschauer, M. & Grimes, D. (2007). Audience, authorship, and artifact: The emergent semiotics of Web 2.0. *Annual Review of Applied Linguistics*. 27, 1-23.
Warschauer, M., & Ware, P. (2008). Learning, change, and power: Competing frameworks of technology and literacy. In J. Leu, Donald J., C. Lankshear, M. Knobel, & J. Coiro (Eds.), *Handbook of research on new literacies*. Mahway, NJ: Lawrence Earlbaum.
Wesch, M. (2007a). Web 2.0.The machine is us/ing us (final version). Downloaded September 25, 2008 from http://www.youtube.com/watch?v=NLlGopyXT_g
*Wesch, M. (2007b). A vision of students today. Downloaded September 25, 2008 from http://www.youtube.com/watch?v=dGCJ46vyR9o

Presentations on Optional Readings

Each Ph.D. student in the class will be asked to make a 10-15 presentation summarizing two of the optional readings on one of the weeks of the class. Assignments for this will be made during the first week of class. You may prepare a PowerPoint or handout if you wish.

Future of Writing Conference

On Nov. 6-7, a two-day conference on The Future of Writing will be held at UCI. There will be no class on Friday, Nov. 7. Instead, your assignment that week will be to attend the conference and help write up your comments on one or more sessions on the course Wiki.

Research Paper

Your major assignment for the course is to write one substantive research paper on a topic related to literacy and technology. You may choose any of the following:
(1) A pilot study
This would be a small investigative study in which you collect and analyze data on the topic. This could be based on a survey you conduct, data you collect online (e.g., blog postings), interviews and observations, a small experiment, or any other study.
(2) A conceptual paper
A conceptual paper would attempt to further our understanding of a topic through in-depth analysis or prior research literature. Through this analysis, you should attempt to make an original contribution rather than just summarizing what others

have said.

(3) A research proposal

A research proposal would put forth an in-depth plan for a future study (for example, your first year project).

Other genres or types of research papers will be considered. Please make a proposal to the professor if you wish to do another type. In additional, products in other media, or multiple media, than papers will also be considered; once more, make a proposal to the professor if you wish.

If submitting a research paper, the following formatting guidelines are recommended.

Formatting of Paper

- Paper should be a minimum of 3000 words (plus tables, figures, and references); there is no maximum length
- Use 12 point Times or Times Roman Font
- Use 1" margins on the top and bottom and either 1" or 1.25" margins on the side
- Double-space your paper, with indented paragraphs and no extra spaces between paragraphs
- **Properly cite or quote all referenced material**, with a reference list at the end exactly matching all your citations (no more and no less).
- Number all pages and staple your print out
- APA formatting is recommended for the field of education; alternative formatting is accepted if you have a justification (such as your major area of scholarly work is in another field that uses different formatting)

Research Abstract

The topic of your paper must be approved by the professor. Please submit an abstract of your paper (minimum length 1 paragraph; maximum length 1 page) no later than November 21. You may submit earlier if you wish. In addition, you may also submit a draft of your paper for consideration before the deadline if you wish. To do so, make an appointment with the professor and bring a print out of your draft.

Submission of Paper and Abstract

Your abstract and paper should be submitted in both printed version (brought to class) and email version (to markw@uci.edu) by the print deadline and with the subject line

"Education 212 abstract" or "Education 212 paper" (without the quotation marks). Please also post your abstract on the course Wiki.

Academic Honesty

Be certain to cite and reference any material that you directly quote or draw on for your study. If you have any questions about how to do this, please consult with the professor. Passing off others' writing as your own is a violation of academic honesty and will result in a failure in the course and a report to the graduate dean.

Student Presentations

Each student will make a 15 minute presentation on your research paper on December 12. You may use a computer and projector if you wish. The presentation need not be highly polished; the purpose of the presentation is principally to share your research with each other.

Grading

The grade you receive on your research paper will be the grade you receive in the class.

Late Work

If you are unable to submit your paper or abstract on time due to special circumstances, please submit your request to the professor by email before the deadline. Indicate the date and time you will submit the paper or abstract by and the reason for the delay. All requests for extensions or grades of incomplete that are received by email before the deadline for submission will be considered, but granting of extensions or incompletes is not guaranteed.

Communications and Computers

You will be required to access email from your uci.edu address for this course. If you do not ordinarily use that address, please go to http://www.nacs.uci.edu/help/handouts/forward.html and arrange to have your uci.edu email forwarded to your outside email address.

Please contact the instructor by email if you will be absent from class or expect to arrive late or leave early.

Finally, please bring your laptop computers to class each week as we may be doing some computer-related activities.

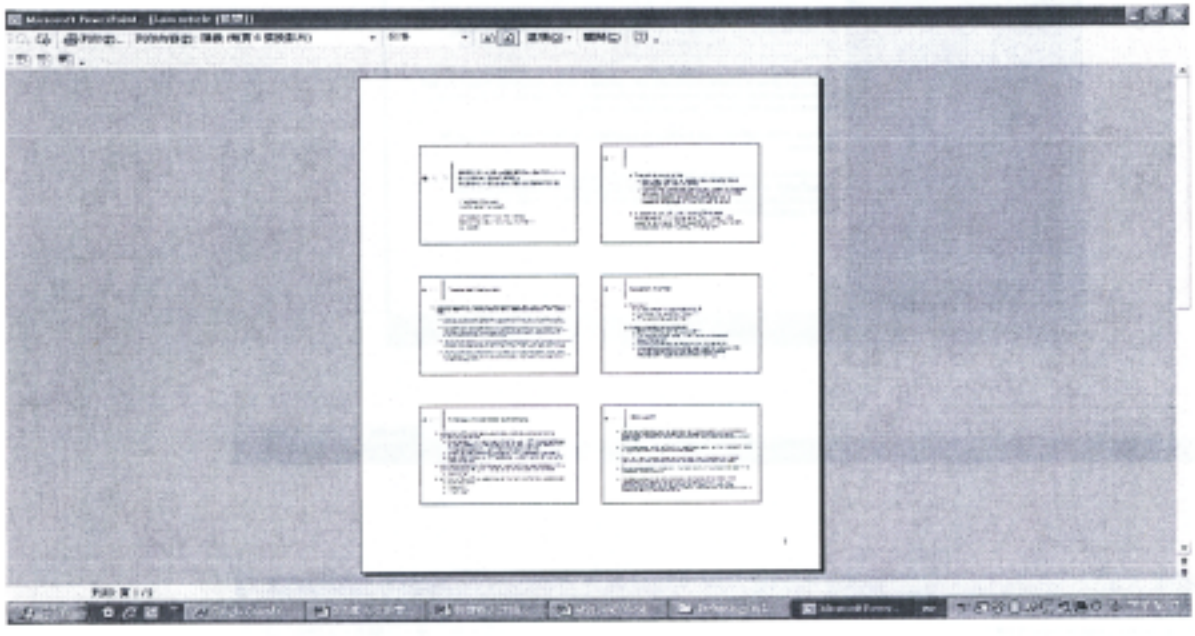
Weekly Schedule (subject to possible change)

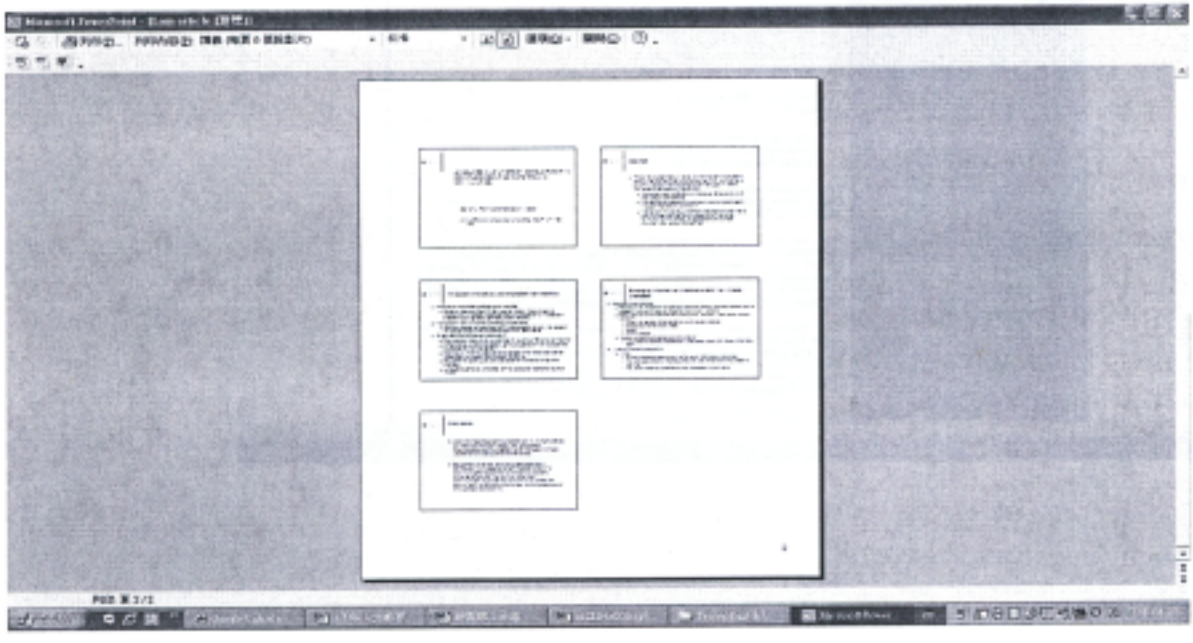
Week	Presentation Topics	Assignments
1. Sept 26	Introduction to the course	
2. Oct 3	Literacy meets technology	LL 1 LL 2 Warschauer and Ware *Leu *Lemke *Warschauer (1999)
3. Oct 10	Reading (Class ends 10:30 am for Cohort 1 Poster Presentations)	LL3 Kulik (p.1-38) Coiro *Moran *Dynarski (p. 17-35)
4. Oct 17	Writing	LL 4 Kulik (p. 39-46) Black *Warschauer (1998) *Russell
5. Oct 24	Digital Literacies	LL5, LL6, LL7, LL8 *Kress *Hull & Katz
6. Oct 31	Videogames	Gee Steinkuehler *Pearce *Shaffer
7. Nov 7	Future of Writing Conference	
8. Nov 14	Web 2.0	Wesch (2007a) Warschauer & Grimes Bloch Jenkins *Herring *Chesher *Guth *Wesch (2007b)
9. Nov 21	Second Language Learners	Cummins Lam (2000) *Lam (2005) *Thorne & Black
Nov 28	(holiday)	
10. Dec 5	To be determined	

Dec 12	Student Presentations	[Research Paper Due]

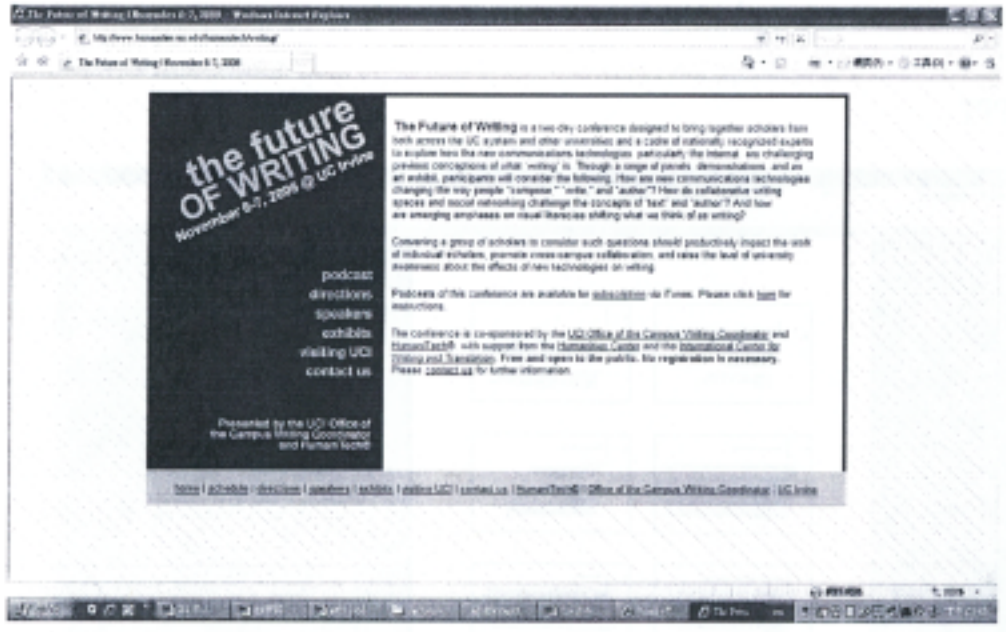
*optional readings

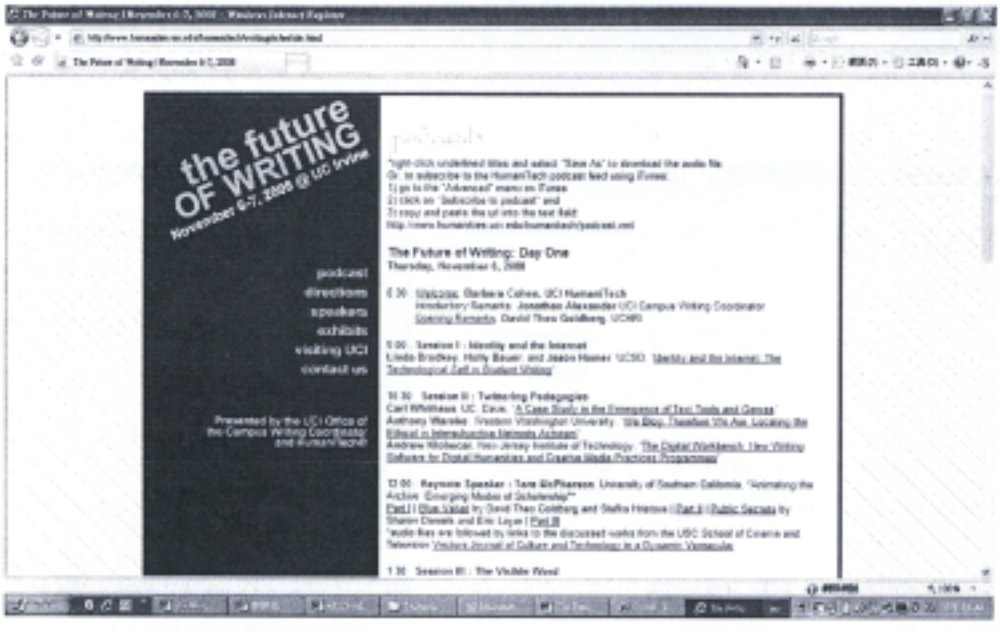
Presentation PPT





附錄三 The Future of Writing 議程及相關訊息





附錄四 共同撰寫專書提案

Technology and Language Learning 2.0

A book proposal to Cambridge Applied Linguistics Series

by Mark Warschauer & Meei-Ling Liaw

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IV. Introduction

The 1990s witnessed an explosion of interest in the use of new technologies in second language instruction. Much of this interest focused on the role of the Internet in language learning through activities such as computer-mediated communication, access to online resources, and web-based publishing. Cambridge Applied Linguistics published two books on technology and language learning that reflected this interest (Chapelle, 2001; Warschauer & Kern, 2000).

Since those two books were published, the terrain of technology-enhanced language learning has changed dramatically. With greater availability of low-cost mobile computers and high-speed Internet connections, wireless online access is now broadly available. In addition, whereas publishing online previously required specialized software or skills, barriers to online publishing, collaboration, and creative production have now allen. Widely available software and sites allow computers users to interact through blogs, collaborate through wikis, play multiplayer games, publish podcasts and video, build relationships through social network sites, and otherwise shape the content of the Web through feedback and evaluation mechanisms (Warschauer & Grimes, 2007).

There is a great hunger for knowledge about how these emerging technologies can be used in the field of language learning. While some works are beginning to appear that address this topic (see, for example, Thomas, in press), none meet the standards of theoretical and empirical rigor of the Cambridge Applied Linguistics series.

V. Content Overview

The proposed book will fill this need (I like this! Also one might ask where that hunger comes from. Has the use of technology enhanced language learning and teaching? Our book should be able to provide an answer and some evidence, right?). It will take as its focus emerging technologies or applications that have either first appeared in the last decade (e.g., social network sites, wikis) or ones that existed previously but have changed substantially in function or accessibility (e.g., artificial intelligence for assessing writing, concordancing). (In addition to drawing on existing studies, we might also need to have our own data to be convincing.) Following an introductory chapter that will set the theoretical basis for the book (Would this be the second chapter? This sounds wonderful. I like the approach you used in the book you co-edited with Rick where Chapter One introduces the theory and practices of network-based language technology. Similar to that book, we need to have a chapter outlining theoretical foundations for technology-based language learning 2.0.), each

of the next eight chapters will discuss a topic among these emerging technologies, reviewing how the particular area intersects with theoretical domains within applied linguistics and second language learning. (Would it be better that, based on the theoretical foundations in the previous chapter, we outline some principles and guidelines for integrating emerging technologies into language teaching and learning and in the following chapters, we then describe specific technologies to exemplify our points?)

Each of these eight topical chapters will have three sections. The first section will introduce the overall terrain of the technology, e.g., what the technology consists of, a brief history of its development and use, and its current role in society and in the classroom. A second section will analyze extant research related to use of the technology in second language learning (literacy, education, etc.) and related domains that shed light on language learning A third section will discuss the implications of this research for language learning and teaching, teacher education, and future research. Each of the three sections will draw connections to extant theory in applied linguistics and second language learning. (I still think language learning would be a better focus than technology for our book since it would be language educators and scholars who are buying our book, not technology folks. Starting with something more relevant would better serve the needs of our readers. It would also be less intimidating, I think. Assessment of the effectiveness of uses of technology for language learning is also an important topic. Should we have that somewhere in the book as well?)

A concluding chapter will consider all of the technologies taken together and put forth some common research approaches for investigating technology-enhanced language learning in the 21st century. (Should we reiterate the principles and guidelines for integrating technologies in language classrooms here as well?)

The table of contents will be as follows:

1. Introduction: Language Learning in the Era of Social Computing (So the theoretical framework for the book would be socio-constructivist theories?)

2. Blogs and Wikis: New Forms of Collaborative Writing

3. YouTube and Podcasts: Mass Access to Media Production

4. Social Networking for Language Learning

5. Multiplayer Games and Simulations

6. Multimodal Computer-Mediated Communication

7. Artificial Intelligence for Assessing Writing and Speech

8. Online Concordancers and Self-Access Tools

9. Laptops, Cell Phones, and Mobile Learning

10. Conclusion: Language Education Research 2.0

Networked Writing (blogs, wikis, collaborative-writing environments/fan-fiction)

Multimodal Production (youTube, podcasts, digital storytelling)

Cross-Cultural Exchanges

Language Immersion (games, simulations, social network sites)

Linguistic structure (iCall, concordancing)

[mobility]

(May I suggest to have learning theories or guiding principles as the main thread for the different chapters, instead of forms of technologies? My concern is that we might be jumping the gun without being able to substantiate our claims of the wonders that these emerging technologies can offer.)

VI. Relation to Other Work

As noted earlier, Cambridge Applied Linguistics has published two previous books on technology and language learning (Chapelle, 2001; Warschauer & Kern, 2000). However, these two books largely focused on technologies of the 1990s rather than the technologies of the current decade addressed in the proposed book. (The title of the proposed book has been chosen to highlight the fact that it tackles the most recent

technologies, many of which are part of a second generation Internet often referred to as Web 2.0.)

The major competing work with this book is an edited collection, the *Handbook of Research on Web 2.0 and Second Language Learning* (Thomas, in press). Though many of the same topics are covered in that book, they are not discussed at the same level of theoretical or empirical rigor as that intended in the proposed book (Do you have a draft of the book? May I have a copy if you do? Thanks in advance). The publisher of that book, IGI Global, is not known for having any particular intellectual leadership in the fields of language learning or applied linguistics. Its handbooks sell for several hundred dollars and are considered reference books. For all these reasons, the proposed book will have greater appeal than that handbook to scholars and graduate students in applied linguistics, who are the proposed book's main target audience.

VII. The Market

Technology and Language Learning 2.0 will appeal to scholars and graduate students with an interest in technology and language learning. It can be used as a required text in graduate courses focused on computer-assisted language learning or on technology and language learning.

VIII. Length and Timeline

The manuscript will be approximately 300 double-spaced typed pages, resulting in a final printed book of about 200 pages. It will be completed by December 31, 2009.

The book will consist of completely original material and will not require any permission for reprints of previously published work. (Well, we might need some materials from makers or publishers of some technologies we introduce in the book. I do not foresee difficulties in obtaining them though.)

IX. The Authors

The first author will be Mark Warschauer, Professor of Education and Informatics at the University of California, Irvine. Dr. Warschauer is the author or editor of eight previous books on technology, language, and literacy, including one published in the Cambridge Applied Linguistics series (Warschauer & Kern, 2000). He was the

founding editor of *Language Learning & Technology* journal and the recipient of the Educational Testing Service TOEFL Policy Council International Award for Outstanding International Contribution to Language Learning and Technology.

Several graduate students or visiting scholars at the University of California, Irvine will co-author the book with Dr. Warschauer. They will help conduct research for the book under his close supervision during the 2008-2009 academic year. Dr. Warschauer will then work from June to December 2009 to construct a sharply-focused manuscript that meets the high standards of an authored book in the Cambridge Applied Linguistics series.
(Should we add our credential here as well?)

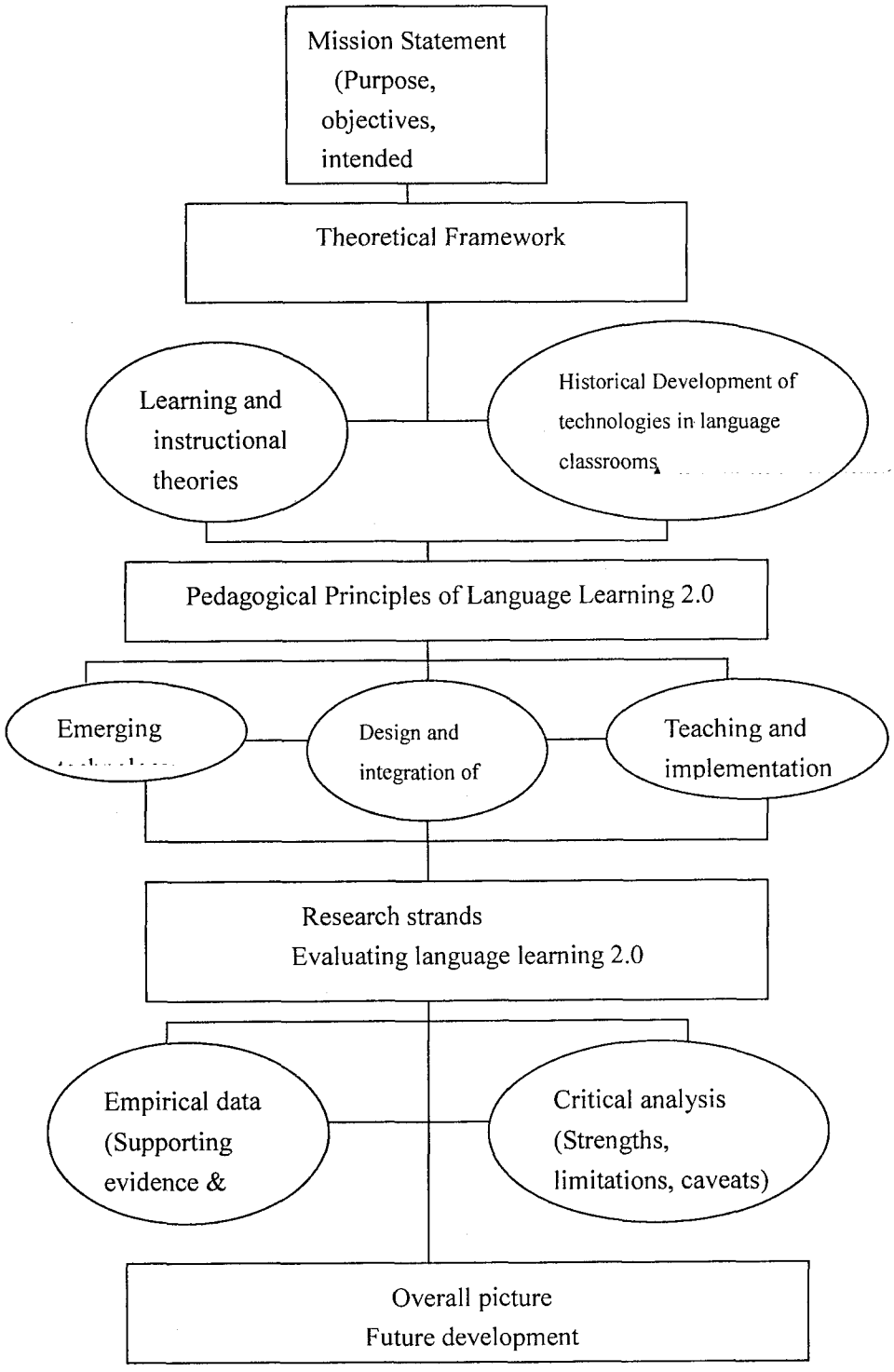
X. References Cited in this Proposal

Chapelle, C. (2001). *Computer applications in second language acquisition.* Cambridge: Cambridge University Press.

Thomas, M. (Ed.). (in press). *Handbook of Research on Web 2.0 and Second Language Learning.* IGI Global: Hershey, PA.

Warschauer, M. & Grimes, D. (2007). Audience, authorship, and artifact: The emergent semiotics of Web 2.0. *Annual Review of Applied Linguistics, 27,* 1-23.

Warschauer, M., & Kern, R. (Eds.). (2000). *Network-based language teaching: Concepts and practice.* New York: Cambridge University Press.


Mission Statement (Purpose, objectives, intended
Theoretical Framework
Learning and instructional theories
Historical Development of technologies in language classrooms
Pedagogical Principles of Language Learning 2.0
Emerging
Design and integration of
Teaching and implementation
Research strands
Evaluating language learning 2.0
Empirical data (Supporting evidence &
Critical analysis (Strengths, limitations, caveats)
Overall picture
Future development

格式化: 字型: 10 點

附錄五 共同為美國 National Institute of Technology 撰寫 *Technology in Adult Literacy and English Language Learning Programs* 一文二次修訂稿

Emerging Technologies in Adult Literacy and Language Education
by Mark Warschauer and Meei-Ling Liaw

Introduction

Over the last 10 years, digital technologies have gone from being an optional tool for the few to a required tool for the majority. Fully 73% of the population make use of the Internet (including 90% of those aged 18-29; Pew Internet and American Life Project, 2008a); a decade previously, less than one-third of Americans accessed the Internet either at home or at work (National Telecommunications and Information Administration, 1999). Computers and the Internet are more important than ever before in domains ranging from employment to education to civil affairs (Bureau of Labor Statistics, 2008; Pew Internet and American Life Project, 2008b).

At the same time, the form and function of computers and the Internet have changed dramatically. A decade ago, a typical person went online at a desktop computer using a slow, sometimes-on Internet connection. Web content was created by a small minority, and most of it was in segregated isolated information silos. Today, the majority of computers sold are laptops, most of which access the Internet from always-on broadband wireless connections. Millions more access online information through personal digital assistants or telephones. Tens of millions of people contribute to Web content through blogs, wikis, podcasts, and other "Web 2.0 technologies," while people and information connect through vast social network sites. And many employers today are looking for much more than basic computer skills; they are seeking the kinds of autonomy and creativity with technology that comes from extensive self-directed use.

In the remainder of this paper, we evaluate emerging technologies and their possible uses in adult literacy and English language learning programs. We emphasize not so much where we have been in this area, or where we may be in a generation or two, but rather what new technologies have emerged in recent years (either as brand new, or with significantly changed features or accessibility) and have the potential to impact adult literacy and language education in the coming years. We consider technologies in five areas that seem especially promising: (1) collaborative writing and communication, (2) multimodality, (3) immersion (4) linguistic tools, and (5)

one-to-one and mobile computing.

Our purpose is to address the potential of using these emerging technologies for adults with low literacy skills as well as adult English language learners in the U.S. However, for most of the technologies under discussion, there has been little if any research conducted with these particular groups. Therefore, this paper also discusses research undertaken with other audiences, such as K-12 students, adults in higher education, or learners in other countries, with the caveat that it is yet to be determined how applicable any findings may be to adult literacy and language

Online Writing

The development of a knowledge economy has greatly amplified the value of being able to write well. A recent national survey of U.S. employers found that the good writing is considered a threshold skill for salaried employment and that the majority of companies frequently or always include writing assessment in hiring salaried employees (National Commission on Writing, 2004). The study also found that in fast-growing sectors of the economy between one-fifth to one-third of hourly employees also have writing responsibilities, and bad writing (for example, on a resume or job application) can harm employment opportunities. Knowing how to write well (e.g., in blogs, discussion forums, and other online sites) is also of value for civic participation, life skills, and forming social relations.

The ability to foster collaborative written communication has long been considered a major advantage of the Internet for both second language learning (see, e.g., Kern, & Warschauer, 2000) and adult literacy (see, e.g., Gillespie, M. K., 2001). Yet new resources for this are in existence today that did not exist a decade ago. These include blogs, wikis, and other free online writing tools.

Blogs

A blog (originally short for Weblog [Web log]) is an online diary posted in reverse chronological order (for an overview of blogging, see Gurak, Antonijevic, Johnson, Ratliff, & Reyman, 2004). Such online diaries could be constructed previously, based on laborious editing and republishing of Web pages, but specialized software popularized in 1999 made the process remarkably simple (for an early history, see Blood, 2000). By early 2006, approximately 39% of teenage and adult Internet users in the U.S. were reading blogs (Lenhart and Fox, 2006). By August 2008, the blogging search engine, Technorati, was tracking 113 million blogs around the world (Technorati, 2008), collectively known as the blogosphere. Standard blog software today allows for posting of images as well as text, links to other material within or

outside the blog, and responses to blog entries by others (referred to as comments). The majority of blogs fall into three general types: (1) personal journals that document people's personal thoughts, feelings, and day-to-day experiences for themselves and others; and (2) informational blogs that seek to further understanding on particular topics (e.g., business, technology) through brief postings and links, and (3) agitational blogs that seek to argue or persuade, often on political topics (see Warschauer & Grimes, 2008). There is wide variation in blog structure, from single-author blogs with few links to external sites, few if any comments, and infrequent updates, to complex multi-author blogs with extensive linking and tagging, constant updates, and voluminous commenting (Herring, Scheidt, Bonus, & Wright, 2005). Examining the overall blogosphere, Herring and her colleagues suggest that blogs fill an intermediary role within online genres, about mid-way between standard HTML documents, such as personal home pages, and asynchronous computer-mediated communication (CMC), such as newsgroups, bulletin boards, or e-mail discussion lists (Herring, Scheidt, Bonus, & Wright, 2005). They are more frequently updated, include more exchange among people, and include a higher percentage of text (as opposed to multimedia) than standard Webpages. But the exchanges on them tend to be more asymmetric (i.e., dominated by main authors) and less frequently updated than CMC sites such as newsgroups.

Blogs are especially popular among young people, and a national study of teenagers online found that those who blog are the most prolific writers in a variety of other online and offline writing realms. However, people some some 52% of people who write for blogs are age 30 or over (Rainie, L., 2005), and blogging activities can be developed for any age level. For example, Allen Kleiman (2008), a librarian specializing in developing library services for older adults, recommends that older adults be taught how to create or contribute to blogs about family history, the history of their local communities, or common interests such as volunteer opportunities.

Not surprisingly, educators are beginning to exploit blogs as a potential tool for the teaching of L1 and L2 writing (see, e.g., Lowe, & Williams, 2004; Walker, 2005; Krause, 2004). A relevant example for language and literacy education is presented by Bloch (2007), who describes the use of blogging to promote critical literacy and academic writing in college ESL class. Bloch's account focuses on the experiences of Abdullah, a Somali student who had immigrated to the U.S. from East African refugee camps as a teenager. Like many generation 1.5 immigrants, Abdullah felt most comfortable with vernacular English, but had difficulties with academic writing. Bloch describes and illustrates how blogging served as a useful vehicle for Abdullah to bridge from a more colloquial style of writing to a more academic style, and how his style shifted over the course of a semester. He also illustrates how blogging can

be a helpful tool for discussing topics that require personal reflection from students, such as plagiarism, and for rhetorical exchange with others in ways that are not usually facilitated by academic writing. Bloch concludes that blogging should be seen as not only a pathway to academic writing for students, but also as an important new literacy act in its own regard, enabling students to become "contributors and not just consumers of information on the World Wide Web" (p. 138).

An excellent example of blogging in adult education comes from the UK, where Cullimore (2007) reports on the successful use of a blog, called LifeChoices, in instruction of adults with learning difficulties or disabilities. LifeChoices was set up as a "closed blog" requiring a user name and password in order to provide a safe environment for those low-literacy adults. Participants in LifeChoices came from four different classes, which allowed learners to interact with others outside their immediate group. Students wrote on a range of topics related to material they were covering in course. Tutors reported that the learners gained confidence in their communications, increased their motivation for writing, became more familiar with the Internet and competent in using computers, and gained respect for both their own and others' contributions. Learners became especially excited when those from outside their own class commented on what they had to say. Based on results of the project, Cullimore makes a number of practical suggests for blogging in adult education, including providing a clear and simple list of instructions appropriate to your learners about how to write on the blog, getting all learners "hands-on" as soon as possible to give them the experience of posting or comments, encouraging students to post at least once a week and ensuring that students receive a response to their postings at least once a week, and making use of digital photographs in class blogs to help spark students' interest.

In contrast to the close blogs of the LifeChoices program, some adult educators, such as Kristi Reyes of MiraCosta College have students contribute to or create their own publicly available blogs. In vocational ESL classes, Reyes emphasizes how having a positive online presence can be helpful in the job market, since employers frequently "Google" the names of job applicants. Using the free Blogger software program (http://blogger.com), Reyes' vocational ESL students create public blogs where they discuss their personal and career interests.

Finally, blogs have an important role in exchanging information among adult literacy educators. Two excellent examples are the Adult Literacy Education blog by David J. Rosen (http://davidjrosen.wordpress.com/) and the Adult Education and Technology

blog by Marian Thacher (http://marianthacher.blogspot.com/).

Wikis

Wikis are simply Websites that any visitor can contribute to or edit (Richardson, 2006). By far the largest wiki, and one of the ten most visited Websites in the world is Wikipedia. This open source encyclopedia exists in more than 190 languages (Holloway, Božicevic, & Börner, 2007). Its English version alone includes more than 1,800,000 articles totaling some 609 million words, about 15 times as many as are in the next largest English language encyclopedia, the Encyclopaedia Britannica (Wikipedia, 2007b). Most remarkably, there have been some 236 million edits to Wikipedia since its inception in 2001 made by 5.77 million contributors (Wilkinson & Huberman, 2007).

Much of the discussion regarding the use of Wikis in education has focused on the suitability of Wikipedia as a source for student research. The founder of Wikipedia, Jim Wales, provides the most commonsense answer to this, suggesting that although Wikipedia can help provide an overview of issues and a starting point for identifying primary sources, students are better off using primary sources as definitive sources in their research (Warschauer & Grimes, 2008)

A more interesting question is how writing for wikis in language, composition, and other courses can affect the learning process and specifically, adult learning processes. The potential of wikis for teaching and learning is hinted at by Ward Cunningham, inventor of the wiki, who commented that "The blogosphere is a community that might produce a work, whereas a wiki is a work that might produce a community." Cunningham's statement illuminates a central contradiction of computer-mediated communication (CMC) since its inception: it has served as a good medium for exploring identity, expressing one's voice, airing diverse views, and developing community, yet has proven unsuitable for accomplishing many kinds of collaborative work due to the inherent difficult of arriving at decisions in groups dispersed by space and time. (See meta-analysis comparing face-to-face and computer-mediated decision-making by Baltes, Dickson, Sherman, Bauer, & LaGanke, 2002).

Wikis turn traditional online writing activity around in several respects. Whereas e-mail and chat facilitate informal, author-centric, personal exchange, writing on a wiki facilitates more formal, topic-centric, depersonalized writing. Each edit makes a concrete contribution to a collaborative written product, with authorships relegated to a separate page that only the most serious of readers are likely to notice. This

kind of de-personalized informative writing is in common in the business world, and wiki writing may be effective in helping teach it.

Though a number of educators are beginning to report on their experiences, publications to date mostly consist of lists of suggestions or summaries of experiences by practitioners (see, for example, Mader, 2007, for a collection of reports from high school, college, and university classrooms, and Mader, 2008, for an informative summary of current uses of wikis in education). A report on Wiki collaboration in an ESL teacher training workshop is provided by (Elia, 2007). Fissaha Adafre and de Rijke (2007) have done some initial work toward creating parallel corpora of similar sentences in different language versions in Wikipedia, which could prove useful for second language education as well as research. Warschauer and Grimes (2008) report how an educator found wiki writing to be more motivating than conventional writing assignments; undergraduates reportedly worked with vigor, attention, and excitement to collaboratively complete and flesh out a dictionary of key terms and concepts. The contributor-tracking facility of wiki software also solved the problem of individual assessment in group-project assignments, as the instructor could use this to see the exact contributions of each individual in a group.

A simple English Wikipedia has been created to ensure greater access to information for English language learners and other low literacy adults and youth (Simple English Wikipedia, 2007b). Contributors to this new version are encouraged to use more basic vocabulary and grammatical structures, avoid idioms and jargon, and write shorter articles (Simple English Wikipedia, 2007a). This simplified Wikipedia can serve as a research site for those with beginning or intermediate literacy skills, a place to contribute meaningful writing for those with intermediate or advanced literacy skills, and a site where prospective literacy instructors or teachers of English can practice communicating at a level appropriate for learners.

Though there is as yet no published research on the topic, adult educators are beginning to experiment with the use of wikis to support collaborative writing in both instruction and professional development. Barry Bakin of Pacoima Skills Center and Jenny Gundy of Vermont Adult Learning launched "Coast to Coast" wiki as an environment for collaborative writing among their students (http://coasttocoast.pbwiki.com/), and Kara Whittingham of Randwick College in Sydney has made use of a wiki for adult ESL students to write group reports about study and career pathways (see information at http://esol3-4.sydneyinstitute.wikispaces.net/Project).

Even in cases where people are writing individually rather than collaboratively, a free educational wiki (see, for example, http://pbwiki.com/academic.wiki) can be a place

for students or educators to easily publish and edit their writings for others to see. For example, Liz Koenig, who helps coordinate teacher training of adult ESL teachers in Los Angeles Unified School District, uses a free wiki for ESL teachers to post their reflections on workshops they participate in (see http://eslacademy.pbwiki.com/).

As with blogs, wikis are a valuable source for collaboration and knowledge production among literacy educators. For example, the Adult Literacy Education (ALE) Wiki, created by David J. Rosen in 2004 and afterwards developed by many adult literacy practioners and advocates, today has over 900 registered users, nearly 1,000 pages, and over a million page view (Rosen, 2007). The ALE Wiki is a free, online environment shared by whoever choose to participate and are interested in adult basic education, adult secondary education, and English language learning. The ALE Wiki includes discussion and resources on a number of topics ranging from adult basic literary, to assessment, workforce and workplace education, and public policy (see http://wiki.literacytent.org/index.php/Main_Page).

Other Free Online Writing and Communication Tools and Environments

In addition to blogs and wikis, other new tools for online writing and collaboration have emerged in recent years that could potentially be valuable for adult educators.

Goodle Docs (http://docs.google.com) is a web-based word processing, presentations and spreadsheets program offered by Google. Google Docs offers several possible advantages over traditional office software for adult education programs. Its use is free, it requires no hard drive space to be allocated to individual users, users can access their documents from any computer connected to the Internet, and multiple users can collaborate on the same document. Google Docs thus provides possible benefits of cost, convenience, and most importantly, new opportunities for collaboration. Google (2008a, 2008b) offers a number of suggestions for making use of Google Docs in the classroom, many of which are applicable to adult education.

Moodle (http://moodle.org) is a free open-source course management system that includes modules for discussion forums, real-time chat, wiki, and other features featured in commercial counterparts, such as Blackboard. Moodle can be used to organize collaborative written discussion among students or offer online courses for students or for professional development. For example, LiteracyTent (http://literacytent.org) offers a wide range of onlie courses to literacy providers and educators free of charge using Moodle (http://moodle.literacytent.org).

FanFiction.net is a site for people to post fictional writing on topics related to books, cartons, games, comics, movies, and television shows. Black (2008) carried out a a two-year study of adolescent English language learners who voluntarily participate on fanfiction.net in their own time, simply to share their writing, to identify how they exploited the social, textual, and technological elements of the networked community to scaffold and promote their reading and writing development. She found that the peer-review practices of the site tempered critique of form with enthusiasm for content and rhetoric, discouraged hostile feedback, and attended to authors' needs as communicated in authors' notes or communication between writers and reviewers. All of this, according to Black, allowed English learners to develop a strong sense of audience, understand the social nature of writing, explore their identity as writers, and master multiple modes of representation to achieve their rhetorical intent. No similar research has been carried out on fan fiction writing with adults, nor in instructional situations. However, Black's study does point to some of the potential advantages of online writing exchange.

Multimodal Production

Multimodality involves combinations of linguistic, visual, audio, gestural, and spatial modes of meaning (Kress, & van Leeuwen, 2001). A number of reasons have been put forth for including multimodal production in language and literacy education. These include familiarizing students with the types of meaning-making that are gaining ascendancy in the worlds of business and other environments today, increasing student motivation by operating in multimedia realms that are familiar to them, helping students develop a critical approach to media (through having produced it themselves), empowering students to create products that are culturally and socially relevant to their lives (by incorporating multimedia images and sounds related to their lives and communities), and providing multimodal scaffolding for content production among students who are still developing their language and literacy skills (see, e.g., Cummins, 2008; Kress, 2003; New London Group, 1996; Warschauer, 1999).

Multimodality has been incorporated in language and literacy education for youth and adults for some 20 years. It is considered an emerging technology, though, because of the new types of software and sites that make it feasible for large numbers of learners without specialized training to produce and share their work. We divide our discussion of this issue into audio and audiovisual applications.

Audio

The development and diffusion of software for producing, uploading, downloading, and playing digital audio files (i.e., podcasts) makes the flexible use of a wide range of audio easier than ever before in the classroom. This potentially is of most use in English language learning programs.

Hegelheimer and O'Bryan (2009) conduct a review of podcast resources and technologies for second language education. One of the resources they point to is ESLpod.com. which includes more than 500 free downloadable audiofiles organized by topic and developed especially for English language learners. Other pre-made podcasts are available to promote academic listening skills, facilitate preparation for listening tests, provide grammar tips, or cover business English topics (Hegelheimer, & O'Bryan, 2009; Viswanathan, 2009). As O'Bryan and Hegelheimer (2007) point out, the use of podcasts, beyond providing listening material for in-class use, class also be made available for outside-of-class use to (1) provide a repository of classroom discussion or lecture; (2) extend, expand, and exemplify what was covered in class; and (3) prepare learners for the next class period.

Audio podcasts provide learners with the opportunity to record their own speech in multiple genres (reports, simulated broadcasts, oral presentations, etc.) to share with classmates or others (Lu, 2009) or to access again themselves later to reflect on their own language learning progress (Warschauer, 2006). Some educators report that students pay especially close attention to detailed aspects of their speech when recording such podcasts (see Stanley, 2006, cited in O'Bryan & Hegelheimer, 2007). Though student creation of audio podcasts occurs more commonly in ESL instruction, it has potential value in first language literacy instruction as well, as students can be involved in writing scripts and then recording them.

Finally, educators are also having students create musical compositions using software such as *Garage Band* (for the Macintosh) or *Audacity* (a free, open-source program for multiple platforms. Uses in literacy instruction include recording of music to express the meaning of poetry, thus engaging in students in active interpretation of what they read (Warschauer, 2006).

The above applications of audio production and use have not yet been systematically studied in language and literacy education, either in general or as particularized for adult education. These uses do correspond to prior second language learning theory and research regarding learner autonomy (see, e.g., Benson, 2007), content production, and audio input, and there is thus reason for some confidence in their potential value.

Finally, one other potential use of audio in the language classroom involves cross-class exchanges. Such exchanges, involving students in one class communicating with other students across town or across the globe, have traditionally been done in writing (e.g., e-mail), but recently educators have been experimenting with audio-based exchanges using Skype, Google Talk, or other peer-to-peer voice-over-Internet-Protocol tools (see, e.g., Mullen, Appel, & Shanklin, 2009). A comparative study by Japson (2005) found some advantages for audio-based vs. text-based computer-mediated communication, with students using audio mode more likely to negotiate for meaning and make conversational repairs. The value of such exchanges is probably greater in English as a foreign language contexts in other countries than in U.S.-based English as a second language classrooms, but ESL instructors who do make use of such exchanges may well want to experiment with incorporation of audio to complement the role of written text.

Audiovisual

Student production of audiovisual material has been used for a wide variety of reasons in language and literacy education for youth and adults, including to develop media awareness, master new genres, and produce documentation for student reflection (Warschauer, 2006). There are a wide variety of audiovisual genres, from film to websites. One particular genre that has been promoted in language and literacy instruction is the digital story.

Storytelling has been a major way of transmitting culture and values throughout human history (2003), perhaps because, as cognitive scientist Schank (1995) posits, humans are wired to understand knowledge communicated through story. Digital storytelling involves the incorporation of digitized photos, video, audio, typography, and texts into personal narrative.

As in many areas of technology and learning, more research has been conducted with youth than with adults. Hull has investigated digital storytelling among adolescents facing literacy challenges at a community technology center in an impoverished community of Oakland, California (Hull & Katz, 2006; Hull & Nelson, 2005). She suggests that students find such production highly motivating, that it allows them to explore and express their agency, and that they develop semiotic awareness as they experiment with meaning-making across modalities and media. The work of Hull and her colleagues is supported by that of Cummins (Cummins, 2008; Brown, Cummins, & Sayers, 2007), who emphasizes the value of what he calls *identity texts*. These multimodal creations by immigrant youth bring together diverse digital resources that

express values important to them, their families, and community.

In one study among adult English language learners, Nelson (2006) have found that the use of multiple media in digital storytelling helps such learners amplify their sense of authorship, as they find deeper meaning in what they want to say through the process of adding and combining modes.

Kristi Reyes teaches an adult (non-credit) ESL class in digital storytelling at MiraCosta College in California. According to Reyes, students take her class to boost their computer skills and practice language in a meaningful context. Reyes has students combine photos they have taken with their own oral narrative, based on a written script they have produced. She finds that gives students a chance to practice grammar, pronunciation, and oral delivery in a highly motivating context as students share life stories. In the end of class, students burn DVDs to share with their families and some post their digital stories on YouTube (see student productions at http://mccdigitalstory.blogspot.com/).

Sharing of students' multimodal work, either within a class, across classes, or with a broader audience, can be one way to help make multimodal production more motivating and interesting to students. In addition to YouTube, some other Web 2.0 sites that are helpful for this process include VoiceThread (http://voicethread.com/), which allows people to post presentations including holds images, documents, and videos and allows people to comment using using voice, text, audio file, or video; Glogster, (see http://glogster.com/edu for special educators' site), which allows creation of public or private "glogs" mixing graphics, photos, videos, music, and text; and Authorstream (http://authorstream.com), which allows students to create flash versions of PowerPoint presentations which they can host at that site or incorporate into their own blogs.

In summary, there is no doubt that multimedia creates a powerful way to convey heart-felt meaning by students from diverse cultures. Since such production often involves the audio recording of scripts the students write, it can also be used to reinforce writing and language development. Language and literacy instructors need to maintain an appropriate balance so that attention to multimodality reinforces language and literacy goals rather than distracting from them.

Immersion

Immersion has long been an effective approach for aiding language learning, whether through immersion in a foreign country or immersion in a bilingual classroom. Similarly, adult literacy can be promoted through immersion in contexts requiring

authentic reading, writing, and other meaning-making activities (see, for example, Elish-Piper, 1995, 1996). Today, emerging technologies can provide new forms of immersive learning online. We consider three prominent applications for immersive learning: multiplayer online games, virtual environments, and social network sites.

Multiplayer Online Games

Multiplayer online games have proven captivating to people of diverse ages. The most popular genre among these involves large numbers of participants in role play. Some 16 million people around the world play these massively multiplayer online role-playing games (MMORPGs), including 10 million players of a single game called World of Warcraft.

Jim Gee, a cognitive psychologist and literacy theorist, posits that much of the appeal of these games lies in their learning mechanisms. Gee (2003; 2004; 2007) claims that, on the one hand, such games are challenging, but, on the other, games provide the types of scaffolding necessary – through multi-stepped levels of difficulty and potential assistance from other players – for people to steadily progress, thus bringing players a tremendous level of satisfaction. All together, he lays out 36 learning principles that are embedded in games (Gee, 2003), including the *semiotic principle* (people learn to understand interrelations within and across multiple sign systems), the *bottom-up basic skills principle* (people learning basic skills not in isolation or out of context but through a process of discovery while engaging a broader domain), and the *affinity group principal* (people learning through groups that are bonded through shared endeavors, goals and practices rather than through race, gender, or ethnicity). A particularly valuable contribution is Gee's tripartite analysis of identity; with game-players having *virtual* identities (i.e., those of their characters in a virtual world); *real-world* identities (i.e., their actual self playing a computer game; and *projective* identities. The latter refers to both how learners project their own values and desires onto the virtual character and also how they see the virtual character as their own project in the making.

Gee's theoretical work in this area is extended by Steinkuehler's (2007) two-year ethnographic study of literacy practices among MMORPG players. Steinkuehler argues that playing these games is a literacy activity in itself, based on how gamers must continually "read and write" meaning within this complex semiotic domain as every successful move requires participants to both recognize and produce meaning out of an overwhelming array of multimedia, multimodal resources. As for more traditional types of literacy, Steinkuehler found that players read and wrote copious

amounts of text while playing, since communication in the game they played was largely text based, involving letter writing (using the in-game mail system), narrative and poetry (shared with others through text chat), and instructional practices (apprenticeship, mentoring). Her study concluded that such games help players develop the types of authentic, creative, and wide-ranging literacies that schools purport to value.

In addition, a small pilot study was carried out to investigate the potential of MMORPGs for second language learning, with a group of adult ESL learners at university recruited to play a fantasy game called Everquest II – which is based on alternative universe races among elves, dwarves, ogres and other characters – for at least four hours per week (Waters, 2007). Unlike World of Warcraft, Everquest has extensive audio built in, as well as visual labels for all items in the game. The study found that, through carrying out tasks in the game, and being exposed to both visual and auditory reinforcement in the process, assisted players in development of vocabulary, but not necessarily grammar. Also, at least in this study only those students with an intermediate level of English or better could benefit from the immersive experience.

Nobody expects that U.S. adult education programs are going to start massively signing up their students to play World of Warcraft or Everquest in class. Rather, the challenge is to develop new games that match educational content with the types of learning principles embedded in commercial online games. Developing these educational games will likely be a challenging long-term enterprise, but the potential value of what are called "serious games" is such that there is substantial interest in them in fields ranging from professional training, military training, and healthcare, to advertising, and public policy.

Virtual Environments

Multi-user virtual environments lack game-like features, such as accumulation of scores toward winning and losing, but otherwise allow interaction among people in digitally simulated contexts. One of the most popular and best known such site, Second Life, brings together tens of thousands of users daily who design avatars, build communities, and interact with the environment. English learners in Second Life can work together with other learners and with native English speakers, collaborate to create objects, role play situations such as ordering at a restaurant, and participate in scavenger hunts and guided tours (Silva, 2008). These Second Life experiences can then be shared in a language classroom via presentations and essays.

A rapidly expanding cottage industry is emerging within and around Second Life to promote second language learning there (see discussion in Stevens, 2008;

Cooke-Plagwitz, 2008), and other virtual environments are being used for language teaching and learning as well. These environments potentially bring together the advantages of several other types of online applications. First, as in Web-based searches, users can seek and make use of information on a variety of topics. Second, as in multimodal production, users can create and post content. Third, as in computer-mediated communication, users can interact with others. Thus, language and literacy activities such as Webquests (which send users out to Websites to find information) can become Second Life quests in which students can adapt new identities and interact with others as part of their online investigation.

In addition to Second Life, a number of other virtual environments are being used or developed for language learning. Sykes, who established a virtual environment for learning Spanish called Croquelandia and studied it in her doctoral research (Sykes, 2008), suggests that these environments pose three potential benefits for language learning (Sykes, Oskoz, & Thorne, 2008). First, by allowing students to adopt simulated identities, students can experiment with and practice pragmatic language functions in diverse social contexts and settings. Second, students can engage in meaningful language practice in low-risk contexts, for example, by practicing authentic ways of apologizing without having to have actually offended a person in real life. Third, the situated realism of virtual environments can help students develop an emotional connection to the language they use and to language learning more generally, since it allows learners to feel as if they were "really there" (p. 538).

As with many other aspects of emerging technologies, the possible benefits of language learning through virtual environments have not yet been verified through research, especially in adult literacy or second-language learning, as opposed to foreign language learning) contexts.

Social Network Sites

Social networking sites (SNSs) are web-based services that allow users to create digital identities for themselves, list other users with whom they have relationships or connections, and view and communicate with these and other users all within a bounded system (Boyd & Ellison 2007). Since their advent in the late '90s, SNSs have logged approximately 250 million unique visitors (Halvorsen, 2009) of which Facebook alone claims 55 million active users. It is estimated that in 2008 nearly 44% of adults and 77% of Internet users will visit a SNS at least once a month (Center for Applied Research, 2008), though the extent of use among adults with limited literacy or English language skills is unknown.

What began as a tool to help friends and affiliates connect and send messages to each other has now evolved into a complex and globally ubiquitous system that serves many purposes, from marketing (bands on *MySpace*) to professional networking (*LinkedIn*). In addition, a number of social network sites have been set up specifically to connect language learners and mentors in English and other languages, including *Livemocha*, *Lang-8*, *Mixi*, and *Praxis Language*. These usually combine access to self-study material and opportunities to practice and communicate with others through peer-to-peer or peer-to-mentor synchronous or asynchronous interaction.

Two studies have been carried out thus far on the use of social networks sites for language learning immersion, both in foreign language contexts. Halverson (2009) carried out a small pilot project involving his university English as a foreign language students in Japan. Students were required to create and maintain MySpace pages using all of the tools integrated therein such as chats, blogs, audio and video uploads and, of course, email. Three important course components included the creation of and response to blogs on a variety of topics, recording and uploading of student-generated audio files, and cross-cohort interactions between students from two classes using chat, email, and responses to blogs—all of which were to be accomplished in the English language. Halvorsen found that the study encouraged student creativity and autonomy, as well as student collaborations, especially amongst mixed-ability language learners, with peer support increasing as (some) students took on the role of instructor. Harrison & Thomas (2009), also based in Japan, had their students sign up for Livemocha, as a supplementary language learning tool in a university course. Limited results were achieved within a three-month period, due in part to issues of trust with unknown distant mentors.

Contrary to what their name suggests, most users of SNSs are not necessarily looking to network or to meet new people; rather they are interacting with individuals who are already part of their extended social network. (For example, research conducted in the UK suggests that adults use social network sites principally to manage their existing relationship and for getting back in contact with old friends; Office of Communications, 2008). This suggests that the approach used by Harrison and Thomas above, using a SNS to link students in a school, may be more effective than that of Halvorsen, in which students are sent to SNSs to find distant mentors. This can be accomplished on publicly available sites, or on special sites created by teachers using software that allows users to develop new SNSs for specific purposes and groups (e.g., *Ning*).

We are not aware of any social network sites that have been set up specifically for use

adults with low literacy levels. However, the use of social network sites appears to have some potential value, both to give students more opportunities for reading and writing authentic material related to their personal lives as well as for developing students' mastery of a tool that they can use for personal or professional networking. Many adults may have an interest in learning about social networking sites to better understand their children's activities online.

Linguistic Tools

Most of the applications discussed above aim to promote writing improvement and linguistic fluency through increased time on task and language practice. However, there also exist a variety of computer-based and online tools that try to provide more direct linguistic support to students. We briefly consider four of these: online concordancing, text scaffolding, speech recognition, and automated writing evaluation.

Online Concordancing

Computer-based concordancing is computer software that provides an alphabetical index of all the words in a text or corpus of texts, showing every contextual occurrence of a word. Though it has been used in language learning for some 20 years (see, e.g., Tribble and Jones, 1990, #1293), there are two recent developments that greatly enhance its accessibility and scope. The first is that concordancing tools and large-scale corpora are now accessible for free on the World Wide Web. Previous use of concordancer involved the installation of special software on individual computers and the development or purchase of specialized corpora. Today, any teacher can introduce concordancing to students simply by pointing to free online sites such as *Concord Writer* and *Web Concordancer*. These allow students to immediately investigate how particular words or phrases are used in context and what collocations they tend to occur with. Secondly, whereas early large-scale corpora were based exclusively on written texts, there are now corpora of spoken texts, such as the free online Michigan Corpus of Academic Spoken English which includes 1.8 million spoken words searchable by gender, age, and position or role of the speaker, as well as category of speech event.

Though concordancing can be confusing to students, teachers can make use of concordancing and provide data to students, either through printouts or online links. For example, Gaskell and Cobb (2004) conducted a study in a lower intermediate level English writing course a university in Montreal, Canada that provided concordance

information as feedback on students' sentence-level written errors. They collected data from 20 adult Chinese English language learners learners between the ages of 18 and 50 (mean=34). During the 15 week period, the instructor gave feedback to each student's assignment, including online concordance links for five typical errors. The students then revises the text for final submission, and for each of the concordance-linked errors to submit a form explaining specifically what correction had been made based on what concordance information. In the end-of-course survey, all of the 20 students stated that they had learned a great deal and that they felt their English writing skills had improved. Over 50% responded that they felt their ability to use many of the grammar points targeted in the course had improved as well. Eight of the 20 learners (40%) contributed their improvement specifically to the concordance work and believed they would continue to use concordancing as a learning tool in future. Gaskell and Cobb's findings provide evidence for the potential advantage of using concordancing tools for adult literacy learners, however no research has yet been conducted among that population.

Text-Scaffolding Software

Adult students with limited literacy skills face a challenge in improving their reading. On the one hand, they need access to cognitively demanding texts to maintain their engagement and interest; on the other hand, many of these texts include too much vocabulary that is beyond their comprehension level. Literacy scholar Jim Cummins (2008; see also Cummins, Ardeshiri, & Cohen, 2008) has developed a text-scaffolding software program called e-Lective designed to overcome this contradiction, and the program is now available commercially. An instructor can import any reading text into the program, which then allows students clickable access to digitized speech readings of any phrase; English and L1 dictionary support for individual words; cloze and other practice exercises based on learners own vocabulary lists; a grammar mode to assist students in identifying part of speech; language detective activities for students to explore aspects of words' meaning, form, and use; and a writing mode to support students' creative response to texts they have read (Dynad, 2008). There has been relatively little research done yet with e-Lective, and none with adult learners.

Speech Recognition

Speech recognition software converts spoken words to machine-readable input. IBM has developed a program called Reading Companion to exploit speech recognition for helping people learn how to read, and is making the program available

for free to public libraries, community colleges, and agencies that offer adult literacy services (IBM, 2008). According to IBM,

> Users log on to the Reading Companion web site and are presented with material to read. An on-screen mentor, or companion, "reads" a phrase to the user and then provides an opportunity for the user to read the material, using a headset microphone. Depending on the accuracy of what was read, the companion provides positive reinforcement (e.g., "You sound great!"), gives the user an opportunity to try again, or offers the correct reading of the words on the screen. As the user's skill improves, the technology reads less material so that the learner reads more.

No studies have been published on the effectiveness of Reading Companion for literacy instruction, but IBM (2008) claims that, "independent evaluations of the technology demonstrate that... for adults, the software not only improved reading skills but also helped improve their English pronunciation."

Automated Writing Evaluation

Automated writing evaluation (AWE) incorporates technologies that provide automated essay scoring and other types of computer-generated feedback to student writing (see discussion in Warschauer & Ware, 2006). The most common AWE scoring engines assess measurable semantic, syntactic, and discourse features of student essays and then assign a score based on similarity of fit on these features to previously submitted student essays that were scored by human graders (2003). Other programs, which principally compare the semantic features of student texts to material from an informational data base, are able to assign scores with a smaller training set of student-essays, and thus can provide scores on alternative assignments, such as student summaries of texts (Landauer, Laham, & Foltz, 2003). Both types of programs also provide a variety of feedback on the mechanics or organization of student writing.

These scoring engines are now sufficiently developed to be used as a partial substitute for human raters on national standardized exams, such as the Graduate Management Assessment Test (see discussion in Burstein, 2003). They are not used in the official scoring of the essay portion of the GED test, but some of the companies that provide practice material and exams incorporate automated scoring of students' practice writing.

Web-based AWE programs for the classroom, which combine automated scoring, feedback to students, individual student and class progress reports for teachers, and a

variety of other student writing tools (e.g., dictionaries, thesauruses, model essays, brainstorming tools), are now available as well (Warschauer & Grimes, 2008).

A few recent studies have reported positive impact on student writing or language arts outcomes from use of AWE (see, e.g., Franzke, et al., 2005). However, the research record on this issue is limited and far from definitive (for an overview, see Warschauer & Ware, 2006). Other recent research, such as a case study of AWE use in culturally and linguistically diverse middle school classrooms in California, suggests that English language learners and other 7th and 8th grade students appreciate the rapid and impartial scoring and feedback provided and are thus more motivated both to write and to revise their writing (Grimes, 2008). According to this study, use of the software helped keep students engaged in writing and revising, freeing teachers to aid individual students as needed and also to be more selective in grading student work (e.g., to comment on and grade only a final draft rather than multiple drafts of a paper.). Another recent study, based on English as a foreign language instruction in a Japanese university had similar findings; there, implementation of AWE was most successful when computer-based scoring and feedback on earlier drafts of writing was combined with teacher response to later or final drafts (Chen & Cheng, 2008).

Though AWE programs are increasingly used (albeit at a still low level) in K-12 schools and universities, we are not aware of any use or research in adult language and literacy education. Many adult language and literacy programs may not find them suitable, but those focusing on writing skills may wish to consider them.

One-to-One and Mobile Computing

Some of the more traditional computer-based learning activities, such as drill and practice software, were intended to be used as an occasional curricular supplement. However, the emerging technologies discussed above for the most part require regular online access to achieve their educational potential. A major benefit of using these new technologies is fostering autonomous technology-based literacy among users. It is difficult to foster such autonomy if a student can only access a game, simulation, blog, or wiki on an occasional basis in a computer lab.

Fortunately, emerging developments in hardware may enable adult literacy and adult ESL programs to provide more consistent and flexible technological access on an individual (i.e., "one-to-one") and mobile basis. Emergent devices potentially affecting the educational sector include netbooks, nettops, rich clients, and cell phones. They will be each discussed in turn.

Netbooks

A decade ago, 20% of computers purchased were laptops. Today they constitute the majority, as laptops have steadily fallen in price and improved in performance, due in part to the widescale availability of wireless networks (Computer Economics, 2005). The recent launching of "netbooks" – low cost, leaner functioning notebook computers designed for Internet-centric work – is expected to hasten the pace of laptop implementation in schools. Currently priced between $300 and $500, these include scaled-down Windows machines with standard hard drives on the higher end and Linux-based computers with flash memory on the lower end. With more than two dozen netbook models either on the market or upcoming (for a listing and specifications, see Wikipedia, 2008a), both K-12 and adult literacy and adult ESL programs will have increased options for low-cost computing.

The potential cost savings of these netbook computers is enhanced by the range of free software now available both online and offline. Word processing, spreadsheet, and slide presentation software can all be accessed for free over the Internet (e.g., Google Docs, though this could put extra demand on school bandwidth, and out-of-school use may depend on students' having suitable Internet access at home) and open-source standard versions of the same programs are available (e.g., Open Office, though this places more demand on the limited computer processing power of netbooks).

The existence of low-cost notebooks and free software make possible expanded laptop use in adult education. The presence of wireless laptops has increased greatly in K-12 education in recent years, where they are often deployed in mobile carts that can be wheeled into rooms as needed, and thus shared among multiple teachers. A smaller but growing number of cases feature what are called "one-to-one" laptop programs, which provide all the students in a class, grade level, school, or district an individual laptop to be used throughout the school day and, in most cases, at home.

An extensive body of research has been conducted on one-to-one laptop programs in K-12 schools, including in language and literacy education. Three recent rigorous studies tentatively, taken together, suggest a positive impact on student test scores from laptop use. In Maine, where all seventh and eighth graders are provided laptops, eighth-graders' test scores in writing rose by 1/3 of a standard deviation from 2000 to 2005; students whose teachers made the most extensive use of laptops in writing instruction showed the greatest gains (Silvernail, & Gritter, 2007). In a California school district, laptop students in the fourth grade showed greater

improvement in English language arts test scores, reading comprehension, and writing strategies than non-laptop students after two years of use (Suhr, 2008). And a large study in Texas found a positive laptop affect on reading comprehension among middle school students, though not at a statistically significant level; students who used the laptops most for academic purposes, especially at home, showed the greatest gains in reading (Texas Center for Educational Research, 2008).

Beyond test scores, there have been a number of benefits of laptop use that have been reported in multiple K-12 studies. These include greater development of technological skills than non-laptop students (Schaumburg, 2001; Texas Center for Educational Research, 2008); decrease in gaps of technological proficiency between economically advantaged and disadvantaged students (Texas Center for Educational Research, 2008); heightened student engagement and motivation (Warschauer, 2006; Silvernail, 2007); and decrease in student disciplinary problems (Texas Center for Educational Research, 2008). Problems associated with laptop programs include their financial expense, the strain they put on technical support personnel, and the time and costs associated with professional development and curriculum development (Warschauer, 2006).

A number of lessons have been learned from K-12 laptop programs that would be beneficial for adult educational institutions that wish to implement similar programs. These include aligning the laptop program with key goals; planning logistical details carefully; planning for long-term funding, including not only the computers but also network connections, increased bandwidth, software, technical support, and professional support; providing training and professional development mainly on curriculum integration, not only on technical skills; developing solid partnerships inside and outside the school system; providing necessary digital content and tools; maintaining the requisite network infrastructure; allowing sufficient time for gradual implementation; and conducting research and evaluation studies (Zucker, 2005; Warschauer, 2005). The applicability of these research findings to adult literacy instruction is not yet known.

Nettops

Many adult education programs have large numbers of short-term part-time students with high rates of turnover. These programs may not find it practical to allow students to take laptops home, thus eliminating one of the main advantages of laptop computers (i.e., their mobility). As an alternative, many adult educations programs may want to expand their use of desktop computers.

Taking advantage of the same chip technologies used in netbooks, a number of companies are developing low-cost desktop versions, called nettops. At least a half-dozen products are currently on the market or forthcoming (for a list, see Wikipedia, 2008b), with prices for a basic unit, without monitor or keyboard, dropping under $250 (Richtel, 2008).

Though nettops have not yet been deployed in U.S. schools, the Indiana Department of Education has launched a large statewide program based on similar inexpensive desktop computers using open source software and operating system (for a detailed description, see Indiana Department of Education, 2008). A major focus of the program is on language arts classrooms. The intent of the program is to achieve the benefits of one-to-one computing at a lower initial and ongoing cost than through programs based on laptop computers with commercial operating systems and application software.

Rich Clients

"Thin clients" are computers with virtually no independent processing power that function through the operating of applications on a central server. Operating a network of thin clients, rather than traditional desktop or laptop computers, saves a good deal of time and money, since individual copies of software need not be maintained on computers. However, traditionally the use of thin clients has come at a great cost of flexibility and performance.

More recently, though, thin clients have been superseded by what are called "rich clients" (alternately called "thick clients" or "fat clients"). These computers also must be at least periodically connected to a central server but can carry out more independent processing and applications without that connection. And, unlike thin clients, thick clients enable users to display streaming video, create multimedia presentations, and engage in complex simulations and games. Nevertheless, as with thin clients, rich clients provide the advantage of maintaining almost all the software on the central server, thus making facilitating maintenance, technical support, security, and virus protection.

The Lemon Grove School District in Southern California has implemented a "one-to-two" (one computer per each two students) computing program for all its K-5 students, using rich client desktop computers, and a one-to-one computing program for all grade 6-8 students, using a mobile wireless rich client tablet called the e-Pad that students can take home (for details, see Anastos & LaGace, 2007). Most of the

software used, including both standard productivity tools and educational applications, are maintained on central servers, though smaller applications are maintained on the e-Pad chip.

A particular goal of the e-Pad program is to foster greater out-of-school learning time. Yet the e-Pad has limited functionality when it is not connected to the district server or the Internet. To allow at-home access via students' e-Pads to the Internet as well as to district programs, files, and applications, the district has partnered with a local cable company to provide filtered broadband Internet access to all students' homes. The district pays about $10 per month per student for the service, and there is no cost to students or their families. Such a model may be especially relevant for students enrolled in adult education programs who attend class a few hours a week but could maximize their learning through greater educational activity outside of school. Whether using traditional laptops, netbooks, or rich client tablets, school or district funds spent on Internet access for students (who then access applications on the Internet or on school or district servers) could help reduce costs for commercial software programs that would otherwise be required on individual student machines.

Though there has been no published evaluation of the Lemon Grove rich client program, the district reports improved student attitude and motivation, increased attendance, and higher English language arts test scores for students in a three-year pilot one-to-one program compared to students not in the program (Lemon Grove School District, 2008).

Cell Phones

Beyond the computers mentioned above, other interconnected mobile devices include a wide range of handheld computers, personal digital assistants, smart phones, and cell phones. Most of these are unlikely candidates for use in adult education programs because their cost-benefit ratio can't compete that of more fully functional low-cost computers, such as netbooks discussed above (see discussion in Warschauer, 2006 as to the limitations of handheld computers in education). However, cell phones represent a possible exception to this, because they are already widely owned by U.S. adults, with estimates of U.S. market penetration ranging from 75% to 90% (see, e.g., Horrigan, 2008; TNS Canadian Facts, 2008), and most students and teachers are already familiar with their interface and operation.

Some of the applications that are under development for mobile phones include collaborative content development, as students contribute to collective websites by sending text messages, or pictures, or video from their phone (Attewell, 2005; Tribal Education Unlimited; Gromik, 2009); vocabulary learning activities through exercises and quizzes (Thornton & Houser, 2005); and task-based language learning activities through graphical games (Kam, et al., 2008).

A major purported benefit of these applications is the convenience and accessibility to the students of material provided via cell phone, both inside and outside the classroom. For example, a study in Japan found that college students prefer to receive language learning materials via their phones than via their computers and also learn material better when it is presented via phones than via paper or the Web (Thornton & Houser, 2005). However, this study and much of the other preliminary research and development on this topic has been carried out in Asian and European countries where cell phone penetration approaches 100 and people are used to using their cell phones to complete a wide variety of functions and tasks (e.g., text messaging, sharing pictures, playing games). Whether adults in U.S. language and literacy programs will also find learning by cell phone beneficial is yet to be determined. A program recently launched to provide phone-based ESL instructional material to Hispanics in migrant farming communities (see Kam, 2008) may shed further light on the value of cell phones in U.S. education.

One relevant project that has been carried out in the U.S.—albeit focused on adults' literacy support for their children rather than adult literacy per se—is the PBS *Ready to Learning* program. This project involved the streaming over cell phones of two types of material to parents of pre-schoolers: literacy tips, which gave parents suggestions on how to incorporate letter recognition and letter sound activities into their everyday routines with their children, and letter video clips, which were intended to be shown to children by their parents and included Sesame Street material about a different letter every day. To evaluate the effective of the project, a study was conducted using surveys, interviews, and an automated system that tracked participants' streaming of literacy content to their cell phones (Horowitz, Sosenko, Hoffman, Ziobrowski, Tafoya, Haggenson, Hahn, 2006). The findings revealed that the participants found the intervention to be a positive experience, especially for their children. The parents and children reacted enthusiastically to receiving early literacy content via cell phone. Parents reported that their children benefited from the program, and that the children were eager and excited to view the letter video clips. (Some parents reported that each time the phone rang, their children came running, hoping

the call was from Elmo.) Despite technical drawbacks, such as slow loading of video clips and quick draining of batteries during video streaming, the researchers conclude that cell phones have the potential to be an effective medium for delivering PBS *Ready To Learn* content to parents of preschool children and to the children themselves.

Conclusion

The emerging technologies discussed in this paper are all rapidly evolving. Many of them have been little investigated and, in some cases, not researched at all in adult education settings. None of them are so demonstratively successful in adult language and literacy programs that educators should feel compelled to adopt them whole cloth immediately.

Yet while over exuberant adoption would be a mistake, so too would we be in error by failing to recognize the long-term potential of these emerging technologies for adult language and literacy instruction. In a world where hardware, software, and connectivity prices are falling; new technologies are playing an increasingly vital role in business, academic, and civil affairs; educational applications of digital media are growing in sophistication; and young adults are coming to school with growing amounts of technological experience and comfort; the cost-benefit ratio of integrating digital technologies into learning is steadily decreasing. One can imagine a day in the not too distant future when some kind of mobile computing device, not any more expensive than a couple of textbooks, will be as commonplace in the classroom as pen and notebook are today, and these devices will be used to carry out many of the above-described functions (e.g., collaborative writing, automated evaluation, multimodal communication, virtual exploration, social networking, concordancing, text scaffolding) within a single integrated environment.

We need not rush this future, but we should begin to prepare for it. Research and development efforts that help adapt emerging technologies for use in adult language and literacy contexts, and then systematically investigate their impact on learning processes and outcomes, will help pave the way for the kinds of adult language and literacy education needed in the next decade and beyond.

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