Technology in Chinese Language Teaching and Learning

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Introduction
Technology is used more and more extensively nowadays in all walks of life. Language educators have also been using technology to enhance their teaching.

The development of technology is reflected in the use of different types of technology over the past few decades. Language teachers have moved from using audiotapes to using audio CDs, and from videotapes to multimedia. This is also true for Chinese language learning and teaching. During the past decades, the extensive use of computers and the Internet in teaching languages is evidenced by a proliferation of web resources and multimedia software for learning (Bourgerie, 2003; Xie, 2007). Extensive use of computers in and out of the classroom has also been documented in research papers and articles. For example, Chun and Zhao (2006) state that "text-based online chat is a second language learning environment that holds some pedagogical potential, as it leads to higher rates of noticing." ¹ Computer Mediated Communication (CMC) has become a trend in foreign language teaching. MSN messenger, Yahoo messenger, Skype, AIM, and QQ have also been used for online tutoring and teaching (Godwin-Jones, 2005).

Although some researchers disagree about the effectiveness of using technology in language education (http://www.nosignificantdifference.org), students seem to like technology. For example, Corbeil's research (2007) shows that students react more positively to using PowerPoint (PPT) in classrooms and consider it to be a more effective learning tool than textbooks. Other research shows that network-based group work carried out via emails, chats, and online discussions helps students increase their awareness of different aspects of the target language and increasingly focus their

¹ ‘noticing’ means that students notice their problematic language productions and the interactional feedback from their interlocutors during chat.
attention on their own language learning process. This in turn increases students' confidence in using the language (Dooly, 2007).

More and more teachers are becoming aware of the usefulness of computers and web resources in teaching. We can, for instance, use special software to prepare teaching materials more effectively than with simple word processing or typing alone. We can also use existing websites to supplement our teaching, or create our own websites and online exercises. However, Chinese language teachers are not always familiar with all the computer resources that are available, and often do not know how to locate them. This article intends to serve as a basic introduction to the role of technology, mainly computer technology, in teaching Chinese and how to utilize computer and Web resources.

This paper will discuss some important concepts and theoretical issues related to CALL (Computer-Assisted Language Learning) first, and then it will recommend some of the computer programs and websites that authors have found to be useful and effective. It is by no means intended to be an exhaustive study of general theoretical issues or any specific computer programs for learning Chinese for two reasons. Firstly, the computer technology develops so rapidly that some programs become out of date very soon while new ones appear almost every day. Secondly, the explosive growth of information made it extremely difficult for anybody to cover too many aspects. Interested readers may refer to Yao (1996), Zhang (1998), and Bourgerie (2003) to understand the history of CALL for Chinese and to read reviews of various Chinese CALL software programs. The Chinese Language Teachers Association website also has a web page called "Online (CALL) Reviews" which provides online access to reviews of computer-assisted language learning (CALL) software and other computing-related reviews published in the Journal of the Chinese Language Teachers Association (JCLTA). The URL is: http://clta-us.org/reviews/reviews.htm.

Three stages of CALL

Educational technology has undergone great changes during the past decades. At the earliest stages, technology used for language teaching and learning included gramophone records, tape recorders, slide projectors, radios, TVS and other electronic devices. The rapid development of computer technology has revolutionized the way of communication and its impacts on teaching languages are unprecedented. The concept of computer aided language learning is widely recognized for foreign language education now.

Some researchers have proposed that CALL has undergone three stages of development. Warschauer and Healey (1998) named these stages as “behaviouristic, communicative and integrative” stages. According to them, the first stage is characterized by using audio-lingual technology based on the structural linguistic view on language. The second stage features interactive communication based on cognitive approach to language acquisition. At the third stage, focus is on authentic discourse and fluent use of language in real situation. Bax (2003) has somewhat different approaches. He proposes that the three stages are: restricted CALL, open CALL and integrated CALL. He claims that during the
first stage, computer programs were mostly for mechanical drills. The students had minimal interaction with other students while teachers have "exaggerated fear and/or awe" toward using computers. In the second stage of open CALL, the focus was placed on "linguistic skills development" and the students might interact with computers and other students occasionally. Finally, the third stage of integrated CALL features computer mediated communication (CMC) and the students’ interaction with others (students, teachers or native speakers). Use of computer becomes normal part of teaching. Computers are accessible in “every classroom, on every desk, in every bag”. That is to say, the use of computer technology is “normalized” (Bax, 2003).

The theoretical issues of using computers in language teaching

It is interesting enough that technologies used for language teaching has often been related to corresponding linguistic theories and every type of language teaching has had technologies to support (Warschauer and Meskill, 2000). According to them the audio tape was “the perfect medium for the audiolingual method”. The appearance of computer software such as text-reconstruction, concordancing and multimeia programs supported cognitive approaches to language teaching. Computer-mediated communication (CMC) in classroom and for long distance exchange provides teachers and learners with the opportunities to take sociocognitive approaches. The Internet becomes a powerful tool for assisting sociocognitive approaches to language teaching.

One of the questions that the language educators often ask is: Is technology (audiolingual or any high-tech device) really effective and useful in language teaching? Although the question is a yes/no question, it has no easy answer with ‘yes’ or ‘no’. There have been many studies on this issue. Some researchers respond to the question with positive evidence while others may find that there is “no difference” in their experimental studies. The web site http://nosignificantdifference.wcet.info/ has archived all articles published in academic journals from 1928 through 2007 and these articles document no significant differences (NSD) as well as significant difference (SD) in learning outcomes of long distance students with use or non-use of technology. Interested readers may also refer to Thomas L. Russell’s book, "The No Significant Difference Phenomenon" (Russell, 2001) for details.

No matter what the research results are, one way to argue is that using technology is at least as effective as the traditional classroom teaching because there is no significant difference. Therefore, teachers may use technology to supplement their teaching. The other way to argue is that since there is no significant difference, why bother to use technology? We would like to argue that even though the evidence in experimental studies does not reveal the significant difference in learning outcomes, there are some

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2 Text-reconstruction software is type of program allowing students to fill in the blanks, rearrange the word order to make grammatical sentences. Concordance software allows users to search for instances of actual use of a specific word or phrase. Multimeia programs can simulate real language situations using image and sound.
other factors that should deserve attention: convenience and productivity, needs of globalization and normalization of computer use.

**Convenience and productivity**

By convenience and productivity it is meant that using technology greatly eases the job of teaching and learning. The sound files can be easily stored and presented through computers. The images (pictures and movies) can be played anytime. The simulated situations for language learning can be easily created. Typing Chinese makes composing easier than before. Email and other computer-mediated communication allow students to exchange their writings with other students and even native speakers from the target language communities. Teaching materials can be easily created, edited and revised. The documents can be transmitted electronically to any other parties instantaneously. Computer made teaching job and learning task much more convenient. We may use such a comparable: Chinese people used brush pens to write characters in the past. Later, the pens replaced the brush pens. The characters remain characters. But the convenience and easiness of using pens to replace brush pens is obvious. Now the tool for writing Chinese characters changed again. Keyboard became the tool of writing. This change has trigged another revolution in teaching Chinese and made Chinese writing and communication much easier.

**Needs of globalization and localization**

The world becomes smaller now. The term “globalization” may have various definitions but, without any doubts, the globalization means more cross-linguistic and cross-cultural exchanges. People may use a common language, be it English or any other language, but learning languages of other nations also becomes an urgent issue. Business world has a slogan: “Think globally and look locally.” As for language education, it can be interpreted as the increase of the need of learning a common language and local languages more effectively and quickly.

**Normalization of computers use**

Bax (2003) indicates that the use of technology will finally be normalized in our daily life. Normalization means that a certain tool or technology is no longer considered to be a tool, but a part of life. As Bax put it, “normalization is therefore the stage when a technology is invisible, hardly even recognized as a technology, taken for granted in everyday life” (Bax, 2003). Nobody would say now that a pen and a book is a technology for language learning. Even tape recorder is no longer considered a high tech. CD player and mp3 player now are replacing tape recorders. Computers are used more and more in all walks of life. It cannot be imagined that foreign language education may stay away from this trend of development.

Therefore, the question “should we use computers in language teaching?” already became outdated. The appropriate question we may ask now is: “What technology is available and how do we use it effectively for teaching?” In what follows, we will try to provide some information and recommend some programs and web sites that we have found convenient to use and productive for teaching Chinese. They may help teachers and
students to meet the challenge of globalization and to realize normalization of the use of computers.

**Suggested programs and web sites**

1. **For preparing teaching materials**

Teachers nowadays are using computers on a daily basis to prepare materials related to teaching, such as syllabi, quizzes, and supplementary materials. Many of the materials require the teacher to type in Chinese. Teachers often need some tools to help them prepare teaching materials, with the most common being tools for converting between simplified and traditional characters, converting characters to pinyin, and typing pinyin with tone mark. Below are some useful tools for teachers to consider.

**1a. Typing Chinese and converting between simplified and traditional characters**

Typing Chinese has become quite easy on newer computer models. For example, Windows XP or higher version allows you to type Chinese in Unicode with pinyin input and output in either traditional or simplified characters. Converting between simplified and traditional characters is also quite easy if you are using Microsoft Word (2000 or higher versions). The "Language Translation" function in the “Tools” menu will convert traditional characters to simplified characters or vice versa. At the same time, it translates some phrases used in Taiwan into phrases used on mainland China. For example, this program will "translate" 電腦 into 计算机. However, one can deactivate this function and leave 電腦 as 电脑. This function must be installed by purchasing Microsoft’s additional "Proofing Tools" package. In addition to this type of conversion mechanism within Microsoft Word, there are several web sites that provide conversion services for free. Below are three examples.

This is a website that allows users to type or paste a text in its text box. Click the button and the text will be converted and appear in a new window. It is simple and straightforward. This program is useful for converting small amounts of text.

The program does not convert the text online, but converts text files (.txt files only). Users need to prepare a text file, select the encoding of the source text file, then select the name of the source text file. Finally, users select the encoding to convert to and use the "Choose File" button on the bottom to select the name of the target file. This program is useful for batch conversion.

**1a3. Adsotrans** (http://www.adsotrans.com)
This program offers several functions. It allows users to convert traditional characters to simplified, or vice versa. First you copy the text into the window, then select "Echo

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3 ‘unicode’ is a standard code for computer use to ‘code’ the writing systems of the word languages
Chinese" under "Style." You also need to specify the encoding (both in and out). This program also allows you to convert a Chinese text to Pinyin or make a vocabulary list. (See more on Adsotrans under 1d2 below.)

Some commercial software producers have put all these functions in one product so users can easily do various types of conversion. KEY software is one of these products. For further information, visit: http://www.cjkware.com/products.htm.

ChineseTA is another program that is designed to help teachers compile teaching materials. In addition to the above mentioned functions, ChineseTA can identify new words and characters, and calculate frequency of word and character usage. For more information, visit: http://www.svlanguage.com/

1b. Typing and converting tone marks

When Unicode is used, typing Pinyin with tone marks becomes possible. However, most applications do not have an easy and direct input method for pinyin with tone marks. The most primitive way of inputting tone marks is to use the “Insert → Symbol” function in Word, which is inconvenient and cumbersome. Some scholars have created easier ways of inputting pinyin with tone marks to look like this: Xiànzài kěyǐ hěn fāngbiàn de shūrù Pinyin.(现在可以很方便地输入拼音). There are three ways of doing it: Using an online input method, using a macro in Word, and using a Pinyin IME4.

1b1. Online input method
An online input method is a program on the Internet which allows users to type pinyin followed by a number indicating the tone, e.g., zhong1guo2. The online program will automatically convert the number to an appropriate tone mark and place it over the correct vowel. Then one can copy and paste the pinyin string to other applications. There are several online programs of this type; we list a few here:
http://www.geocities.com/shixilun/pinyintextfield.html
http://www.foolsworkshop.com/ptou/ (this program allows one to type pinyin with numbers first and then convert it to tone marks.)

1b2. Using a macro5 in Word
Creating and using a macro file in Word is another way of inputting pinyin with tone marks. In Word, one can type pinyin followed by a number, e.g., pin1yin1 shu1ru4 fang1fa3, then run a macro program to convert the string to: pǐnyīn shūrù fāngfā. The user must know how to create a macro file in Word. Instructions for creating a macro file are available at http://www.csulb.edu/~txie/PINYIN/pinyin.htm. Prof. Zhang Zhengsheng (San Diego State University) has created his own macro program. He uses symbols -, /, \ and _ to represent the four tones. For example, his macro program can

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4 IME means ‘input method editor’. See below for explanation.
5 ‘macro’ is a symbol, name, or key that represents a list of commands, actions, or keystrokes in computer applications. Once a macro is executed, a whole series of actions can be performed.
convert pin-yin- shu-ru\ fang-fa_ to pǐnyīn shūrù fāngfā. The source code for the macro program is available at:
http://www-rohan.sdsu.edu/dept/chinese/newtonemarkconversion.txt

1b3. Using a pinyin IME
Installing a pinyin IME is a recent and uncomplicated solution for typing pinyin with tones and can be accomplished through the use of a small program like Microsoft's Chinese IME called Pinyininput. This program can be downloaded from http://www.chinese-forums.com/pinyininput-install.zip or http://www.mandarintools.com/download/pinyininput-install.zip

After the program is installed, the pinyin input bar will be listed as a Chinese input method. Selecting Pinyin input will activate it and a small icon will appear. One can just type pinyin with numbers, e.g. Pin1yin1 shu1ru4 fang1fa3 and the program will immediately convert the string to tone markers. For more information, see http://www.chinese-forums.com/showthread.php?t=13005.

1b4. Using Microsoft Word Asian Layout or Chinese fonts with Pinyin
Teachers sometimes need to use Pinyin to represent the pronunciation (above or below Chinese characters). There are two ways to do it.

(a) Use Microsoft Word Asian Layout function or Chinese Plus
Microsoft Word has a function to place Pinyin over the characters. Choosing Format, Asian Layout, Phonetic Guide will convert characters and place Pinyin over these characters. Chinese Plus has a similar function to convert characters to HanYuPinYin. The Pinyin with tones will be placed either over or below the characters. The size and position of Pinyin can be adjusted.

(b) Use special character-Pinyin fonts (e.g. Fangzheng Pinyin Ziku 方正拼音字庫)
Some companies sell Chinese fonts with Pinyin. These fonts are combinations of characters and the corresponding Pinyin. Users don’t have to type Pinyin. They type characters and choose the special font for the characters. For example, the characters 怎样给汉字注音 will be displayed as:

Both simplified and traditional character fonts are available. However, the size of Pinyin may not be changed because it is part of the graph and cannot be separated.

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7 For more details, users can visit http://www.pinyinok.com/hanziku.htm.
1c. Finding Chinese texts and other teaching materials on the Internet

Language teachers often use examples to illustrate word usage. We can write examples, or we can find examples on the Internet using programs such as the concordancer developed by the Department of Linguistics and Modern English Language (LAMEL) at Lancaster University.

1c1. Concordancer (http://bowland-files.lancs.ac.uk/corplang/cgi-bin/conc.pl)

A concordancer is a computer program that retrieves a particular word or phrase in its immediate contexts. Using a concordancer allows teachers to find examples of word usage easily. For example, when an instructor needs some examples of using "讲究", he/she can use the concordancer and find sentences like the ones below containing the word "讲究":

人们越来越讲究讲究讲究讲究生活质量。
弟弟妹妹都到了爱漂亮的年纪，对身上的衣着很讲究。
以前人们对食物营养方法不讲究。

The concordancer will also indicate that the expression "讲究" is used as a verb in those sentences. The concordancer allows the user to search for sentences in 18 text categories, including news editorials, popular lore, science fiction, essays, and biographies.

1d. Other online tools

There are some online programs that are very useful for teaching and learning Chinese. Some programs were developed by software companies and some were developed by Chinese learners. The learners clearly know what they need, so their programs are very pragmatic. However, due to limited funding resources, these programs are sometimes incomplete or not modified for further improvement. One such an example is DimSum, a Chinese learning tool developed by Eric Peterson. DimSum is freeware which can be downloaded from http://www.mandarintools.com/dimsum.html. Once the program is installed, users can either type in a Chinese text or retrieve a text from web sites. There are many functions in DimSum, such as typing pinyin with tones, converting Chinese characters to pinyin, adding pinyin next to words, converting between traditional and simplified characters, etc. It also has a dictionary and flashcard-making function, with some characters being animated. Users can therefore see a stroke-by-stroke animation of characters being written. This is indeed a good learning tool for learners, but some functions are not fully implemented.

1d1. Online dictionaries

There are also electronic dictionaries available online. NJSTAR (njstar.com), Wenlin (wenlin.com) and Clavis Sinica (www.clavisinica.com) are three programs already familiar to many people. NJSTAR is basically a Chinese word processor with an e-dictionary, while the other two are basically e-dictionaries with limited word processing
capabilities. These programs are very useful for students. The e-dictionaries that we would like to introduce in more detail are online dictionaries which are available over the Internet for free and which can be accessed through online searches. One of the dictionaries that we recommend is Dict.CN在线辞典 (http://dict.cn). This is an online dictionary that provides pronunciation, meaning, and sample sentences for words you look up. This feature is unique among online dictionaries. Users can save the words they have checked for future study, and online Chinese input and automatic translation are available. Traditional and simplified character versions are available.

1d2. Glossing engines
Glossing engines can "segment" and "annotate" Chinese texts and provide pop-up windows with the pronunciation and meaning of the words, which is useful for students doing online reading. There are several online glossing engines:

(a) Adsotrans (http://www.adsotrans.com)
This glossing engine not only annotates and glosses the text, but also provides more functions such as converting character text to pinyin text. (See 1a3 above)

(b) Popjisyo (http://www.popjisyo.com/WebHint/Portal_e.aspx)
Its pop-up window provides pronunciations in Mandarin, Cantonese, and Japanese.

(c) Rikai (http://www.rikai.com/perl/HomePage.pl?Language=Zh)
You put the text that you want to read in the window and press "Go." Then you just move the mouse over any Chinese word to see the pronunciation and definition.

(d) Chinese text annotator (http://online.eon.com.hk/annotate.html)
This works in a similar manner to Rikai. You put the text into the box, then click the "Annotate" button. Then you just move the mouse over any Chinese word to see the pronunciation and definition.

The quality (accuracy) of segmentation and interpretation depends on the database the glossing engine uses, and there is no way for users to change anything in the dictionary. Some words may not be properly segmented and interpreted, and some words simply cannot be annotated because there is no such entry in the online dictionary. However, we have recently seen an online program that allows users to edit the word interpretations. The program requires registration and it can be accessed at http://www.wordchamp.com/lingua2/Home.do.

2. Resources available on the Internet

There are hundreds, if not thousands, of websites designed to help students learn Chinese. How to pick out the most useful websites is a real challenge. In the following pages, therefore, we will introduce some websites that Chinese language teachers might find useful.
One of the most popular sites where Chinese teachers can seek online resources is Tianwei Xie's "Learning Chinese Online." (http://www.csulb.edu/~txie/online.htm or http://learningchineseonline.net) This site is the most complete and the most frequently updated website for guiding people to useful websites for learning Chinese. The menu covers just about everything that a Chinese language student and teacher need to know, including grammar, characters, dictionaries, online schools, etc. We strongly encourage the reader to visit this website regularly for newly added entries.

2a. Listening

The listening materials available online cover different levels, serving beginners as well as advanced learners. Most of them are stand-alone lessons. But there are also some sound files that go with certain Chinese language textbooks. For example, sound files are available from the University of British Columbia in both WMA and MP3 formats for *A Primer for Advanced Beginners of Chinese* by Duanduan Li et. al. (2003) New York : Columbia University Press. (http://www2.asia.ubc.ca/faculty/li/audio/daxueyuwen.htm)

In the following section, we have selected a few sites to allow the readers to sample what is available online. Teachers may want to use some of the materials listed below as supplementary materials.

This site has lessons for students to listen to, with topics including home, travel, law, etc. It also allows you to record and play back your speech if you have RPAppletmp3.jar on your computer. Sound files only, no video.

2a2. Chinese Video Exercises (by Mingliang Hu) (http://camel2.conncoll.edu/academics/departments/chinese/mhu/videos2/index/index.html)
This site provides video segments of short conversations covering topics related to daily life. It also has online exercises that give instant feedback.

2a3. Cultural Interviews with Chinese-Speaking Professionals (by Orlando R. Kelm, Haidan Wang and Jeanette Chen) (http://www.laits.utexas.edu/orkelm/chinese/index.html)
This is a collection of video clips of interviews with professionals on various topics, including "ability vs. connections", "Hierarchy and Social Status" and "talking business vs. socializing." The materials are suitable for advanced learners. Chinese language classes can use this site to prepare students to engage in classroom conversations or debates. No online exercises.
This site offers free listening exercises and video clips online. The screen displays colorful drawings with animation when the sentences are read. You may obtain free membership and listen to the lessons online. However, if you want to download the transcripts and the vocabulary list, you have to pay a fee.

2a5. Podcasting or webcasting
Podcasting was first introduced several years ago and started to take off as a learning tool shortly thereafter. By the time teachers read this article podcasting may not be so new anymore. According to Wikipedia, a podcast is a digital media file, or a series of such files, that is distributed over the Internet on portable media players and personal computers. In other words, a podcast is a collection of files (usually audio but may include video) residing at a unique web feed address. People can "subscribe" to it so when new "episodes" become available in the podcast, they will be automatically downloaded to that user's computer (http://en.wikipedia.org/wiki/Podcast).

Webcasting can be very useful for conversational classes while using podcasting as a supplementary homework assignment is also worth trying. Teachers might also ask students to listen to the dialogue, checking their comprehension, teaching new words, then discussing it in class or even writing a blog entry about it (i.e., less mechanical type exercises and more communicative ones, especially for more advanced students.)

Some popular podcasting sites are:

(a) Chinesepod.com (by chinepod.com in Shanghai, China) (http://chinesepod.com)
Chinesepod.com offers listening materials for all levels ranging from "newbie" lessons to advanced ones. Listening to the basic podcasting is free but users pay fees for additional services such as obtaining transcripts of dialogues, exercises, online tutoring, etc.

(b) Serge Melnyk’s Chinese Lessons with Serge Melnyk (http://www.melnyks.com/)
The site offers theme-based and progressive lessons from beginning to advanced levels. The student may take the lessons with downloaded programs on his iPod or Mp3 player and study at anytime and at any place.

(c) iMandarinPod (by a team in Tianjin, China) (http://www.imandarinpod.com/hoola/)
This podcasting site offers online Chinese classes, with audio for the text displayed on the screen with the teacher explaining the text on the screen in detail. It also provides a learning guide in pdf format to help the learner understand the lesson better.
2a6. Voice Web (by Beijing Infoquick Sinovoice Speech Technology Corp)
(http://www.sinovoice.com.cn/e-voice.asp)
This website will read texts aloud in several languages, including Mandarin Chinese and English. If you want to listen to a Chinese text, you can type the Chinese text into the box, or simply cut and paste any Chinese text into the box, set the pitch and volume to your preference, then click "submit." The sound quality is pretty close to that of natural speech.

In addition to what was described above, it is worth noting that recent development of YouTub (http://youtube.com/) will be a very useful source for language learning. Some language learners or teachers take advantage of this new streaming technology and created many video clips for language learning. These video clips can be very good supplementary materials for listening.

2b. Reading

There are many websites that can be used to help learners to read Chinese. They range from the most basic ones which only provide raw reading materials, such as "A Chinese Text Sampler" by David Porter (http://www-personal.umich.edu/~dporter/sampler/sampler.html), to more sophisticated ones that come with exercises and feedback. There are also sites geared to preschoolers, such as "Chinese Language for Preschoolers" (http://members.tripod.com/~StudyChinese/textbook.htm) and sites that anybody can use. In the interest of space, we will only introduce four sites below.

2b1. Progressive Reading (by the University of Southern California)
(http://www.usc.edu/dept/ealc/chinese/Level/1.htm)
We selected this site because of its pedagogical value. The same reading text appears several times but at various difficulty levels. The student can therefore start from the beginning level and than gradually move up to higher levels. Each reading text comes with questions for the student to check comprehension.

2b2. Chinese Reading World (by Helen Shen)
(http://www.uiowa.edu/~chnsrndg/index.html)
The reading materials are divided into three levels: beginning, intermediate and advanced. Each level has eighty reading pieces. This is an ongoing project, with readings continuously being added. Each reading piece comes with audio file and reading comprehension questions. The reading materials cover a wide range of topics, from "Self Introduction" to "Panda Story," and from "Chengdu Tea House" to "Being a Volunteer in the United States."

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8 streaming technology means that sound or image files such as sound, movie or video files can be played at the same time when they are downloaded. Users don’t have wait until the completion of downloading and begin to listen or view.
2b3. **LangNet** (by National Foreign Language Resource Center)  
(http://128.8.10.217/)

LangNet is a state-of-the-art online language learning system that offers free mini-language lessons to foreign language faculty, administrators, and students at U.S. institutions. Chinese is one of the thirty-plus languages being offered. Each lesson (Learning Objects) starts with an overview, followed by a series of activities. The materials are graded according to the ACTFL Proficiency Guidelines and arranged according to five topic areas: culture/society, economics/politics, science/technology, defense/security, and ecology/geography. You need to contact the National Foreign Language Center at the University of Maryland (c/o LangNet Administrator, Patapsco Building, Suite 1110, 201 Paint Branch Parkway, College Park, MD 20740) to obtain access.

2b4. **Read Chinese!**  
(http://www.nflc.org/)

This is a state-of-the-art website developed by the University of Maryland’s National Foreign Language Center (NFLC). It offers reading lessons arranged as Learning Objects similar to the texts cited above in LangNet. Although this site is intended to help high school students to read Chinese, it is also accessible to students in lower level courses at colleges and universities and to the public at large. The instructional materials are available via the Internet without costs. CD-ROMs are available to schools that prefer an alternative to the online version. For ordering information call the main NFLC line at (301) 405-9828.

2c. **Speaking**

While it is relatively easy to find listening and reading materials online, it is very hard to find websites that can help students improve their speaking skills. This is primarily because the computer cannot easily check students’ speaking performance and offer specific feedback. We will introduce a couple of sites that are designed to help the student practice speaking.

2c1. **Chinese Learn Online** (by chinesearnonline.com)  
(http://www.chinesearnonline.com/about/)

This site offers online Chinese lessons with sound files where the student can listen to the dialogues. This website has a new feature called "Pong Audio Forum" whereby the online teacher will ask some questions and the student has an opportunity to answer the questions through online chat. The students then can compare his own answers with those given by the teacher and other students.

2c2. **Learn Chinese** (by Tianwei Xie)  
(http://www.clearchinese.com/learn-chinese/index.htm)

"Learn Chinese" is available on ClearChinese.com. It has a "Practice" section that asks the student to say something in Chinese. The student can click the "answer" button to compare his answer with that given by the teacher.
Both "Chinese Learn Online" and "Learn Chinese" ask the student to check their own speaking against the model answer. Since the computer technology is not yet sophisticated enough to check open-ended answers, this is a viable way to allow the student to practice speaking at home.

2c3. Online Speaking Homework
Instructors sometime may require students to do some voice homework. In the past, teachers would ask students to record their voice homework on cassette tapes and hand them in. Now it is possible to do voice homework over the Internet. One of the examples of using online voice technology is YackPack (http://www.yackpack.com/). Some teachers use this online voice chat room for students to post their voice homework and talk to each other (Sun, 2007).

2c4. Wimba voice email (by wimba.com)
(http://www.horizonwimba.com/demos/voiceemail.php)
It is very easy for both instructors and students to use Wimba's voice email system online. Users don't have to download and install any software. They just go to Wimba site (see URL above) and use it. It is a demo version, but it functions well. Students can record their voice and send it to their instructor's email address. When the instructors receive the voice message, they can either listen to the message or save the message for future use. There are some other voice email programs, but this one is easy to use and doesn't require any installation.

2d. Writing

In today's world, typing Chinese on the computer is a necessary skill that everyone who writes in Chinese should possess. When we write to our Chinese friends, we type Chinese in the e-mail message. In fact, the first AP® Chinese test which came out in May 2007 was done completely on the Internet whereby the student must type in the answers to the writing section. In addition to teaching students how to write Chinese characters on paper, Chinese language teachers should also train their students to type Chinese on the computer.

2d1. Using blogs
It is worth noting that blogs (short for “web logs”) have been recently used more and more often by language learners. Students can write anything and share their writing with their friends. To encourage students to write Chinese outside of the class, some teachers have created their own blogs. For example, Xiao Yang (University of California at Davis) created a blog called 萧老师的中文教室 (http://xiaolaoshi.livejournal.com/friends) when she was teaching at the University of Hawaii. According to Xiao, students enjoy writing on the blog, and because the blog is for the public to view, students are more careful not to make any mistakes when they write. For a list of blogs for learning Chinese, see John Pasden and John Biesnecker's website (http://www.chinabloglist.org/csl/).
It is interesting to note that most blog sites for learning Chinese were created by learners rather than teachers. Xie (2007) has listed some blog sites dealing with teaching and learning Chinese.

2d2. Using course management software
Many universities and public schools are using Blackboard or WebCT (http://www.blackboard.com and http://www.webct.com). These are two popular course management software programs which allow teachers to store and deliver course materials without too much computer knowledge. The two programs are very similar. The programs that teachers and students can use include discussion forum and chat for asynchronous and synchronous communication. These functions are good for collaborative learning. Readers can refer to Zhang & Mu (2003) and Xie (2002).

2d3. Collaborative learning tool (http://docs.google.com)
Another way to make writing interesting is through “collaborative learning,” which can take place online through Google docs (http://www.docs.google.com), a free service offered by Google. When one student starts a project of writing a dialogue or an essay, he/she may invite other students and/or instructors to be his/her collaborators who are able to view and edit the document that the first student created. They can work at different times or at the same time (real time). Each one will see that the document is being edited by other parties, and any changes or modifications are recorded as a "history" of revisions. In this way, students can write something collaboratively, while instructors may also add comments or corrections at any time.

2e. Chinese characters
Learning how to write Chinese characters has been considered to be a big hurdle for many Chinese language learners. Thanks to computer technology, learning Chinese characters has become a little bit easier.

2e1. Learning characters using animated characters
One of the most difficult tasks in learning Chinese is to learn how to write characters. Characters must be written stroke by stroke according to a particular sequence. The traditional way for textbook writers to present the stroke order was to make a chart by hand showing the stroke order:

Unfortunately, it was time consuming to create this type of chart for hundreds and hundreds of characters. However, technology has made it possible now to produce such a stroke sequence picture automatically (see “Making stroke order chart” below). What is more amazing is that computer software can create the animation of characters and show the process of writing a character stroke by stroke while also providing the pronunciation in Pinyin, and the meaning in English, while also showing possible words or phrases.

9 BlackBoard and WebCT are merged now.
containing this character. There are two products of this type that have similar and unique functions. The first product is called eStroke and it can be downloaded at http://eon.com.hk/estroke/. The second product is Chinese Writing Master http://www.cchar.com/. Users just type in a character or drag any character from the Internet to the box, and the animation will be displayed immediately.

The software eStroke mentioned above not only shows the animation of writing characters stroke by stroke, but also saves the animation as a .gif file. Instructors may take advantage of this function to make animated characters for demonstration in the classroom or to put the animated characters in their web pages. When eStroke is activated, right click and select "Export to Animated Gif", then choose a character. When the animation is finished, the .gif file is also saved. One can include this .gif file in a web page. If users select the "Create sequence" function, the writing of the character stroke by stroke will be saved as a picture with the word’s stroke order:

2e2. Websites tailored to textbooks
Some websites that teach Chinese characters using animation are tailored to certain textbooks. For example, the users of the textbook Integrated Chinese can learn how to write the Chinese characters taught in this book by going to this website prepared by Audrey Li and her team at the University of Southern California (http://www.usc.edu/dept/ealc/chinese/character/). The computer will draw each character stroke by stroke for the student to view and copy. It also displays the radical of each character in pink color to let the student know what radical group this character belongs to. Also, see Character animation for New Practical Chinese Reader offered by YellowBridge (http://www.yellowbridge.com/general/invoke.php?http://www.hanyu.com.cn/En/htm_newlesson/cc-01.htm).

2e3. Electronic flash cards
Learning how to write Chinese characters properly is not an easy task. Memorizing the Chinese characters that one has learned is equally difficult. Before the computer era, students used flash cards to help them learn new words. Now they can use electronic flashcards. Below are two examples:

This site offers online Chinese flashcards that go with more than ten textbooks.
Flashcards are divided into many "decks" corresponding to each textbook chapter or wordlist so that they match the user's lesson plan. This site also offers flashcards for commonly used characters in Hong Kong and Taiwan, as well as HSK vocabulary items.

2e5. FlashcardsExchange (by an unknown author)  
(http://www.flashcardexchange.com/)  
This site is a huge flashcard library containing 11,212,344 flash cards for the world languages including Chinese. The Chinese flash cards made by teachers and students can be found at http://www.flashcardexchange.com/tag/Chinese. Teachers and students can create a free account there and develop their inventory of flash cards.

2f. Pronunciation  
There are many websites designed to introduce Chinese pronunciation. We will only mention two here:  
Chinese Pronunciation (by New Concept Mandarin Limited, Hong Kong)  
(http://www.newconceptmandarin.com/support/Intro_Pinyin.asp)  
Standard Mandarin (by Joel Hansen)  
(http://www.standardmandarin.com/)

2g. Text-to-speech software  
Text-to-speech (TTS) programs "read" aloud any text, whether Chinese or English. The quality of earlier technology was not very good because the voice did not sound like a human voice. The recent development of text-to-speech technology is very fascinating, so now the intonation of sentences is more natural and the sound is like a human voice. What is more amazing is that the computer software can automatically "recognize" the correct pronunciation of certain Chinese characters in context such as "行" (xíng, háng) as in 行人 xíngrén and 銀行 yínháng, "重" (zhòng, chóng) as in 重量 zhòngliàng 重慶 Chóngqìng.

Text-to-speech programs can be used by instructors in the classroom, so now it is even more convenient for students to listen to any text they have found without having to wait until their instructors make voice recordings for them. There are several commercial programs such as KeyTip (http://www.cjkware.com/download.html) and Speech Plus 一聲通 (http://www.biderworld.com/) and YellowBridge Talker (http://yellowbridge.com/talker/) for this purpose.

3. Computerized testing formats  
Assessment is an integral part of a language program. Tests are used to check the student's progress and achievement. Some Chinese language tests are now available on the web. We will introduce a few of them below.
3a. Computerized test

3a1. AP® Chinese test

Many high school students take AP® courses and AP® tests before they enter college (see Chi, this volume). The first AP® Chinese exam administered in May 2007 was an iBT (Internet Based Test) which covers the four language skills of listening, reading, speaking and writing. A sample test is available online at: http://www.starttest2.com/5.0.0.0/starttest.aspx?cmd=demo&program=ap&type=consumer&target=order&limit=all&test=xxxx

3a2. Chinese Horizon: Placement Test (By Chinese Placement Test Online) (http://www.chinesehorizon.com/placementTest.cfm)

This site offers a free placement test and is available to anyone. The test was designed by the company to evaluate students’ proficiency and place them in an appropriate level for online learning and it is not related to other standardized test such as SAT, HSK, etc.

3b. Prepare your own computerized tests

Creating quizzes, tests and exams is a routine job for a language teacher. Some commercial test authoring software like Questionmark and online quiz "makers" can help teachers. One of the online test makers that many teachers have used is Quia Web at http://www.quia.com/. Instructors can easily create activities, quizzes, games, Web pages, surveys, etc. The preformatted test templates include multiple choice questions, true or false questions, short essay questions, fill in the blank exercises and other formats. Both voice and picture files can be used for questions. Voice files can be used for listening comprehension exercises and pictures can be used for any other purposes. The quiz/test can be automatically or manually graded and the results can be saved. Statistical analysis is also provided.

Concluding Remarks

We have only listed some resources for teaching and learning Chinese that we feel helpful in conducting daily teaching activities. It is impossible and unrealistic for us exhaust all programs and web sites. Whether these programs or resources really work for you is depending on how you use them. It is also our belief that teachers do not have to learn and use all these programs at one time. A more realistic way is to ask the question: “What kind of technology may be available if I want to accomplish a certain task?” For example, if you want to take advantage of technology to teach characters, you can search over the Internet and see if there are any programs that will help you. Consulting with experts and experienced colleagues is another effective way to locate appropriate computer resources. That will save you a lot of time and you don't have to "look for a needle in a haystack.” Using technology, then, is not a fad, but should be viewed as a means to accomplish more convenient and effective teaching.
There is one more aspect of using technology that deserves our attention: the ephemeral nature of the web resources (Harter and Kim, 1996). This means that online teaching and learning materials, like all other online data, change rapidly. According to research, 20-50 percent of online materials will change or disappear within two or three years. Chinese teachers must be aware of this fact and should continue to stay abreast of newly emerging technologies and resources for teaching Chinese. Therefore, this article is also "ephemeral" and its contents will be and should be updated in the near future.
References


