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Chinese Language Learning and Teaching through Desktop Videoconferencing
(运用桌面视频会议之汉语语言教学与习得)

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Abstract: This study aimed to investigate the language teaching and learning which occurred via one-on-one desktop videoconferencing (DVC), and the tutors' and learners' opinions about the online sessions. To be specific, the research questions posed are: (1) What types of instructional feedback do DVC tutors employ, and how do they affect learners' responses? (2) What is the rationale behind the use of different types of instructional feedback in DVC?, and (3) What are students' perceptions toward online language learning through DVC? Participants included 12 pre-service teachers in Taiwan and 12 college learners of Chinese as a foreign language in the United States. The study results show that repetition is the type of instructional feedback used most frequently in the online sessions while picture prompts were least used. In addition, this study found that certain types of instructional feedback yielded more learner responses than other types. Furthermore, the pre-service teachers' teaching reflections reveal that they had particular reasons for using certain types of instructions in a given context. Finally, the majority of the learners in this study spoke highly about the desktop videoconferencing project; however, they also indicated that there was room for improvement for future projects.

摘要：本研究旨在调查一对一桌面视频会议的语言教学和学习，以及教师和学生对在线课程的意见。此论文的研究问题包括：（1）桌面视频会议教师使用什么类型的教学反馈，以及它们如何影响学习者的反应？（2）教师在桌面视频会议中使用不同类型之教学反馈背后的理由是什么？以及（3）学生對桌面视频会议學習语言的看法為何？参加者包括台湾 12 名职前教师和 12 名学习中文的美国大学生。研究结果发现，重复是在线会话中最常使用的教学反馈类型，而图片提示使用最不频繁。此外，这项研究结果指出，某些类型的教学反馈比其他类型更容易引起学习者的共鸣。另外，职前教师的教学反思表示，他们有特定的理由在特定情况下使用某些教学反馈类型。最后，本研究中的大多数学习者对桌面视频会议项目给予了高度评价; 然而，他们也表示未来的桌面视频会议项目仍有改进的余地。

Keywords: Chinese language acquisition, desktop videoconferencing, Skype

关键词：汉语习得，桌面视频会议，桌面视频会议工具

1. Introduction

With technology rapidly evolving in the 21st century, it is common to see educators utilizing technology tools to aid in language learning activities. One type of frequently used technology tool is synchronous computer-mediated communication (SCMC). Often seen as an effective way to enhance learners' communication skills, SCMC creates a real-time environment which increases learners' motivation in communication with others in the target language (Yamada, 2009). SCMC studies in the past 20 years have identified many benefits of the use of SCMC in language learning. To name a few, when compared to face-to-face communication, SCMC better promotes equal turn-taking among interlocutors in the target language, helps learners produce more speech, increases introverted learners' participation in discussions, and reduces learners' anxiety levels (Abrams, 2003; Beauvois, 1998; Kelm, 1992; Warschauer, 1996). Although SCMC is not without any drawbacks such as learners feeling under pressure to produce language quickly and being inflexible in terms of online meeting time (learners must set a specific time to meet online) (Levy & Stockwell, 2006), the advantages of SCMC are seen as outweighing the disadvantages. However, most SCMC studies have focused on the effects of either voice, text, or a combination of voice and text communications on language learning. A newer type of SCMC, desktop videoconferencing (DVC), which provides real-time video, audio, and text transmissions between two or more locations, is a relatively less researched area in terms of its effects on language learning and teaching. Since the early 2000s, the number of people who use free videoconferencing Voice over Internet Protocol (VoIP) tools, such as Hangouts and Skype made available by major technology companies on desktops and mobile devices, has been quickly growing (Kozar, 2012).The availability of such tools has also attracted language educators to employ them for teaching. Although DVC tools make communication with speakers at a distance possible, and communication through DVC is seen as similar to face-to-face communication, Kern (2014) cautions that "various forms of technological mediation introduce important differences from face-to-face interaction" (p. 98). Therefore, investigations are much needed on the under-researched type of SCMC, namely DVC, and how it influences second language learning and teaching. By focusing on the investigation of DVC, this study intends to contribute new findings to the SCMC research field.

2. Theoretical Framework

This study is grounded in the interaction theory of language development, which argues that second language acquisition occurs as a result of interaction. As Bates (1997)

describes, interaction could be an individual or a social activity. Interaction occurs as an individual activity when a learner uses a learning medium (e.g. a book or a computer program) to learn. On the other hand, interaction is considered a social activity when a learner interacts with others via learning medium. Before the technology boom, social interaction was mostly thought of in a face-to-face mode. However, when technology rapidly developed in the 21st century, a new kind of social interaction named technologized interaction, referred by Hutchby (2001) as telephone- or computer-mediated human to human interaction, has broadened the scope. Technologized interaction can be categorized into three types: written, oral, and oral-visual (Wang, 2004). Amongst the three types, oral-visual interaction is considered the highest level of computer-mediated interaction; however, it is also the most under-researched type. This study looked into how teaching and learning occur in oral-visual interactions through DVC.

3. DVC and Second Language Learning and Teaching

Previous studies investigated the use of DVC in second language acquisition in a few areas: (1) exploring the use of DVC, (2) the effectiveness of using DVC, and (3) teachers' perspectives toward DVC. The rest of the section briefly reviews the studies and teases out the DVC research areas that are still needed in the second language acquisition field.

3.1 Exploratory Studies

Some of the existing studies on second language teaching and learning through DVC are exploratory in nature. These studies tried to get an idea of how DVC tools are used in language education. For example, Hampel and Stickler (2012) explored German language teacher-student interaction in a DVC environment and reported a few common topics including greetings and farewells, discussing technology issues, negotiating meaning for the learning and teaching tasks, off-task conversations among students, and teacher feedback. In Algeria, Bensafa (2014) also conducted an exploratory study on the role of DVC in language education and identified two factors, namely interaction and motivation, as the key factors to a successful DVC experience. As language teaching through DVC is still at a fairly early stage in Algeria, Bensafa also mentioned the importance of having well-equipped hardware for videoconferencing and sufficient bandwidth to minimize possible delays during videoconferencing.

3.2 The Effectiveness of DVC

A few studies investigated the effects of DVC tools on language learning using different types of evaluation criteria. For example, Charbonneau-Gowdy, Cechova and Kriz (2009) examined the effectiveness of a DVC tool designed by a Canadian company used between a group of English language learners in Czech Republic and an English teacher in Canada. The study results showed that the learners not only gained more language knowledge, but also became more empowered and self-directed. With a focus

on language performance in DVC, Yamada's (2009) study involved 40 English as a foreign language (EFL) Japanese college students and found that the use of voice and images in DVC enhanced the students' learning performance in terms of turn-taking and self-correction frequencies. In the Netherlands, Canto, Jauregi and Van den Bergh (2013) compared three modes of communication (DVC, gaming, and face-to-face) and their effects on language learning involving college learners of Spanish. The researchers concluded that the experimental groups which used the DVC and gaming modes outperformed the control group on their oral proficiency test. They also found that the experimental groups reported being more motivated and gaining more inter-cultural awareness and confidence. In a different study, Cheng and Zhan (2012) found that learning through DVC enhanced the learners' understanding of the content; however, they also cautioned that overusing multimedia may cause instructional obstacles and claimed that developing abilities that link technology tools with instructional goals was the key to online teaching success.

3.3 Teachers' Perspectives on DVC

Teachers' experiences with, and perspectives on, DVC were investigated in a few studies. Eröz-Tuğa and Sadler (2009) invited a group of language instructors to test and evaluate six DVC tools. The results indicated that the teachers ranked MSN Messenger and Skype as their top two tools for both language teaching and personal communication. Another study focusing on teachers' perceptions is Guichon's (2010) investigation of online teachers' experiences of using DVC in language teaching. In order to build a DVC platform for language teaching, Guichon examined the teachers' comments about the difficulties they encountered when teaching via DVC, the strategies they used to try to overcome the difficulties, and the suggestions they provided. The results illustrated that most of the difficulties found were technical and that the strategies identified and the suggestions provided later were mostly tied to addressing the technical difficulties found.

In summary, the existing studies on DVC have identified different genres in teacher-student interactions and found positive psychological and language learning outcomes after using DVC. Moreover, current literature also touched upon teachers' opinions about DVC including the particular DVC tools they preferred to use and pedagogical issues related to DVC. After a review of the literature, a couple points are apparent. First, although many aspects of DVC have been studied, the quantity and the context of the studies are not large and wide enough to make generalizations in all language learning contexts. A call for more research in all aspects of DVC is needed. Second, it seems that one aspect most lacking in the DVC research is an analysis on how actual teaching and learning occur in interactions in DVC, such as Kozar's (2015) study not mentioned in the literature review above. Kozar did a thorough investigation on the interactions of six tutor-learner dyads in a private online English language learning school and found that even though the learners were highly satisfied with the DVC sessions with their tutors, the analysis of the actual interactions illustrated that the instructions were not of good quality. There was no preparation for the lessons, and the interactions were mainly in recursive question-answer sequences, in which the learners were inclined to answer questions, but not initiate exchanges. As Kozar stated, "As the

social practice of teaching language online via audio/videoconferencing tools continues to grow, there is a clear need to understand the dynamics of this practice and its effect" (p. 98). While Kozar's study has provided some understandings of the nature of teaching and learning interactions in the context of a private online language school, more work is yet to be conducted in relation to the varying teaching contexts. Although the current literature showed that language learning outcomes in DVC are positive, without a close analysis of the actual teaching and learning episodes which occur in DVC, no constructive teaching or learning suggestions can be made to improve DVC language instruction. Hence, this study seeks to fill in the research gap by investigating teaching and learning episodes in DVC, and what online teachers and learners think of teaching and learning via DVC.

4. Research Questions

The research questions are as follows.

(1) What types of instructional feedback do DVC tutors employ, and how do they affect learners' responses?
(2) What is the rationale behind the use of different types of instructional feedback in DVC?
(3) What are students' perceptions toward online language learning through DVC?

5. Methods

5.1 Participants

Participants in this study include 12 Taiwanese tutors and 12 American learners of Chinese as a second language. The Taiwanese tutors were pre-service teachers taking an undergraduate introductory language teaching course in a teacher-training university in Taiwan. Half of them had no previous language teaching experiences while the other half had taught English as a second language to young learners for a few months. The American learners were taking an advanced Chinese conversation course in a state university in the southwest United States. The tutors all majored in education with different concentrations. As for the learners, half of them were business majors (e.g. Accounting, International Business, and Marketing) while the rest majored in different disciplines such as American or Asian Studies, English, Global Communication, and Mechanical Engineering. The age range of the participants was between 19 and 24. All participants had prior experience with a DVC tool such as Skype used in this study. However, all of the participants used it as a personal communication tool except for one learner who used it to take an online language course.

With respect to the American learners' Chinese learning background, all of them were native speakers of English who had studied Chinese for three to four years. Even though the learners had similar lengths of time studying Chinese, their prior learning

experiences before coming to the conversation course were significantly different. Five of the 12 learners spent two years in a Chinese speaking community abroad for a religious mission while the rest of the learners studied Chinese in a typical language program at a university in the western United States. Because of the distinctive learning experiences, the learners' self-rated Chinese proficiency level and comfort level speaking with Chinese native speakers were divergent. Table 1 shows that some participants believed their Chinese was still at the beginning level while some thought they were at the intermediate level, and only a few considered their Chinese proficiency to be advanced.

Table 1: Self-rated Chinese proficiency level

Proficiency Levels	# of Learners
Beginning High	3
Intermediate Low	2
Intermediate Mid	3
Intermediate High	2
Advanced Low	1
Advanced Mid	1

Table 2: Self-rated comfort level speaking with native speakers

Comfort Level Speaking with Native Speakers	# of Learners
Comfortable	3
Somewhat Comfortable	3
Somewhat Uncomfortable	3
Uncomfortable	3

Table 2 illustrates that the participants felt differently when speaking with native speakers. The number of participants who felt comfortable, somewhat comfortable, somewhat uncomfortable, and uncomfortable speaking with native speakers was spread out evenly. This could be a result of some of the participants reporting that they frequently (e.g. every day) talked with native speakers while others reported seldom conversing with native speakers (e.g. once a month) in a survey they completed after the DVC project ended.

5.2 Procedure

Before the semester began, the instructors in Taiwan and the United States set up three 30-minute one-on-one DVC sessions for the Taiwanese students to practice teaching and for the American students to review materials taught in class. These DVC sessions were designed as class assignments. The theme for the first session was related to the first movie seen in the Chinese conversation class named, *Sorry. I love You*. The second session was designed to review Chinese dining etiquette knowledge taught in

class. The third session was related to the movie, *Hear Me*, a second movie seen in the conversation class. The Taiwanese tutors are all knowledgeable about Chinese dining etiquette as it is embedded in the culture they practice in their daily life. In addition, the tutors were asked to finish watching the two movies before the review sessions for those movies. A few weeks before the project started, the instructors helped each dyad set up the meeting time for each session and recorded the schedule on Google Docs, which could be accessed by all participants. The participants also exchanged email address information for easy communication, such as when the tutors needed to send out reminders to the learners about their meetings or in case a meeting time needed to be rescheduled. The first session occurred mid-semester, and the consecutive sessions occurred every other week after the first session. Before each session, the tutors were required to prepare for the online teaching by creating their own teaching materials using PowerPoint, and explain it to the instructor and their classroom colleagues in Taiwan. For the two movie sessions, the tutors were expected to first review the content of the movie to ensure the learners had reached a certain level of understanding. Next, the tutors would focus on discussing the Chinese culture observed in the movie. For example, the tutors pointed out certain body language and ways of expressing oneself in the movies and explained how they were related to the way Chinese people expressed love. For the Chinese dining etiquette session, the tutors were to briefly review the materials taught in class (the US instructor showed the teaching materials to the tutors in advance) and then attempted to expand the learners' knowledge on the topic by adding new, related information. For example, the tutors were prepared to review Chinese table manners such as seating arrangement and appropriate time to start eating. After the review, they added more information on the topic of adequate Chinese dining such as a discussion about the conventions related to chopsticks (e.g. not to stick chopsticks in a bowl of rice). The learners were asked to record each session using the software, Callnote, and submit the recordings to the US instructor.

5.3 Data Collection

The data included in this study are (1) the recordings of the dyads' DVC sessions, (2) American learners' survey regarding their opinions about the DVC sessions, and (3) Taiwanese tutors' reflections on their teaching. The participants submitted their recordings every time they completed a session. Some of the dyads had different technical issues; therefore, some of the recordings were not complete. At the end, a total of 13 complete sessions were recorded, which resulted in 395 minutes of interaction data analyzed in this study. After the online sessions ended, the American learners were asked to complete a survey in class. The survey consisted of two parts. Part 1 elicited the learners' learning background information, part of which has been presented in the Participants section above. Part 2 included open-ended questions regarding the effectiveness of the DVC sessions and suggestions for future DVC projects. At the same time, the US instructor traveled to Taiwan to visit the tutors in their classroom. The US instructor divided the tutors into small groups and posted a few questions to guide them for discussion on their online teaching. At the end of the visit, each tutor wrote a teaching reflection and shared it with others. The written reflections were also used as data in this study.

5.4 Data Analysis

For research question 1, *what types of instructional feedback do DVC tutors employ, and how do they affect learners' responses?*, the researchers first identified all teaching episodes in the session recordings. In this study, a teaching episode is defined as the whole process of the teaching of a single language point. A teaching episode can be student-initiated, which occurs when the student uses the target language inappropriately or asks a language question and the tutor responds to it. A teaching episode is teacher-initiated when the tutor uses different means to check the student's understanding of a language point and the student does not understand and needs more instruction. Once the researchers identified a teaching episode, the type of instructional feedback employed in the episode was analyzed. This study found seven types of instructional feedback. The definition of each type is listed below (See Appendix 1 for examples).

(1) Translation: The teacher translates an utterance from Chinese to English.
(2) Simplified Reformulation: The teacher paraphrases his or her utterance.
(3) Direct Explanation: The teacher uses Chinese to explain the meaning of a word, a phrase, or a sentence.
(4) Examples: The teacher gives examples of the meaning or concept he or she tries to convey.
(5) Repetition: The teacher repeats what he or she says.
(6) Elaboration: The teacher attempts to let the student give more information by pausing to let the student complete the teacher's utterance or by asking questions to help the student elaborate more on the topic.
(7) Picture Prompts: The teacher uses one or more pictures as prompts to assist the student's understanding and to encourage discussions.

Next, the researchers analyzed how the learners responded to each type of instructional feedback. This study found four kinds of responses from the students, which are listed below (See Appendix 2 for examples).

(1) Confirming Understanding: The student says something such as "Right", "Oh ya.", or "I got it." to confirm his or her understanding.
(2) Repetition: The student repeats the teacher's utterance.
(3) Responding Correctly: The student's response to the teacher's statement or question is on topic and uses correct formulation.
(4) Not Understood: The student's response is incorrect (e.g. off the topic, wrong grammar, etc.), which shows that he or she does not understand the teacher's instruction.

Confirming understanding and repetition are considered learner uptakes, which refer to a student's response that follows the teacher's instruction. On the other hand, responding correctly is considered learner repair, which is the correct reformulation of an error as uttered in a single student turn (Lyster & Ranta, 1997). Both learner uptake and repair are seen as indicators of learning effectiveness (Sung & Tsai, 2014).

After all instructional feedback and responses are identified, the researchers tallied the frequencies of each type of instruction and student response.

For research question 2, *what is the rationale behind the use of different types of instructional feedback in DVC?*, any concepts or reasons which made the tutors use certain kinds of instructional feedback in the online sessions, and that which emerged in the tutors' teaching reflection notes, were coded into different categories for reporting. For research question 3, *what are students' perceptions toward online language learning through DVC?*, common ideas which emerged in the following areas were coded into different categories under each area: language skills most benefited, language skills least benefited, cultural knowledge gained, and future DVC project suggestions.

6. Results

6.1 Instructional Feedback Types and Student Responses in the DVC Sessions

This study identified a total of 168 teaching episodes in the DVC sessions, among which 100 of them are student-initiated and 68 of them are teacher-initiated. The number of student-initiated episodes being larger than the teacher-initiated ones is a sign of active learning. In addition, a total of 190 instances of instructional feedback were executed in the 168 teaching episodes, among which repetition (34%) was most frequently used, followed by direct explanation (19%), simplified reformulation (17%), translation (10%), elaboration (9%), examples (7%), and picture prompts (4%) (See Table 3). In fact, repetition was used almost twice as many times as the second most frequently used type, direct explanation. On the other hand, picture prompts were the least used for teaching by the tutors.

Table 3: Frequencies of instructional types and student responses

Instructional Types	Frequency and Percentage	Student Responses	Frequency and Percentage
Repetition	64 (34%)	Confirming understanding	19 (30%)
		Repetition	29 (45%)
		Responding correctly	1 (2%)
		Not understood	15 (23%)
Direct Explanation	36 (19%)	Confirming understanding	18 (50%)
		Repetition	5 (14%)
		Responding correctly	2 (5%)
		Not understood	11 (31%)
Simplified Reformulation	32 (17%)	Confirming understanding	17 (53%)
		Repetition	0 (0%)
		Responding correctly	1 (3%)
		Not understood	14 (44%)
Translation	19 (10%)	Confirming understanding	15 (80%)
		Repetition	2 (10%)

		Responding correctly	0 (0%)
		Not understood	2 (10%)
Elaboration	17 (9%)	Confirming understanding	2 (11%)
		Repetition	4 (24%)
		Responding correctly	4 (24%)
		Not understood	7 (41%)
Examples	13 (7%)	Confirming understanding	10 (77%)
		Repetition	0 (0%)
		Responding correctly	1 (7%)
		Not understood	2 (16%)
Picture Prompts	9 (4%)	Confirming understanding	5 (56%)
		Repetition	3 (33%)
		Responding correctly	0 (0%)
		Not understood	1 (1%)

In terms of the learners' responses to each type of instructional feedback, their most frequent response is learner uptake (confirming understanding or repetition) to four types of instruction: repetition (75%), translation (90%), examples (77%), and picture prompts (89%). On the other hand, direct explanation, simplified reformulation, and elaboration resulted in lower learner uptake, which also yielded higher frequencies of learners not understanding the instruction. The learners did not understand the simplified reformulation instruction 44% of the time, elaboration 41% of the time, and direct explanation 31% of the time. These results could mean that the three types of feedback might be more difficult to maneuver to make them effective. Insights regarding the use of different instructional feedback types are discussed in the next section.

6.2 Tutors' Reflections on Their Teaching

6.2.1 Repetition

Repetition, the most frequently used method, was employed when the tutors were not sure if the learners could hear them clearly or on time. For example, Tutor 7 stated, "There was the time lag issue in the online sessions. In order to decrease the problem of the student not understanding what I said due to time lag problem, I often used repetition." The high frequency use of repetition illustrates that the unstable connection probably occurred very often. In addition to using repetition to minimize the effect of connection problems, some of the tutors used it to give more time to the learners to respond to them. Tutor 9 said, "I thought repetition was effective in that it gave my student time to think and comprehend."

6.2.2 Simplified Reformulation

When the language point or concept they tried to teach was very complicated or abstract, the tutors used simplified reformulation to teach. Tutor 1 said, "I often used simplified reformulation when I felt the material I tried to teach was hard and the student

could easily understand me after I used simplified reformulation in a short time." This might be true sometimes, as the data show that 56% of the time simplified reformulation was used, the learners understood it. However, in the remaining 44%, the participants still did not understand the tutors. This finding implies that some of the tutors might had misinterpreted whether their learners understood them and underestimated the difficulty level of the reformulation used in their utterances.

6.2.3 Direct Explanation and Examples

The two methods, direct explanation and examples, were mostly used to explain abstract or cultural concepts. The tutors thought they could be effective in making students understand clearly and more completely. However, with direct explanation, the tutors learned from their DVC teaching experience that if they did not use the vocabulary at the students' level to explain, the method might not yield good learning results as expected. Tutor 3 described, "My experience with my student was that I needed to avoid difficult vocabulary. If I avoided difficult vocabulary, I found that it quickly helped my student understand what I meant." Having a similar experience, Tutor 7 elaborated, "Using direct explanation is risky because when you explain, the vocabulary you use to explain might not be comprehensible to the student. You end up having to explain about the explanation." In terms of the use of giving examples, the tutors also learned a few things about which to be cautious. They found that using simple examples and examples closely related to the students' daily lives were most effective. Tutor 3 explained, "Using complicated examples might have a negative effect as the student might not understand you and you end up needing to think of other ways to teach them." Tutor 4 also pointed out that "It would be best if you could find examples related to your student's life because in my online sessions, probably because we have different life experiences, many times the student did not understand my examples."

6.2.4 Translation

The method of translation was used when the tutors could not think of a better way to teach the students. A few tutors mentioned the advantage of using translation for students to understand quickly, but the study results showed that the tutors did not use the method very often (only 10% of the instruction time). This could be due to the tutors' belief that using translation to teach might not help learners retain the knowledge in the long term. The concern is illustrated in Tutor 3's statement, "I feel by using translation the student can quickly understand the meaning, but I am not sure if they will be able to remember the knowledge in the long run. I only used it when I didn't know how to address the language point."

6.2.5 Elaboration

Elaboration, a method less used in the online sessions, was also rarely addressed in the teaching notes. In fact, only one tutor, Tutor 4, explained her use of this method. She said, "I used it when the student's answer was not what I expected. I tried to ask her for more information". The low frequency use of elaboration in this study could be due to

two reasons. First, the learners in this study were probably advanced enough that they were able to give elaborated statements in the interactions and the tutors did not see the need to ask for more elaboration. Second, a few tutors commented on their learners being highly motivated and active during the sessions to the extent that one tutor thought that in the future she needed to have a better estimate of how long the student needs to respond to her. Tutor 6 stated, "Because my student was very outgoing, she spoke a lot more than planned." With the majority of the learners being highly active and talkative, elaboration was rarely needed. However, when it was used, the learners did not understand the instruction 41% of time. This suggests that when the learners had short utterances in the initial answers, they probably did not have sufficient vocabulary or grammar knowledge to elaborate on the topic; hence, asking them to elaborate more could not yield a positive teaching result.

6.2.6 Picture Prompts

The least used method, picture prompts, was, surprisingly, a highly discussed method among the tutors. Tutor 10 believed that the use of pictures "strengthened the student's memory of the new vocabulary." Sometimes, picture prompts were used as a secondary method as Tutor 5 said, "My student understood me most of the time, but if he didn't, showing him pictures was a good way to help." In a different case, Tutor 11 revealed that it was his student who requested that he use a picture "because the use of a picture seemed to help him connect more quickly to the lessons." Both Tutors 4 and 6 thought the use of pictures were effective. Tutor 6 described, "When I showed a picture, I would ask questions about the picture and I found that it was effective. It made the student speak more Chinese" and Tutor 4 expressed, "I feel the use of pictures was very effective as it helped the student understand my teaching." The study results regarding picture prompts were contradictory to the low frequency with which the method was used, but many of the tutors spoke highly about it. This could be attributed to the fact that the time it takes to use pictures as prompts is much longer than to use other methods. For example, Tutor 6 mentioned that she would ask questions when showing a picture. The time that takes the tutor to show the picture, to ask questions, and the student to respond probably is much longer than the time the tutor translates a word meaning or repeats what he or she says. As a result, even though the use of pictures as prompts has a low frequency count, based on the teaching notes, each instance was used for a longer period of time than other types of instructional feedback and was effective.

6.3 Learners' Perceptions on the Use of DVC

The learner survey elicited the learner participants' perceptions on how effective they thought the learning was through Skype. First, the participants were asked to identify the aspects most benefited and least benefited from the Skype sessions (See Table 4).

Table 4: Aspects most benefited and least benefited from the Skype sessions

Survey Items	Learning Aspects	Number of Learner Participants
Aspects most benefited from the Skype sessions	Listening	10
	Vocabulary Use	2
Aspects least benefited from the Skype sessions	Grammar	6
	Pronunciation	3
	Speaking Speed	2
	Reading	1

The majority (ten out of 12) of the participants mentioned that their listening skill is the most benefited area from the Skype sessions. A few reasons are attributed to such a result. First, a few learners mentioned that because the connections could sometimes be spotty, they could not rely much on body language through webcams. As a result, Participant 2 stated, "I had to focus really hard to make sure I understood what she was saying." Participant 10 made a similar comment by saying "I had to listen intently to understand everything the instructor was saying, so much so that I was physically exhausted after each session." Another reason the participants thought their listening skill benefited most is that they felt the interaction with the tutors were more authentic compared to their other learning experiences (e.g. role-playing in the classroom). For example, Participant 12 said, "I'm used to more 'role' conversations, and talking to my tutor helped me work on real-world listening/understanding." Participant 5 mentioned the authenticity of the interaction in which colloquialisms were often found. He said, "It's very different listening to a native speaks colloquially, so it forces me to listen harder." Another aspect related to the authenticity of the interaction is speaking speed. In a language classroom, it is common for instructors to slow down their speaking speed to accommodate learners' target language levels. However, in the Skype sessions, the tutors used a normal speed yet enunciated clearly, which helped the learners get accustomed to the normal speed a native speaker would use. Participant 3 said, "My tutor was very helpful by not trying to speak slower." Although the DVC sessions were not without technical flaws, such as unstable Internet connections, with the tutors' devotion and effort in making understandable communication, the learners spoke positively about the learning experience. Participant 2 stated, "By the 3rd session we were going really well."

As for the area least benefited, half of the learner participants believed that grammar was addressed least. Participant 12 recognized that grammar "was never an element of focus." This could be attributed to the Chinese level of the learners being sufficient to carry out meaningful communication with the tutors; hence, the tutors did not interrupt the conversation when the learners' made a grammar error. This is evident when Participant 5 mentioned, "If she understood what I was trying to say, then we moved on." Although the participants realized that grammar was not the emphasis in the DVC sessions, a couple of them expressed their hope to learn more grammar online. For example, Participant 1 said, "I have a good grasp on vocabulary, but grammar could be more specific."

Next, when asked if any cultural knowledge was gained in the DVC sessions, the majority (ten out of 12) answered positively (See Table 5).

Table 5: Cultural knowledge gain and Skype experience ratings

Survey Items	Answers	Number of Participants
Was any cultural knowledge gained in the DVC session?	Yes	10
	No	2
How do you rate your Chinese language learning experience using Skype?	Displeased	1
	Somewhat Displeased	2
	Neutral	2
	Somewhat Pleased	4
	Pleased	4

Some learners appreciated the opportunity to learn about cultural differences. For example, Participant 7 said, "I enjoyed comparing eating customs and culinary norms with my tutor." A few learners especially liked the learning of the Taiwanese perspectives. Participant 8 mentioned, "It was pretty helpful. She would explain on why Taiwan people think or say those things." The other learner, Participant 12 stated, "I got to learn more about Taiwanese perspective of the Chinese movies we watched." Participant 5, who had extensive immersion learning experience, thought that even though he had already been exposed to the Chinese culture, "it was still interesting since she [the tutor] was from Taiwan, not China." Even for learners who had been to Taiwan, such as Participant 1, she thought that "there are always cultural points to learn." Overall, the majority (eight out of 12) of the participants were pleased or somewhat pleased with the Skype learning experience.

Finally, the participants made a few suggestions for future DVC language learning projects. One aspect often mentioned was how to better deal with the technology issues they encountered. A few participants stated that Skype was not the best option for DVC learning. For example, Participant 3 said, "Skype has always had quality issues on my computer and I could have made it better using something else." Participant 1 suggested using a different tool. He stated, "Skype is unreliable. Zoom is an App that I have heard of that is nice." Another issue some of the participants often ran into was unstable internet connections. Participant 2 suggested to those students to "reserve a room in the library so internet problems is not a problem." However, this suggestion would be difficult to achieve if the online session is scheduled at odd hours (e.g. late at night due to time differences between Taiwan and the US) when the library is not available. Other technology issues occurred when the participants tried to record the online sessions. For different reasons, some of the students had incomplete recordings or failed to record the sessions. Participant 6 suggested using a new recording system. The other aspect frequently mentioned in the suggestions was how to make the DVC teaching more effective. Participant 8 thought that the teaching materials the tutors made was "somewhat of a surprise", therefore, having a handout of vocabulary before or after the session would be helpful. Participant 10 had a similar suggestion as he said, "perhaps provide some vocabulary to review before the session to help it go more smoothly." As

mentioned in the Participants section, the learners in this study had a wide range of Chinese learning backgrounds. Even though the US instructor sent a brief description of each learner's learning background and current level to the tutors, it was difficult for the tutors to design teaching materials most suitable for the individual learners. The tutors might have prepared something below or above the learners' current language levels. In order to overcome this issue, Participant 12 suggested that "Maybe have an "introductory" session, where the lesson is secondary to figuring out how to teach the student." Sometimes, not only the learner's language level, but also his or her personality might have been a factor affecting the online sessions. For example, Participant 7 was a very shy student and felt extremely uncomfortable having to meet an online tutor he did not know and speaking in a target language he was still learning. After one session, he requested to have a Chinese-speaking friend to sit next to him when he had the second DVC session. In the survey, he suggested to have "alternative options for uncomfortable students." He then further elaborated on his experience, "Having a Chinese native speaking friend next to me in my last two sessions helped my stress level a lot but the first session was very uncomfortable." Besides the technology and teaching aspects that received most suggestions, the majority of the learners felt positive about the DVC learning experience and suggested to have "more of them" in the future.

7. Conclusion

The current study investigated the Chinese language teaching episodes which occurred in one-on-one DVC sessions between pre-service teachers and college language learners, and their opinions on their teaching and learning. To answer research question 1, *what types of instructional feedback do DVC tutors employ, and how do they affect learners' responses?*, among the 168 teaching episodes identified, the tutors most frequently used repetition as the instructional feedback. The use of repetition was fairly effective as it received frequent learner uptake (75% of time) and the learners did not understand the instruction only 24% of time. On the other hand, picture prompts was the least used instruction type. Despite the low frequency of use, the tutors believed the method was effective. Overall, the findings show that in spite of the pre-service teachers' limited teaching experiences, they managed to employ a wide variety of teaching instructions in the DVC sessions. This result is much more positive compared to the one in Kozar's (2015) study which found low teaching quality in the private online language school. With regard to the learners' responses to the instruction, four types of instructional feedback (repetition, translation, examples, and picture prompts) yielded high frequencies of learner uptake while three types of instruction (elaboration, simplified reformulation, and direct explanation) resulted in higher frequencies of no understanding. This result could imply that the learners in the study did not have enough target language knowledge to elaborate on the topic when asked, or understand the tutors' rewording or explanations. The use of the three instructional feedback types (elaboration, simplified reformulation, and direct explanation) not being effective in this study could be attributed to the fact that all three types of feedback require proper adjustment of the teacher's feedback. Teacher training researcher, Sung (2010), pointed out that adequate adjustment of the teacher's feedback for language learners is a challenging task for novice language

teachers. Many novice teachers are unable to provide perfect input due to lack of experience. If the tutors plan to use these types of instruction, a suggestion would be to learn more about the student's current language level including their current vocabulary and grammar range before deciding the expected depth of the learners' elaborations and what rewordings or explanations to include in the instruction.

To respond to research question 2, *what is the rationale behind the use of different types of instructional feedback in DVC?*, repetition was mostly used to ensure that the unstable internet connection did not interfere with the instruction. When a language point was complicated or abstract to explain, simplified reformulation was used. On the other hand, when an uncomplicated or concrete concept needed to be conveyed, direct explanation and examples were employed. When the tutors could not think of other methods to use and needed the learners to understand quickly, translation was used. Elaboration was only used when the tutors wanted the learners to provide more information. Lastly, the use of picture prompts was to aid the tutors to ask the learners questions for more discussions or used as a secondary method when the first method used was not very effective.

To answer research question 3, *what are students' perceptions toward online language learning through DVC?*, the learners believed that their listening skills improved most from the online sessions. One reason is that the bad Internet connection forced them to not rely on the webcam for body language cues, but only focused on listening to the tutors. Moreover, the authenticity of the interactions in terms of the content and speaking speed helped develop their listening ability. In addition to the improvement in their listening skills, the learners also experienced significant gains in cultural knowledge. Such finding is aligned with Canto, Jauregi and Van den Bergh's (2013) study in which the participants in the DVC group reported gaining inter-cultural knowledge during the online sessions. In the present study, the learners from traditional and immersion learning backgrounds both appreciated the opportunity to learn more cultural knowledge from the Taiwanese perspective and the cultural differences. Despite the gains in listening and cultural knowledge, the learners felt least benefited in grammar and hoped future DVC projects can emphasize not only oral skills, but grammar as well. Finally, the learners suggested that future DVC projects can experiment with other DVC tools which might be more effective for language learning, and that online tutors need to know more about their learners in terms of their level and personality before teaching starts.

8. Discussion

The results of the current study are much more positive than a similar study conducted by Kozar (2015) which reported the learners being in a receptive role to answer the tutors' questions and not initiate conversations. In this study, the learners actually initiated more teaching episodes than the tutors. The different results in the two studies could be due to the amount of training the online tutors had. In the current study, even though the tutors had very limited prior teaching experience, the language teaching

introductory course they were taking offered instructions on language teaching theories, how to apply theories in lesson plans, how to make teaching materials, and how to teach Chinese as a foreign language to English speakers at different levels. Moreover, after each online session, the Taiwan instructor would ask the tutors to discuss the teaching issues they encountered and how to avoid them the next time. This teacher training and support probably made a positive influence on the results of this study. This assumption is supported by the finding in Charbonneau-Gowdy, Cechova and Kriz's (2009) study in which the participants were found to be more self-directed in the DVC sessions when they were taught by a qualified and experienced teacher. This implies that implementing useful training for online teachers is necessary to ensure online teaching quality.

Next, both the tutors and the learners expressed concerns about the tutors not being able to teach at the students' levels and teach with consideration of the students' personality. This implies that online teachers need to take time to get to know their learners' language and comfort levels, learning backgrounds, and personalities before teaching. In the one-on-one online setting, it could be intimidating for learners as they need to speak the target language they are learning to a teacher they have not met in person. Talking at the language level suitable to the learners and acting carefully with the learner's personality in mind are teaching techniques necessary to ensure online teaching success. In addition, the study results illustrated that instructional feedback could be influenced by technology. This finding is similar with the findings in Hampel and Stickler's (2012) and Bensafa's (2014) studies. For example, Bensafa reported that the conversation delays during DVC sessions affected the quality of instruction while Hampel and Stickler stated that instead of focusing on the teaching and learning tasks, the participants spent time discussing technology issues. In this study, bad Internet connections made the tutors repeat their utterances. The frequency of repetition was so high that it was ranked the most frequently used instruction in the DVC sessions. If the technical problems could be minimized or eliminated, it would yield a much better teaching and learning environment where teachers and learners could focus on what the learners need to learn, and not that they could not hear clearly. Lastly, although one or two participants complained about the quality of the DVC tool, Skype, used in this study, the majority of the learner participants positively rated this tool. This finding supports the finding in Eröz-Tuğa and Sadler's (2009) study in which Skype was rated as one of the top DVC tools for language learning and teaching. This suggests that Skype is a good option to consider when instructors explore possibilities for DVC tools.

9. Limitations

This study has provided detailed information on how language teaching and learning occurred in an online one-on-one environment via DVC. To further explain the teaching and learning phenomenon observed, the tutors' reflections and the learners' survey data were analyzed. Although this study found fairly positive teaching results in terms of the wide variety of teaching methods utilized and mostly positive comments from the learners, cautions should be used as this study has several limitations. First, due to the technical difficulties when using Callnote to record the DVC sessions, some of the

sessions failed to be recorded, so the data did not include all sessions from all six dyads. Second, this study only focused on one single advanced Chinese class in which half of the learner participants had Chinese immersion experiences while the remaining half only learned Chinese through traditional classes in the United States. Future studies are needed to include a larger number of participants at various language levels in both similar and distinct study contexts compared to this one to yield a higher reliability in results. Nonetheless, this study shows the importance of understanding more about how DVC teaching occurs and how the online environment might affect teaching and learning.

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Appendix 1

Examples of the Seven Types of Instructional Feedback Found in the DVC Sessions

T = Tutor
S = Student

(1) Direct Explanation
The learner did not know the meaning of "market" and the tutor used direct explanation to define what a market is.

T: 你知道"市场"吗？
[Do you know "market"?]

S: 我不知道
[I don't know.]

T: 市场就是很多卖小吃，然后可以买菜，然后有水果的地方。
[Market is a place, which sells small bites of food, a place you can shop for grocery and fruit.]

S: 哦，就是一个很大的地方有很多很多的东西？
[Oh, is it a very big place with a lot of things?]

T: 对，有很多东西，可能有卖吃的，有卖喝的，然后有很多用的东西。
[Yes, a lot of things, maybe some of them sell food, some sell drinks, and some sell things people use.]

S: 嗯哼。
[Ah ha.]

(2) Translation
The learner wanted to say she liked to eat spring rolls, but did not know how to say it. The tutor translated "spring" and "roll" for the learner.

S: 所以我喜欢吃…怎么说…应该是"spring roll" 在英文。
[So I like to eat…how to say…should be "spring roll" in English.]

T: Spring 是春，roll 是卷。所以是春卷。
[Spring is spring, roll is roll. So it is spring roll.]

S: 嗯哼。
[Ah ha.]

(3) Repetition
For some reason, the learner asked the tutor to repeat his question, but still did not answer the question. The end of the excerpt shows that the problem was the bad Internet connection, which affected the clarity of the tutor's utterance.
T: 我想要请你分享在台湾旅行的过程中有没有遇到过困难？
[I want to ask you to talk about any difficulties you encountered when you traveled in Taiwan]

S: 再一次？
[One more time please?]

T: 我想要请你向我分享一下你在台湾旅行的过程中有没有遇到过困难？
[I want to ask you to talk about any difficulties you encountered when you traveled in Taiwan]

S: 我？
[Me?]

T: 对，没错。
[Yes, correct.]

S: 我觉得我们的上网 internet connection 非常坏。很难听你，所以你常常说

一样的句子，不好意思。
[I feel our internet connection is very bad. I have a hard time hearing you, so you often need to repeat the same sentence. I am sorry.]

(4) Providing Examples
The learner did not understand the tutor's question; hence, the tutor used herself as an example to answer the question.

T: 那你说英文是你的母语嘛，那你学习中文。那你还会其他语言吗？
[You said English is your native language, and you are studying Chinese. Do you speak other languages?]

S: 我不明白。
[I do not understand.]

T: 额，就是我还会说一点点韩语跟一点点德语，那你会其他语言吗？
[Hmm, I meant like I speak a little bit of Korean and German, do you speak other languages?]

S: 明白，好了。额，我会说英文还有中文，还有一点点，怎么说"Spanish"？
[Got it, OK. Hmm, I speak English and Chinese, and a little bit, how do you say "Spanish"?]

(5) Simplified Reformulation
The learner did not know the term "go to school", so the tutor reworded the phrase to "go to university".

T: 我现在在高雄念书。
[Now I go to school in Kaohsiung.]

S: 念书？
[Go to school?]

T: 上大学。
[Go to university.]

S: 上大学，好。
[Go to university, OK.]

(6) Elaboration
The learner initially made a short sentence. The tutor helped him elaborate more by the use of elaboration.

S: 我从美国到台北。
[I went from the US to Taipei.]

T: 从美国到台北，然后去？
[From the US to Taipei, and then?]

S: 然后，哦，我去越南。
[And then, oh, and then I went to Vietnam.]

(7) Picture Prompts
The learner did not know what "boat" means. The tutor tried to show him a picture of a boat.

S: 什么是"船"?
[What is "boat"?]

T: 船…那船是… 有没有办法给你看图片…好, 我用图片给你看
[Boat…a boat is…am I able to show you a picture…OK, let me show you a picture.]

Appendix 2

Examples of the Four Types of Student Responses Found in the DVC Sessions

(1) Confirming Understanding
The learner repeated the phrase, "top of the building", after the tutor mentioned it. The tutor was unsure if the learner understood what it meant and asked for confirmation. The learner confirmed it positively.

T：这里是顶楼。
[Here is the top of the building.]

S：顶楼。
[Top of the building.]

T：顶楼是一栋房子最高的地方。你知道意思吗？
[Top of the building is the highest place of a building. Do you understand?]

S：知道啊。
[Yes, I do.]

(2) Repetition
The learner did not know how to say "cereal" in Chinese. After the tutor translated it for him, he repeated the word in Chinese.

T：所以你平常在家里都是吃美国菜？
[So you usually eat American food at home?]

S：但是我最喜欢的是 cereal.
[But my favorite food is cereal.]

T：哦，谷类那些的吗？
[Oh, you mean cereal and such?]

S：嗯，yeah yeah.
[hmm, yeah yeah.]

T：那个叫做，中文里面叫做谷类。
[That is called cereal in Chinese.]

S：谷类。
[Cereal.]

(3) Responding Correctly
In this example, the student did not understand the tutor's question. The tutor gave an example of himself (he is a senior in college) and elicited the same question to the learner.

T: 那你现在几年级？
[Which year are you at in college?]

S: 现在吗？
[Now?]

T: 那你在大学，我念四年级，你念？
[You are in college. I am a senior, and you?]

S: 四年，我现在我第四年。
[Senior, I am a senior.]

(4) Not Understood
The learner did not understand the phrase, "wait a minute" in Chinese. After the tutor used repetition a few times, the learner still did not understand it.

T: 等一下我们听他的歌。
[Wait a minute, let's listen to his song.]

S: 等一下？
[Wait a minute?]

T: 等一下。
[Wait a minute.]

S: 等下？
[Wait minute?]

T: 等一下。
[Wait a minute.]

S: 等下？
[Wait minute?]

Students' Perceptions about a Flipped Online Chinese Language Course
(学生对于网络中文翻转课堂的感知)

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Abstract: The flipped-classroom model provides students with "a dynamic and interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter" (Flipped Learning Network, 2014). Flipped instruction can be especially beneficial for second-language teaching, since classroom time can be applied to more interactive tasks. However, little research can be found focusing on flipped-classroom instruction in online environments. This paper fills the gap by presenting students' perceptions about a flipped classroom model adopted in an online Chinese language course offered by an institution associated with an American university. Specifically, the flipped course format is "2+1+2", referring to two preview assignments, one 50-minute online synchronous session, and two review assignments. Survey results from a total of 31 students enrolled in Chinese Level 1 (beginning level) indicate that students had positive perceptions towards the use of the flipped classroom format in online language class.

摘要：翻转课堂的模式为学生们提供了"一个活跃的互动环境，从而使教育者能够引引导学生在某一学科领域对应用所学概念并有创造性地参与到学习中"（翻转学习网络，2014）。因为课堂时间可以被用来完成更多的互动性任务，所以翻转教学法对于二语习得有特殊的帮助。但是，目前对于在网络环境下的翻转课堂教学和模式的研究寥寥无几。本文旨在弥补上述研究的空白，从学生的感知角度来研究由美国一所大学提供的网络中文翻转教学。具体而言，本文中提到的翻转课堂采取"2+1+2"的模式，即两个预习的作业、一堂 50 分钟的实时网络课和两个复习作业的模式。通过对第一级别 31 位学生（零基础）的问卷调查，我们发现学生们对于网络中文课程中的翻转模式及教学持有非常积极的态度。

Keywords: Flipped-classroom, online language class, online Chinese teaching, student perceptions

关键词：翻转课堂，网络语言课程，网络中文教学，学生的感知

1. Introduction

Amid the rise of educational technology, teachers have been taking innovative steps to modify their teaching methods to meet learners' changing needs. Online learning, having displaced the traditional face-to-face model of learning to an extent, has also raised a claim on designing an effective model to maximize learning outcomes. However, while there are a wealth of resources aimed at making online language learning enjoyable and effective (Wang, 2016), scholars have long recognized that there is insufficient support for interaction and collaboration in language learning by distance (Kennedy & Tim, 2004). The flipped classroom, a concept that has been gaining attention in recent years, has been widely seen as a solution for increasing content-related interactions and encouraging a collaborative learning environment (Egbert, Herman, & Lee, 2015).

Traditionally, in-class time is spent passively receiving concepts via listening to lectures and taking notes on them, and out-of-class time is devoted to the unassisted completion of homework assignments. However, an active learning process requires that teachers perceive instruction as useful, stimulating, and the best use of classroom time. Lage, Platt, and Treglia (2000) provide a simple definition of the flipped-classroom concept: "events that have traditionally taken place inside the classroom now take place outside the classroom and vice versa" (p. 32). Put another way, a flipped classroom is a setting where everything "traditionally done in class is now done at home, and that which is traditionally done as homework is now completed in class" (Bergmann & Sams, 2012, p. 13). Though such explanations are useful up to a point, they inadequately present the core of the flipped process. Bishop and Verleger (2013) noted that the flipped classroom should consist of interactive group-learning activities and computer-based individual instruction outside it. In other words, a flipped classroom should convert the physical classroom into a place where active learning processes occur: e.g., discussing concepts, collaborating with peers, and investigating questions related to learning content (Basal, 2015). The flipped classroom has also been described as a process for guiding students to achieve higher-order thinking, as per Bloom's taxonomy (Sarawagi, 2014); and as changing the role of the teacher from a "sage on the stage" to a "guide on the side" (King, 1993).

The current study is inspired by the importance of interaction and collaboration in language acquisition (Wang & Chen, 2007). Since language learning requires constant synchronous interaction in the target language, it is crucial to design a language course that is supportive for both oral and visual interaction. However, research is needed in understanding what students' perceptions are about the effectiveness of an online flipped language course.

2. Theoretical Perspectives

In this session, we introduce three theoretical perspectives that guided this study, namely active learning, Bloom's taxonomy, communicative language teaching. Each theoretical perspective is discussed in connection with flipped model in an online language course.

2.1 Active Learning

Designing an instructional strategy that can effectively engage online learners is challenging. Active learning strategies may involve students both doing things and thinking about the things they are doing (Bonwell & Eison, 1991). Such strategies can help students to think critically and creatively, to become or remain more involved in communication with others in their group or in the class as a whole, and/or to further express their ideas and reflect upon their own learning process. Considered from the perspective of teaching, active learning environments place "less emphasis … on transmitting information (teacher-centered) and more on developing students' skills (student-centered)" (Bonwell & Eison, 1991, p. 2).

Online teaching strategy should foster students' active and constructive learning (Hanover Research Council, 2009). Active learning is an effective instructional strategy for both the traditional brick-and-mortar classroom and the online environment. However, Moore and Kearsley (2011) have noted that active learning may not occur in online environments if interaction is not deliberately planned and encouraged by the instructor. Teachers can apply the student-centered approach to engage students in actively constructing knowledge (Syam, 2014), for example, by creating interactive videos instead of merely showing lecture videos. Therefore, exploring the integration of flipped model and online language course is important to support students' active learning from designing and pedagogical perspectives.

2.2 Bloom's Taxonomy

Flipped learning is rooted in social constructivism, which holds that students engaged in communication and interactive activities will learn more effectively. Students construct their views of new knowledge based on their existing knowledge; and Bloom's revised taxonomy (2000) helpfully classifies the cognitive process of learning, from basic remembering of facts to applying, evaluating, and creating. Figure 1 presents Bloom's taxonomy as revised by Anderson and Krathwohl (2000).

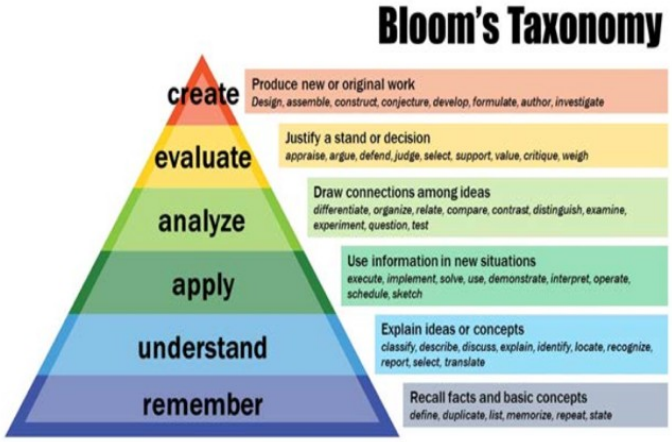

Figure 1. A revised version of Bloom's taxonomy of cognitive learning.

In the flipped classroom, students will do the lower level of work (in Bloom's terms, understand and remember) in the self-study stage: learning basic facts with the ability to pause, rewind and repeat the learning content at their own pace until they remember and understand. Later, when joining their classmates for a synchronous lab session, they will develop their higher-level thinking (apply, analyze, evaluate, create) with the help of the instructor through peer interactions, collaborative tasks, and group problem-solving activities.

2.3 Communicative Language Teaching

As a paradigm for teaching foreign languages, Communicative Language Teaching (CLT) believes that "second language learning is facilitated when learners are engaged in interaction and meaningful communication" (Richards, 2006, p.22). CLT is based on the ideas that the primary function of language use is communication, and that success in language learning comes through communicating real meaning. Cowan (2008) further explained that the key factor of CLT is the shift in the roles of teachers and students as the class activities are not directed by teacher. Instead, students work together to communicate through interaction and collaboration. However, before they are able to produce language and exchange meaning with others, they need to receive "meaningful and comprehensible input" (Spino & Trego, 2015), and students may achieve better learning results if instruction and feedback are provided during the input procedures, according to Spada & Lightbown (1993). Wang and Chen (2007) argued that the core principles of CLT are equally important for successful online language learning as it enhances the peer interaction and teacher-student interaction, which is the key factor for online learning. Hammond (2000) investigated the value of the communicative approach in online learning environment and found that its task-centered characteristic not only offer a powerful environment for engaging online learners, but also bridge the personal experience and learning circumstances.

3. Research Questions

The purpose of this study is to investigate students' online learning experience and their perceptions towards our online 2+1+2 flipped classroom model. The following questions guided this research:

1) Does 2+1+2 flipped model promote the interaction and enhance students' active learning experience in an online environment?
2) Do students perceive that they have sufficient opportunity to practice oral skills in this flipped classroom model?
3) Do students perceive that 2+1+2 flipped classroom model supports their online Chinese study?

4. Methods

4.1 Overview of the Flipped Online Chinese Model

No single dominant model of flipped learning has been established (Basal, 2015). Multiple approaches could be used to arrive at an effective one. In this study, we define the flipped classroom as a student-centered learning model in which students preview teacher-created learning content outside of the class in a self-directed learning mode. Later, students collaborate in a teacher-guided interactive activity, which is followed by self-directed review assignments. Guided by the theoretical framework set forth above, our course design is inspired by the desire to 1) promote the interaction and enhance active learning experience in web environment, and 2) increase the opportunities for online language output practice.

The implementation of a flipped-classroom model commenced in 2016. Our online Chinese flipped classroom was established based on a 2+1+2 course format. Each session's 2-day preview assignment comprised one or two videos focusing on vocabulary and grammar. In the lab session, there was usually a 5-10 minute review period, 5-minute question-and-answer section, and 25-30 minutes of task-based activities, followed by a short recap. Among the 2-day review assignments, there were interpretive activities and presentational activities.

4.1.1 Preview Assignments (Asynchronous Stage)

In preview stage, instructors upload lecture videos and pre-lab assignments to Blackboard. The goal of the preview assignments is to provide students with fundamental understanding of the new vocabulary and sentence structures in the coming lesson. Ensuring students have sufficient input is "integral to a communicative language class" (Spino & Trego, 2015, p.3). Quizlet, an increasingly popular flash-card games website, has provided students with an amusing way of studying vocabulary. We adopted VoiceThread (VT) as our primary tool for producing interactive videos, which is a web tool integrating multimedia and teaching content. Learners or teachers can add comments on the VT page via microphone, telephone, camera, keyboard text, and doodling. Along with the embedded lecturing videos, teachers can also add interaction activities in VT to increase student's engagement and provide feedback in asynchronous study. With the help of VT, students will not have to do the self-study alone, instead, they were guided through the lecture material and also had their understanding checked via exercises. In VT, teachers not only provide videos, but also design an interactive activity for students to practice right after lecturing on a new language point. At the end of the VT presentation, instructor may provide a simple question for students to reflect on their learning of new language contents. Instructors also encourage students to post their questions on VT or in Blackboard discussion board before the synchronous lab session.

4.1.2 Lab Session (Synchronous Stage)

Our synchronous sessions are designed as an alternative to typical in-class activities. The lab session, which is conducted in Adobe Connect, has been redesigned to

reschedule the time for learning activities, aiming to create more opportunities for students to apply the knowledge into meaningful language tasks and to collaborate with peers.

4.1.3 Review Assignments (Asynchronous Stage)

After the lab session, students need to complete a 2-day assignment in LMS for reviewing the learning contents. The assignments provide opportunity for students to practice their reading, speaking, and writing skills in three modes of communication, namely interpretive, interpersonal, and presentational modes. Various online tools including Flipgrid (students can post video comments together for discussion) and Padlet (an interactive digital wall that students can post their project and leave comments to others' works). At the end of the assignment, a can-do checklist is provided to give students chances to self-reflect on what they've learnt, realize their strength and weakness and motivate themselves to set a goal for the next study circle.

4.2 Participants

An anonymous final course survey was conducted at the end of 2016 Fall semester (at the end of January 2017). The study participants were students enrolled in the 20-week online Chinese course (Level 1). A total of 31 students aged between 13 and 18 participated in the survey voluntarily. 11 (35%) are male while 20 (65%) are female students. 12 (39%) participants have taken online courses before while 19 (61%) participants indicated that it's their first time to join an online course.

4.3 Data Collection and Analysis

The final course survey was administered to all participants via Qualtrics (an online survey tool). Both quantitative and qualitative data were collected.

Quantitative data was collected from the closed questions in the survey. The closed question part of survey was divided into four sections to investigate students' learning experience in each learning procedures: Pre-class video, Assignment, Lab Session and Overall Evaluation. Single-answer questions and 5-point Likert scale (ranging from a score of 1, "strongly disagree with the statement" to 5, "strongly agree with the statement") questions were adopted to supply the quantitative data. The data received were analyzed using descriptive statistics.

In addition to quantitative data, qualitative data was collected through the open-ended questions at the end of the survey. It includes 6 open-ended written questions providing students the opportunity to describe their perceptions in their own words. Students' responses were analyzed using thematic categorization. Each student's response was coded and grouped into common themes. The common themes were drawn from the significant and similar responses. Two researchers worked independently on determine the categorization first and reach an agreement on the common themes after discussion.

5. Results

5.1 Quantitative Results

The quantitative questions are divided into four sections according to the learning procedure. The results are presented in this article under four themes: Time & Amount, Language Study, Interaction and Overall Rating.

Time & amount. When answering the question of how much time students used VT to study per week, a majority (83%) of the participants report that they spent less than 1 hour studying in VT while over 63% of the participants only used less than 30 minutes every week. When asking how much time students prefer to spend in VT per week, all participants reported that they prefer spending on VT is less than or equal to 1 hour while nearly 83% of the participants report that they prefer less than or equal to 30 minutes on VT. When students were asked to indicate their agreements on 5-point Liker scale "I think the general duration of VT in this semester is reasonable", more than half of the participants (52%) agreed with the statement.

Students also stated their opinions on the amount of the preview assignments and review assignments. In answering the question "I find the amount of the pre-lab assignments is appropriate", 56% of the students either agree or strongly agree with this statement and about half of the students (52%) find the amount of the review assignments is appropriate as indicated in the responses.

The responses of "I prefer at least one lab session per week" showed that students have a positive attitude toward the amount of the lab session (M=3.89). 68% of students either agreed or strongly disagreed that there should be at least one lab session per week.

Language study. In preview stage, students use VT to watch videos and learn new content. The responses demonstrate highly positive attitudes toward the facilitation of VT in pre-lab language study. Students find the content in the VT, which is designed and uploaded by our instructor is clear to understand (M=3.66) and VT is helpful for learning both vocabulary (M=3.82) and grammar (M=3.79). The purpose of the adoption of VT is to help students to be more familiar with new learning content and have themselves well prepared for the lab session communicative practices. A majority of students indicate that they understand most of the new content with the help of VT before class (M=3.75) and have prepared themselves for the lab practice (M=3.68). Though the instructors do not ask students to take notes, nearly 54% of the participants still taking notes in their learning process (M=3.54).

Preview assignments and review assignments are designed to enhance students' language skills. Students responded that preview assignments help them improve the Chinese speaking skills (M=3.78), Chinese listening skills (M=3.48), Chinese reading skills (M=3.52) and Chinese writing skills (M=3.37). It is worth noticing that only 1 participant selected strongly disagree on all the usefulness of VT in improving speaking, listening, reading, and writing skills.

Students also find review assignment helpful for improving their speaking skills (M=3.63), listening skills (M=3.48), reading skills (M=3.67) and writing skills (M=3.39). The mean of the reading skills in the questions of review assignments is higher than it in the preview assignment (M=3.52). 67% of the participants felt that review assignments assist them in the improvement of reading skills.

With regard to the impact of lab session in language study, students gave a significantly high rating on the items relates to the language study in the lab session. When asking the question "I had enough opportunities to practice Chinese language during the lab sessions" (M=4.04), students also think "the lab session is helpful for Chinese language learning", with a mean of 3.93. The results from these items were overwhelmingly positive. Only 1 student selected strongly disagree with all the questions associated with lab session.

Interaction. Two dimensions are explored to investigate the interactions: teacher support and peer interactions.

Teacher support. Participants report that the "instructor always presents a model example before they were asked to post a comment on VT" (M=3.71). Students also indicate that "I always watch the instructor's example first before I create my own" (M=4.11). Participants who agree or strongly agree with this statement take up a percentage of 86%.

In respect of the teacher support in lab session, students find "the instructions in the lab session are clear to understand", with a mean of 3.89. They also satisfy with the "numerous interactions with the instructor in the lab session" (M=4.07) and speak highly of the "enough feedback received from the instructor" (M=4.07).

Peer interaction. 75% of the participants "would like to see how other students present their answers" in VT, with a general mean of 3.96, because they think they can learn from others in this way. Nearly 64% of them believe the interactions with instructors and peers in VT are helpful for self-study (M=3.64). They also view the lab session as a great chance to interact and collaborate with their classmates (M=3.78).

Regarding the question of whether students prefer reading materials than interacting with instructors/peers in VT, 43% disagree with this statement and the general mean of the responses is 2.82. When students were asked whether they prefer watching videos only without any interactions or not. Over half (54%) of the participants disagree and the mean is 2.46, which is relatively low. Therefore, in accordance with the findings in most of the items in this dimension, it's clear that students value interactions in online learning environment.

Overall Evaluation. Generally speaking, students feel both "practicing with VT (M=3.52)" and "the lab session (M=3.93)" are engaging. As for the 2+1+2 course format, more than half of them agree that it's appropriate for learning Chinese online (M=3.37) and they would like to recommend this course to other students (M=3.48). Moreover, the learning experience in this semester also encourages them to participate in future online language courses as well (M=3.7). Admittedly, students still feel technology is challenging.

In answering the question "I think technology is not a challenge", 60% agree or strongly agree with the statement and 26% of them disagree or strongly disagree.

5.2 Qualitative Results

There are six open-ended questions providing qualitative data. Common themes were coded and identified. The questions are as follows:

1. What do you like best about the online course this semester?
2. Do you have any challenges when studying Chinese online? What are they?
3. What is the biggest advantage of this course comparing to face-to-face learning?
4. What is the biggest disadvantage of this course comparing to face-to-face learning?
5. Can you describe one learning activity you find most engaging during this semester?
6. What part of the online learning would you like to see different if you were to take this next time?

The results of the questions fall into three categories: strength, challenges and future improvements.

5.2.1 Strength

59% of the participants respond that self-pacing is the biggest advantage comparing to face-to-face class. Students mention that they can "spend as much or as little time as needed" and the learning tasks "can be done at any time of the day". The due dates make it possible for them to "complete the tasks anytime" according to their own study pace and schedule. Some students appreciate being able to work ahead faster if they can while others pointed out that they can also catch up easily. Some students mention that they could "access the video lessons whenever they needed' and it is "convenient" as they can rewind or pause the video on their own.

A majority of students enjoy the lab sessions. 31% of the participants indicate that lab session is what they like best this semester and they like the in-class activities. Some students find that lab session provide them opportunities to practice and receive feedback from teachers. 19% of them find lab session is the most engaging activity in the online flipped classroom.

Interactions. 15.38% of the participants like the interactions best. One student states that the course is very interactive and hands on while another student points out she has "a lot of interactions with her peers and instructors via lab sessions". Interactions in assignment is also mentioned by one student, she said "I liked the interactions we got to do in many of the assignments".

Helpful for language skills practice. Some students point out that the course enable them to be more fluent and practice speaking by applying what they learnt in the class. One student thinks it's helpful for grammar learning and he find he "get a better understanding of the grammar now", which is something he struggled with in the past.

Another student stated that he learnt much more in this online course than he did at school in face-to-face class.

Teacher support. 12% of the students find the support of the instructor is the biggest advantage of the online course. Most of them mention that the instructors were "helpful and supportive".

Technology tools. 15.3% of the students like the tools adopted in the course best. 59% of the students find the learning activity with web-tools most engaging, among which there are 36% of the participants like VT while 23% of them enjoy playing Quizlet. Students perceive the game feature of Quizlet as important. As students state, "I liked Quizlet the best because I can learn the material, test myself and then continue to practice", "Quizlet helped me memorize" and "very easy to use and learn material". As for the VT, students favor the interaction features and like the way instructor designed to present grammar rules and vocabulary. One student says that "I appreciate how VT describe grammar rules, new words and sentence structures. I also like how they give you a chance to practice". Some students like the recording features in VT as it helps them with the pronunciation and teacher can provide audio feedback on VT of how they can improve the pronunciation. Another student favor the use of VT because VT helps her to "see the teacher".

5.2.2 Challenges

While two students perceive that they do not encounter any challenges when studying Chinese online, other students express their views on the disadvantages of the online flipped classroom.

Lack physical presence and face-to-face interaction. Though VT and Lab session has helped students to interact with the instructor, students still feel that the lack of physical presence and face-to-face interaction is the biggest disadvantage of the course. Students complained about the difficulty of getting feedback from instructors, such as "I can't ask questions as easily" and "I can't ask questions and get a response right away". Because "it is much more difficult without having everything naturally explained in person and without being able to immediately ask questions and get answers.", students often feel being left alone when facing difficulty in learning the language.

Technology problems. In the open-ended questions, students still express concern with the technology problem. Nearly half of the responses reported that technology is the challenge they have when learning Chinese online. They technology "struggles" and is hard to navigate. Specially, it's "confusing for new students" and it "takes some time getting used to". Sometimes, the internet is not working in some areas and "getting set up for this class was challenging for school's computers."

5.2.3 Future Improvement

There are two students state that the course is great and there is no need to change anything about the course. But others provide their suggestions for the future improvements. A majority of students suggest to increase the amount of lab session so that

they have more opportunities to practice language skills. Just like this student mention, "there could maybe be two scheduled lab sessions or just an extra one that could be attended." Besides lab session, students also recommend that improvements could be made on making instructions more clear. For instance, one student explains that "better directions for discussion board projects" while another student emphasizes that "more instruction should be provided".

6. Discussion

In this session, both quantitative and qualitative results are discussed in response to the three research questions of the present study. The three questions are: 1) Does 2+1+2 flipped model promote the interaction and enhance students' active learning experience in an online environment? (RQ 1); 2) RQ 2: Do students perceive that they have sufficient opportunity to practice oral skills in this flipped classroom model? (RQ 2); and 3) Do students perceive that 2+1+2 flipped classroom model supports their online Chinese study? (RQ 3).

For RQ 1, the majority of students respond positively to their interaction with instructors and the peer interactions. They appreciate the timely and useful feedback from their instructors and the instructors' modeling for practice is important for their study. Students are satisfied with the collaborative and communicative environment created by the instructor. They take the lab session as a great chance to interact with students on meaningful and communicative tasks. What's more, the adoption of the web tools (VT and Quizlet) has been found supportive to engage online students. Most of the students start to take ownership of their learning as they believe that they have prepared themselves for the lab session practice and even taking note during the learning process. The design of preview activities contributes to the increase in participation and pre-lab practice. Instead of sitting and receiving the preview information passively, they learn the new contents through doing and reflect their learning process. The community feature of VT, through which students can view other's comments on VT, has found to be beneficial to help students learning from others.

For RQ 2, the results show a significantly high agreement on the improvement of oral skills with the help of the flipped classroom model. Most students responded positively that the pre-lab VT practice, the assignments and the lab session are supportive to their improvement on language skills, including speaking, listening, reading and writing. It is worth noticing that speaking (oral skill) is the highest rating among all four skills in both preview and review stage when students are asked to answer the question whether preview and review assignments are helpful to improve their four skills. Although students think writing skills are less supported by the preview and review assignments, it is not surprising considering the participants are all at the beginning stage of learning Chinese language. Moreover, students believe that the assignments are of great help in improving oral skills in both quantitative and qualitative results. They also see the value of the in-class activities in the lab session and indicated that the opportunity to practice is sufficient in the synchronous stage.

For RQ 3, the results of the survey suggest that students enjoyed their online Chinese learning. There is a strong consensus that the design of the 2+1+2 online flipped classroom model assists student's study in the aspect of language skills improvement, interactions, and engagement. Most students like the fact that they can study at their own pace. More than a half of the students agree that the amount of the assignments are appropriate, but it's worth noticing that some students recommend a change in the amount of the assignments. Despite the fact that students sill perceive some challenges, including technology (poor internet connection, unsupportive school computer, difficulties in getting familiar with technology as a new online student), students demonstrate a positive attitude toward the interactions in the flipped online Chinese course. In general, more than a half of the participants find 2+1+2 model appropriate for learning Chinese online and will recommend the course to other students. The learning experience in this online course motivates them in future online study.

7. Conclusion

This paper has introduced the implementation of a flipped-learning approach in an online Chinese course. The theoretical basis of this flipped model involves active learning theory, Blooms' taxonomy, and communicative approach in language learning. By adopting the 2+1+2 model in an online Chinese course, this study investigated how Chinese language beginners experience the flipped online language course. Based on both quantitative and qualitative survey data, student's perception on the implement of the flipped classroom model is quite positive in regard with online interactions, improvement of Chinese language skills and the active engagement in the learning process. In terms of challenges, students feel that technological difficulty is still a barrier that hinders them from successful learning, which includes internet connection problems, technology support issues, and insufficient instructions on how to use certain technology tools. From students' perspectives, offering more lab sessions, providing clearer instructions, and adjusting the amount of assignments could be done to improve the current flipped online Chinese course.

Based on the survey that Flipped Learning Network and Sophia (2014) conducted, 78% of the teachers who participated reported they have flipped a lesson, which increased 30% comparing to the percentage in 2012. More importantly, about 9 out of 10 teachers in the survey noticed a positive change in student engagement and 71% of teachers reported improved grade since flipping their class. All these numbers indicate that flipped learning is becoming more and more beneficial to support students' learning.

The current study provided empirical evidence regarding students' perceptions about an online flipped language course. The results have not only coincided with previous studies in demonstrating the benefits of flipped learning, but also provided a unique perspective to explore in an online language course. Theoretically, the study proves that it is beneficial to prepare students with guided practices and individualized learning and tasks as the flipped content in order to actively engage students in the online language learning. Practically, the study sets up a design model for online flipped language courses with many useful technology tools and instructional strategies. For

future research, more studies are needed to investigate the effectiveness of the online flipped model using students' learning outcomes as measurement. Teachers' feedback and assessing students learning progress are also important areas that warrant further exploration.

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Implementing Online Platforms to Promote Collaborative Learning in Chinese Language Classrooms (中文课堂中借助网络平台提升学生合作学习之应用与实例)

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Abstract: Today's students were born digital. Technology has become an essential tool that they use and rely on in everyday life. Technology also plays an important role in language learning. It mediates language learning by forming a bridge between the authentic world and the language learners. Based on the idea "to give students language input, provide opportunities for interaction, and encourage output", the author gives three examples of implementing online platforms into a Chinese class. Student feedback shows that the online cooperative learning projects can expose language learners to different opinions, experiences and thinking processes. Students also gain a deeper understanding of the target culture through the online learning experience. With carefully deigned instructional activities via online platforms, technology can help students to become active participants and develop their 21st century skills. The author also discusses limitations and provides further study suggestions.

摘要：今日的学生属数位原生世代，科技成为他们日常生活不可或缺之物。科技 也占语言学习的重要部分，它是联系语言学习者及真实世界的媒介与桥梁。本文作 者基于"给予学习者语言输入，提供语言交流机会及鼓励输出"的概念，提出三个 于中文课堂中应用网络平台的实例。由学生反馈得知网络学习计划使学习者得以接 触不同意见，经验及学习历程。学习者亦由此网络学习经验获得更深层的文化理解。 透过审慎设计的网络教学活动，科技可辅助语言学习者成为积极的参与者，并发展 学习者 21 世纪所需技能。本文作者亦提出研究限制及未来研究方向供华语教学之参考。

Keywords: Online platforms, language and technology, 21st century skills, collaborative learning

关键词：网络平台，科技与语言，21 世纪技能，合作学习

1. Introduction

Today's generation, Generation Y, is the generation of "digital natives", a concept first introduced by Marc Prensky ("Policy Brief", 2011). In his article "Digital Natives, Digital Immigrants", Prensky (2011) commented that today's students represent the first generations to grow up with new technology. They think and process information differently than their predecessors. They are all "native speakers" of the digital language of computers, video games and the Internet. Some of the significant characteristics of digital natives are: They are used to receiving information quickly; they like to parallel process and multi-task; they prefer graphics before text; they prefer random access; they function best when networked; they thrive on instant gratification and frequent rewards; and they prefer games to serious work. Technology, like language, is an essential tool that we use and rely on in everyday life (Wang & Chen, 2013). Today's students are born with accessible technology at their fingertips, but are today's educators ready to embrace technology?

2. Language Teaching and Technology

Described in American Council on the Teaching of Foreign Languages (ACTFL) "Role of Technology in Language Learning" (2017), in recent years, technology has been used both to assist and enhance language learning. Teachers have incorporated various forms of technology to support their teaching, engage students in the learning process, provide authentic examples of the target culture, and connect their classroom to classrooms in other countries where the target language is spoken. For example, through Web searches, students can extend the input contained in the course materials and find written and spoken sources that are more up-to-date and of greater relevance to their own interests (Hampel & Pleines, 2013). In addition, some technology tools enable teachers to differentiate instruction and adapt classroom activities and homework assignments, thus enhancing the language learning experience. Those online activities give students the opportunity to practice and revise content and language introduced elsewhere and to expand and update the existing content. Technology continues to grow in importance as a tool to assist teachers of foreign languages in facilitating and mediating language learning for their students.

Shrum and Glisan (2010) concluded that better and more effective use of class time, individualized learning and empowerment are three benefits of the planned and purposeful use of technology. Technology mediates language learning by forming a bridge between the authentic world and language learners. Yang (2001) suggested that online experiences allow learners to participate in the culture of the target language, which in turn enable them to learn how one's cultural background influences one's view of the world. A digital learning environment opens up a broader range of connections and meaning-making among learners.

While technology can play an important role in supporting and enhancing language learning, the effectiveness of any technological tool depends on the knowledge

and expertise of the qualified language teacher who manages and facilitates the language learning environment (American Council on the Teaching of Foreign Languages [ACTFL], 2017). According to Hong and Samimy's (2010) study, students who showed a relatively more positive attitude toward the use of technology reported that their teachers were more actively involved in using technology. On the other hand, educators are increasingly under pressure to use technology to prepare students to live in a technologically interconnected, globalized world (Chun, Kern & Smith, 2016). Wu (2013) argued that many instructors often struggle to find the best way to teach with technology because they are not sure what students like or dislike, and what works or does not work for them. Bourgerie (2003) explained that unenthusiastic teacher support and failure to integrate the materials into a larger learning environment contribute to students' negative attitudes toward technology. Dema and Moeller (2012) found that on some occasions, the majority of classroom students simply surfed the Internet rather than participated in learning.

3. Technology and Collaborative Learning

According to Vygotsky's sociocultural theory, learning is the consequence of interaction with other people, objects or tools, and culture in socially organized and goal-oriented activities (Cole & Engestrom, 1993). Fung (2004) explained that learning takes place in a social milieu, within which the negotiation of shared meaning through social interaction will result in cognitive dissonance, allowing individual learners to restructure their own concepts. Within the paradigm of the sociocultural theory of learning, the notion of scaffolding is central. Scaffolding was initially defined as the assistance given by an expert to enable a novice to reach a higher level of performance than would otherwise be possible, and was subsequently re-conceptualized to include the assistance shared among peers in the collaborative construction of learning (Hsieh, 2017). Wang and Chen (2013) stressed that meaningful learning occurs in the process of negotiation among the participants through dialogues, collaboration and interaction. Without social and cultural interaction, the meaning of context and content would not exist. Therefore, collaboration serves as a powerful vehicle of socialization in human psychological development (Wang, 2007).

Published by American Council on the Teaching of Foreign Languages in 2011, "the 21st Century Skills Map for World Languages" highlighted "collaboration" – students as collaborators use their native and acquired languages to learn from and work cooperatively across cultures with global team members, sharing responsibility and making necessary comparisons while working toward a common goal as one of the essential skills. Collaborative learning, either among students or between students and teachers, is essential for assisting each student in advancing through his or her own zone of proximal development- the gap between what the learner could accomplish alone and what the learner could accomplish with the help of others who are more skilled or experienced (Warschauer, 1997). Chen and Wang (2013) stated that the benefits of collaboration in learning are the promotion of deep learning, critical thinking skills, shared understanding, and high levels of participation, achievement and self-esteem.

Collaborative learning requires learners to identify for themselves their common points of interest. Its success resides in the learners' intrinsic motivation to participate in group learning and the sharing of ideas.

Technology paves the path for the development of students' 21st century skills, including problem solving, critical thinking and collaboration (McKeeman & Oviedo, 2015). It enables the sharing of resources between students and encourages interaction between teachers and students, and between students themselves during the process in which learning can happen (Guo & Guo, 2013). Technology allows for creative, dynamic and collaborative learning venues, both within and outside the school day (Haywood, Johnson, Levine & Smith, 2010). Chen and Wang further explained that online collaborative learning exposes learners to different opinions, experiences and thinking processes, and provides them with opportunities to interact with other learners, educators, experts and content. Supported by technologies, learning can happen anywhere and anytime. Kiddle (2014) also pointed out that digital language learning tools and materials can potentially support individual or collaborative learning in any physical location. Online collaborative learning creates a shared understanding of meaning through dialogue among learners. Learning communities can be formed at the local, national, or global level, expanding participants' global awareness.

4. Using Online Platforms in Chinese Class

Technology has played an increasingly important role in the field of Teaching Chinese as a Foreign Language (TCFL). In the early 1970s, Chinese instructors using computer assisted language learning programs (CALL) focused mainly on characters, reading, pronunciation, grammar drills and practice. Communicative CALL, such as text reconstruction, language games and real-world simulations focusing on learning elements of the language, was popular in the 70s and 80s (Wu, 2016). Multimedia (TV, recordings or text), Internet and mobile devices are considered the newest phase of TCFL. Studies about CALL, e-learning projects, online learning materials and mobile applications in Chinese class are abundant (Bourgerie, 2003; Guo and Guo, 2013; Chen, 2013; Wu, 2016; Lee, 2016; Han and Yang, 2016; Chuang, 2016). However, studies regarding the use of online platforms in TCFL are rarely found. This article aims to provide Chinese instructors with directions and practical examples when they integrate technology into Chinese class. In addition, some problems occurred during the implementation process are identified for further research.

According to Frank et al. (2008), technology use has the potential to enhance the five primary functionalities of foreign language learning and teaching. They are: organization, input, output and interaction, feedback, and collaboration. Based on the idea "to give students language input, provide opportunities for message-focused interaction and negotiation of meaning, and encourage output" (Hampel & Pleines, 2013), the author implemented three online platforms—ThingLink, Padlet and Homestyler—into a Chinese class. As shown in the Input-Process-Output (IPO) model (Figure 1), at the beginning, the author provided language input and a comfortable learning environment. Next, the author

interacted with students in the target language to encourage output. Lastly, students produced output through collaborative learning.

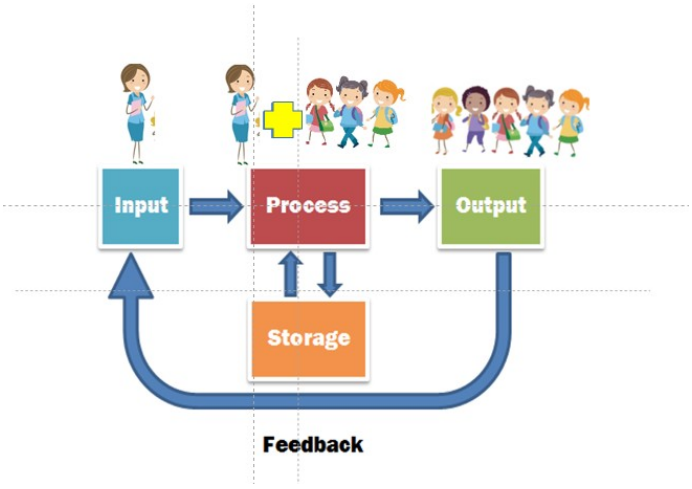

Figure 1. Input-Process-Output (IPO) model

The introduction of each platform as well as student work and student feedback are described below.

4.1 ThingLink

Traditionally, language teachers have given students vocabulary lists to memorize followed by pictures to label. While it is important that the students interact with visual content, a simple picture with a basic word or sentence does not engage students to their fullest capacity (Ousselin, 2013). ThingLink is a Web tool that allows students and teachers to annotate an image with video, audio and textual tags. The tool is useful for educators who wish to provide a more thoughtful introduction to vocabulary, grammar or culture with interactive elements. It is also an excellent assessment tool for learners as it requires them to demonstrate their comprehension of a concept beyond the basic translation. ThingLink provides a space for students to feel that they are learning through a self-guided investigation.

Figure 2. ThinkLink example: Students design an interactive poster of different medical symptoms

Dema and Moeller (2012) suggested that when teachers integrate powerful technological tools into their instruction, students are allowed to personally interact with real data and solve open-ended problems. Technology promotes socially active language learning in multiple authentic contexts. It gives foreign language teachers various opportunities to create better and more effective instructional materials to teach both the language and the culture (Dema & Moeller, 2012). When it comes to cultural products, practices and perspectives, technology reinforces, encourages and provides the opportunity to interact and engage with culturally authentic materials.

Based on the learner-centered approach, the author divided the class into several groups and invited them to compile their own vocabulary lists, create examples and upload images to ThingLink. Each group had to research online and upload two links related to the topic (traditional Chinese medicine). This approach flips the authority in the classroom from the teacher to students. Students take responsibility for their own learning and apply what they have learned in engaging, practical and collaborative ways.

4.2 Padlet

Padlet is a virtual pin board that allows students to upload a variety of files, including Word documents, YouTube videos, PowerPoint presentations, etc. It is an interactive platform that enables participants to write notes on and upload links to a shared page. It is a collaborative tool, which means that everyone with a link to the pin board can access it and add their comments. Harrison (2015) concluded the following benefits of using Padlet: It allows those who are less confident to have a voice in the larger classroom; it confirms that the student is on 'the right track' with the task; and it provides a snapshot summary of the various perspectives in the room. De Berg (2016) commented that Padlet motivates individuals to research a topic more in-depth and also improve language skills.

Padlet is a good alternative for reducing the communication gap among students, teachers and peers. It provides a platform for generating new knowledge. Collaborative learning encourages cognitive processes as the learners acquire new ideas from sharing knowledge through Padlet (DeWitt, Alias & Siraj, 2015). In the Padlet collaborative project, the author provided a vocabulary list to the students and showed them an example of a birthday invitation card. Following the example, the author and the students designed a birthday card together. Then the whole class discussed major holidays in America and how people celebrate them. Next, each student was assigned a holiday (Halloween, Thanksgiving, Christmas and Birthday) to design an invitation card for and upload the cards together with a vocabulary list to Padlet. In addition to design the invitation card, the students had to read each card and reply to it.

Figure 3. Padlet example: Students design invitation cards for different occasions

4.3 Homestyler

Homestyler is a free online home design software program that allows users to create and share their dream home designs in two dimensions and three dimensions. The online tool allows users to either upload their existing floor plan or create a new one via a simple drag and drop system from the catalog. You can view your design in three dimensional-mode and rotate it to view it from different angles. The three dimensional view enables viewers to get inside the room and see what it looks like. The virtual-reality image makes users feel like they are real interior designers. When teaching "Location and Position", the author invited the students to participate in a project called "My Dream House". The students were paired up in three teams. Each team used Homestyler to design a dream house. The house had to contain at least a living room, a dining room, a kitchen, a bedroom and a bathroom. There are different styles of furniture, appliances, accessories and décor on Homestyler for the students to choose from. When one team member preferred one design rather than another, he or she had to negotiate or compromise with his/her partner. After the dream house was done, each team had to show the 3 dimensional image and make a presentation of the house using location and position words.

Using technology in support of collaborative learning can foster student engagement and allow teachers to keep track of student cooperative work. Instructors who use computer-supported collaborative learning can monitor student understanding and achievement in collaborative learning activities (Resta & Laferrière, 2007). For example, while the students were exploring this online home design website, the instructor walked around the language laboratory and gave feedback on the project. The instructor also used peer correction techniques to enhance student engagement and peer learning.

Figure 4. Homestyler example: Students design their "dream house" and present it in class

A few students gave their feedback on the online collaborative projects using ThinkLink, Padlet and Homestyler.

-Student1: "Being able to write and add to the Padlet could help everyone in the class become much better at speaking and learning Chinese. Padlet also offers a different way to learn a language instead of just listening to a teacher in class".

-Student2: "Overall I think that it is very helpful in learning a language. I like that the online tool is customizable as it makes it seem like it would be easy to incorporate pictures and videos to learn about the culture of a county. I like that it is easy to share our work and be able to look back on how we and our other classmates progress".

-Student3: "It helps create stronger bonds between students and the teacher. It is a nice learning tool that makes it easier for us to share things within the classroom that is appropriate".

-Student 4: "I think those are useful tools for learning as they allowed us to diversify our learning environment. They forced us to better comprehend the information we had learned and be able to apply it".

-Student 5 "The collaborative project had us research traditional Chinese culture, immersing us in the culture. This helped us to learn more about

China as a whole and not just about the language. Creating our own work made us go more in-depth with our sentence structure and vocabulary use. This was a great learning experience because we made the vocab sheets for our classmates to help them understand our invitation, demonstrating our knowledge of the topic".

-Student 6 "I think those websites were extremely useful in expanding my Chinese knowledge. I enjoyed the corroboration aspect. I liked how multiple people could work on it at once. People can share their ideas with one another. Not only can I use these in Mandarin class, but I can work on them with other classmates from other classes in the future".

-Student 7 "Using Homestyler to design our houses helped in many different ways. First, it changed up the style of the class. Because of this, it engaged us in a different form to make sure we really knew what we were talking about when we were constructing sentences and making our houses. As we built our house, we would describe it in Chinese so it gave us more practice with constructing sentences, which is typically the toughest part about learning spoken Mandarin. Also, we used this collaboratively with a teammate so we could converse with one another to figure out our presentations. Having this teamwork and sentence structure element were really beneficial to learning the topic of the house and directional words".

Shoffner (2013) suggested that technology offers various ways to support the development of higher order thinking skills. Students can use social networking sites to aid in their collection, questioning and evaluation of information. Through implementing the three online platforms in Chinese class, the students create, analyze and synthesize materials by developing multimedia projects that draw on multiple literacies. They also collaborate with peers for meaningful discussions. Technology implementation increases student learning, understanding and achievement. Integrating technology into instruction transforms teacher-dominated classrooms into more student-centered classrooms (Kaya, 2015). By sharing resources among group members, students save time in producing the resources on their own. In addition, students do their best and learn comprehensively as a group.

5. Future Studies

Previous research has mentioned student adjustments (Yang, 2001; Lee, 2016), student characteristics (Resta & Laferrière, 2007), student e-readiness (Wu, 2016; Lee 2016) and student attitude (Chuang, 2016; Luo & Yang, 2016) regarding using technology in language learning. Yang (2001) summarized that learners who do not adjust well appear to have much learning anxiety and cognitive disorientation. Yang further stated that the full educational significance of technology will not be realized by using it to present information to students but by empowering students as multimedia

composers, giving them new insights into organizing and synthesizing information. Those learners who show reluctance toward technologically oriented projects need careful guidance and support.

Among the most positive feedback the author has collected, here are two different aspects that drew the author's attention. One student wrote: *"With ThingLink, the set up was a little more confusing and difficult to get around".* Another student wrote about the Homestyler experience: *"At first, the app was a little hard to use, but after a few minutes we got a good base knowledge of it and were able to function well. After one class we were really able to use a lot of the full functionality that the app provided and this opened up many more options for us"*. This student added: *"In this day and age, this is not a confusing app; the generation coming up through college should, in general, be able to handle picking up apps like these, which also makes this a useful part of class. There is very little time wasted in having to do training just to use the app; we sat down and almost instantly started building our houses".* According to the author's observations, students who expressed frustration or had less motivation spent more time finishing the projects. This also reflected their partners' willingness to participate. One student told the author that he didn't want any confrontation. He simply agreed with his partner on everything. Although teacher enthusiasm leads to greater student achievement, student e-readiness and student acceptance of technology is the key component of whether the e-learning experience is successful. Providing scaffolding, both when using Internet applications and when orienting the learners to the task, is vital to the successful implementation and integration of technology into the curriculum. Further research with regard to student e-readiness could be conducted for future studies.

6. Conclusion

Laakkonen (2011) commented that technology changes the position of learners from consumers to producers and creators. By involving learners in the actual design of learning materials and structures through selected tools and applications, work modes and resources, learners no longer play the roles of passive recipients of information but become active participants in the process of developing their own expertise through selecting, demonstrating, building, and creating knowledge and new meanings together with their interlocutors. When designing a course, teachers should provide students with enough structure to keep their studying on track while giving students enough freedom to work creatively and flexibly on the course (Guo & Guo, 2013). There were a few limitations of this study. First, the relatively small size of the class (10 students) made it difficult to apply the results to all Chinese classes. Second, the research data was based on student feedback. There was no standardized test to measure student learning outcome. It was also difficult to generalize student performance based on the projects as creativity was one of the main requirements when the author implemented those projects. Despite the limitations, the author found those projects very productive and rewarding. Parmaxi and Zaphiris (2016) concluded that technology depicts a significant shift from the four basic language skills toward a body of skills that would enable our learners to succeed in today's workplace. With the use of technology, teachers can guide students toward

thinking critically about what they are learning, building interpersonal communication skills, working more effectively in teams, creating and innovating new ideas, concepts, and products and developing students' 21st century skills. Taking the Padlet project as an example, students were able to design invitation cards similar to authentic Chinese invitation cards. The students put more thought and consideration into the Homestyler project because they see the dream house as their real home. With the use of various technological tools and applications, teachers can tailor language learning to individual students as they interact, explore, and experiment with the target language and culture (Dema & Moeller, 2012).

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外语教师网授技能培训:文献综述与培训计划建议
(A Review of Literature on Preparing Language Teachers to Teach Online: What Has Been Done and What Is Needed?)

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摘要：在美国，越来越多的语言教学项目和学校提供网上外语课程。作者通过对相关英文学术期刊的穷尽式搜索来回答几个研究问题：自2005 年 Hampel & Stickler 提出高等院校外语教师网上教学所需技能的框架之后，是否已出现对所需技能的新理解？如果出现，这些新理解是什么？研究者所提出的教师网上教学所应具备的技能是否被成功传授给教师？在这些培训项目中，使用了什么方法使之得以成功？此项研究结果显示： 后来的研究提出了一些新的见解，而且在培训方法方面这些研究的结论是：实践中通过反思学习是最有效的方法。作者最后提出了对培训项目设计方面的一些建议。

Abstract: The purpose of this article is to synthesize the research on skills and competencies to prepare college language teachers to teach online since the publication of Hampel and Stickler's article "New skills for new classrooms: Training tutors to teach languages online" in 2005. The researcher identified 15 studies in peer-reviewed journals to review. The findings reveal that new understandings have emerged about the necessary abilities and skills that a language teacher needs to acquire to be prepared to teach online. Important strategies to prepare teachers to gain these skills and abilities include learning by doing, by observation, and through reflection and learning from a critical friend's feedback. Implications for designing programs to prepare language teachers to teach online are discussed.

关键词：网络外语教学，虚拟空间外语教学，外语教师网上教学培训，教师培训，师资培训

Keywords: Teaching foreign languages online, virtual classroom for learning foreign language, training foreign language teachers to teach online, foreign language teacher training, pre-service language teacher training

1. 研究目的

目前，高等院校外语教师培训面临的一个需持续不断推进的任务，就是网络授课技能与策略的培养。计算机网络技术为外语教学提供了很多预设用途, 比如说，无所不在式学习(ubiquitous learning), 多模态学习(Multimodal learning), 因材施教式学习 (Differentiated learning), 等等。这些预设用途不仅为传统外语课堂教学提供方便（Chapelle & Hegelheimer, 2004）从而使外语教学更有效率，而且使网络授课成为可能、变得普遍。再者，计算机网络技术的这些预设用途也会使对于网络教学的需求日益增加（Bauer-Ramazani, 2006; Kessler, 2006, 2006; White, 2006 ）。对如何培训教师进行网络教学，很多学者做了研究并提出了很好的建议(Baran, Correia & Thompon, 2011; Guasch, Alvarez & Espasa, 2010)。然而，由于自身的特殊性，外语教学对网络的运用不同于其他学科。正如Hampel (2009, p. 7)所指出，“［外语教学中］所传授的内容与传授所用的媒介实为一体。”在语言教学中，需要特殊考虑的因素包括：“交际的重要性；形式与内容并重；所教内容在概念上的浅显与学生本身高认知能力的不匹配；学生运用尚未掌握的语言而容易产生的焦虑” (引同上)。这些因素使得网上外语教学特别具有挑战性 (Borg, 2006; Hampel, 2009)，而又不能将传统外语教学模式照抄照搬到网络教学中（Sun, 2011）。网络外语教学所需要的是一套全新的教学技能与策略，这套技能与策略应该能够帮助教师应对网络教学所面临的新挑战。本文主要针对成人学习，特别是高等院校的外语教学，但是因为在培训项目中，受训教师在练习授课的网络课堂里面对的学生可能不仅仅包括大学生，也有可能包括高中生或者研究生。因为网上外语教师培训文章少之又少，加之在师资培训的过程中并没有强调大学生、高中生、与研究生的区别对待，所以，即使文章在网络课堂实践里的学生包括大学生以外的学习者，本文章并未排除。

谈到网上授课或者网上教学，一些说法很容易混淆，所以很有必要在此说明一下远程教学、网络教学（网络授课）与混合式教学的区别。远程教学(Distance Education) 是整个授课过程中教师和学生不在同一地点。远程教学包括通过电视授课或邮寄教学材料，也包括通过网络的交互功能来完成教学目标。网上教学或者网上授课 (Online teaching or teaching online) 指的是远程教学其中的一种，即不在同一个地点的老师和学生利用网络的存储及交互功能来完成教学任务。而混合式教学 (Blended and hybrid courses) 则是课程设置里既包括面对面的教学方式又包括利用网络教学的方式(Caruth & Caruth, 2013; Hyman, 2012; Lei & Gupta, 2010）。本文所讨论的，不是宽泛意义上的远程教学，而是网络教学（网络授课），但是也包含一些混合教学中针对网上授课部分的师资培训。

Hampel & Stickler (2005) 提出了一个金字塔式的技能框架，列出了开展有效网上教学所需的技能：基本的信息交流技术（ICT）能力、特殊的利用软件技术的能力、处理不同媒介所特有的局限及其所提供的可能性的能力、网络社交能力、促进交际能力的能力、创造性和选择能力，以及自己的教学特色（见图 1）。

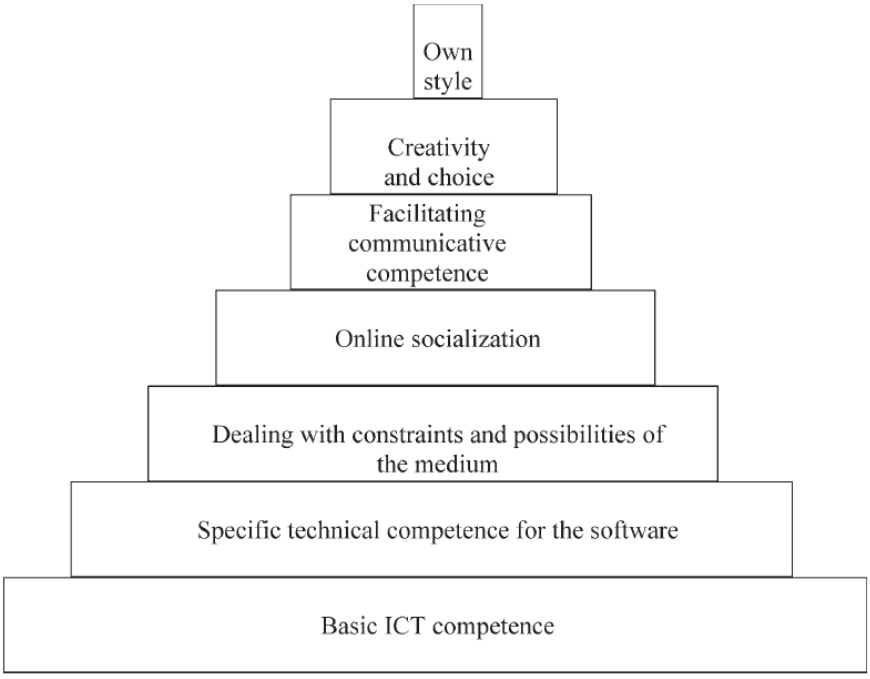

图 1. Skills pyramid (Hampel & Stickler, 2005, p. 317) (技巧金字塔)

数位技术的发展和研究正在不断深入。但是，他们所提及的必需技能是否已被发掘运用？对这些必需技能和知识新的解释及理解是否已经出现？了解这些，需要进行综合性文献研究。然而据作者所知，至今还没有文献综述研究探讨如何培训外语教师进行网上授课。因此，通过对过去十余年间研究结果的穷尽搜索和综合分析，本文旨在回答如下两个问题：

1) 自 2005 年 Hampel & Stickler 提出外语教师网上教学所需技能的框架之后，对所需技能的新理解是否出现？如果已出现，这些新理解是什么？
2) Hampel & Stickler (2005) 和后来研究者所提出的教师网上教学所需具备的技能是否已被成功传授给教师？若是，这些师资培训项目使用了什么方法才得以成功？

基于对这些问题的回答，本文将提出对于外语教师网上授课培训的一套设想。

2. 文献综述

针对外语教师网上授课培训的文献综述研究，迄今所能找到的唯一文章是 Aguilar (2012)研究教师如何利用混合式 (blended) 教学模式讲授外语课程的研究，然而其重点并非网上外语教学。Aguilar 就她搜寻到的六篇混合教学模式的文章分析了其中的外语教学情况，总结出混合教学模式的益处、所面临的挑战，以及混合教学模式中外语教师的角色。针对此种状况，本文作者专门围绕外语教师网上授课培训进行了文献综述研究。

3. 研究方法

本研究的大范围文献搜索工作涵盖了如下五个文献信息检索库: Communication Abstracts (EBSCO), Education Resources Information Center (ERIC), J-STOR, Google Scholar, 以及 Linguistics and Language Behavior Abstracts (ProQuest)。此搜索只包括同行评审文章(peer-reviewed articles)。搜索所用的关键词包括：training, professional development, language teachers, foreign language, CMC, online, blended, hybrid, teach language teachers to teach online, second language and foreign language。为确保没有遗漏，作者也查对了上述检索库之外的一些关键学术期刊，比如 *CALICO Journal*、*CALL* 和 *Language Learning and Technology* 等过去十一年的目录。作者还通过两个途径来实现穷尽式搜索：查找关键文章的引用资料和外语教学领域关键作者的著作。此外，因为中文的特殊性，为了确保涵盖所有关于网上教授中文的教师培训研究，作者也对北美中文教学界最为权威的两份学术期刊进行了穷尽式搜索：过去十一年的《汉语教学研究—美国中文教师学会学报》，和自 2010 年创刊以来的《科技与中文教学》。

本文文献搜索有三个标准：1）实证性研究或理念分析的文章（为回答第一个研究问题）和实证性研究文章（为回答第二个研究问题）；2）2005 年之后发表的文章；3）通过同行评审的文章。此穷尽式搜索的结果是：能够回答第一个研究问题的文章有六篇，能够回答第二个研究问题的有十一篇，其中两篇与前面六篇重合（见参考文献）。

本文作者阅读和对文献进行综合的过程如下：研读每篇文章，将相关信息和心得记录在数据表格中。这些信息和心得包括：每篇文章的研究重点、研究取向（定性还是定量研究）、研究方法（具体的数据收集、数据分析、参与者等等）、文章中针对的具体语种、所发现的网上教学技能，以及网上教学侧重同步教学还是非同步教学。

4. 结果分析

结果分析将分别用于回答本文所提出的两个研究问题。首先，自 2005 年 Hampel & Stickler 提出外语教师网上教学所需技能的框架之后，对所需技能的新理解是否出现？如果出现，这些新理解是什么？

4.1. 不同学者对外语教师必备技能的理解

搜索结果显示，自从技能框架提出以来，有六组学者在外语教师必须具有的技能方面提出了自己的理解。

4.1.1 Compton (2009) 在其文献分析及观点文章中，主要从两方面评析了Hampel & Stickler (2005) 的框架。Hampel & Stickler (2005) 在解释他们的金字塔框架时指出：

“各种技能，一个建筑在另一个之上；先要掌握金字塔最底层的普通技能，然后才能逐层递进，最后形成自己的教学风格” (第316页) 。这个解释意味着技能的培养要有先后。 Compton (2009) 则认为，不同层面的技能可以同时发展。比如，培养技术方面的能力和培养应对媒体所带来的不便的能力都与技术相关；网上授课教师在学习某个软件的同时，可以学习如何处理此软件本身的带来的不便，也可以学习创新运用的能力。另一方面，Compton (2009)认为，Hampel& Stickler (2005)框架中的技能只有一个是网上教学独有的：即促进交流的能力。其它方面的重要技能，比如应用外语习得理论的能力、网上教学评估能力、任务设计评估能力都没有包括在内。因此，Compton提出了网上教学所要掌握的另一个技能框架。此框架涵盖技术、教学、和评估三个层面，在每个层面，技能都分为三个级别，即新手、精通者、专家。比如，新手水平在技术方面的其中一个指标，就是能够运用一些软件并能理解不同软件自身的限制和可能性；在教学法方面的一个指标，是具有建立网上学习社群和培养学生的网上交往的能力；在对网上语言教学的评估方面的一个指标，是既具有评估任务设计的知识又有评估课程的知识。而针对专家则有不同指标。比如在技术上，是能够针对不同教学任务创造性地合理利用技术；在教学法方面，是具有创造性地运用并改善现有教学资源来培养学生的交际能力；在评估方面的，则是能够运用不同的框架综合评估任务的设计和课程（见图2）。

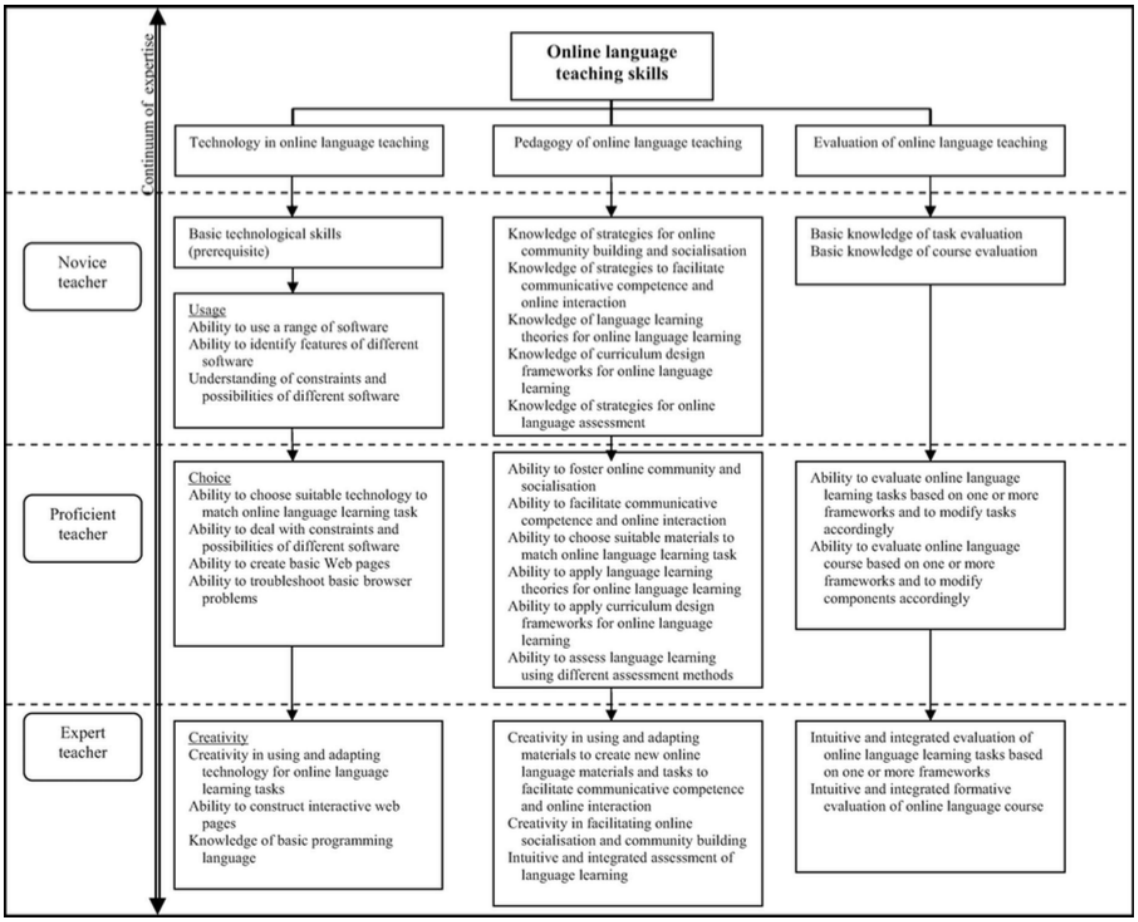

图 2. Compton (2009：82) 提议的外语教师网上教学所需技能框架

4.1.2 在其举办的一个培训项目中，Hampel (2009) 仔细研究了有关网上外语教学的全部技能，发现外语教师网上教学必须具备下列具体技能 (参见 Hampel, 2009, 第13页)：

1) 应对新的、仍不熟悉的新技术工具的能力(The ability to face technical challenges of using new and still unfamiliar tools for teaching)（对应于 Hampel & Stickler 金字塔框架第二层的技能）;
2) 应对网上工具本身某些局限的能力(The ability to deal with the constrains of the tools)（对应于 Hampel & Stickler 金字塔框架第三层的技能）;
3) 运用网上工具提供的可能性进行社交的能力 (The ability to make sure of the possibilities of online tools for socialization)（对应于Hampel & Stickler金字塔框架第三层和第四层的技能）;
4) 运用新的学习工具时及时调节情绪和情感的能力 (The ability to regulate emotion and affect when employing new learning tools)（对应于Hampel & Stickler金字塔框架第三层和第四层的技能）;
5) 帮助学生发展网络社群认同感的能力 (The ability to help students develop a sense of community)（对应于Hampel & Stickler金字塔框架第四层的技能）;
6) 鼓励学生独立学习、以及[与此相关的]在激励学生学习与过度“干预”之间找到平衡的能力（对应于Hampel & Stickler 金字塔框架第五层和第六层的技能）;
7) 兼顾学生学习语言形式的期望与交际能力培养的课程要求的能力 (The ability to design tasks that develop students' communicative skills and to deal with the conflicts between student expectations and course demands（对应于Hampel & Stickler 金字塔框架第五层的技能）;
8) 利用特殊工具达到特殊目的、从而形成自己独特教学风格的能力 (The ability to use particular tools for particular purposes and thus develop one's own style)（对应于Hampel & Stickler 金字塔框架第六层和第七层的技能）。

Hampel（2009）将培养将来学生互动及合作这一技能细分为网上教师需要获得的四种次级技能：能够运用多模态技术所提供的预设用途；在网络环境中，为了帮助学生形成学习社群，能够考虑到社交和情感问题；能够鼓励学生“自治”(autonomy)；能够设计适合于实际网络环境的学习任务。

4.1.3 与Hampel (2009) 相似，Guichon (2009) 在其实证研究中判断外语教师网上同步教学需要培养三种能力。第一种是社交情感调度的能力 (the competency of socio-affective regulation)，即能够与学生建立一种既亲密但又保持适度距离、有学习气氛的社群感（Lomicka & Lord, 2007）。第二种是教学方法调度能力 (the competency of pedagogical regulation)，即能够设计适合网上同步教学的学习情景并提供针对不同学习者的反馈，以便同时在情感与认知上调动学生掌握自己的学习体验。第三种是多媒体调度能力(the competency of multimedia regulation)，即能够合理利用交际工具以最有效的方式完成一个 “界面角色” (interfacing role) 的能力（参见第170页）。

4.1.4 Comas-Quinn (2011) 认为“学习这些技能只是培养外语教师能够有效进行网上授课的漫漫长途中的一步”（第220页）。Comas-Quinn所作研究中的受训教师参加了两期动手操作的工作坊。在第一期培训中，一位培训者教他们作为学生如何使用音频会议软件；在第二期培训中，他们则作为教师来学习使用这个软件。研究结果发现：技术问题太多，而且缺少将软件运用于教学的整合过程和时间；受训教师不能将一些非常有用的网络工具（比如博客）运用到教学中。主要原因是，他们缺乏对于在教学法上将这些工具有效运用到教学中的理解。而且在很短时间内，将大量新信息和技术介绍给受培训教师也使得他们难以应对。基于这项研究，Comas-Quinn指出：培训外语教师网上授课，应该超越提高使用信息交流技术(ICT)技能的单纯目标。重点应转移到培养教师如何从教学法角度理解新媒体提供的预设用途、以及帮助他们适应网上教学教师的新角色和新身份。Comas-Quinn (2011) 的研究对当前的外语教师网上教学培训很有帮助，因为它指出了教师职业发展培训中常犯的错误：这些培训项目往往以传授知识为主，却忽略了从传统实体课堂改换到网上课堂过程中教师自身角色的转变。

4.1.5 在其教学反思描述文章中，Sun (2011)呼吁教师网上授课培训要进行一个根本转变，即从以教师为中心或者着重技术的模式，转变为以学生个体和小群体为导向、多层面的网上教学模式。这一转变，要求教师网上教学培训重点集中于如何利用这一新模式实施网上教学。 Sun（2011）指出，着重技术的培训方式其不足在于以培训教师发展管理虚拟课堂的技能为主。这样会误导教师，让他们相信：传统的实体课堂可以被虚拟课堂取代；他们可以继续墨守陈规，准备一个演讲再设计几个不同的小组活动即可应对。同时也会让他们认为，网上教学只要学会处理一些技术问题，比如一些可能会引起焦虑和压力的技术问题（Guichon, 2009），就会万事大吉。由于网上教学的学生群体及其行为与传统实体课堂的学生群体及其行为不同，教师应该学会掌握技术新模式的根本能力，即能够针对学生个体，面向小群体，运用多层面技术来增进学生的学习。也就是说，受训教师应该学会如何在网上教学中转变自身的角色变成一个辅导者（tutor）教授小班或个体学生, 而不是学习如何将传统实体课堂讲授大课的做法照搬到同步的虚拟教学空间中去。

4.1.6 Ernest等 (2013) 的实证研究没有泛泛地探讨如何培养教师网上的教课能力，而是主要集中在如何培养教师帮助学生掌握互助合作学习的能力。他们研究了两组外语师资班的学员，为他们提供了合作学习的实际操作经验。结果显示，一组学员合作学习成功而另一组失败。由此，Ernest及其合撰作者总结出网上教学中如何让学生互助合作的重要技能。这些技能可归类到Hampel & Stickler (2005)金字塔框架中的第四层的能力（社交能力）和第五层的能力（合作能力）(见Ernest等, 2013, 第327-328页)：

1) 计划和管理技能 (The ability to plan and manage)。网上学生合作需要精心准备。比如，一些组织任务问题便包括如何分配任务（全班还是小组）、小组怎样组合、时间掌控、如何引导、每个任务最后的成品、用同步还是异步、如何引入新的网络工具，以及如何引导学生反思等等。这些技能看似简单，

但是需要在培训项目中利用实际操作方式来传授给受训教师。

2) 设计网上合作活动的技能 (The ability to design online collaborative activities)。针对网络环境的预设用途寻求如何能促进学生的合作至关重要。在学期开始，设计一个每人必须参加的“破冰”活动(ice-breaker)容易让学生有一种归属感和社群感。在随后的活动设计中，教师须考虑如何使活动设计与每个学生的实际生活相关，并在合适的时候给学生提供一定的引导，让其有一定之规可循。而且，对活动的目标须有明确的规定, 并要在活动完成后引导学生进行反思等等。这些都是网上授课教师培训时必须包括的内容。
3) 给学生设立基本规则并教给学生在小组内部设立小组规则的技能 (The ability to set ground rules for participation)。规则太宽泛会使学生对活动没有“掌控”感 (the sense of control)，而让学生自己设立很多规则又会使他们感到压力过大。故在制定活动时，不仅仅需要给学生明确的基本规则，还要教给学生如何在小组内部自己制定小组合作规则比如责任分配、交流频率、发帖长度等等。
4) 监督调节小组活动的技能 (The ability to moderate group activities)。培训教师时，要使教师能够监督调节小组活动、能够洞悉活动进展情况、预知可能出现的冲突。学生有问题时，教师要能够及时提供帮助，给予建设性的支持帮助而又不过分进行干预。
5) 选择适当的环境和正确的工具 (The ability to use tools and group space)。培训项目要使教师意识到如何选择同步教学还是异步教学才会推动学生之间的互助合作，还必须使他们意识到工具的选择取决于每个任务的目标。

最后，Ernest等 (2013)指出：培养教师获得这些技能和动手操作的方法最为有效，也就是说，一定要给接受培训的老师一个亲自体验网上小组互助合作的机会。

4.1.7 与后来的研究对比，Hampel & Stickler (2005) 提出的外语教师网上教学所需技能框架，似乎更注重对技术媒介的掌握和自我创新以及建立自己教学特色。2005年之后，这六组学者并未忽视教师在技术层面上的能力。但是，他们更注重如何培养教师从教学法角度理解新技术媒介提供的预设用途，如何帮助教师适应自身网上教学的新角色，以及如何从以教师为中心或者从技术导向的教学模式转变为以学生个体为中心和以小群体为导向、多层面的网上教学模式。另外，这六组学者所总结的网上教学技能更侧重了培养教师如何设计网上活动帮助学生交流，建立有效学习社群，并提高小组合作的技能。这些都是以学生为中心这一教学宗旨的体现。

4.2 网上教学技能培训的有效方法

Hampel & Stickler (2005) 和后来研究者所提出的教师网上教学所应具备的技能是否被成功传授给教师了？若然，在这些培训项目中使用了什么方法得以成功？正如 Hauck 和 Stickler 所强调，“我们不停地探索和发展新的网络媒介［以使教学更加有效］，所以说‘教书实际上也是学习’。这个‘学习’不仅仅是学习怎样利用网络授课，而且是学习怎样学习网上授课” (第 472 页)。

通过文献搜索发现，十一篇文章做了有关培养外语教师网上授课方面的研究，其中四篇的研究对象是外语师资班的学员，七篇的研究对象是在职外语教师。文章所涉及的外语有德语、法语、日文、西班牙语、意大利语、英语和汉语；其中五篇的研究项目利用的是网上同步教学，另外五篇的研究项目使用的是异步教学，余下一篇结合了两种模式。这些研究，多数并没有针对某项技能，而是集中在培养教师网上授课本身。有两篇包括了如何培训教师设计和发展网上课程，三篇偏重研究教师的合作技能，两篇验证了一个培训网上中文授课项目的有效性。这十一篇文章所涉及的实验研究，成功地将所要培养的技能传授给了教师。它们在如何培训外语教师网上授课方面的主张可总结如下。

4.2.1 在做中学习 (Learn by doing) 。正如 Felix (2005)及很多学者所指出的：教育需要最根本的转型，应该从最传统的知识传播模式转变到以学生为中心的模式。培训外语教师如何进行网上教学的传授模式，也应该采用以学习者为中心的模式。这种情况下，受训教师便是“学生”，这些“学生”应该在做中学习。在做中学习，可以有不同形式；比如在他们的研究中，Guichon (2009)、 Lewis (2006)、 Levy 等 (2009)、 Jauregi 等 (2012) 和 Comas-Quinn (2011)就都要求每个受训教师自己教一门课，在实际网上教学过程中学习如何进行网上教学。在 Tseng (2017) 的研究中，两位受训教师组成一组，一位授课，另一位观察并辅助，然后隔天轮替。Hsin, Hsieh, & Chang-Blust (2017) 的师资培训研究中，每一位受训教师必须有六到八次机会面对美国学生进行远程同步教学，每次一个小时。 另外一种方式，是通过在模拟网上授课的情形中传授技能，使这些受训教师既有机会在虚拟网络课程中直接体验作为网上授课的老师的角色，又有机会直接体验作为学生的角色 （Meskill & Anthony，2007）。 第三种方式，则是针对所要重点培训的网上教学技能来设计专门的活动，使受训教师亲身体验并从中学习。比如，为了培养教师在网上教学中促进学生合作互助的技能，Ernest 等(2013)和 Hampel (2009)设计了受训教师要完成的网上小组活动。在完成这个网上小组活动过程中，这些教师对于如何互助合作、如何设计网上互助合作活动都有了深刻的认识。这对他们将来帮助学生设计互助合作以及成功完成活动非常有帮助。

4.2.2 观摩式学习至关重要 (Observational learning is important) 。Hampel (2009) 指出：与学生需要看到榜样相似，培养外语教师网上授课必须给他们“树立样板” (Modeling) ，让他们看到网上成功教学是什么样子、会碰到什么难题、如何解决这些难题，以及如何有效地让学生学习语言与文化。Meskill & Sadykova (2011) 的研究发现了如何合理利用观摩式培训 (Fishbowl)的做法成功地培养外语教师的网上授课技能。通过观摩一个文化专家（同时又是教育技术专家）非同步网上授课（比喻为观察玻璃鱼缸）的经验并进行反思，受训教师学到如何利用网络所提供的预设用途来照顾每个学生需求的意识，从而提高了网上授课的技能。需要指出的一点是，通过观摩行学习并不一定在课堂，也可以通过其它方式，比如 通过观看以前同步教学的实况录像，来达到学习目的(Hsin, Hsieh, & Chang-Blust, 2017)。

4.2.3 通过反思进行学习 (Learn through reflection)。这一方法并不能独立存在，而是

作为上述两种方法的一个必需的步骤而存在。 Comas-Quinn (2011)、 Hsin, Hsieh, & Chang-Blust (2017)、Jauregi 等(2012)、 Levey 等 (2009)、 Lewis 等 (2006)，Meskill 等(2007)，和 Tseng (2017) 都提倡：受训教师在教课或者观摩有经验教师授课的同时和之后要写心得体会，通过对整个学习过程进行反思、并与老师及同学分享讨论中所学而使自身技能得到提升。Guichon (2009) 则主张用“自我审评” (self-confrontation)的方法来提高受训教师的网上授课技能。在 Guichon(2009)的研究中，法语师资硕士班的学员有机会利用电子会议平台给中级法语学习者授课；每次授课都会全程录像，学员则从中选取可以作为讲解自己授课心得体会和存疑的片段，在师资培训课中与老师和同学探讨。这种方法，使得受训者能够注意到网上授课中最关键的方面，也能培养他们的后设能力(meta-competence) ，即适应能力、预测能力以及创造变化能力的总和。

与写反思文章类似，写教学日记也对提高外语教师的网上教学技能有所帮助。不同的是，写反思文章往往发生在培训项目的最后，而写教学日记则发生在每一次教课之后。写教学日记，是在没有职业发展培训项目时教师自我提高教学技能的一个手段。当然，对教师自我提高，很多学者有很多异议(见 Smith, 2000; Wallace, 1998; Stenhouse, 2002)。但是抛开这些异议，Lewis (2006)在他的研究中发现，在没有职业发展培训机会的情况下，边进行网上教学边写教学日记有如下好处：帮助教师减轻压力、管理对网上教学的情绪、为供现实或将来反思的事件做纪录、并使自我审视教学成为可能（参见第597-598页)。总之，写教学日记能够提高教师对网上教学的意识，然而它并不能帮助教师对自己的网上教学做出任何实质性改变。

4.2.4 通过他人的批评进行学习 (Learn from a “critical friend’s” feedback) 。Lewis (2006, p. 598) 的研究发现：在职业发展培训短缺时，他所采取的三种自我提高的方式（写教学日记，在网上和同事讨论网上教学问题，和请同事观察自己教学）中，以最后一种方式最为有效。也就是，请一位教学和技术都很有经验的可信赖的同事观察自己的网上授课过程，并给出反馈意见。这种方式，能使教师注意到一些重要的教学技能，而且得到实际可行的建议，从而能够将新的技能付诸实践。这点与教学日记一起运用，能够帮助教师自主发展。

4.3 教师网上教学培训研究总结

以上综述各种研究所发现的对外语教师网上授课进行培训的种种有效途径。总结如下：

首先，培养网上授课技能并不意味着培养教师如何把面对面授课搬到虚拟空间(Sun，2011)。网上授课可以同步进行，也可以异步进行。现在，很多教师培训很注重如何传授同步教学，以为网上授课就是将实体课堂移到网络空间，而且很多研究也探索如何使同步教学更有效以及如何管理网上大课课堂。比如 Guichon (2010)指出，同步教学中常常发生的技术故障，会使得本来就有限的时间变得更为紧迫。这种情况，就需要教师运用他们所学的教学法结合对不同技术工具（例如用聊天室或别的视频工具等等）的了解做出正确的决定 (参见 Guichon, 2009，第 174 页)。

在承认这些研究所作努力的同时，Sun（2011）认为，这种坚持培养教师管理网上大课堂的做法，实际上容易使教师错误地相信网上教学即是传统教学到虚拟空间的迁移（见同上）。因为技术问题会导致很大的焦虑和压力，教师会自然地把传统课堂中讲大课、组织相似的小组活动挪到网络教学中，并认为只要学会如何应对技术问题即可以成功进行网络教学(Guichon, 2009)。现在我们知道，网上教学并非简单地照搬传统课堂，而是有很多不受教师控制的因素。正如 Sun (2011)所指出的，网上教学培训需要考虑到两个重要因素才能使受训教师既获得教学技能，又能对网上教学有一个正确理解。

第一个因素，是网上学生群体与实体课堂的学生群体不同。McLoughlin & Lee(2010)提到：现在很大部分学生既工作又学习，网上学生群体更是如此。他们选择网上课程是由于时间和地点的灵活性，他们不可能把上课时间固定到每周的一个时间。鉴于学生群体的改变，网上授课应视课堂为一个把不同小组的学生连在一起的大网，而每个小组又可细分为成对学生或者学生个体。教师应该运用不同的网上工具和技术给予这些小的群体或个人适当帮助（参见第 440 页）。

第二个因素，则是学生学习行为的改变。Harrison & Thomas (2009)在研究中发现，网上学生的学习行为和课堂学生的有所不同。网上学生常常选择自己的学习工具创造出能更好地为自己服务的环境（参见 120 页）。在培养教师网上授课的时候，这也是应该考虑的一个因素。应该使受训教师进行改变，针对新环境做好一对一或者小组的个别指导。

其次，教师网上教学培训中不应该忽视教师对教学法的理解。仅仅知道如何用一些网上的教学工具还不够，教师应该进一步熟悉在网上教学中怎样运用这些工具以使学生的学习更加有效。在很多培训项目中，通常是把教学工具的运用以一种传授知识的方法教给受训教师；但是如何把这些工具更具体地应用到教学、更有效融入到教学方法中，都只能靠教师自己摸索(Comas-Quinn, 2011)。显然，那并非易事。

最后，网上教学培训不应该忽视对教师的教学观、教学态度和教学理念的培养。只有具备一个正确的态度和认识，教师才能拥有内在的动力去对网上教学进行改善和提高。否则，“教师就没有一个深度学习的机会，不能把自己变成一个有效的网上教师” (Comas-Quinn, 2011, 第229页)。比如说，对于那些刚刚接触网上授课的教师，他们通常有很多面对面教学的经验，这些经验是他们的教学观教学理念形成的基础。当他们要转到网上授课时，这些教学理念一方面会促进他们的实践，但另一方面会起到阻碍作用。当今的教师网上授课培训，大多注意的是新技术的操作，而忽略了培养教师形成自我特色，对网上教师角色的认识和学生角色的认识，以及如何通过互动使学生对语言和文化的学习达到最大化。

自 Hampel & Stickler (2005)以后，一些学者在对其认可的基础上，又补充了一些其它技能（比如教学评估和教学理论运用），并认为这些技能的培养可以同步进行，而不认为一种能力必须以另一种能力为基石。更多的学者尤其重视教师如何设

计并管理学生网上互助合作活动的技能，并将这种技能细分成可操作培养的次级技能。

在培训方法中，最重要的是要从以教师为中心的低效率的套路改变为以学生（受训教师）为中心的模式（当然，也要教给这些受训教师在将来的网上授课中采用以学生为中心的模式）。要培养受训教师运用技术的能力，但是培养他们如何在教学中运用技术来使学生更高效地学习尤为重要。研究者发现，培训教学技能最为有效的方法是：在教学实践中进行、让受培训教师在观察中学习、在实践或观察之中或之后进行反思、在实践中请有经验的教师观察并给予批评反馈。然而，由于网上教学头绪众多，第一次接触网上授课的受训教师在面对不同的技术问题、教学法流派、技术运用、设计课程需要考虑的诸多因素之时很容易不知所措。培训项目的设计应该将这些考虑进去。

5. 实施建议：分阶段网授教师培训方案

基于以上对教师网上教学培训文献的综述和讨论，针对高等院校大学外语教师，可以归纳出一套的网络授课培训的可操作程序：培养应尽早着手，循序渐进，将教师必学的技能一层层、一步步传授给他们。正如Comas-Quinn (2011)所指出，如果将所学内容在短时间内都灌输给受训教师，他们往往只选择与实体教学最相近的内容去学习。所以，如果培训尽早着手，就可以做到从容地按照以下四个不同阶段进行培训。

第一阶段：使教师意识到网上教学的独特价值 (Comas-Quinn, 2011; Felix, 2005; Hsin 等, 2017; Sun, 2011)。首先要意识到网上课堂的学生群体与实体课堂的学生群体多数情况下有很大不同。网上学生更看重网上教学的灵活性。那么，网上教学如何利用不同技术给学生提供这些灵活性？其次，与实体课堂比较，网上教学应尽力弥补由其自然特点所带来的学生缺乏学习社群感（a sense of learning community）的局限。如果教师意识到这一点，就会更加投入地学习如何设计活动以增强学生之间的交流与合作，以及如何建立学习社群。对于认为网上教学就是实体课堂到网络环境的简单迁移的教师，在培训最开始的阶段改变他们对网上教学的态度和认识是一项必要而艰巨的任务。

第二阶段：培养教师对教学法和技术利用的认识 (Compton, 2009; Ernest等, 2013；Hampel, 2009; Hsin等, 2017) 。在教学法方面强调要以学生为中心， 将网上教学的重要特点讲授给学生；比方如何着手设计课程，如何建立一个学习社群(learning community)，如何加强学生之间的互助合作，以及如何评估学生的学习和课程设计。这些培训的重点就是Kirkwood & Price（2015）所指出的，“我们应该把老师培养成自信的技术应用者，懂得如何应用技术支持学生的学习。不仅仅知道怎样运用技术，而且知道为什么运用它” (第221页)。

在这一阶段，对课程设计的学习实际上牵涉到语言习得理论。比如说，语言学

习最终目的是有意义的交际而不是语法。无论是网上、面对面、还是混合模式，成功学习外语的关键都是学生的参与和互动。“语言学习是学习基本技能而不是内容(skill-based v.s. content-based)。基本技能的培养，比如听说技能是需要不断的同步互动才习得的” (Wang & Chen, 2009, 第5页)。教师对语言习得、语言技能发展过程的基本了解是网授课程设计的必要准备。当然，同步互动是学习语言的一个很重要的途径，但是异步互动以及随着技术的发展而出现的其他方式的互动，比如人机交流都成为学习语言各种技能的重要手段。

第三阶段：以观察和反思为主 (Hsin等, 2017; Meskill & Sadykova, 2011; Tseng, 2017)。在对网上教学的价值和设计有一个全面的认识后，安排既熟悉技术运用又理解教学理论的有经验的教师网上授课，让受训教师通过观摩的 (Meskill & Sadykova, 2011)方式的观察进行反思和讨论。观察应该从课程的准备阶段开始：这些有经验的教师是如何设计并准备网上课程的，他们从什么角度考虑、做了哪些准备？在教课过程中做了哪些，为什么那样做？观察，提问，反思会给受训教师提供一个机会，让他们在大脑中形成一个网上教学思考模式，并扩展加深其对实际网上授课需要解决的问题的认识，从而帮助日后的网上教学。

第四阶段：以模拟教学为主 (Comas-Quinn, 2011; Hsin等, 2017; Jauregi 等, 2012; Guichon, 2009; Lewis, 2006; Levy, 2009; Meskill & Sadykova, 2011; Tseng, 2017)。在通过理论学习和观摩以后，应该安排受训教师实际授课以获得在做中学习的机会。安排实际授课机会对于一些项目来说可能比较困难，这种情况下可以安排受训教师组自己给自己进行网上授课。在这个网上课程里，受训教师既当学生又当老师。每个学员都参与整个过程，包括如何设计网上课程，如何开发教学材料，如何进行实际教学。参与并负责整个教学过程会使他们获得网授的第一手经验。

这一套四阶段模式，在不同培训项目中可以针对自身具体情况作出调整变化。与教任何其他课程比起来，网上教授外语课程是一个极端‘耗费人工的’(labor-intensive)的工作，需要的教师培训时间最多（Ernest & Hopkins, 2006）。比如，在Ernest & Hopkins (2006)的培训模式中便包括了这样众多的活动：阅读网上教学相关资料、面对面教学、使用电子邮件及时给受训教师指导和帮助、教学观摩、培训人员及时对一系列教师应该做到的得体行为给予反馈、在受训教师的网上讨论室进行关于教学法的讨论、受训教师互相听课等等。培训需要考虑和试验的具体问题是多方面的。这些都有待于学界的进一步研究和交流。

6. 结论

本文以文献综述的方式，将过去十一年在美国的数据库能找到的与网授外语教师培训相关的文献进行了整理。通过对2005年以来同行评审文章的总和分析，本文发现，众多学者不仅重视网上授课教师对技术本身的掌握、创新和树立自己的教学风格，而且认为网上授课的关键，是培养教师设计网上活动来帮助学生交流与合作，改变以往教学方法来适应以学生个体或以小群体为中心的教学模式。文献分析还指

出，培训教师网授的有效途径是通过实践、观摩、反思、及他人批评来学习。

需要指出的是，在这十一年间的文献中，有不少跟网上教授中文相关的文章。比如，关于网上资源系统的建设(Da, 2011), 网上阅读课件的设计（Lee, 2011）, 网上教授中国文化（Jiang, 2011; Chu & Wang, 2012; Zhang, 2016）, 测评网络参与式学习工具 (Xu, 2011), 授课网络平台的评估(Chen, 2013; Hon, 2013; Jiang, 2014; Sunaoka, 2012; Tsai, 2012), 网上教学实例分析（Cheng, 2011）, 以及交互系统评价（Liang, Deng, & Au, 2013）。这些研究或多或少都对中文语言以及教学的独特性有所提及。专门针对培训中文教师网络教学的文章只是最近才出现（见Hsin, Hsieh, & Chang-Blust, 2017; Tseng, 2017），他们分别验证了两个不同的中文网授师资培训项目的有效性。与其他并不是针对中文网授教师培训一样，这两篇文章对关于外语教师网授所需技能以及如何培养外语教师获得这些技能提出了他们独到的见解并验证了其可行性，对中文教师的网授培训作出了贡献。但是，由于中文语言的特性，比如，它的语音语调及汉字的特殊性，在网络教学中教师也需要特殊的技能。然而在上述两个中文网授教师培训项目研究里并没有提及中文教学的这些特点。我们期待将来的中文网授的师资培训研究可以将中文教学的特点容纳进去，特别是，可以给受训教师学员设计课程的机会。这样，中文教学的特点就可以很自然地融入到网络教课所需技能的范围之内。

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(注: 带 *的是回答第一个研究问题所找到的文章；带 ** 的是回答第二个研究问题找到的文章。标为*/**者则二者兼而有之。
Note: Articles with * are the ones that helped answer the first research question. Those with ** are for the second research question. Those with */** are the ones that helped answer both research questions.)

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虚拟现实技术的历史、现状及其在语言教育中的应用
(History and Current State of Virtual Reality Technology and Its Application in Language Education)

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摘要：虚拟现实（VR）技术在时隔第一次热潮近 20 年后因为 2014 年 Facebook 以 20 亿美元收购一家 VR 初创小公司而重新受到社会和媒体的关注。本文首先回顾虚拟现实技术的发展历史，并分析在上世纪八十年代末和九十年代出现的第一次 VR 热潮的兴起和冷却的原因及相关因素。其次，文章介绍 2014 年以来 VR 发展的情况并对市场上的主要 VR 产品进行分类。接着，文章讨论 VR 在教育以及电子商务、医疗卫生等各领域的应用。最后，文章探讨 VR 在包括中文在内的语言教学中的应用，并对其优势和挑战加以总结。

Abstract: Having faded from public attention for nearly 20 years, virtual reality (VR) has been regaining its popularity since 2014 following Facebook's acquisition of a startup VR company for two billion dollars. This paper first reviews the origin, history, and evolution of virtual reality technology, which can be traced back to the early 1930s, and analyzes factors related to the rise and fall of the VR technology in late 1980s and the mid-1990s respectively. The paper then introduces the development of VR technology since 2014, and categorizes the major VR products available in the markets (such as Oculus Rift, HTC Vive, Google Cardboard, and Samsung Gear VR). Additionally, the paper discusses the applications of virtual reality in education and other fields such as business, medicine, and entertainment. Finally, the paper describes sample products and practices of using VR technology in language teaching and learning. The paper concludes with an analysis of the advantages and challenges of applying VR technology in language education including Chinese language teaching and learning.

关键词：虚拟现实，技术，头戴设备，教育，语言教学

Keywords*:* Virtual reality, technology, head-mounted device, education, language teaching and learning

1. 引言

2016 年曾被很多英文报刊、杂志和书籍称为“Year of Virtual Reality” (虚拟现实年)（如 Cellan-Jones, 2016; Morris, 2015; Steinicke, 2016; Swanson, 2016 等）。中文媒体（如天津日报, 2016）、有关研究机构（如艾媒咨询, 2016）及很多业界人士（如戴若犁，2016）也将 2016 称为 “虚拟现实的元年”。

虚拟现实究竟指的是什么？它是一项崭新的技术吗？如果是，它与其他已存在的有关技术相比新在何处？如果不是，它源于何时，为什么最近几年受到如此关注呢？这项技术可应用于哪些领域？可以用在教学当中吗？对包括中文在内的语言教学有什么帮助吗？

Rheingold 在其 1991 年所著的《Virtual Reality》书里说，了解 Virtual Reality 如何开始、从何开始将有助于讨论它走向何处及其原因（译自 377 页）。本文首先对虚拟现实技术的缘起及发展历程作一回顾，然后介绍虚拟技术的现状。文章最后讨论虚拟现实技术在教育，特别是语言教育，及其他领域的应用。

2. 虚拟现实技术发展历程回顾

“Virtual Reality”(虚拟现实)一词公认是由美国电脑科学家、视觉艺术家 Jaron Lanier 在二十世纪八十年代首先使用并推广开的（Rheingold, 1991; Steinicke, 2016）。每一项科学技术的发展都离不开几代人的努力和探索，虚拟现实技术也不例外。

2.1 八十年代前

在回溯虚拟现实技术发展历程时，有人（如 VR Roundtable, 2017; 赵沁平, 2015 等）将之追溯到上世纪三十年代初用于培训飞行员的飞行驾驶模拟器: The Link Trainer Flight Stimulator 。该模拟器简称 The Link Trainer, 是 Edwin Albert Link 在 1929 年所做的探索的基础上发展而来。这个模拟器由一个大的蓝色箱子组成，故又称 The Blue Box。使用者通过操作安装在里面的仪器，可以体验空中驾驶飞机的感觉，所以该模拟器被视作人类对创造身临其境体验的初次尝试。据 Naval Air Station Fort Lauderdale Museum 网页介绍，此模拟器是二战期间最重要的飞行培训设备，有超过 50 万的美国飞行员使用过（Naval Air Station Fort Lauderdale Museum, 2010）。

另外，在谈到虚拟现实技术发展历史时，很多人（如 Rheingold, 1991; Steinicke, 2016; VR Roundtable, 2017; 赵沁平, 2015 等）都会提到 1962 年 Morton Heilig 发明的 Sensorama Machine。据一个专门详细介绍 Morton Heilig 生平与贡献的网站（http://www.mortonheilig.com/）介绍，该机器其实造于 1957 年，是 1962

年获得的专利[1]。Morton Heilig 曾作过电影制作人和摄影师，在 1955 年曾发表过一篇题为 Cinema of the Future 的文章，此机器是 Heilig 根据自己对未来观影体验的一些设想所做的一个简单原型机 (Prototype)。

图 1. Sensorama. **来源：** http://www.mortonheilig.com/InventorVR.html

Howard Rheingold 在 1991 年出版的名为“Virtual Reality” 一书 (第 50-51 页)中，提到他在 1990 年 3 月曾见到 Heilig 本人并亲身在 Heilig 家中试过这台时隔多年却仍可操作使用的 Sensorama 机器。据 Rheingold（1991）描述，该机器通过三维影片 (3D motion picture) 产生的视觉效果，引擎轰鸣声和风声造成的听觉效果,空气吹动头发及震动对手和身体产生的触感，可让他身在 1990 年的南加州却能全方位身临其境地体验到骑着摩托车奔驰在 50 年代纽约 Brooklyn 街头的所见所感。Rheingold（1991）在体验后评论说虽然该体验仅有 30 秒，但对虚拟现实发展历史而言，可与飞机发明史上 Wright 兄弟做的飞机原型机(Prototype)的重要性相提并论。尽管由于种种因素，该机器可惜未能实际投入生产，但如 Steinicke（ 2016）评论所说，其对之后的 4D/5D 电影的发展起到了奠基作用。

1967-1968 年, 计算机图形学 (Computer Graphics) 奠基人和图灵奖（Turing Award，1988 年）获得者 Ivan Sutherland 博士在任哈佛大学电子工程副教授时，与其学生 Bob Sproull 一起发明了第一个与计算机连接的头戴式显示器(Head-mounted display,简称 HMD)系统（Burton, 2012; Steinicke,2016）。由于该系统需要通过一根长棍吊在空中与天花板连接，当使用者戴上该显示器时，这根棍子就在其头顶上，令人联想起希腊神话中的达摩克利斯之剑的故事，故该发明又被称为达摩克利斯之剑（the Sword of Damocles）。Burton（2012）把这一发明看作是第一个虚拟现实和增强现实 HMD 设备。Lanier (2017) 称之为第一个可以真正算作 VR 的产品（翻译自第 41 页）。而 Steinicke（2016）则指出由于这一设备所产生的图形是叠加在眼前看到的真实物品上的[2]，所以严格意义上讲，只能算作是增强现实（Augmented Reality）的第一个 HMD。

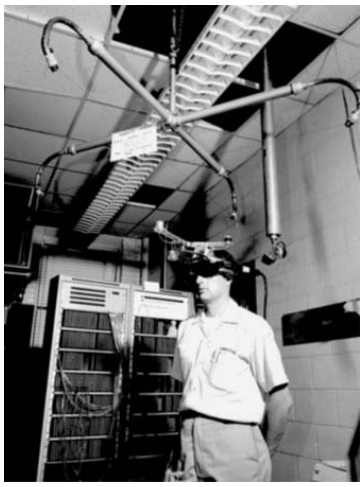

图 2. The Sword of Damocles 来源：https://www.britannica.com/technology/head-mounted-display

[1] http://www.mortonheilig.com/InventorVR.html

[2] https://www.youtube.com/watch?v=ISJWZpFIAlQ （一段记录当年头上戴上该设备操作情况的时长 20 秒的视频）

值得指出的是，仅就 HMD 本身而言，有人（如 VR Roundtable, 2017; Steinicke, 2016 等）认为这个达摩克利斯之剑并不是最早的 HMD 设计，比如上文提到的 Morton Heilig 在发明 Sensorama Machine 之前还曾设计过一个可戴在头上观看电视的设备叫 Telesphere Mask，该设备在 1960 年获得专利[1]。另外，1961 年两名 Philco 公司的工程师 Charles Comeau and James Bryan 发明了一个头戴装置，使用者可通过头部运动来控制设置在远方的照相机，观察远方的情况，该设备主要用于军事中的危险情况。虽然该设备被一些人看作是第一个 HMD，但如 Steinicke（2016）评论所言，这一设备不能产生图像也尚未与计算机结合。此外，还要指出的是在谈到 HMD 历史时，也有人会提到 1939 年获得专利的 Viewmaster，该发明当时被用来戴在头上看 3D 照片。2014 年推出的可戴在头上看智能手机上的 3D 影像的 Google Cardboard, 其设计理念从一定程度上说与 Viewmaster 相似（Virtual Reality Society, 2017）。

图 3. Viewmaster 来源：https://www.vrs.org.uk/virtual-reality/history.html：

2.2 VR 的第一次兴起 （80 年代末 90 年代初）

真正开始使用 Virtual Reality 一词的是 Jaron Lanier （Steinicke, 2016, VR Roundtable, 2017）。1984 年 Jaron Lanier 在自己家里成立了 VPL Research 公司，开始专注于自己一直感兴趣的将电脑语言形象化的研究。他认为当时的计算机语言如同数学一样过于不必要的抽象化和符号化。据 Lanier 回忆，公司名字里的 VPL 既可代表被理解成研究 Visual Programming Languages，也可理解为研究 Virtual Programming Languages，是他当时在一位媒体人追问他的工作单位名称时临时起意顺口说的（Snider, 1993）。第二年他在 Atari 的前同事 Thomas Zimmerman 和其他几个人加入。 公司专门开发和销售 VR 有关的软硬件成品。

VPL Research 比较有名的产品是数据手套（Data Glove）,该产品是在 Thomas Zimmerman 之前已有想法的基础上发展而成（the Economist, 2010）。据产品演示录像显示[2]，用户戴上该手套后电脑显示屏可以显示手的活动情况, 并且还可通过软件，实现手在空中对电脑显示屏中的物品进行操作并与之互动。在 Data Glove 基础上发展而来的还有 Data Suit,用户可穿在身上后与电脑里的图像互动，电脑也可显示用户身体各部位的活动。 VPL Research 另外一个代表产品是 Eye Phone，外形与今天市场上的 HMD 产品极其相似。用户戴上后可以通过头部运动控制屏幕上显示的物品并与之

图 4. Eye Phone 和 Data Glove 来源：https://vrwiki.wikispaces.com/VPL+EyePhone

[1] http://www.mortonheilig.com/TelesphereMask.pdf

[2] https://www.youtube.com/watch?v=fs3AhNr5o6o （Data Glove Demo 视频）

互动，并且还可和与同样戴上该设备的其他用户互动（参见 VPL1990 年介绍 Data Glove, Data Suit 和 Eye Phone 的视频[1]）。

据 1989 年采访 Jaron Lanier 的 Adam Heilbrun 介绍，当时美国国内大约有 20 个 VR 研发团队，包括 NASA (National Aeronautics and Space Administration 美国国家航空航天局) 在内（Heilbrun, 1989）。Jaron Lanier 的 VPL Research 是第一家生产并销售 VR 产品的公司 (Steinicke, 2016)。其生产的 Eye Phone 和 Data Glove 产品受到社会和媒体的热烈关注，并登上 *Wall Street Journal* 和 the *New York Times* 等封面（Parkin, 2014）。Eye Phone 还在 1992 年上映的基于 VR 的科幻恐怖电影 *The Lawnmower Man* 中出现过（Parkin, 2017）。Jaron Lanier 也在当时特别是 1989 年前后接受过多家媒体的采访，除了介绍 VPL 的产品外，还阐述他对 VR 的理解和展望。*The Lawnmower Man* 电影获得了票房巨大成功，从而进一步提高了 VR 在社会上的关注度（Harris, 2016）。Virtual Reality 在 80 年代底 90 年初迎来第一次热潮，成为非常热门的一个词。

值得指出的是从上文提到的 30 年代初用 The Link Trainer 培训飞行员，到 1958 年成立的 NASA 开始培训宇航员，进行飞行模拟训练一直是虚拟现实技术发展的不可或缺的推动力和一个重要应用领域。VPL Research 生产的 Data Glove 很多也是被 NASA 采购。NASA 并在 1991 年成立了 Virtual Reality Laboratory （VR Roundtable, 2017）。

同在 1991 年，致力于开发 VR 街机游戏(Arcade Games)设备的 Virtulity Group 公司在英国成立（Steinicke, 2016; VR Roundtable, 2017）。该公司的创始人，总裁和首席技术官是 1990 年从英国 Loughborough University of Technology 计算机专业毕业的年轻博士 Jonathan Waldern。Jonathan Waldern 和他的合作者在 1990 年的一个展览会上展示了两个基于自己在校期间研究所造的设备。该设备被 British Communications (BT) 购买以用来探索虚拟视频会议的可能性 (Strassel, 1997)。此外，他们还收到请他们做培训和行销方面 VR 产品的投资（Musings of a Mario Minion, 2016）。而 Jonathan Waldern 和他的合作者则选择将他们的 Virtulity Group 公司定位在开发 VR 街机（游戏厅用的）游戏设备。1991 年他们推出了一坐一站两款 1000 系列游戏设备。用户可以头戴上 VR 设备，手里拿着操作杆，与同时戴上设备的玩伴在虚拟世界里互相射击、拳击和做其他互动（详见分别摄于 1991[2]和 1994[3]年介绍该设备的视频。）

[1] https://www.youtube.com/watch?v=ACeoMNux_AU （VPL Eye Phone 1990）
[2] https://www.youtube.com/watch?v=rVn3H93Ysag （Virtual Reality 1991）
[3] https://www.youtube.com/watch?v=2Imyn6QSq9s （Virtuality - Manufacturing Virtual Reality Arcade machines in 1994）

图 5. Virtuality 产品

图 6. Virtuality 产品

图 5 和图 6 来源：https://www.virtual-reality-shop.co.uk/virtuality-gaming-system/

同一时期比较有名的 VR 游戏产品是 1995 年总部在日本的 Nintendo 公司（又称任天堂株式会社）开发的 Virtual Boy。 该产品由有名的游戏开发专家 Gunpei Yokoi（横井軍平）领导制造，于 1995 年在市场推出。包括一个可架在桌子上形状类似望远镜的 VR 一体式眼镜和类似今天家用游戏机（如 Xbox）配置的可用于两手同时操作的游戏柄。用户把双眼贴近 VR 眼镜，双手通过游戏柄与 VR 眼镜显示屏上的游戏互动，比如可和里面的 Mario 卡通人物打网球 （详见评介该产品的视频[1]）。

图 7. Virtual Boy 来源：https://www.virtual-reality-shop.co.uk/virtuality-gaming-system/

2.3 VR 第一次兴起的背后

二十世纪八十年代末九十年代初的第一次 VR 热潮及诸多 VR 产品的出现固然受益于与之前有关产业如模拟培训、电影技术等的发展，但最重要的还是有赖于七十年代和八十年代初的计算机技术的突破，特别是个人计算机（Personal Computer）的发明。1971 年 Intel 公司的工程师 Ted Hoff 发明了第一个微型中央处理器 (Micro Processor), 为大幅度降低计算机成本和缩小计算机体积提供了可能性。据 History.com (2011)介绍，由 University of Pennsylvania 科学家建造的 Electronic Numerical Integrator Analyzer and Computer (ENIAC)是最早最有名的计算机之一，在二战期间主要用在军事上。其耗资达 50 万美元，重 30 吨，占地约 2,000 平方英尺。而 Ted Hoff 发明的这款被称作 4004 的微处理器芯片体积虽只有 1/16 英尺宽、1/18 英尺长，但却有与 ENIAC 相同的强运算能力。1975 年，Bill Gates 和 Paul G. Allen 利用 为 Micro Instrumentation and Telemetry Systems (MITS)公司生产的 Altair 编写“Altair BASIC”挣的钱，成立了 Microsoft 公司。1976 年 Steve Jobs 和 Stephen Wozniak 制造了 APPLE I， 比 Altair 所用的微处理器更便宜，储存量更大，并且还有一个显示屏。第二年，他们又推出了配有彩色显示器和可外储数据的 APPLE II，并且鼓励社会各界的人为其编写适用程序（History.com, 2011）。1983 年 APPLE 推出了 Lisa， 第一个图形用户界面(Graphic User Interface) 的个人用电脑

[1] https://www.youtube.com/watch?v=Jjz4bls_gPs （Virtual Boy-Gaming Historian）

（Computer History Museum, 2017; Zimmermann, 2017），1984 年 1 月又推出了 Macintosh 和 Lisa 的升级版。个人电脑的普及和电脑技术及图像处理技术的提高促进了虚拟技术的发展，比如 Heilbrun A. (1989)采访 Jaron Lanior 的报道中 提到 Jaron Lanior 演示 VPL 产品时用的就是 MAC 电脑。

2.4 第一次 VR 热逐渐冷却（90 年代末）

然而，VR 技术以及与其相关的技术在当时才刚刚起步，远未成熟。如 Jonathan Waldern 在 2015 年接受采访时回忆说当时 Virtuality 用的 Sony 的 LCD 显示器的像素只有 300 x 200 pixels, 而如今最低的像素则是 1080 甚至 4K（Arthur,2015）。人们在试用 VR 产品后发现了诸多问题。比如虚拟现实里的图像模糊、卡通化，不能给人好的沉浸式代入感。而 Virtual Boys 游戏里图像更是只有红色和黑色组成。另外，人们在转动头部或身体时，虚拟现实里的图像和视角变换滞后（National Public Radio, 2016)。再者，很多 VR 硬件设备笨重，使用不便。还有基于虚拟现实开发的游戏和其他内容尚十分有限（Strassel，1997）。

另外，人们发现这些 HMD 设备不能连续长时间使用，即便短时间（如 15 分钟）使用也会产生头晕恶心等类似晕车的症状（Kolasinski，1995；NPR, 2016; Parkin, 2014）。类似情况在利用模拟器进行飞行训练时也有(Miller, & Goodson, 1960), 被称做 Stimulator sickness，并已有大量研究（如 Crowley, 1987; Kennedy & Fowlkes, 1992）。Kolasinski （1995）针对虚拟现实中的 Stimulator sickness 开始研究。此外有人担心使用 VR 设备会影响儿童的视力，这一点也是 Virtual Boy 在市场上失败的原因之一 (Gaming historian, 2014)。

成本高、价格昂贵也是造成生产 VR 产品设备的公司失败的重要原因之一。如 Strassel（1997）分析所说，创造虚拟现实不同于运行其他计算机程序，它对电脑硬件设备如计算空间和图像处理能力等要求极高。虽然计算机芯片和显卡在 80 年末和 90 年代初与六七十年比有了很大下降，但对生产商来说，仍然负担沉重。Virtuality 公司的创始人 Jonathan Waldern 在 2015 年回忆说，虽然当时生产的 VR 设备于今天相比功能有限，但每台设备耗资七万美元(Arthur, 2015)。与之类似，Jaron Lanier 的 VPL Research 公司生产的包括 Eye Phone 初级版要一万多美元，高级版则要 49,000 美元、Data Glove 初级版要 8000 美元（IGI Consulting,1992）。另一方面，社会在对 VR 新鲜度过后购买欲望降低，需求有限。1990 年 VPL Research 公司申请破产（NPR，2016），其专利被借款给它的一家法国公司拍卖 (Snider,1993)。

人们在被媒体点燃的对 VR 的热情和过高期望在体验一些 VR 产品后逐渐冷却和变得失望（Schnipper, 2016）。虽然很多专业领域如航空、医学、建筑等对虚拟现实的研究仍在继续，但从 1995 年之后，虚拟现实已渐渐远离普通大众和主流媒体关注的视线。直到近 20 年后的 2014 年，新的一轮虚拟现实热被一起高达 20 亿美元的收购重新点起。

2.5 VR 热再度兴起（2014 年）

2014 年 3 月 24 日 Facebook 在其网站上宣布 20 亿美元收购 Oculus VR 公司，并在网页上对 Oculus VR 公司和收购目的做了简单介绍。按其说法，Oculus 是“the leader in immersive virtual reality technology” （沉浸式虚拟现实技术的领头羊)，其设计的头戴式耳机 the Oculus Rift headset 已收到超过 75000 个订单。Facebook 期待将 Oculus 现有在游戏方面的优势延伸到社交、媒体、娱乐、教育等其他应用领域 (Facebook, 2014)。

此次收购强烈刺激了资本市场和科技圈，使沉寂多年的 VR 产业再一次爆发。VR 在时别 20 年后重新得到媒体和社会的关注。下面就虚拟现实技术在近几年的发展情况及当今市场上的主要产品做简单介绍。

3. 虚拟现实技术发展现状及当今主流产品介绍

3.1. 虚拟现实技术近几年的发展

2014 年 3 月 Facebook 宣布 20 亿美元收购 Oculus 公司，3 个月后，Google 在 6 月 25 日召开的 Google 为开发者举行的 I/O 大会年会[1]上给来自世界各地与会者免费赠送了一个硬纸壳做的 Google Cardboard 眼镜（Lowensohn, 2014）。很多人当时以为是 Google 开的一个玩笑，试过以后才认识到这可能是 Google 踏足 VR 领域的一个开始，并且是一个花费低（Seppala, 2014）、时机好、非常巧妙的开始（Metz, 2015）。如有分析家评论，Google 此举好比给那些主张 VR 高大上的人迎面一掌，证明 VR 不一定非得那么贵、离普通大众那么远（Metz, 2015）。2014 年 9 月，Samsung 宣布与 Oculus 合作生产 Samsung Gear VR，Samsung 提供硬件，Oculus 提供软件。12 月，Samsung 开始销售第一款 Gear VR。虽然该款 VR 标明是 Gear VR Innovator Edition，主要供软件开发者试用，但仍是主流电子产商推出的第一款基于移动手机的 VR 眼镜。由于其软件由 Oculus 提供，这无疑增加了产品的号召力，因为虽然人们知道基于电脑主机的 Oculus Rift 头戴式显示设备的效果一定会好得多，但是有 Oculus 软件支持的 Gear VR 显然也会让他们对 Oculus 的技术效果略尝一二（Gilbert, 2014）。

图 8. Samsung Gear VR
来源：goo.gl/LGsokb

2015 年 Google 在 5 月 28 日举行的 I/O 年会上[2]推出了 Google Cardboard 的改进版。改进后的 Google Cardboard 除了支持 Android 系统的手机外，还支持 iOS 系统的手机。同时 Google 在此年会还宣布了面向学校

图 9. Google Cardboard
来源：goo.gl/ovUu3o

[1] https://www.google.com/events/io
[2] https://events.google.com/io2015/

的 VR 项目 Expeditions （Robertson, 2015）。Google 的网站上将 Expeditions 译作”实境教学” 并提供 Expeditions 项目的中文版[1]。按其网站[2]解释，“Google 实境教学是一款虚拟实境的教学工具。有了它，不用离开教室，即可与鲨鱼一起游泳、游览外太空、参观博物馆等等。”纽约时报 (New York Times) 在 2015 年 9 月的报道说，Google 已经与学校老师和很多相关机构合作，完成了包括对中国长城、费城的 Independence Hall (独立厅) 等 100 多个虚拟教学旅行(virtual field trips)的创建,并已在数学、科学、历史、语言等课上尝试过，感兴趣的学校可以向 Google 申请免费得到参加该项目的设备（Singer, 2015）。 同年 11 月，Google 与 New York Times(纽约时报)合作，将 Google Cardboard 免费邮寄给时报的 140 万订户，作为帮助宣传纽约时报自己 VR 内容[3]的一部分（Wohlsen, 2015）。

2016 年 3 月底经过两年的千呼万唤后 Oculus Rift 推出普通消费者版(Rubin, 2016)。两个星期后，总部在台湾的 HTC（宏达）推出与美国著名游戏公司 Valve（中国游戏者所称的 V 社）合作生产的 HTC Vive。由于这两款 VR 都需要在电脑上运行，都来历不凡，从而成为强有力的竞争对手。VR 市场的战斗正式开始（Hardawar, 2016a）。同年 10 月 Sony 公司推出基于其 Play Station 4 游戏机的 VR。基于 Play Station 4 已有四千万的用户群，有人预测 Sony 当年就有可能销售 260 万台这款 VR。Google 在 2016 年更是不甘寂寞，先是在其 3 月 18 日举办的 I/O 年会上，宣布 Daydream （白日梦）VR 软件平台，作为下一代 Android N 系统支持的 VR 认可标准（Robertson & Miller，2016），接着在 11 月推出硬件 Daydream View 眼镜（或译作头盔）。Daydream View 是 Google Cardboard 的超强版。虽然只支持 Android 手机，但一经推出，便被看作是 Samsung Gear VR 的极大挑战（Hardawar, 2016b）。原因之一在于 Samsung Gear VR 只用在 Samsung 自己生产的几款手机上，而 Daydream View 则可用在几乎所有运行 Android 系统的主流品牌产品的高、中端手机上。面对资金雄厚的各大公司在 2016 年 VR 市场的激烈角逐，难怪很多人(如 Cellan-Jones, 2016; Steinicke, 2016; Swanson, 2016 等) 将 2016 年称为虚拟现实年(Year of Virtual Reality)，或虚拟现实元年（iiMedia Research, 2016; 戴若犁，2016；天津日报，2016）。

图 10. 基于电脑或游戏主机的三款高端 VR 头显
来源：goo.gl/6S1C6D

值得指出是，2016 年 8 月中国工业和信息化部在 iWorld2016 数字世界博览会 VR/AR 领袖峰会上发布《2016 全球虚拟现实产业研究报告》,里面提到中国生产 VR 设备的公司已达 90 多家（新浪 VR，2016）。9 月由中国电子信息产业发展研

[1] https://support.google.com/edu/expeditions/answer/6335093?hl=zh-Hans&ref_topic=6334250
[2] https://support.google.com/edu/expeditions/answer/6335093?hl=zh-Hans&ref_topic=6334250
[3] http://www.nytimes.com/marketing/nytvr/

究院、北京航空航天大学虚拟现实技术与系统国家重点实验室、歌尔股份有限公司、宏达通讯有限公司(HTC)等虚拟现实领域主要企业、研究机构联合发起的虚拟现实产业联盟[1](Industry of Virtual Reality Alliance，英文缩写 IVRA)在北京成立。12 月由 Google VR、 Facebook 的 Oculus, HTC Vive, Sony 等六家 VR 巨头组成了全球虚拟现实协会 Global Virtual Reality Association (GVRA)以共同推动 VR 技术的发展（详见 https://www.gvra.com/）。

3.2 目前虚拟现实技术主流产品分类

当前市场上头戴式（HMD）VR 的主流产品可大致可分成四大类：

（1）需要与电脑主机相连接的 ，如 Oculus Rift 和 HTC 的 Vive 都需要与电脑主机连接， 并且对电脑主机的运行速度、图像显示卡配置、计算机内存等有很高的要求。

（2） 需要与专门的游戏主机相连接，如 Sony PlayStation VR 需要与 Sony 生产的 PlayStation 游戏主机连接。

（3）需要有智能手机支持的，如 Samsung 和 Oculus 联合制作的 Samsung Gear VR （只支持三星手机）、Google Daydream View (支持 Android 手机)、Google Cardboard(同时支持 Android 和 iOS 系统)。

（4）一体式(Standalone) 的，不需要有主机或手机的支持，自成一体，具有独立的 CPU、输入功能和显示屏。一体机目前以中国品牌为主，如大朋 VR 一体机和 微鲸 VR 一体机等[2]。Google 、Oculus 和 HTC 也都在发展自己的一体机。Oculus 网站上显示 2018 年初会 出售起价 199 美元的一体机 Oculus Go[3]。 HTC 的中文网站显示从 2017 年 12 月 12 日开始接受预定，2018 年 1 月会发售一体机 Vive Focus[4]，两款售价人民币 3999 元和人民币 4299 元，但其首先主要在中国市场发行（Feltham, 2017）。Google 网站显示 Google 正在和 Lenovo 合作制造 Daydream Standalone headset[5]。

[1] http://www.ivra.com/
[2] 参见 5 款 VR 一体机横评：http://vr.pconline.com.cn/869/8690905_all.html#content_page_2
[3] https://www.oculus.com/go/
[4] https://www.vive.com/cn/product/vive-focus-en/
[5] https://vr.google.com/daydream/standalonevr/ ; https://www3.lenovo.com/us/en/google-io/

图 11. Oculus Go
来源：goo.gl/fYoruz

图 12. Vive Focus
来源：goo.gl/zSG992

以上四类产品按其生产厂家可以用一下图表归类：

表 1. 头戴式（HMD）VR 主流产品一览表

主要厂家	基于游戏机的(Game console based)	基于电脑主机的(Computer based)	基于智能手机的(Smartphone based)	一体机(Standalone）
Google			• Google Cardboard(一代) • Google Daydream View(二代)	Daydream standalone headset *(即将发布)*
Oculus (Facebook)		Oculus Rift	Gear VR (Samsung 和 Oculus 合作产品)	Oculus Go *(预计 2018 年初发售)*
Samsung				
HTC		HTC Vive (和 Valve 合作)		HTC Focus *(预定在 2018 年 1 月出售)*
Sony	Sony PlayStation VR			

3.3 虚拟现实内容制作和其他相关支持技术

选择 VR 设备时，如同选择智能手机类似，除了其硬件配置，操作系统（Android，iOS, Windows）外，一个很重要的要素是其所能支持的内容。基于 Windows 系统的手机一直销售不高的一个原因很大程度是因为基于 Windows 系统开发的 Apps 的数量和质量都落后于基于 Android 和 Apple iOS 系统开发的手机，尽管有很多 Windows 系统的手机本身的硬件配置和软件都不错。

与之类似，一方面，VR 设备本身的硬件和软件所能创造的沉浸感、交互性固然是越强越好，但是另一方面，用户买 VR 设备回家使用，在新鲜劲过后，更关注的还是支持该 VR 设备的平台所能提供内容的数量和质量如何。比如用 VR 玩游戏，需要有很多针对 VR 开发的质量高的游戏。目前游戏是 VR 内容中发展最快的的一个方向(Sina VR, 2016)。HTC 的 Vive 就是与著名的游戏公司 Valve 合作的产品，用户可以头上戴着 Vive 玩全球最大的电脑游戏发布平台 Steam 上的游戏[1]。而 Oculus Rift 的缘起则是其创始人时年 18 岁的 Palmer Luckey 在 2011 年用遍所有他能找到的 VR 设备玩游戏后，仍不满意才决定在网上发起众筹，自己动手造一个为自己和支持者可更好用的 VR 设备来玩游戏（Rubin, 2014）。而 Oculus 的首席技术官 John Carmack 则是游戏界传奇人物，也是著名的第一人称视角射击游戏（the First Person Shooting 简称 FPS) Games 的开创者。他 1991 年成立的 id Software 是整个 3D 游戏概念的创建者（Rubin, 2014；Webster, 2013)。2013 他之所以离开自己创办并工作了 20 年的游戏软件公司加盟小小的 Oculus 公司，就是因为从中看到了 VR 技术给游戏界带来的新机会，想专心做 VR 方面的工作。值得指出的是他对 Samsung Gear VR 所用的 Oculus 软件也已做了诸多开创工作(Durbin, 2017)。《2016 全球虚拟现实产业研究报告》中有机构预测，2020 年全球 VR 游戏市场规模为 150 亿美元，约占 VR 行业总体市场规模的 50%（Sina VR, 2016）。

除了游戏外，新闻报道也是目前 VR 内容的一部分。前文提到与 Google VR 合作的纽约时报专门有自己 VR App 和 VR 网页[2]供用户利用 VR 眼镜来观看 360 度视角拍摄的新闻(Wohlsen, 2015)。用户可以对视频中的情景更有身临其境感，对新闻中的人物更易产生同理心，也对新闻本身会更感兴趣 （New York Times Magazine, 2015；Renner, 2017)。戴若犁 2016 年在谈到 VR 用途时，除了游戏外，还提到了用于社交和直播。利用 VR 来拓展人们社交的空间和交流方式。这也正是当初 Facebook 购买 Oculus 的一大目的。Facebook 在 2017 年已经尝试了在虚拟现实中进行约会（Swant, 2017）及谈话秀（Lichterman, 2017）。前文提到的 Google Expeditions (实境教学)与世界各地博物馆、科学技术、文化历史古迹等机构合作，已推出了近 500 多项实境教学场景[3]，是 VR 在教育、同时也可看作是在 VR 旅游方面的尝试。此外，虚拟现实技术在医疗、建筑、电子商务等领域的应用也已取得了一些进展，详见文章第四部分的讨论。

如《2016 全球虚拟现实产业研究报告》及诸多业界人士指出，虚拟现实技术在内容方面还有巨大的发展空间。2017 年 7 月，全球第一个虚拟现实技术内容制作中心在北京成立(Sina VR, 2017)。中国国家工业与信息部电子信息司副司长乔跃山在成立大会指出，虚拟现实内容是产业发展的重要组成部分。除了以视频游戏娱乐为代表的虚拟现实应用外，还要同时加快开发面向生产制造、互动式授课教学、文物古迹再现、三维广告投放、电商在线展示、虚拟旅游、主题游乐公园、赛事直播等行业应用的解决方案和创新产品 （虚拟现实技术产业联盟，2017）。

[1] http://store.steampowered.com/app/358040/HTC_Vive/
[2] http://www.nytimes.com/marketing/nytvr/
[3] https://support.google.com/edu/expeditions/answer/6335093?hl=zh-Hans&ref_topic=6334250 https://edu.google.com/expeditions/

另外，2014 年由 Mozilla 公司(免费 Firefox 浏览器的开发者)的软件工程师 Vladimir Vukićević 和其几个同事提出，之后得到 Google 和 Microsoft 等浏览器提供者支持的 Web VR 为虚拟现实的进一步发展和普及起到了极大的推动作用（Nikolaou，2017）。Oculus 的产品经理 Andrew Mo 在 2016 年 Oculus Connect 大会上介绍 Web VR 时说到，跟庞大的 30 亿互联网用户群比起来，拥有专门 VR 设备的用户数量还太少太少。Web VR 可以让不具有任何 VR 设备的互联网用户也能在网上欣赏 360 度视频和虚拟现实的其他应用，从而感觉 VR 离自己并不太遥远，尽管其观看效果不及使用专门的 VR 设备。此外，开放的 Web VR 技术，还可让更多的软硬件技术人员和内容开发者参与到 VR 技术发展中来（Antonov & Mo, 2016）。Web VR 网站 https://webvr.info/的首页上写的一句简单解释就是“Bring VR to the Web”, 并且列出了所支持的几乎所有市场上的 VR 产品如 Oculus Rift, HTC Vive, Samsung Gear VR, Google Cardboard, Daydream View 等等。Nikolaou （2017）列出了基于 Web VR 巧妙应用的三个例子：Meditate VR，Blair Witch 以及 Google 和 Miraikan 一起开发的 The Searching Planet VR。

如同 90 年代初的虚拟现实的兴起归功于七、八十年代计算机以及其他相关技术的发展一样，此次 2014 年开始的虚拟现实技术的再度兴起很大程度上要归功于互联网、智能手机、计算机芯片、图像处理等有关技术的长足发展。例如正是互联网让不到 20 岁默默无名的 Palmer Luckey 和 John Carmack 建立了联系，从而创造了被 Facebook 巨资收购的 Oculus 公司，也是互联网帮助 Palmer 得到了众筹资助，从而使其最初在父母车库里产生的制造 Oculus Rift 的想法一步步变成了现实，创造出了全球有名的 VR 产品。

在 VR 相关支持技术中特别值得一提的是全景相机。全景相机（Omnidirectional Camera，360° Camera），又称全景多相机视觉系统，其内部封装有多个不同朝向的光学传感器，通过对分画面进行图像拼接操作得到全景效果。对于没有 VR 设备的用户，可使用专用的发布软件在互联网上播放全景照片或全景视频，浏览者可以获得 360 度的观看体验；而配戴 VR 头戴式显示设备的用户观看时，则可以获得身临其境的沉浸式视觉感受。

近几年随着价格较低的消费级全景相机大量开发并投放市场，全景相机在普通消费者中的热度持续攀升。目前消费级的全景相机主要品牌包括：Facebook Surround 360、SUMSUNG Gear 360 、Kodak 4KVR360 等。其中成立于 2014 年总部在中国深圳的 Insta360 公司表现尤为突出。它同时提供 Insta360 air （for Andriod）、Insta360 nano （for iOS）、Insta360 one (高阶产品，支持 iOS 和 Andriod 系统的配置较高的手机和平板电脑)等支持各种系统的产品，且价格实惠。全景相机使用有趣，操作也并不复杂，网上又有不少如何拍摄、编辑全景视频的软件和指南。另外随着 Web VR 技术的推广，又有很多供用户分享全景视频的平台如 Youtube VR、vimeo 360 等。

普通用户自制的 360 视频，虽然其质量参差不齐，但一定程度上也有助于解决 VR 内容稀缺的状况，并且有助于 VR 技术的普及和下一步的提高。另外，从 2016

年起，随着消费级全景相机的出现，虚拟现实直播平台也陆续推出。其中最早的一个平台是 2016 年 5 月由美国直播平台公司 Twitch 推出的 Vreal 虚拟现实直播平台（Evangelho, 2016）。目前在中国境内的虚拟现实直播平台包括虎牙直播、目睹科技等。

最后，还要指出的是面对时隔 20 年重新兴起的此次虚拟现实热，虽然有人持质疑态度（Economist， 2017; Leetaru, 2017），特别是目前市场上的虚拟现实产品还有很多可改进的空间。上一次 VR 热潮中出现的问题——如 VR 图像在用户转动头部时会出现延迟，用户戴上 VR 头盔不长时间后出现眩晕等——仍然不同程度的存在（Strassel ， 1997）。但这次的 VR 技术比 20 年前无疑有了质的提高，并且有一点毋庸置疑，那就是这次 VR 技术和产品比上一次有了更大的普及。比较 20 年前要花一万多美元的初级版的 Eye PhoneVR，如今的 VR 产品真的从昔日王侯“庭前燕”，飞到了寻常百姓家。

4. 虚拟现实技术在教育及其他领域的应用

4.1 虚拟现实技术在教育中的应用

从 20 世纪 90 年代起虚拟现实技术已在临床教学与驾驶培训等应用领域发挥作用（Stevens, 1995; 郑艳群，1999）。随着近几年移动端 VR 设备的普及以及 VR 教育类内容开发平台的兴起，虚拟现实技术正在逐步走入中小学课堂，走进大学校园，帮助学生更快更好地掌握学习内容，帮助教师实现一些传统课堂教学无法实现的目标。本文试将目前 VR 在教育领域的应用梳理为以下几类：

(1) “硬科学” 教学

虚拟现实技术在教育领域很多早期的应用都集中在“硬科学(hard science)”学科（Reede，2016），譬如生物、化学、地理、地质、天文等，因为能够同虚拟的三维物体、动物、环境等进行互动,可以极大地加强这些学科的学习体验和效果。特别是对一些日常生活中无法感知的微观世界和宏观世界的知识的学习，比如有关微生物或者天体物理学的知识。

Labster 是一家 2012 年成立于丹麦的科技初创公司，主要是与高等教育机构合作通过虚拟实验室帮助 STEM 专业的学生学习成为生物、化学和物理等学科的科学家所需要的核心实验技能。根据其官网数据[1]，其合作院校目前已达到 150 余家，分布在全球各地。其中包括麻省理工学院、哈佛医学院、伦敦帝国学院和香港大学。Labster 目前提供 68 种模拟实验，并通过情节化游戏化的挑战促进学生的参与，涉及课题包括细胞培养、基因表达与调控、腐蚀性化学品的处理、蛋白结构合成和共焦显微镜的使用等等。下面是 Labster 开发的虚拟实验室的两张图片。

[1] https://www.labster.com/

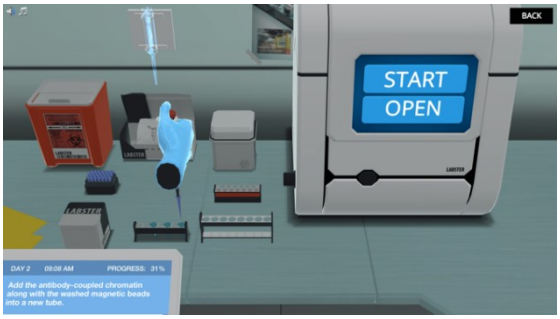

图 13. 基因工程实验
来源：goo.gl/bmmNRA

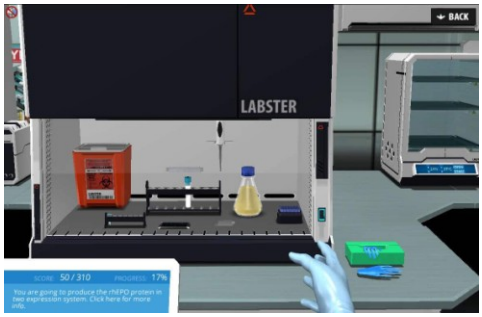

图 14. 蛋白质合成实验
来源：goo.gl/oT2xww

zSpace 则是一家 2007 年成立于硅谷的公司，从底层的硬件和技术出发，逐步形成了一整套利用 VR 进行教学的解决方案，主要服务于中小学校 STEM 学科的教育。其核心产品由一台独立电脑和高保真 VR 显示器组成，并配有提供人机交互的触控笔，帮助学生操纵虚拟物体，加强学习体验。与 Oculus、HTC 的头戴设备不同，Z-Space 的眼镜是 3D 电影眼镜的升级版，佩戴较长时间也不会出现眩晕反应。其网站信息显示(zSpace, 2017)，目前 zSpace 开发的中小学教学内容包括欧几里德图形、代数几何、居里元素、牛顿力学公园、富兰克林实验室等等。据其官方网页显示[1]，截至 2016 年 4 月，zSpace 已经进入 4000 所美国普通中小学校，并在 2017 年 5 月成立了中国分公司，现也已进入京沪广深多家学校。

图 15. 小学生利用 zSpace 产品学习青蛙解剖结构
来源：goo.gl/QpDLPf

捷克的开发人员早在 2014 年就实施了一个名为“World of Comenius”的项目（Reede，2016），利用 Leap Motion 的手部跟踪技术和 Oculus Rift DK2 设备在捷克的公立学校进行互动式的生物内容教学。

(2) 医学和临床教学

虚拟现实技术已被用于医学院学生的人体解剖课教学和新手医生的手术培训。虚拟现实模拟学习是加州大学旧金山分校医学院 2016 年启动的“Bridges Curriculum”课程的一部分(Baker, 2017)。在该校解剖学助理教授 Derek Harmon 给医学院大一学生所上的解剖学课程中，学生可以在 VR 模拟系统中从人体模特身上取下每一层结构来仔细研究和学习：从表层皮肤到最深层的骨骼。虚拟现实界面可以让他们更好的

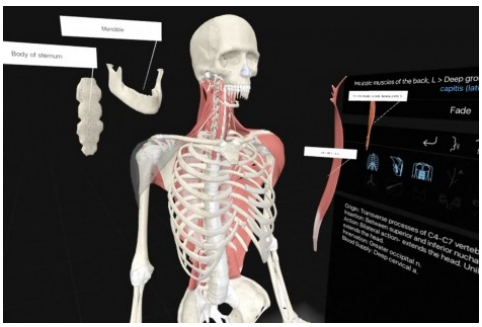

图 16. 利用 VR 教授解剖学
来源：goo.gl/Q8D7as

[1] http://zspace.asia/edu

理解皮肤、肌肉、器官、神经和血管之间的相互关系及相互作用。

Derek Harmon 表示，虚拟现实对学生来说是一种激动人心的学习方式，因为它非常有助于增强学生对身体结构的理解。对于这些未来医生来说，对人体结构越了解，未来的职业生涯发展就会越顺利。该校理疗和解剖学教授 Kimberly Topp 表示，虚拟现实还可以模拟一些真实的医疗体验，比如急诊医生可能会遇到的病人各种受伤的情况。而在传统的医学院本科阶段的教学中，很难模拟真实的经历，而虚拟现实让学生们在进入到实际临床环境之前就能有这些真实的体验，是非常有助于学生们记住复杂的解剖学知识的新方法(Baker, 2017)。

传统手术培训往往需要依赖昂贵的人造人体部件，而一些初创公司正在试图利用虚拟现实技术提供新的培训方式。据数字健康媒体 MobiHealthNews(2017)报道，波士顿的 Osso VR 公司开发的软件可以在 Oculus Rift / Touch 或 HTC Vive 等 VR 平台上创建虚拟手术室，医生可以在其中练习复杂手术和复杂医疗器械的操作。而位于芝加哥的 Level EX 公司则于 2016 年 10 月在苹果和安卓系统上推出了名为“Airway EX”的应用程序，这是由开发人员和医生共同根据实际手术录像设计的模拟训练系统。该软件专门为麻醉医生、耳鼻喉科医生、重症监护专家，急诊室医师和肺科医师而设计，为他们提供了基于真实病患案例进行虚拟气道手术的机会，这些虚拟气道手术细致到毛孔级别，并多达到 18 道程序。

图 17. 医生在 Osso VR 虚拟手术室中练习器械操作
来源：goo.gl/QLJE91

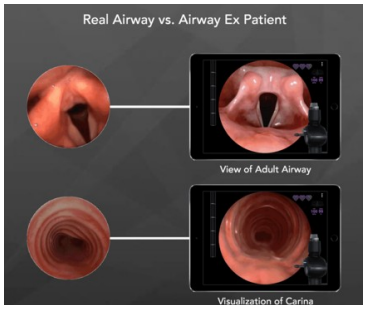

图 18. 真实气道和 Airway EX 中的气道对比图
来源：https://www.level-ex.com

此外，虚拟现实技术还被应用于以下教育相关领域：

(1) 特殊教育：波兰的 Silesian 科技大学和以色列海法大学分别都开发了 VR 学习系统，设计了不同的日常生活场景来对自闭症儿童进行治疗，他们可以在虚拟场景中练习并学习生活常识，比如过马路、去超市购物等等（Reede，2016）；

(2) 建筑和工程教学：密苏里州的 Drury 大学已经开始采用虚拟现实设备进行建筑设计的教学（Walsh, 2017）。而笔者之一所在的圣母大学的工程学院也已采用 VR 进行有关污水处理的教学；

3）大学招生：美国一些高校已经利用 VR 技术吸引生源，提供虚拟校园参观，并同增强现实技术结合（Walsh, 2017）。比较受欢迎的此类平台包括 You Visit 和 Georama。

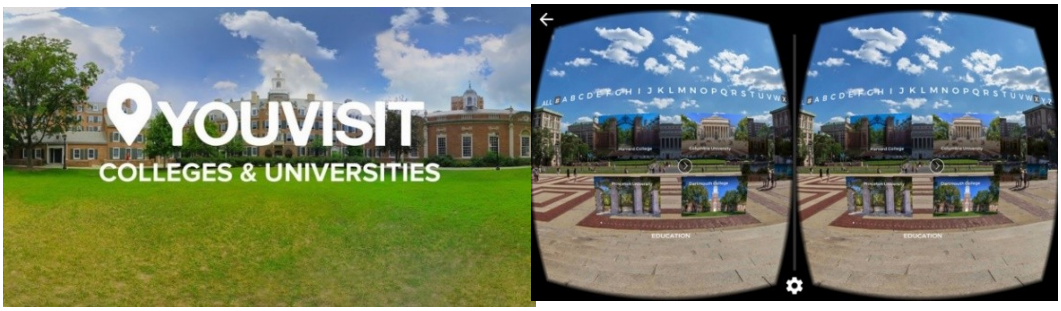

图 19 和图 20. You Visit 提供的 VR 校园参观体验
左图来源：goo.gl/MmYWkT　　右图来源：goo.gl/2QxEfB

4.2 虚拟现实技术在其他领域的应用

随着虚拟现实产业近年来的发展，VR 的应用领域已从早期的军事训练、医疗健康（如 PTSD 治疗）、游戏等传统 VR 应用领域迅速扩张到了教育、体育、影视娱乐、社交通讯、电子商务、工业制造、建筑与房地产、旅游、展览、博物馆等其他垂直领域。本文略去曝光度已经较高的 VR 游戏领域，下面就与大众日常生活密切相关的若干 VR 应用领域略作说明。

（1） 医疗保健

医疗保健是虚拟现实的传统应用领域，事实上（Meyerbröker，2010），VR 早已被证明有助于治疗疼痛、恐惧症(phobia)、创伤后应激障碍(PTSD)。美国著名数字健康媒体 MobiHealthNews 于 2017 年 6 月统计了虚拟现实技术在医疗行业应用的 15 个案例。其中包括痛疼管理、理疗、脑震荡评估、减压和看牙等。例如波士顿的 VR Physio 公司可以为患者提供可互动的沉浸式虚拟环境，帮助他们进行理疗。患者需要手持虚拟的一把剑击中目标，这项动作可以对他们进行肩膀运动的测试。同时，患者可以在游戏中通过头部运动来控制手中的虚拟水枪，以达到锻炼颈肩部的目的

图 21. VR Physio 公司利用 VR 游戏对患者进行理疗
来源：goo.gl/HDYJA

（2）影视娱乐

近年来好莱坞和中国各大影视企业也纷纷在进行 VR 产业布局，对 VR 影视内容、VR 主题公园等进行了开发。IMAX 于 2017 年初在洛杉矶开设了第一家 VR 中

心，随后又迅速在纽约、多伦多和上海等城市增设了 VR 中心，并在近期和华纳兄弟联手推出其最新影片《正义联盟》的 VR 体验（映维网, 2017a）。

著名导演李安近期也在媒体采访中透露将在自己 2018 年新片《双子煞星》的拍摄制作中采用 VR 技术（ 映维网, 2017b）。2018 年也是经典恐怖电影《活死人之夜》上映的 50 周年纪念，洛杉矶 VR 制作公司 Supersphery 正在通过虚拟现实对其进行重拍（映维网, 2017c) 。Oculus 已推出了世界上第一部 VR 动画短片 Lost[1]。

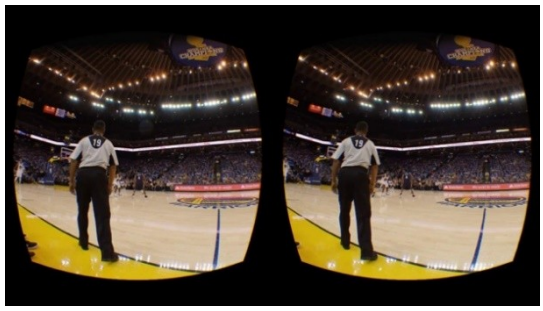

图 22. NBA 与 NextVR 合作推出的球赛直播
来源：goo.gl/97e5bd

尽管 VR 能带来观影时沉浸式的震撼体验，不过也有 VR 专业人士表示传统电影产业在过去百余年里形成的一套完整的语言体系和大众的观影习惯未必能被 VR 电影简简单单地超越（戴若犁，2016）。同时 VR 交互电影本身也面临着诸多技术、拍摄水平和市场的瓶颈和门槛，这些因素决定了 VR 电影在短期内不会成为主流。相反，不少专业人士认为 VR 直播或将成为 VR 视频实现收费化和盈利的最快突破口（戴若犁，2016）。原因在于直播内容的制作门槛较低，同时观众对直播的需求更为刚性。以明星演唱会、体育赛事、综艺节目为例，能到现场的观众毕竟是少数，一方面 VR 直播能提供现场感和沉浸感，另一方面，这些直播内容大多与明星相关，而庞大的明星粉丝群更容易转化为 VR 直播的用户。

(3) 社交通讯

VR 社交具有很多自身优势，一方面，与传统网络社交媒体以及视频通话相比，虚拟现实世界的临场感和沉浸感使用户在虚拟世界中的人际交流更加逼真，更容易吸引用户持续使用，其应用场景包括熟人之间的社交和异地亲人之间的联络等等；另一方面，同现实生活中的社交相比，VR 社交又能跨越时空，随时随地进入虚拟场景，同时虚拟化的人物、环境也有助于减轻社交焦虑和社交压力。此外，VR 社交的魅力还在于，在虚拟场景中，你可以同朋友一起创造真实生活中无法实现社交体验，例如亲子可以一同去海底世界“旅游”，历史爱好者们可以结伴去参观烧毁前的圆明园抑或是埃及金字塔的建造现场。

图 23. Facebook Spaces: Facebook 好友们在虚拟场景“Arctic Open”中一起聚会垂钓
来源：goo.gl/qwqayr

[1] https://www.oculus.com/story-studio/films/lost/

正是基于 VR 社交的这些优势，Facebook 非常重视打造的 VR 社交应用 Facebook Spaces。在 Facebook Spaces 中，用户不仅可以同好友在虚拟场景中聊天、玩预先开发的游戏，而且还可以自行进行 VR 活动的创作。Facebook 社交 VR 负责人 Rachel Franklin 在 OC4 上谈到，希望把那些互相关心、互相有联系的人带入虚拟现实中，并为他们提供有趣的活动、自行创造有意思的活动的工具。她表示 Facebook 正从以下三方面来实现这一目标：即创建更多吸引人的活动（engaging activities），提供更多的沉浸式媒介（immersive media），并连接虚拟世界和现实世界（connecting worlds）(Popper, 2017)。

目前较有影响的 VR 社交应用还包括 VR 社交先锋 Altspace(已被微软公司收购)、“第二人生”创始人 Philip Rosedale 重出“江湖”之作的 High Fidelity、由 HTC 领投的 VRChat、全球最大的电脑游戏发布平台 Steam 推出的 SteamVR Home，此外还有 Rec Room(微软 HoloLens 项目前任经理为联合创始人)、VTime 等等。

(4) 电子商务

VR 购物技术利用虚拟现实技术生成具有交互性的虚拟三维购物环境，它对产品的展示兼顾了网购和实体店购物的优势，一方面，VR 购物跨越了时空限制，可以是消费者随时随地浏览、挑选各类商品；另一方面，立体展示和虚拟试穿试戴的体验又近似去实体店购物。

2016 年 7 月，淘宝在上海举办的“淘宝造物节”上首次展示了名为“Buy+”(中文谐音“败家”)的阿里 VR 购物技术，“Buy+”的宣传视频[1]在网络上获得了现象级的传播。宜家、亚马逊、京东等众多商家也陆续尝试 VR 广告和 VR 购物技术，不过目前该技术更多地还是起到了品牌宣传作用，离消费者实际应用尚需时日(Ghoshal, 2017)。

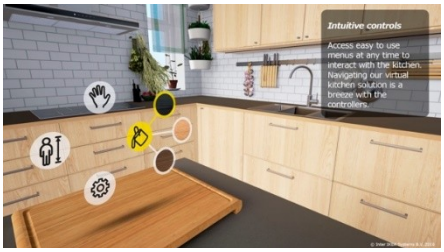

图 24. 宜家推出的 VR 购物体验
来源：goo.gl/96cvDh

著名公关公司 Walker Sands 的零售调查报告显示，过半的受访者（55%）认为，VR 购物技术会影响他们的购物决定，而 35% 的消费者更是表示，若 VR 网购技术能提供可靠的虚拟试穿试戴功能，他们将会网购更多的物品(Walker Sands Communications, 2016) 。此外，很多公司也正在尝试利用虚拟现实技术为购房购车的客户提供足不出户就能身临其境地进行网上看房、看车，全方位地展示房屋或者车辆的结构、设计、布局、性能等特征。

[1] http://v.youku.com/v_show/id_XMTUxODc0NzE2MA==.html

5. 虚拟现实技术在语言教学中的应用

5.1 虚拟现实技术在语言教学中的应用方式及实例

目前虚拟现实技术可以通过两条路径应用于语言教学领域：一是基于全景相机(输入端)和 VR 头戴式显示设备（输出端）构建的“虚拟现实课堂”，通过录播或者直播向远程端学习者全方位地展示教学现场的实景；二是通过 3D 建模或者全景相机拍摄来制作的语言学习产品。

5.1.1 虚拟现实课堂

本文第三作者提出应构建基于全景相机的汉语“虚拟现实课堂”，并进行了初步的尝试。其基于全景相机的虚拟现实课堂分为教学现场端和远程学生端两个部分。使用的主要设备包括：全景相机、VR 眼镜、iPhone、iPad、笔记本电脑，录播和直播使用的设备略有区别。录播状态下，只需在教学现场端设置一台全景相机，将教学现场以全景视频记录下来，通过网络传输到远程学生端，学生使用一台安装了 VR 视频播放器的手机，搭配虚拟现实眼镜进行播放，即可获得沉浸式的学习感受。直播状态下，为了实现教学现场端和远程学生端的互动，应在全景录播设备基础上，增加一台 iPad（教学现场）和一台笔记本电脑（远程学生），用于语音交互和帮助教学现场获得远程学生的图像。直播时教学现场端和远程学生端的设备使用情况如下图所示：

图 25.和**图 26.** 教学现场端的设备使用情景

在全景录播和直播中，远程学生端可通过佩带 VR 眼镜获得坐在教学现场特定位置(全景相机安置点)的全景感受，并通过自由转动脖子获得教学现场任意方向的交互式图像，通过佩戴耳机可获得现场的立体声效。

图 27. 远程学生端的设备

在测试过程中发现，从教师的角度来看，基于全景相机搭建的虚拟现实课堂硬件要求不高，搭建成本较低，搭建完成后，多增加学生的边际成本为几乎为零；从远程学生的角度来看，新购置硬件设备成本很低，沉浸式教学感受强烈，视角仿佛坐在现场教室中间位置，相比一般线上教学，注意力能得到更长时间的保持。不足之处主要在于：VR 眼镜

搭配手机会有一定的“纱窗感”，长时间佩带 VR 眼镜，眼睛会有一定程度的疲劳感；网络延迟影响互动效果，延迟最高时曾达到 3 分钟。

由于虚拟场景制作门槛和之前的虚拟现实硬件成本都比较高，虚拟现实技术在教学中的应用难以得到推广。但是随着技术发展，特别是近两年消费级的全景相机被大规模推向市场，为虚拟现实技术在汉语课堂的广泛应用提供了可能。随着虚拟现实直播技术的发展和互动效果的不断增强，全景直播教学应当会获得越来越多的应用。

5.1.2 基于虚拟现实技术的语言学习产品

目前 VR 语言学习产品的开发途径主要有两种。第一种方式是制造和利用全景视频。虽然有些 VR 纯粹主义者(VR purists)认为全景视频不是真正的虚拟现实(Lloyd 等人,2017)，因为用户只能被动地观看预设好的情节和场景，然而全景视频在制作成本和制作难度方面则远远胜过利用 Unity 等平台搭建 3D 虚拟环境。其中比较有代表性的是上文中提到的谷歌应用“实境教学(Google Expeditions)”，它可以为外语学习者提供了很好的目的国文化体验。在手机上下载“实境教学(Expeditions)”应用后，教师可以把课堂变成一次虚拟“海外学习”，并且可以将自己设置成导游模式，带领学生在各自的 VR 眼镜中探索国外旅游和文化景点。下表就目前（2017 年 12 月）“实境教学(Expeditions)”中部分有关中国的内容进行了整理。

表 2. 实境教学(Expeditions)中部分有关中国城市和中国文化的教学内容

名称	主题	开发者	场景数	场景举例
The Great Wall of China	名胜古迹	AirPano	4	长城塔楼、司马台长城、古北口长城
Beijing	城市景点	AirPano	9	紫禁城、天安门、天坛、颐和园、北海公园、银河 SOHO(北京新地标)
Shanghai	城市景点	AirPano	6	上海外滩、陆家嘴、上海国际博览中心等
The Art of Yangzhou	城市文化	Google	5	汉广陵王墓、剪纸博物馆、个园竹林、个园假山、何园
Guilin, China	自然风光	AirPano	5	桂林山林、喀斯特地形、漓江、阳朔旧城、桂林的塔
Festivals Around the World	节日文化	Vida System	5	中国春节、印度排灯节(Diwali)、墨西哥亡灵节(Day of the Dead)等

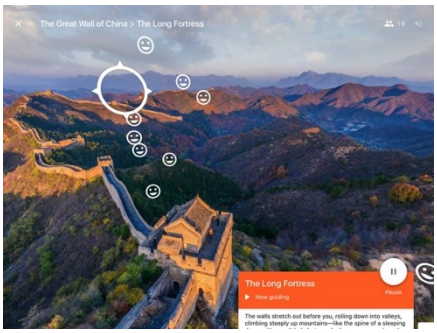

图 28 和图 29. Google“实境教学(Expeditions)”中的长城场景和春节场景

第二种方式需要通过 3D 编辑工具和 3D 引擎来编辑和加载虚拟现实语言游戏，目前最流行的两大 VR 游戏开发平台是 Unity 和 Unreal，它们都对开发者有较高的专业要求。而 Minecraft（一款译名为“我的世界”的沙盒游戏，2016 年推出了虚拟现实版）的游戏平台则允许非专业人士对游戏内容进行改编，但是可改编的程度有限，很难适应语言教学需要(Lloyd 等人,2017)。Google 第一代的 Cardboard 平台和第二代的 Daydream 平台对虚拟现实的定义更为宽松，为第三方开发者提供了更多样化的开源工具来开 Learn Immersive 中的学习场景发手机 VR 应用。下面就基于这种 3D 建模方式的三款 VR 语言学习应用进行介绍和评价：

第一款产品是 Tony Diepenbrock 通过众筹的方式于 2015 年在旧金山推出了名为“Learn Immersive”的 VR 语言学习系统，目的语为法语，可以对某些主题的词汇进行学习，同时该系统提供的模版可以允许语言教师对软件中的提示信息进行编辑。总体而言，Learn Immersive 系统的开发并不算成功，其场景数量和语言学习内容非常有限，学习方式也基本上以理解性为主(interpretive)，最后该系统的开发由于资金原因已停止，不过，Learn Immersive 的开发仍不失为一次具有开拓性的尝试。下面是 Learn Immersive 中学习场景的两个截图。


图 30.（左图）为欢迎界面 **图 31.**（右图）在餐厅学习有关词汇)

第二款要介绍的产品由美国的游戏开发工作室 Fox3D 于 2015 年推出，是基于移动端 Gear VR 平台的 VR 语言学习软件“House of Languages”，可以在三星 Gear VR 和 Oculus 的软件商店里下载(Oculus, 2017)，目前可供学习的目的语包括英语、法语、德语、西班牙语和俄语五种。

图 32. House of Languages 中的卡通角色　来源：goo.gl/4JaNFj

该 VR 学习软件为单人线下游戏，学习内容为十余种场景(例如学校、居所、机场、动物园等)中的

常用词汇，学习模式也是以理解性(interpretive)为主，包括对虚拟场景中物品名称的视、听输入，以及猜词义的测验(听词后利用 VR 设备选择场景中的正确物品)，同时也提供了简单的口头输入功能，例如允许用户重复物品名称。

图 33. 学习者听词汇发音选对物品后的效果图　　来源：goo.gl/R3G5qf

图 34 和**图 35.** House of Languages 中的不同场景
图 34(左)为动物园，来源：goo.gl/hF4Xo1
图 34（右）为医院，来源：goo.gl/ftsGo2)

第三款介绍的产品由 ATi Studios 开发，这是一家位于罗马尼亚专门开发语言学习手机应用的公司，成立于 2013 年。2017 年 2 月该公司利用之前开发外语学习类手机应用的优势并整合虚拟现实技术，推出了基于 Gear VR 平台的应用 Mondly VR，2017 年 9 月又拓展到了 Google Cardboard 和 Daydream 平台。

笔者认为，这是目前推出的 VR 语言学习软件中功能最为完备的一款，目前支持 30 种语言的学习（包括中文）。此外，其学习模式不仅包括理解性的听和读，还利用语音识别技术提供了练习口语的功能。更为可贵的是，其学习内容不局限于主题词汇，而是真实语境中的对话练习，例如火车认识新朋友、在宾馆前台登记、打车等等应用场景。总体而言，Mondly VR 的功能、用户体验和学习效果是目前 VR 语言学习产品中的佼佼者，这得益于 ATi Studios 公司之前在开发 Mondly 系列外语学习软件的积累，Mondly 系列手机应用(主要是非 VR 的外语学习应用)曾获得 Facebook 发布的 2017 年“App of the Year”奖。但是于囿于目前 VR 技术水平，特别是交互性，其基于语音识别的对话练习功能的流畅度还急需提高。

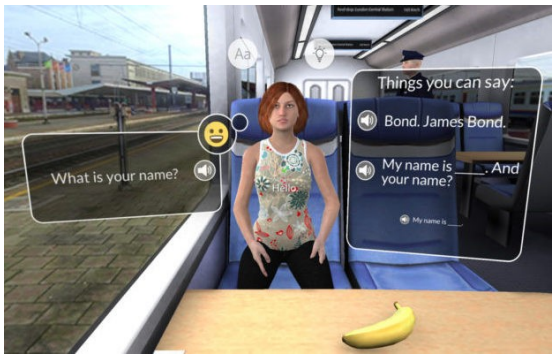

图 36 和**图 37.** Mondly VR 中场景化的对话练习
图 36（左图）场景为火车上认识新朋友；图 37（右图）为在饭馆点饮料

练习时，学习者可以选择只是听虚拟人物说话，还可以选择同时显示他们的台词的文本；在回答时，画面会显示文字和录音提示，学习者说话后经过语音识别，系统会予以反馈，并进入后续情节。

5.2 在语言教学中应用虚拟现实技术的优势、挑战与展望

5.2.1 在语言教学中应用虚拟现实技术的优势

Dalgarno 和 Lee 在 2010 曾提出了虚拟环境在教学中的几大优势（他们使用了“功能可实现性”，即“affordance”一词），虽然他们当时所谈的优势是针对虚拟环境(例如“第二人生”游戏)，但是其中一些优势同样也适用于虚拟现实技术，而 VR 技术所提供的交互性、感官沉浸式学习体验甚至可以在虚拟环境技术的基础上进一步强化这些优势。

（1）现实世界中无法实施的任务：在第二语言教学中受制于有限的课堂时间和班级规模，学生在课堂上能获得当众演讲训练的机会往往很有限，而通过虚拟现实技术则可以让每个学生获得更多的当众演讲的机会(Lloyd 等人,2017)。此外，以 Google Expeditions(实境教学)为代表的虚拟“实地考察”也可以使第二语言学习者不用出国就能感受到目的语国家文化景点的魅力，可以在传统的语言学习方式之外补充丰富多彩的体验。

（2）提升学习动机与参与度：Benjamin Chang 等人(2012)指出高保真的视觉模拟效果、故事情节引人入胜的游戏化设计，以及与虚拟环境之间的互动性均可加强二语学习者的学习动机和参与度。

（3）在有效合作中学习：VR 技术同样也为合作性的语言学习任务提供了很好的设计平台，例如不同学习者可以在 VR 游戏中通过语言交流共同完成一项游戏任务。

（4）在语境中学习语言：跟传统的课堂教学方式比，虚拟现实技术可以模拟典型的语言应用情景，无疑可以让学习者更好在典型语境中练习、习得 L2 语言能力，特别是语用层面的语言能力。

Taguchi（2015）指出，虽然已有大量研究设计了各种教学方法和学习任务来教授 L2 的语用知识，但是效果甚微。究其原因，主要在于以下三个方面：一是提供语用输入(pragmatic input, 包括 pragmalinguistic forms 和 contextual factors)的方式囿于书面或者录音的对话，与真实语境的呈现方式相去甚远；二是由于采用了显性的元语用解释方式(explicit metapragmatic explanations)，教学系统缺乏互动性，L2 学习者不能基于自己的语用选择来对输出的语言进行及时反思和调整；三是前两个原因所导致的学生缺乏能动性(learner agency)。在很多教学设计中，学习者变成了完完全全的观察者，而不是第一视角的对话参与者。针对上述问题，Taguchi 和她的合作者（2017）进行了开创性的改进，利用电脑辅助系统来让汉语学习者学习一些特定场景中的汉语习惯表达方式。他们对在上海拍摄的母语者真实对话视频进行

了加工处理，剔除了其中目标角色的语音，以便让学习者在练习时可以根据前一角色所说的话，在电脑上选取与语境最契合的汉语表达方式。该研究中学习者的学习测试结果和反馈数据均表明了该方法在利用语境教授汉语习惯表达方式上的有效性，但同时实验参与者也在反馈中指出了沉浸感不足的问题，特别是练习式的操作形式(多项选择和填空)和有限的互动性。笔者认为，随着虚拟现实技术的发展，特别是交互性的加强，VR 技术恰恰可以很好地帮助克服上述沉浸感和互动性不足的问题，成为 L2“语用”研究和教学的利器。

除了上述四点优势以外， 基于虚拟现实技术的语言学习还有助于培养 L2 学习者的自信，特别是帮助一些学习者克服社交焦虑问题。Qu 和其合作者(2015)通过实验考察了基于 VR 技术的虚拟英文课堂中，虚拟的“旁观者(bystanders)”的行为对被试的学习信念、自我效能和焦虑感的影响，结果发现，虚拟观众的正向反馈提升了被试学习者的自我效能感。由此可见，在虚拟现实课堂中虚拟听众反馈的可操纵性也许可以为一些易焦虑型的学习者提供了克服焦虑、培养自信的便利。

5.2.2 在语言教学中应用虚拟现实技术的挑战与展望

如上所述，虚拟现实技术的沉浸感、交互性使其在语言教学中的应用具有巨大的潜力，但是目前 VR 在语言教学中应用的广度和深度都很有限，这主要是受制于以下几个因素。一是 VR 设备目前普及范围有限，专业的主机端 VR 设备造价昂贵，便携性又较差，需要用数据线连接电脑主机；而价格低廉便于携带的手机 VR 设备的用户体验和功能又大打折扣。二是使用 VR 时的眩晕等健康问题还有待克服，很多 VR 头显(HMD)设备厂商在使用说明中也明确提到不允许幼童使用并建议每次配戴使用时间不宜过长。三是 VR 在应用于语言教学时虚拟场景中的图像保真度和交互水平还亟待提高，例如上述语言学习应用中的人物或卡通形象的逼真度特别是动态表情还差强人意，其中比较出色的也是唯一提供对话练习功能的应用 Mondly VR 的对话练习功能也被饱受用户诟病，很多购买者在应用商店的评价区留言称该软件时常对语音输入无法做出任何反应。Mori（2012）和 Banos（1999）分别强调了在虚拟游戏中，虚拟人物的逼真度和人机互动性对用户接受虚拟人物度的程度和用户体验的重要影响，显然目前的 VR 语言学习体验的逼真度还并不能令人满意，然而这一问题的改进还需要依赖虚拟现实整体行业水平的提升，这无疑尚需时日。

根据 VR 技术现状与发展趋势，笔者认为，在未来一段时间，VR 技术在语言学习上的应用将呈多元化发展，一方面从长期来看，利用 Unity 平台 3D 建模开发的应用，例如 Mondly VR，会随着整体行业水平的提升而不断加强虚拟环境的逼真度和互动性，使得在虚拟现实中的语言练习逐渐更臻于真实体验，同时高端 VR 设备价格也会逐步下降；另一方面，在短期内，基于全景相机的 VR 技术应用，例如教学现场的全景直播和虚拟“实地考察”(如谷歌“实境教学”)，因其成本和技术门槛更低，可能会更快更早地在语言教学中普及开来。

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汉语中介语口语语料库建设的现状与任务[1]
(Constructing Spoken Corpora of L2 Chinese Learners: Where We Are and What Needs to Be Done)

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摘要：与书面语语料库建设的蓬勃发展相比，汉语中介语口语语料库的建设相对滞后，制约着基于语料库的口语教学与习得研究的发展。目前，急需对口语库建设进行研究，解决对口语库的认识问题、语料收集与标注问题。本文简要讨论了汉语中介语口语语料库研究相对滞后的原因，并介绍了汉语中介语口语语料库需要标注的内容和标注方法。希望我们的介绍能有助于今后更多的研究出现。

Abstract: The construction of Chinese interlanguage spoken corpus lags behind similar efforts in Chinese written corpus, which constrains the research on spoken corpus-based Chinese language acquisition and teaching. At present, there is an urgent need to study the construction of Chinese interlanguage spoken corpus, focusing on issues such as the understanding of the basics of such spoken corpus, materials collection, and corpus annotation. In this paper, we briefly discuss the reasons for less research efforts on the construction of Chinese interlanguage spoken corpora. We also introduce the content, scope, and annotation of Chinese interlanguage spoken corpus, with the hope that our introduction will help promote more research in this field in the future.

关键词：汉语中介语语料库，口语语料库，语料收集，语料标注

Keywords: Chinese interlanguage corpus, spoken corpus, corpus collection, corpus annotation

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1. 引言

基于汉语中介语[1]语料库的对外汉语教学研究于上世纪90年代中期发轫，20余年来得到迅速发展，取得了众多的研究成果。仅以“HSK动态作文语料库”为例，在中国知网（CNKI）中进行查询，已发表各类论文3029篇（截至2017年12月15日）。其年度发文数量见下面图1。

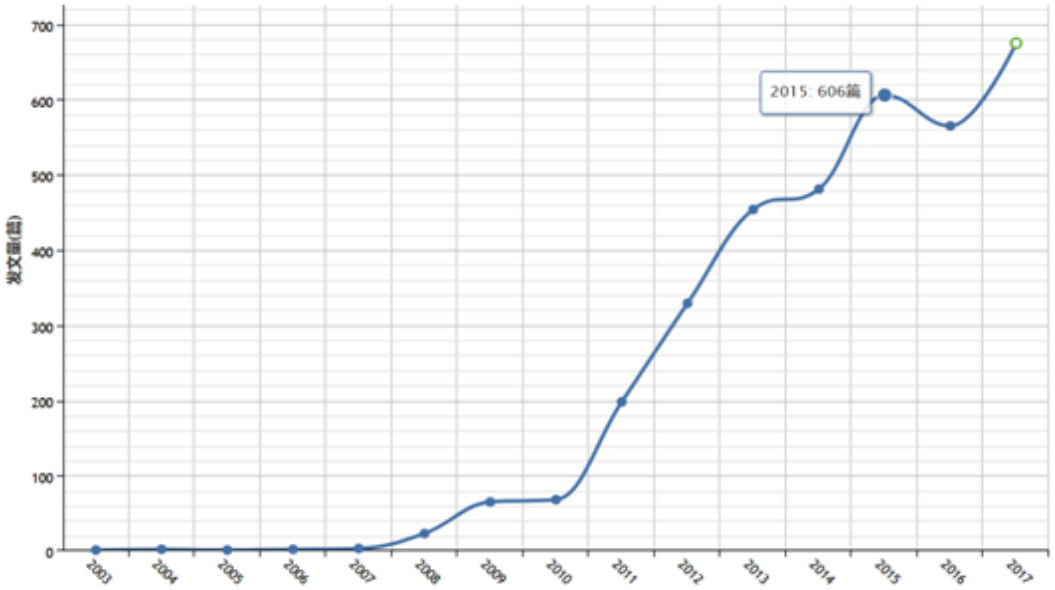

图1. 年度发文数量统计分析图（单位：篇）

图1显示，年度发文量增长的重大拐点出现于2011年，当年发文量达到198篇。此后，每年产出的论文达数百篇，从329篇、454篇、481篇、606篇、565篇，直到2017年的675篇，除2016年略有下降，年度发文量均创新高。而基于语料库的研究带来的另一变化，是促进了汉语习得研究范式的转变，即从小规模、经验型、思辨性研究逐渐发展为基于大规模真实语料的、定量分析与定性分析相结合的实证性研究，使研究结论具有了较强的客观性、稳定性和普遍意义。

由此可见，汉语中介语语料库在对外汉语教学研究中确实发挥了重大作用。而基于语料库的汉语偏误分析与习得研究的不断发展，又极大地促进了汉语中介语语料库的建设：从上世纪90年代北京语言大学“汉语中介语语料库系统”的一枝独秀，到本世纪前10年北京语言大学“HSK动态作文语料库”、中山大学“留学生中介语语料库”、和南京师范大学“外国学生汉语中介语偏误信息语料库”等多个语料库并存，直至今天各种中介语语料库的蓬勃发展[2]，十分鲜明地勾勒出汉语中介语语料库的发展轨迹。

[1] 中介语指二语学习者产出的目的语，汉语中介语语料库所收集的是把汉语作为第二语言的学习者产出的汉语语料。

[2] 关于汉语中介语语料库建设的目前进展情况，可参见林新年, 肖奚强和张宝林(2016)。

然而，这种语料库建设与基于语料库的研究蓬勃发展的繁荣局面仅限于书面语语料库，口语语料库则少之又少，仅有“汉语学习者口语语料库”[1]、留学生中介语语料库之口语语料库[2]、小型外国学生口语中介语语料库[3]。其中开放的口语库曾有暨南大学华文学院的语料库。

与口语库建设缺乏的现实情况相对应，基于口语库的汉语口语中介语研究同样很少；对口语语料库建设的研究也不多。我们看到的仅有杨翼、李绍林、郭颖雯和田清源（2006）、陆庆和和陶家骏（2011）、刘运同（2013，2016）、刘喆（2013）、李航（2013）、周宝芯（2013）、张蕾（2016）、方淑华、陈庆华、杨惠媚和陈浩然（2016）等。

杨翼等（2006）认为，在对外汉语教学界，有关口语习得和口语测试的研究，在数量和质量上，都处于令人遗憾的状态。大多数研究方法依然是经验型的，仅靠例举少量零散的口耳直觉语料或一次性小规模抽样，得到的是不够系统的、缺乏说服力的定性结果。因此，建立具有一定规模的汉语学习者口语语料库就显得十分必要和迫切。

我们认为，这种评价是非常中肯的，从今天口语库的建设与应用情况看，仍有其现实意义。口语语料库建设已经成为汉语中介语语料库建设的瓶颈，严重制约着语料库建设水平的提高，并影响到对外汉语教学效率与水平的提升。口语库建设在汉语中介语语料库建设中有着独到的价值，在对外汉语教学研究中具有特殊的作用。因此，值得充分注意，深入研究。

2. 口语语料库的作用与价值

2.1 解决口笔语语料库建设的“倒挂”问题，为口语习得研究奠定坚实基础

在人们的日常交往中，口语[4]始终占据主导地位，是使用最方便、使用频率最高、使用范围最广、因而最重要的交流方式。而书面语[5]虽然可以打破时空限制，却仍然是使用受限、使用频率相对较低、使用范围相对较窄、因而较为次要的交流方式。在目的语环境中学习汉语的外国学习者，不论是在汉语学习中还是在日常生活中，不论是在汉语学习的课堂上还是下课之后，其使用汉语口语的几率同样远远高于书面语。然而，不论是以往传统的对外汉语教学研究，还是上世纪80年代中期以来的汉语中介语研究，都是重书面语，轻口语，并直接影响到汉语中介语语料库

[1] 见杨翼等，2006。
[2] 暨南大学华文学院建设的语料库曾在 http://www.globalhuayu.com/corpus3/Search.aspx 开放。目前该网址已失效。
[3] 见陆庆和和陶家骏，2011。
[4] 这里所谓口语仅指自主口头交流形式，包括独白和对话。所谓自主，指自发产出的言语材料，即不包括对书写材料的朗读。
[5] 这里所谓书面语仅指自主书写出来的言语材料，包括作文、日记、邮件、微博、便条等。所谓自主，指自发产出的言语材料，而不包括抄写的材料。

的建设，书面语库相对较多，口语库则极为少见。在口笔语的实际使用和语料库建设与相关的应用研究之间，存在着十分严重的“倒挂”现象。这是非常不正常的，也是十分不应该的。这种“倒挂”意味着以往学界的众多研究所关注的只是学习者使用目的语的次要部分，即书面语；而忽略了其主要部分，亦即口语。倘能加强口语语料库的相关研究，推进其建设，则将为口语教学与口语习得研究奠定坚实基础，有助于解决口笔语语料库建设与应用研究的倒挂问题。

2.2 为口语习得研究及其与书面语习得的对比研究奠定基础，进而提升汉语中介语研究水平

在对汉语中介语口语语料库进行深入研究的基础上，建设大规模、高质量的口语语料库，首先可以为汉语口语的偏误分析与习得研究奠定坚实基础，通过基于口语语料库的中介语研究，加深我们对汉语口语中介语的认识，更好地把握其规律，为口语教学提供有益的参考。

另一方面，还可以将这种研究与已经取得众多研究成果的基于书面语语料库的相关研究相结合，进行对比分析，研究口语和书面语习得的相同点与不同点，认识二者在习得过程中的相互作用、相互影响与相互关系，全面掌握作为第二语言的汉语习得特征与规律，进而把汉语中介语的研究水平和对外汉语教学与研究的水平提升到新的高度。

2.3 为口语教学、教材编写等提供语料支持

口语语料库中的大规模真实语料，将提供语音、词汇、短语、句子、语篇、语体、语义、语用、修辞等各语言层面的各类偏误与正确的语言表现，经研究可以揭示汉语中介语的全貌与典型的偏误类型。口语中介语的这些宝贵信息，将为口语教学和口语教材的编写提供典型的例句、句群与篇章，从而使口语教学与教材更有针对性，促进口语教学水平与教材编写水平的提高。以把字句为例，研究表明参加高等汉语水平考试写作考试的学习者把字句的偏误率并不高，虽然在一定程度上存在回避问题，但同时也存在与之相反的泛化问题，且与回避现象相差不到一个百分点。（张宝林，2010）那么，在口语中把字句的习得情况如何？应予考察。假如同样存在类似现象，那么在教学以及教材编写中再过分强调把字句难学及其回避问题，就纯属误导，很有可能会加重其泛化问题。

2.4 为口语测试研究提供参考

基于口语语料库的教学与习得研究，其成果将为口语测试提供重要参考与借鉴。例如研究表明，对于参加高等汉语水平考试写作考试的学习者来说，离合词的偏误率极低，甚至达到了可以忽略不计的程度。（张宝林，2011）假如学习者口语中也呈现出同样现象，也就没必要把离合词作为测试的重点，甚至无需将其作为语法点进行测试。

2.5 为语料库建设探索新经验

相对于书面语语料库的建设而言，汉语中介语口语库建设是一个全新的挑战，建设实践很少，相关的研究也很少，成熟的建设经验几乎为零。汉语中介语口语语料库究竟应该如何建设？例如在选取语料方面，是只选取独白语料，还是也选取二人对话语料，乃至三人以上的多人对话语料？多人对话语料如何辨识说话人的身份？如果无法分辨说话人与话语之间的对应关系，这种语料还有无价值？能否补救？采用什么方法补救？在标注方面，是只做语音标注，还是同时进行词汇、语法、语体、语义、语用等多层面语言现象的标注？是只对小规模语料做精细标注，还是对大规模语料做浅层标注？这些问题都需要进行深入研究并得出明确、可靠、可行的结论，并付诸建库实践，逐渐积累经验，掌握相关规律，推动口语语料库建设。

2.6 支持教学资源库的建设

除为课堂教学提供语料支持，以及用于数据驱动学习和翻转课堂的教学之外，语料库直接应用于教学的几率并不多。语料库为教学服务的主要方式是间接的，一是通过偏误分析与习得研究为老师们的教学工作提供参考；二是通过二次开发，在语料库基础上建设各种教学资源库，例如不同母语背景的学习者使用汉语的口语词和书面语词对照表、口语句式和书面语句式对照表、所使用到的语法点、项的语法项目表、口语话题表，研发词汇、语法（含词法、句法、篇章语法）、语音（含声、韵、调、停顿、重音、轻声、儿化）、辞格、标点符号、语体、语义、语用的偏误信息库（包括偏误类型与数据、习得顺序、偏误原因、教学建议等）。这些教学资源库均需在语料库基础上进行建设，建成后可以为教师备课提供极大方便，提高教学的针对性和教学效率，对汉语教学具有重大意义（张宝林， 2016a）。

3. 口语语料库建设滞后的原因与影响

3.1 原因

如上文所述，口语库在对外汉语教学与汉语中介语研究中具有十分重要的意义与价值。然而，其建设情况却远远落后于书面语库，基于口语库的相关研究也同样滞后于基于书面语库的相关研究，其原因究竟何在呢？

我们认为，主要有如下几点：

（1）语料获取难

a. 语料内容过于单一

从语料内容的角度看，目前收集到的语料中，与教学、测试相关的语料较多，较易收集。前者如教学实况的录音、录像，后者如高等汉语水平考试（HSK高等）

中的独白、C.TEST[1]考试中考生与主考官的对话，成绩考试中的独白与师生对话等。而学习者的自然交谈语料很少，谈论学习之外内容的语料很少。这固然与在校生以学习为主的校园生活内容有一定关系，但如果安排得当、引导得法，还是可以收集到学习者更多内容的口语语料的。

不同国家和地区汉语学习者语料不均是老问题，在书面语库建设中已经普遍存在，并已受到学界较多关注，例如任海波（2010）、施春宏和张瑞朋（2013）等。在口语库建设中，此问题更加凸显。整体上看，仍然是东亚、东南亚国家学习者语料多，欧美国家学习者语料少，非洲、南美国家学习者语料更少。新问题是某些国家学习者样本数量太少，在这样的基础上，很难形成具有普遍意义的结论。例如欧洲一所大学可以通过网上辅导和语伴的形式提供其口语语料乃至视频语料，但只有寥寥数人，难以形成大规模真实语料，研究结论的普遍性依然难以保证。

b. 语料质量欠佳

所收录的部分口语语料声音不清晰，音量太小；多人谈话分不清说话人身份，难以分辨说话人和话语之间的对应关系。这些问题一方面是语料收集者对摄录设备操作不当或缺乏对语料用途的正确认识所造成的，另一方面也需要其他技术手段的支持。例如多人对话只是录音就不够了，还需要录像，收集视频语料。这也是建设多模态语料库的必要性之一。当然，视频语料除学习者的口语表达之外，还能提供表情与肢体动作等非言语信息，这对说话者话语内容的表达具有重要的辅助作用，这也是非常有研究价值的。

（2）语料转写难

为了对语料进行标注与检索，口语语料需要进行转写，这是口语语料与书面语语料的最大不同点。其转写准确率低，转写后的语料校对也不容易，而且费用昂贵。母语语料库建设即已因此受到制约，汉语中介语语料由于语音偏误的影响，其转写难度更为突出。

（3）标注规范缺乏研究

口语语料无需汉字标注，这是其简便之处；但增加了语音标注，而语音标注究竟应该标什么？怎么标？并无定论，都是有待研究的问题。例如正常停顿与非正常停顿的时间长度标准如何确定，即尚需研究。这是其繁难之处。此外，词语、句子、语体、话语、语义、语用等层面是否应该标注，观点不一，也需要进行研究。

（4）对口语库重要性的认识不足

[1] C.TEST 的全称是“实用汉语水平认定考试(Test of Practical Chinese)”，它是用来测试母语非汉语的外籍人士在国际环境下社会生活以及日常工作中实际运用汉语的能力，它的主要目的是考查应试者在商务、贸易、文化、教育等国际交流环境中使用汉语的熟练程度，对应试者的汉语实际应用能力给予权威的认定。可参见：http://www.c-test.org.cn/。

从语料库建设与应用研究的整体表现上看，目前学界止步于书面语库的建设与应用研究，对口语库的建设认识不足，重视不够，建设积极性不高。从更深的层次考虑，如果学界满足于书面语库的建设与应用研究的已有成果，因而故步自封，止步不前，那么必将使口语库的建设与研究减缓与停滞，难以推动相关研究的进一步发展，导致更为严重的后果。

3.2 影响

口语库建设的停滞不前，对学术发展已造成或将造成如下影响：

（1）对外国学习者的汉语口语表达状况与能力的研究缺乏足够的研究资料，难以形成具有普遍意义的研究结论，无法全面、准确地了解与把握学习者的口语习得状况；

（2）无法对学习者的汉语口语和书面语表达进行对比分析，无法对其口笔语表达特征进行研究并得到准确的认识；

（3）无法在前述研究的基础上，深入了解与认识学习者汉语口语习得与书面语习得之间的相互作用、影响与关系，进而形成学习者口语习得与笔语习得相互促进的教学方法、体系与模式；

（4）影响汉语中介语研究、汉语作为第二语言的习得研究、汉语学习理论研究的发展，严重影响汉语教学水平与效率的提高。

因为这些或可能的影响，所以我们需要开展并大力推进口语库建设的相关研究，积极探索，切实推动口语语料库的建设。

4. 口语语料库的标注内容

4.1 口语语料的特点及影响

相比于书面语语料，口语语料的最大特点是其有声性。这决定了在标注内容方面，口语语料应增加语音标注。因为口语语料本身无文字表述，为了研究与标注而进行的转写由母语者承担，因而无需进行文字标注。而为了了解学习者口语在词汇、语法、语体、语义、语用等方面的具体运用与表现情况，为了检索与研究的方便，皆需进行标注，这和书面语语料是完全相同的。

4.2 语音标注策略

（1）单一标注与综合标注

有研究依据口语语料的有声性特点主张对口语语料只做语音标注，而不做其他

语言层面的标注。我们认为这种认识是非常片面的。有声性固然是口语语料的重要属性，但并非其唯一属性；我们固然关注学习者的汉语语音状况，但也关注其在词汇、语法、语体等方面的实际表现，关注其口语习得的全面情况。为此，就不能只做语音标注，还须进行全面的综合性的语言标注。必须明确认识到，口语语料库并不等于语音语料库，不能像语音语料库那样只做语音层面的单一标注，而要对中介语口语语料进行多层面的综合标注。

（2）深层标注与浅层标注

从为教学与研究提供更多帮助的角度来看，标注的内容越多、层次越深、越细，可能越有价值。例如语音标注应该把停顿的时长多少算非正常停顿、声调偏误是第几声的偏误乃至应该用第几声、声韵母的具体使用情况都标注出来。我们曾经是这样认为的，也是这样做的。然而姑且不论标注的正确性与一致性问题，即以语料库使用者的研究需求而言，真的需要做这样深入细致的标注吗？如果使用者所采用的语言知识系统与标注所依据的系统不一样怎么办？如果使用者不认同、不相信标注结果怎么办？倘真如此，所做的全部标注不仅失去了应有的价值，甚至反而成为了使用者使用语料库的障碍，这就完全背离了人们建设语料库的初衷了。

也许，“不替用户做判断”是最明智的选择。语料库的建设者只要标出在母语者看来有问题的停顿、声调、声母、韵母等即可，至于算不算偏误、停顿多长时间算不正常停顿、声韵调等为什么不对、应该用哪个声母、韵母、声调等，皆无需标注，因为这些恰恰是语料库的使用者需要研究与解决的问题，无需建设者代劳。

4.3 语料标注的全面性

建设语料库的根本目的是为对外汉语教学及其相关研究服务。从学习者角度看，在汉语学习过程中，在语音、词汇、语法、语体、语义、语用等各个语言层面都可能出现偏误；从教学者角度看，教师和研究者们的关注点和研究兴趣是多方面的。因此，语料标注应包括语言的各个层面，便于教师和研究人员通过语料检索，查询并了解学习者汉语口头表达的各方面情况，并在此基础上进行相应的科学研究。

这就决定了中介语口语语料库的标注必然是一种全面标注，包括语音、词汇、短语、句子、语篇、语体、语义、语用、修辞格等。原则上能体现学习者口语特征的项目都应该进行标注。

语料库的功能只是为教师和研究人员提供检索语料的方便，而不是代替他们的研究工作，并不需要把所有的语言现象都研究清楚，提供彻底而清晰的分类结果。因此，语料标注又只能是一种浅层标注，即以便于检索为原则，能查询到所需要的语料即已达到目的。（张宝林，2016b）应尽量少标，避免任何画蛇添足的行为。例如标明某词存在声调偏误即可，至于应为第几声、误读成了第几声，皆无需标注。

5. 口语语料库的标注方法

5.1 相关理念

根据目前自然语言处理和中文信息处理的研究水平，语料标注想完全采用计算机自动标注的方式是不现实的，而只能采取以人工标注为主、计算机标注为辅的“人标机助”的方式。但摒弃传统而陈旧的人自为战的离线分包方式、采取互联网思维基础之上的“人机互助、人人互助”的在线众包方式则是完全可行的。这种方式不但可以提高语料标注的速度，而且可以改变标注模式，扩大标注的开放性与社会参与度，提高语料标注的正确性和一致性，提升标注的质量与效率。

5.2 标注工具

传统的手工标注方式及其采用的表示方法随意性很强，缺乏相应的理据。例如表示不正常停顿，一般的不正常停顿用1个后单引号（’）表示，严重的用2个后单引号（’）表示，最严重的用3个后单引号（’）表示。停顿正常与否母语者是可以凭语感加以判断的，但其时间长度多长算一般或严重的不正常停顿，则比较主观随意。单靠人工标注，不可能保证标注结果的客观一致性。

ELAN软件则非常直观，可以显示声波图、发音时长、停顿时间，可以显示国际音标以及视频图像等，还可以进行多层标注，十分适用于口语乃至视频语料的标注。而且可以更好地体现“不替用户做判断”的理念，软件客观显示了停顿时间的长度，算不算不正常停顿，算何种等级的不正常停顿，语料库建设者都无需过问，而由研究者自己去判断与论证。这也在一定程度上简化了建库程序，降低了口语库的建设难度。

6. 结语

口语库有其十分重要的作用、意义与价值，与书面语库相辅相成而不可互相替代。应充分认识口语库建设的重要性、必要性、紧迫性，积极开展口语库建设，更好地为对外汉语教学与相关研究服务。

毋庸讳言，口语库建设确实有其特殊性，存在诸多问题与难题，应通过多种方式，研究并解决相关问题，促进口语库建设。例如语料来源与分布问题，可以通过与不同国家的大学中文系、中文部、孔子学院等汉语教学单位进行国际合作，解决语料分布不均的问题。应尽快研制口语语料的收集标准，规定录音的音量、声道、制式等技术标准；研究并制定口语语料的标注规范，包括标注的目的、原则、内容、方法、工具、代码等，以便于相关实际工作的开展，确保工作质量与效率。对口语语料来说，语音和语体是其显著特点，对其标注规范的研究应给予充分的重视。

为了提高语料库建设的效率与水平，应开发基于网络的语料库建设平台，包括

语料收集与转写转录系统、语料标注与审查系统、语料库管理系统、语料检索系统等，使语料库建设更加便捷、高效。

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