

Original Paper

The Effects of Online Learning on Alleviating Students’ Chinese Language Learning Anxiety: A Study in a Chinese University

Chen Chen¹

¹ International College, Southwest University, Chongqing, China

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Abstract

This study aims at investigating the effects of online learning on alleviating international Chinese as a Second Language students’ foreign language anxiety. Participants of the study were 240 international students enrolled in a Chinese university, being divided into two groups. In-class Group remained their routine Chinese learning by following a traditional textbook-based approach, while Online Group employed computers and the Internet. Data collection were administrated via two questionnaires with all 240 participants, in-depth individual interviews with eight student participants and their reflective reports. This study found that online learning could relieve international students’ listening, speaking and writing anxiety, but increase students’ reading anxiety. The study also revealed the sources of students’ anxieties in Chinese learning in both contexts. Implications for the employment of the online approach in Chinese language learning and teaching for further development are made on the base of these findings. Recommendations for future studies are also provided.

Keywords

Chinese as a second language, foreign language anxiety, language skill-specific anxiety, online learning

1. Instructions

To echo the commencement of Belt and Road Initiative in 2013 and China’s pledge to continue the Reform and Opening-up policy in 2018, China’s higher education sector has attracted increasing number of international students across the world. To date, more than 500,000 international students are enrolled in different degree courses and short-term immersion programs in more than 820 China’s higher educational institutions (Ministry of Education of China, 2018). Learning and living in China,

international students have made some achievements, while they are also facing challenges in terms of their Chinese as a Second Language (CSL) affected by Foreign Language Anxiety (FLA) raised as a key issue (Wright, 2017).

FLA refers to “the feeling of tension and apprehension specifically associated with L2 contexts” (MacIntyre & Gardner, 1994). Four components of FLA concerning students’ language skills are identified, namely listening anxiety, speaking anxiety, reading anxiety and writing anxiety (Luo, 2018). A strong research track on general FLA and the four language skills has established over the last decades (Jee, 2018). Though no inclusive agreements have been made, it is generally recognized that FLA has a negative impact on learners’ skill build-up, thereby leading to possible communication apprehension, fear of negative evaluation and test anxiety in foreign language learning (Yan & Horwitz, 2008). These feelings may have negative impacts on international students’ language development, social and cultural adaption and academic success in Chinese universities (Liu, 2017).

Learning in a new online context, students’ perceptions are largely unexplored. Though several studies have been conducted to investigate the impacts of technology-supported learning on students’ learning anxiety, most focuses have been put on an English as a foreign language context (Daud, Daud, & Kassim, 2016). There are not many studies on anxiety contextualized in a foreign language learning context by taking the characteristics of Chinese language into consideration. Sources of international students’ anxiety in online Chinese learning have not been fully investigated from a student perspective either (Jee, 2018). To fill this research gap and to provide referential information for CSL education, the present study is conducted to examine the impacts of online learning approach on international students’ FLA from a student perspective. The twofold research questions addressed in the current study are:

- 1). What are the major sources of international students’ four-language skill-specific anxieties in Chinese language learning?
- 2). What are the effects of online learning on alleviating international students’ general FLA and Chinese language skill-specific anxieties?

2. Literature Reviews

Anxiety has been long studied as an impeding factor to foreign language learning by scholars, language teachers and learners since the introduction of the concept of FLA by Horwitz et al. in 1986. Given its impacts on foreign language learning, empirical studies have been conducted to examine FLA in terms of the four-language skill-specific anxieties.

Listening anxiety has been extensively studied with regard to foreign language learning in an online context: Rahimi and Soleymani (2015) noticed that the use of mobile learning could reduce EFL students’ listening anxiety and improve their listening comprehension; Kim (2018) also confirmed that by using mobile phones Korean EFL students had better experience of listening practice. Learning from these studies, one can assume that the technology-supported approach could effectively alleviate

students' listening anxiety. This has been further verified by a number of studies focusing on students' perceptions (Cheng & Chen, 2019; Hwang et al., 2017). However, all these studies have centered upon the listening anxiety in the learning of other languages than Chinese. Chinese language is of phonological difference from others, demanding students' different metalinguistic awareness in listening practice (Lai & Dilley, 2016). Whether students' employment of technologies could effectively relieve their listening anxiety in a Chinese learning context remains largely unexplored. In response to this question, the current study is contextualized in a CSL listening context.

As Luo (2014) has put, speaking is the most anxiety-provoking skill in foreign language learning. For this reason, speaking anxiety is one of the main motivators that stimulate extensive research on FLA in recent years. Studies across the world have been conducted to investigate foreign language learners' speaking anxiety: Liu and Jackson (2008) found that many Chinese EFL students felt anxious about speaking English in public; Çağatay (2015) confirmed that Turkish EFL students experienced a moderate level of speaking anxiety, particularly when communicating with a native speaker of English; Luo (2014) also found that Chinese as a foreign language students experienced speaking anxiety with their self-perceived linguistic abilities and the perceived difficulty of learning Chinese as significant predictors. With the introduction of online learning tools and digital resources, new ways of speaking practice, such as anonymous interaction and non-simultaneous oral interaction, have emerged together with digital resources covering more up-to-date topics. These may have changed students' experience of speaking Chinese, while not many previous studies have noticed.

Reading anxiety is believed to be related with scripts, writing systems and cultural elements of the language as the key factors (Saito, Garza, & Horwitz, 1999). Zhao et al. (2013) found a significant negative correlation between reading anxiety and reading performance for elementary and intermediate levels of CFL learners in the US; Joo and Damron (2015) noticed that reading anxiety usually occurred in an in-class context. Reading in a digital environment, as students may perceive that reading characters on the screen is different from reading hardcopy books (Myrberg & Wiberg, 2015), learners' experience may vary, and their reading anxiety may change accordingly as a result. This study focuses on these changes of learning in an online context in terms of reading anxiety.

Writing is claimed to cause more anxiety than other skill-based practice as writing is product-oriented, which is more demanding for foreign language learners (Tsui, 1996). Starting from this point, a wide range of studies have investigated learners' writing anxiety: Atay and Kurt (2006) used Cheng's (2004) scale to measure EFL students' writing anxiety in a university in Turkey, finding that anxious students usually had difficulties in producing ideas in writing; Altunkaya and Topuzkanamış (2018) went further. They employed web-based tools to help relieve Turkish as a foreign language learners' writing anxiety. Chinese language is of some linguistic characteristics, including the inconsistency of form-meaning association, strokes, radicals and the unique formation of Chinese characters (Chen et al., 2014). Writing in Chinese may be different from writing in other languages. Whether foreign language learners perceived a similar level of anxiety in writing practice is largely unclear. The present

study centers on a CSL context, exploring the effects of online learning on alleviating Chinese writing anxiety.

After the outbreak of COVID-19, students across the world have returned to home and attended learning via the Internet. A number of studies have noticed their online foreign language learning and focused on their anxieties caused by new learning context (e.g., Milutinovi & Savi, 2020; Oraif & Elyas, 2020; Toshmatov & Zoyirova, 2020). These studies mentioned that by learning online, foreign language students experienced an overall decrease in their anxieties, while for some learning situations, the level of anxieties was seen to increase. It can be said that online learning can be an effective way to alleviate foreign language students' anxieties.

These previous studies have provided insights of FLA and four-language skill-specific anxieties. Learning from them, it hypothesizes that anxiety exists among international students' language learning, while online approach could play a role on alleviating the anxiety. Contextualized in a Chinese language learning environment, this study, being illuminated by previous ones, focuses on investigating the effects of online learning on alleviating international students' FLA with regard to the four-language skill-specific anxieties from a student perspective.

3. Methodology

A total of 240 international students enrolled in a university in China participated in this study. All of them were non-native speakers or heritage speakers of Chinese. They attended Chinese courses via the Internet. All 240 participants were equally divided into two groups on the basis of their locations: one was In-class Group, and the other was Online Group. All participants were classified into the intermediate and advanced level group of Chinese language courses, and attended Modern/Advanced Chinese courses in-class or online for at least six hours per week. The core curriculum was the same for student in both groups.

The present study was conducted from May 2020 to July 2020, lasting for 12 weeks. A highly recognized online platform was employed to assist participants' learning in the online group. The platform was designed and developed by experienced Chinese language experts and teachers in the university for online Chinese learning and teaching. Traditional courses were presented in multimedia forms, including videos, audios, interactive texts, puzzles and scaffoldings, on the platform. Various online interactive learning activities, including group discussions, role-play, presentations and tutorials, were supported on the platform as well.

Descriptive data were collected via two questionnaires after students' 12-week learning. The general FLA questionnaire was developed from Horwitz et al.'s (1986) by taking Chinese language and Chinese language learning contexts into account. The language skill-specific anxiety questionnaire was adopted from previous studies and was revised regarding the in-class and online Chinese learning contexts (Cheng, 2004; Luo, 2011; Pae, 2013; Saito, Garza, & Horwitz, 1999). The questionnaires asked students about their perceptions of anxiety across five domains, including general FLA and

four-language skill-specific anxiety, namely listening anxiety, speaking anxiety, reading anxiety and writing anxiety. All items were surveyed by a 5-point Likert scale, with values ranging from 1 (strongly disagree) to 5 (strongly agree), so that a higher score indicated a higher level of FLA. The Statistical Package for Social Sciences (SPSS) was used for statistical analysis. Cronbach's alpha of the two questionnaires in this study was 0.88 and 0.82 respectively (see Appendix I).

Eight participants were invited to further investigation for their varied backgrounds and educational experiences on a voluntary basis. Participants were sampled from diverse academic areas. Table 1 shows the demographic information of the eight participants:

Table 1. Participants' Demographic Information

Participants (pseudonyms)	Gender	Age	Nationality	Learning Chinese	Staying in China	Other foreign language(s)
Zhao	Male	25	Thailand	7 years	3 years	English
Qian	Female	22	Vietnam	3 years	2 years	English
Sun	Female	18	America	5 years	4 years	N/A
Li	Male	33	Chad	5 years	1 year	N/A
Zhou	Female	19	Kazakhstan	4 years	2 years	English
Wu	Female	22	Guinea	6 years	2 years	N/A
Zheng	Male	19	France	2 years	10 months	English
Wang	Female	31	Egypt	7 years	7 years	English, French

Four students were from In-class Group (Zhao, Qian, Sun & Li), and the other four were from Online Group (Zhou, Wu, Zheng & Wang). Qualitative data were collected through reflective reports of their 12-week Chinese learning and in-depth interviews. The reports were designed to collect information on students' immediate reflections of learning anxieties. The individual interviews provided insight descriptions about their experience of anxiety in Chinese learning. The guiding questions were developed by referring to literature (Tóth, 2011; Zhang & Tsung, 2020), and were modified according to the results of questionnaires and students' reflective reports (see Appendix II). Each interview lasted for around 45 minutes. Interviews were performed face to face or online. All were tape- or video-recorded. Considering interviewees' backgrounds, Chinese mandarin was used for better communication. The transcriptions were translated by professionals, and were double-checked with all interviewees. A back-translation approach was also used to validate the information. Constant comparative analysis was used to identify emerging themes from students' responses to the interviews and their descriptions in the reflective reports.

4. Findings

Collected descriptive data were analyzed to examine the students' levels of FLA in the two Chinese language learning contexts. Data showed that students in Online Group suffered less general anxiety in Chinese learning than their peers in a traditional context ($M_1=3.47$, $M_2=3.11$). Students' four-language skill-specific anxieties were also different in the two groups. Students experienced more Listening Anxiety (LA), Speaking Anxiety (SA) and Writing Anxiety (WA) in a traditional learning context, while their anxiety in Reading practice (RA) was high in online learning:

Table 2. Descriptive Data of Participants' FLA and Language Skill-specific Anxiety

	In-class Group		Online Group	
	M_1	SD_1	M_2	SD_2
General FLA	3.47	0.71	3.11	0.80
LA	3.58	0.64	3.07	0.61
SA	3.69	0.91	3.30	0.77
RA	3.46	0.87	3.68	0.69
WA	3.61	0.95	3.13	0.71

A Pearson correlation was performed and found that in both groups, general FLA had positive correlation with all four-language skill-specific anxieties. In In-class Group, anxieties in aural-oral aspects of Chinese language learning (listening & speaking) displayed a higher correlation with general FLA than the other two subcategories. In Online Group, reading anxiety showed the highest correlation with general FLA. Table 3 and Table 4 show the details:

Table 3. Correlation Data in In-class Group

	General FLA	LA	SA	RA	WA
General FLA	1				
LA	0.747**	1			
SA	0.871**	0.839**	1		
RA	0.544**	0.561**	0.409**	1	
WA	0.719**	0.440**	0.641**	0.622**	1

**Correlation is significant at 0.01 (two-tailed).

Table 4. Correlation data in Online Group

	General FLA	LA	SA	RA	WA
General FLA	1				
LA	0.662**	1			
SA	0.646**	0.712**	1		
RA	0.851**	0.840**	0.419**	1	
WA	0.544**	0.498**	0.571**	0.692**	1

**Correlation is significant at 0.01 (two-tailed).

A multiple regression analysis was performed to examine to what extent the four-language skill-specific anxieties accounted for students' general FLA. Data in Table 5 showed that the four categories of anxieties explained 77% ($R_1^2=0.77$) and 84% ($R_2^2=0.84$) of the variances of general FLA in In-class Group and Online Group respectively. Among all four-language skill-specific anxieties, speaking anxiety was the strongest predictor ($\beta=0.611$) in in-class Chinese learning, followed by listening anxiety ($\beta=0.436$), while reading anxiety had the highest regression coefficient in an online context ($\beta=0.724$).

Table 5. Regression Data of both Groups on General FLA

	In-class Group			Online Group		
	β	<i>t</i> -statistic	<i>p</i> -value	β	<i>t</i> -statistic	<i>p</i> -value
LA	0.436	1.45	0.009	0.289	1.92	0.103
SA	0.611	7.91	0.000	0.513	6.03	0.002
RA	0.189	1.86	0.150	0.724	6.98	0.000
WA	0.340	2.84	0.105	0.450	5.40	0.122

Note. N = 240; dependent variable: General FLA; $R_1^2 = 0.77$; $R_2^2 = 0.84$.

Participants from both groups provided some in-depth descriptions of their experience with regard to the two different Chinese learning contexts. As reported by participants in In-class Group, the listening anxiety was one of the major concerns. The worries of making mistakes and misunderstanding in communication, others' negative feedback and a lack of learning support were three key reasons raised by these students for their listening anxiety in the classroom, while those aspects of anxiety were much eased in an online context. Table 5 lists some participants' key comments from the two groups:

Table 6. Participants' Comments on Listening Anxiety

Reasons	In-class Group	Online Group
Ineffective communication	<p><i>"I was anxious to follow my teachers' oral instructions in the classroom. ... I might make mistakes if I did not fully comprehend the instructions"</i> (Sun)</p> <p><i>"I was always worrying about mistaking one word for another. There are too many homonyms in Chinese"</i> (Zhao)</p>	<p><i>"Although multimedia materials provided some support to the listening tasks, they still did not solve my problems in fully understanding those Chinese words. ... (Listening) covered more topics. ... I was quite unfamiliar with those topics. That brought about more challenges to me."</i> (Zhou)</p> <p><i>"Multimedia materials provided a possibility to have a better understanding of listening questions through vivid images."</i> (Zheng)</p>
Negative evaluation	<p><i>"I was always afraid of losing face when making a silly mistake."</i> (Qian)</p>	<p><i>"I felt relieved when using a computer for listening practice, particularly in interactive learning. ... It was less embarrassing to request a peer to repeat what he or she said via the computer than in a face-to-face way."</i> (Wang)</p>
Learning support	<p><i>"I was always anxious about finding myself enough support materials. ... Not many such materials were provided in class."</i> (Li)</p>	<p><i>"As far as I knew I could always replay the listening part and have listening scripts when learning online, I was confident. ... I could learn the part in my own pace, rather than following others' or teachers' blindly."</i> (Wu)</p>

In terms of speaking learning, participants in In-class Group stated that they were afraid of speaking Chinese. The afraid of ineffective oral communication due to a lack of speaking skills was a major reason for speaking anxiety in a traditional Chinese learning context, particularly the traditional communication context did not provide them with enough support. The worries that native speakers would laugh at their pronunciations when talking face-to-face led to their anxiety as well. For online Chinese speakers, these worries were alleviated for different reasons. Table 6 illustrates the differences of participants' perceptions of speaking anxiety in the two learning contexts:

Table 7. Participants' Comments on Speaking Anxiety

Reasons	In-class Group	Online Group
Ineffective communication	<i>"I was afraid of making mistakes in my speaking. My accents could result in other's misunderstanding, which might be quite serious in learning and in daily life. ... Tones matters in modern Chinese." (Qian)</i>	<i>"People might think I was saying a word while I was actually saying another. But I usually found nothing could be more precise to express my ideas than memes, stickers, emojis and emoticons" (Zhou)</i>
Negative evaluation	<i>"Speaking Chinese in front of my classmates made me tense." (Zhao)</i> <i>"Speaking Chinese was challenging. ... People might laugh at me for my weird pronunciations, though I was trying my best. ... That was quite discouraging. Sometimes I just wanted to escape from the talk." (Li)</i>	<i>"I was bolder to face the computer than my peer classmates when being required to speak Chinese." (Wang)</i> <i>"when I did not need to face my classmates in person, I was less concerned about their comments." (Wu)</i>
Communication support	<i>"Except from my teachers, I seldom got support when speaking Chinese. Many people just ignored my mistakes rather than telling me." (Sun)</i>	<i>"It felt so good that I could get assistance whenever I needed to better my speaking. ... Otherwise, I would be very hesitated to turn to a classmate for help. ... Generally, I did not want my peers to know that I could not finish my part without their help." (Zheng)</i>

Chinese character and word recognition and syntax of Chinese language were two major concerns in students' reading practice both in the traditional in-class context and in the online one. The new environment did not improve students' reading experience. For some students, the digital forms of Chinese characters and sentence comprehension on the screen increased their levels of reading anxiety. Table 8 shows participants' thinking on reading anxiety:

Table 8. Participants' Comments on Reading Anxiety

Reasons	In-class Group	Online Group
Character and word recognition	<p>“Many Chinese characters look the same!” (Qian)</p> <p>“Chinese character recognition was full of pressure in a reading test. It cost me a lot of time, while the outcomes were not always satisfying.” (Zhao)</p>	<p>“From my perspective, screens made reading more difficult. I was struggling to recognize those Chinese characters on the screen, which was much harder than doing that on books.” (Zheng)</p> <p>“Sometimes I was wondering why these characters looked different from what I had learned on the textbooks.” (Wu)</p>
Syntax	<p>“I was worried about my reading with those articles in our textbooks. ...particularly in HSK tests. ... Long sentences and complicated structures made reading challenging. (Sun)</p>	<p>“I was more anxious when I had to read Chinese texts on the computer. ... Computers did not help me understand the sentences ... That was even worse when reading a long article. Scrolling up and down drove me crazy.” (Zhou)</p> <p>“I could not understand what the articles were saying. It was harder for me to analyze the structures and components.” (Wang)</p>

Regarding writing anxiety, international students in In-class Group indicated that it was one of their major concerns in Chinese language learning in a traditional context. For their peers in the online environment, it was less anxious as new ways of writing with strong support were provided. Table 8 shows some key comments from participants of the two groups:

Table 9. Participants' Comments on Writing Anxiety

Reasons	In-class group	Online group
Writing ways	<p>“Writing one Chinese character correctly was quite demanding. Writing four hundred characters drove me crazy.” (Zhao)</p> <p>“Do you know how many radicals are there in Chinese language? And do you know how many types of strokes are there? It was a nightmare to memorize all these while I was working out a composition.” (Sun)</p>	<p>“Compared with writing a Chinese character stroke by stroke, I definitely prefer to type in pinyin. ... After all, there are only 26 letters on the keyboard.” (Wu)</p> <p>“Thank the scholar who invented pinyin! Writing in pinyin made my Chinese learning much easier.” (Zheng)</p>
Writing	<p>“I was very worried about my writing tasks</p>	<p>“Writing tasks did not encourage my ideas.</p>

support	<p><i>as I did not know how to precisely express my thoughts by using Chinese. ...For many times, my mind went totally blank after reading the writing instructions.” (Li)</i></p> <p><i>“I needed help when writing a paragraph. But there was always none.” (Qian)</i></p>	<p><i>But I could employ these devices and the Internet to trigger my thoughts. ... So many interesting things online... Perhaps I could be enlightened by a picture or a video on the Internet. (Wang)</i></p> <p><i>Writing online provided a wider range of multimedia resources that might be of some help than sitting in the classroom.” (Zhou)</i></p>
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5. Discussion

This study showed that learning Chinese in an online context had effects on alleviating international students' general FLA. The new approach helped students relieve their tension when learning and using Chinese language. This finding partly concurs with previous studies on FLA, suggesting that digital devices and multimedia resources contribute to a reduction in foreign language learners' anxiety, and usually enhance students' confidence in future learning (Melchor-Couto, 2017; Yang, Lin, & Chen, 2018). However, it is noteworthy that the approaches of online learning to relieve students' FLA were different in terms of their four-language skill-specific anxieties. Aural-oral aspects of anxieties in Chinese learning (listening anxiety and speaking anxiety) were strong predictors of general FLA in a traditional context (Tables 3 & 5). In the new online environment, the most anxiety-provoking practice was reading, while students' tense was eased in other learning (Tables 4 & 5).

As for students' aural-oral aspects, learning Chinese in an online context was found to be useful to relieve their anxiety. Students seemed to feel less anxious when listening and speaking Chinese online. Findings from this study suggested that online learning comforted students' listening and speaking anxiety via three approaches: facilitating effective communication, helping avoid negative evaluation and providing a supportive self-controlled learning progress.

Tones and intonations can contrast meanings in modern Chinese (Zhang & Yin, 2009). For CSL students, the unique sound-meaning association system of Chinese language makes their listening and speaking practice challenging. Students suffered strong negative feelings in oral communication in a traditional context that aural-oral aspects of Chinese language learning were highly correlated with general FLA (Tables 3 & 5). Participants admitted in this study that they usually had problem in connecting the tonal-syllabic system with the meaning system in Chinese correctly, which made them quite embarrassed in communication activities. In a conversational practice, for instance, a student mispronounced 除夕 (chú xī, the New Year Eve) as 出席 (chū xí, attend). This made his teammates anxious as they found the conversation was hard to understand. All students turned to be silent for a while until they “awkwardly” changed the topic. They hereby suffered great pressure and anxiety of misunderstanding in oral communication and intended to “escape” from using Chinese (Li in Table 7). As noticed in this study, those students in the team attempted to use English to explain themselves

anxiously after their unsuccessful communication in Chinese. The traditional context did not provide a context to help students' effective communication in the target language, leading to their anxiety in aural-oral aspects of Chinese learning and using.

Online learning relieved students' anxiety in speaking and listening through facilitating communication. It should be noted that this relief of anxiety in the online context was not achieved by improving CSL students' linguistic or communicative skills, but through multimedia support. Compared with participants in In-class Group, who had to use their acquired aural-oral skills for effective communication in Chinese, those in the technology-supported learning context could employ various multimedia resources, such as vivid images, memes, emojis, short videos and motion pictures to enhance their meaning expression and information transmission. A participant (Zhou in Table 7) said in the interview: "I usually found nothing could be more precise to express my ideas than memes, stickers, emojis and emoticons." As a form of the ubiquitous language (Lu et al., 2016), these multimedia resources were effective to facilitate communication. As Yan and Horwitz (2008) have put, successful communication could ease language learners' tense in using the target language. Using multimedia resources in an online context, students' communication apprehension was much relieved as a result of their successful communication in Chinese.

However, this study needs to mention that the new learning approach could not solve CSL students' difficulties and misunderstanding caused by the complicated phonetic system of Chinese language in oral communication in a broader learning and using context. Simply employing multimedia resources could play a role in alleviating anxieties in listening and speaking, but it does not help these students avoid the ambiguity of words and characters with similar or same tones and pronunciations on a regular basis, which should have been a necessity for native and advanced Chinese speakers (Duanmu, 1999). Successful communication in Chinese is supposed to achieve via students' learning and improvement of aural-oral skills, rather than using multimedia resources as communication substitutes. The challenge of communication apprehension that students were facing in a traditional context remained in an online one. Students in the online context might employ these resources for communication temporarily. In the long term, however, developing students' Chinese language listening and speaking skills need practice and improvement rather than avoidance.

A cloak of protection from others' negative evaluation was provided by online learning to ease students' tense. As found from this study, participants in Online Group indicated that they were less embarrassed when making mistakes in listening and speaking activities (Wang in Table 6), while those in In-class Group considered that as losing faces, largely leading to an increase in their anxiety (Qian & Sun in Table 6). Negative evaluation had strong influence on students' feelings of anxieties of aural-oral performances in a traditional face-to-face context (Jiang & Dewaele, 2019). In the online context, however, students were "relaxed" when receiving negative evaluation from others in practice. As a student (Wu in Table 7) admitted: "when I did not need to face my classmates in person, I was less concerned about their comments". Compared with the traditional learning context, where students

had to face negative evaluation in person, the modern technologies created an independent space for individual student's learning. In this space, students focused more on themselves rather than external evaluation. Online learning provided a low-stress context for students' listening and speaking practice that encouraged them to take a bolder step in Chinese learning with less suffering from aural-oral anxieties.

The online learning approach also created a supportive environment for CSL students' aural-oral learning. It effectively alleviated their anxiety. This supportive context provided "a consistent, basic level of support" to students' language development via various resources as scaffolding (Sharma & Hannafin, 2007), including pictures, videos, puzzles and mini games. CSL students, by employing these resources, "had better understanding" (Zheng in Table 6) of the learning tasks, whereas the traditional ways of listening and speaking practice was more confusing for less scaffolding was implemented. Furthermore, with the support of the integrated multimedia scaffolding in the online context, students' self-supervised and self-controlled learning progress was enabled as well. In the context, students could learn "in my own pace" (Wu in Table 5). In the new resource-rich context, international students could develop their language abilities and skills with less anxiety by employing all kinds of supports to tailor their personalized learning. Online students enjoyed autonomy in Chinese listening and speaking practice with a decrease in negative emotions. This concurred with findings from Pishghadam' study (2009), claiming that autonomous learning could be a way to relieve students' anxiety. International students' self-controlled learning and autonomy in learning-related issues with strong confidence and motivation were supported online, rather than following teachers' requirements stressfully in the classroom.

In short, the online approach provided international students a low-anxiety context for their aural-oral learning. Compared with their peers in the traditional environment, online students' anxiety was relieved for effective communication and less concerns about negative evaluation when learning Chinese in a resource-rich supportive context.

In consistence with previous studies on anxiety (Atay & Kurt, 2006; Chen et al., 2014), the present study suggested that writing anxiety contextualized in an online context was much relieved. This study found that the alleviation of students' writing anxiety was achieved via two approaches: to change the writing ways and to support idea-generating.

A major source of international students' Chinese writing anxiety was to write characters (Chen et al., 2014). Chinese characters feature a unified configuration of forms associated with unique semantic and phonetic components. Cai (2018) and Luo (2014) have put that this feature makes writing Chinese characters anxiety-provoking, as it is not easy for students to process the semantic-phonetic combinations. In line with these indications, participants in In-class Group thought that writing Chinese characters "drove me crazy" (Zhao in Table 9), leading to their strong negative feelings of writing practice (Table 3). Students believed that writing "stroke by stroke" was challenging, since the components and structures of Chinese characters were difficult (Sun & Wu in Table 9). Due to the

linguistic features of the inconsistency of form-meaning associations, students had to face strokes and radicals in writing activities. It was hard for them to “organize” these components into preset script system—the unique formation of Chinese character script system. Writing tasks were anxiety-provoking for international students in a traditional paper-and-pen context. As observed in this study, writing was “so challenging” for them that it often interrupted their thinking—students “forgot” what to say after they attempted to “piece strokes and radicals into characters” correctly. This made many students stressful. Some students doubted themselves that whether they could write a meaningful composition if they focused on characters.

As for participants in Online Group, computers and other digital devices changed their ways of writing. They used pinyin to write online. Pinyin is a Romanized phonetic spelling system for Chinese characters. For the phonological and orthographic uniqueness and complexity of Chinese language, for most international students, writing Chinese character is more demanding of their metalinguistic awareness than using alphabetic pinyin (Koda, 2004). In this respect, participants preferred pinyin as a writing substitute of Chinese characters (Wu & Zheng in Table 9). Pinyin shares some points with their familiar languages as alphabetical languages, like English, French and Thai. Writing in pinyin was employed as a way for students to “avoid” (Zheng in Table 9) the script difficulties. With intelligent association and error correction mechanisms of pinyin input tools on computers, the belief that writing in pinyin was much easier than writing characters on paper was widely accepted by participants in Online Group. Writing in pinyin, as a way to strengthen their confidence and enhance their writing performance, was effectively to alleviate students’ writing anxiety in the online learning context.

The other approach that modern ICTs employed to relieve students’ writing anxiety was to provide a supportive context for composition idea-generating. The production of individual characters is considered as “the most time-consuming” (Kubler, 2002) part in traditional paper-based writing. Working out a composition in Chinese made students anxious since their minds “went totally blank” (Li in Table 9) to produce meaningful ideas while they were trying to write a Chinese character correctly. The traditional writing context did not provide necessary support to their writing activities. As an interviewee in In-class Group insisted, they only had limited resources in the classroom to support their writing that could hardly trigger new thoughts and ideas (Qian in Table 9). For this reason, the traditional approach might provoke students’ writing anxiety as students could not organize meaningful ideas when writing Chinese characters.

Online writing, on the other hand, improved students’ experience by providing various support to their idea-generating. Writing practice is a product-oriented process that needs students to generate their own ideas within the prescribed rhetorical frameworks in Chinese language (Chin, Gong, & Tay, 2014). It was necessary to have something meaningful to say before students wrote (Wang in Table 9). Modern ICTs provided a supportive context with various multimedia resources covering a wide range of topics, including images, audios, videos, puzzles and other interactive materials. Using these resources, students generated, formulated and developed ideas and put these organized ideas into the Chinese

language system, instead of simply stacking characters as they used to do in a traditional environment. In online writing, a student (Wu) employed provided reading materials and links to web resources before he wrote a composition about 城市化 (urbanization). In reflective report, he mentioned that the extending reading on Shanghai (浦东与浦西, Pudong and Puxi) and Beijing (古老的城与树, An Ancient City and Trees) gave him more information about the theme as well as more perspectives looking into the topic. This benefited his writing, while it could be hardly achieved in the classroom as time and resources were limited. Writing in the online context, students reported to have more pleasant experience.

It was noteworthy in this study that the use of technologies could not relieve international CSL students' anxiety in reading practice. On the contrary, the online approach made their reading more anxiety-provoking than that in a traditional context. Found from this study, the increase of reading anxiety level was related with two factors: character and word recognition and syntax.

Participants in both groups faced a similar anxiety-provoking problem in reading practice: Chinese character and word recognition. In a traditional paper-based reading context, as reported by participants, recognizing and distinguishing Chinese characters was anxious (Qian & Zhao in Table 8). It is widely assumed that character recognition involves the processing of orthographical and phonological information (Hulme et al., 2019). In reading activities, establishing a firm association between visual and verbal representations of the character is meaningful for recognition and comprehension (Jin, 2003). Due to the nonalphabetic nature of its orthograph, however, the association between meanings and sounds of Chinese characters—a square-shaped logographic script system—is largely irregular and unsystematic in morphology and morphophonemic (Everson, 2011). That makes Chinese character recognition challenging for foreign language learners, particularly for learners whose L1 employs an alphabetic system, like English and French. It was seen in this study that students in a traditional context found Chinese character and word recognition on paper time-consuming, while the outcomes were not satisfying (Zhao in Table 8). That triggered their anxiety in reading practice.

As for those in Online Group, using digital devices for reading did not improve students' experience. They found Chinese characters were even harder to recognize on the screen (Wu in Table 8), which concurred with previous findings (Myrberg & Wiberg, 2015). That caused students' increasing level of anxiety in online reading activities. As noted in this study, online reading did not substantially improve students' reading skills. At this stage, online reading merely transplanted traditional paper-based reading materials in a screen-based context. The difficulties that students faced in traditional reading in the classroom—processing orthographical and phonological information and establishing the form-meaning association of Chinese characters, were still present in online reading.

Moreover, students said that they found Chinese characters “looked different” (Wu in Table 8) from those printed on paper. That made reading more challenging, and increased students' anxiety. This study claimed that what students called “differences” were not changes in character forms, but a result of their unfamiliarity of Chinese characters. Transformation of Chinese characters did not really happen

during the reading process. Since a traditional paper-based approach is widely used in various Chinese learning and teaching contexts nationwide in China, international students are unfamiliar with Chinese characters in digital forms on the screen. As Soomro, Khan and Younus (2019) have mentioned in their study, unfamiliarity with writing script system and foreign language reading anxiety had obvious correlation. New to reading Chinese on the screen, students experienced more anxieties than their peers in a traditional and familiar reading context.

Besides, participants in Online Group felt anxious in reading practice due to a lack of syntax knowledge. Reading is a complicated practice, demanding of a lexicon of individual characters that follow an explicit compositional structure in the language (Perfetti, Liu, & Tan, 2005). As Perfetti and Dunlap (2008) have suggested, more than a reader's grammar knowledge of phonology and morphology at the character and word level, reading demands the knowledge of syntax at the sentence level as well. Online reading imposed new challenges to students' comprehension of long sentences and paragraphs, though they had acquired those selected characters. This study noticed that in a traditional context, students intended to "stitch together" sentences and paragraphs that spanned the pages so that they could read the first and the second half of the sentences at the same time. In online reading practice, however, students had to "scroll up and down" the screen (Zhou in Table 8). That further fragmented meanings of a long sentence. Students found it harder to have a complete picture of components and their syntactic relationships in a sentence (Wang in Table 8). The same challenge existed in reading a cross-page paragraph: meanings were segmented. Students could not fully understand. Thus, online reading majorly led to increasing anxieties (Tables 2 & 5).

6. Conclusion and Implications

This study investigated the effects of online Chinese learning on alleviating international students' general FLA and four-language skill-specific anxieties. Students' more positive experience in online Chinese learning than in a traditional context was found. Online learning eased students' tense in their aural-oral practice and writing practice from different approaches. As for reading, however, digital devices and materials made students' reading practice more anxiety-provoking.

Learning from this study, it is advised that employing the online approach could enhance international students' Chinese language learning experience. Abundant supportive resources, self-controlled learning progress, and encouragement from peers and teachers were key to the alleviation of anxieties. It is also important for students to get accustomed to the new online learning approach. Online and computer-assisted learning may play a role for education after COVID-19 across the world. Having better learning experience will help students obtain their anticipated learning outcomes.

Students and teachers should be aware that the online approach provided some "shortcuts", which were claimed to be a relief of anxiety. However, such shortcuts might be harmful to students' language skill development. For example, by using digital tools, students' writing anxiety was alleviated as they used pinyin instead of characters for writing. Pinyin, as Lin et al. (2010) have put, is an auxiliary

phonological coding system, rather than reading or writing itself in Chinese. Scholars have noticed the negative effects of overdependence on pinyin in Chinese language learning and warned that it did not help language development (Zhang & Min, 2019). Adopting new technologies in language education should be appropriate and supportive to students' language development in the long term.

This study heavily relied on scales and students' provided reports and descriptions. Classroom observations and teachers' opinions would be helpful. Future studies are supposed to work with teachers to examine FLA and four-language skill-specific anxieties. This could further interrogate the findings for future CFL education, as well as help students and teachers have better understanding and employment of the language learning-related technologies, adopt appropriate learning and teaching strategies, and develop proper curriculum for less anxiety-provoking CSL education in the new Internet era.

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Declaration of interest statement

N/A

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Appendix I

The Questionnaire for general FLA

Descriptions	SD	D	N	A	SA
1. I don't worry about making mistakes in language classes. **					
2. I tremble when I know that I'm going to be called on in Chinese classes.					
3. It frightens me when I don't understand what the teacher is saying in Chinese.					
4. It wouldn't bother me at all to take more Chinese classes.					
5. During Chinese classes, I find myself thinking about things that have nothing to do with the course.					
6. I keep thinking that other students are better at learning Chinese than I am.					
7. I am usually at ease during Chinese tests in class/online. **					
8. I start to panic when I have to answer teacher's questions in Chinese.					
9. I worry about the consequences of my performances in Chinese classes.					
10. I don't understand why some people get so upset over Chinese classes. **					
11. In Chinese classes, I get so nervous when I forget things I should have known.					
12. It embarrasses me to answer the teacher's questions voluntarily in Chinese classes.					
13. I get upset when I don't understand the learning content in Chinese classes.					
14. I often feel like not going to Chinese classes.					
15. I am afraid that the teacher is ready to correct every mistake I make.					
16. I can feel my heart pounding when I'm going to be called on in Chinese classes.					
17. I don't feel pressure to prepare for Chinese classes. **					
18. Chinese classes progress so quickly that I worry about getting left behind.					
19. I feel more tense and nervous in Chinese classes than in my other classes.					
20. When I'm waiting for Chinese classes begin, I feel very sure and relaxed.					
**					

21. I feel overwhelmed by the number of rules I have to learn to use Chinese.					
22. I am afraid that other students will laugh at me when I use Chinese.					
23. I feel comfortable around native speakers of Chinese. **					
24. I get nervous when the teacher asks questions which I haven't prepared in advance.					

SD=Strongly disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly agree.

**=reversed questions. According processes of the collected data were made.

The Questionnaire for language skill-specific anxieties*

Descriptions	SD	D	N	A	SA
Listening Part					
I get frustrated when I cannot distinguish among the Chinese tones.					
I get nervous when all the Chinese tones sound the same to me.					
I get anxious when I don't understand what my classmates are saying in Chinese.					
It frightens me when I don't understand what the teacher is saying in Chinese.					
Speaking Part					
It embarrasses me to volunteer speak Chinese in classes/online.					
I can feel my heart pounding when I'm going to be called on in classes/online.					
I feel confident when I speak Chinese in classes/online. **					
I feel very self-conscious about speaking Chinese in front of other students/online.					
Reading Part					
When I'm reading Chinese, I get so confused I can't remember what I'm reading.					
I feel intimidated whenever I see a whole page of Chinese in front of me.					
I have difficulty distinguishing among the Chinese characters when reading Chinese.					
I feel confident when I am reading in Chinese. **					
Writing Part					
Writing Chinese characters makes me forget what I'm trying to compose.					
I'm usually at ease when I'm writing in Chinese. **					
I freeze up when I am asked to write something without preparation.					
I feel unsure of myself when I'm writing in Chinese.					

SD=Strongly disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly agree.

*=These items were delivered in random sequence.

**=reversed questions. According processes of the collected data were made.

Appendix II

Guiding questions for interviews

- 1). In general, when do you feel uncomfortable or anxious in Chinese classes?
- 2). Why do you think you are uncomfortable or anxious in the class?
- 3). Which of your four-language skill learning (listening, speaking, reading and writing) do you think provokes your anxiety the most?
- 4). What factors do you think trigger your anxiety in Chinese classes?
- 5). Do you think online learning will be/is a way to alleviate your anxiety in Chinese learning?
Why/How?
- 6). What elements of online learning do your think increase/decrease your level of anxiety in Chinese learning?