Online Comics for the Teaching and Learning of Chinese Language in the Australian Context

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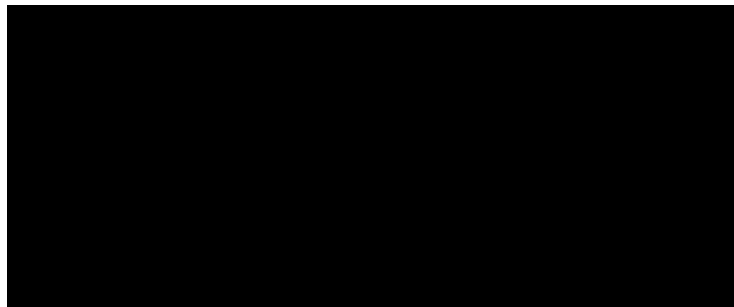School of Education

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Statement of Authentication

The work presented in this thesis is, to the best of my knowledge and belief, original except as acknowledged in the text. I hereby declare that I have not submitted this material, either in full or in part, for a degree at this or any other institution. Information derived from the published or unpublished work of others has been acknowledged in the text and a list of references is given.

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Abbreviations

CFL	Chinese as a foreign language
CLT	communicative language teaching
CLIL	content and language integrated learning
EFL	English as a foreign language
ICT	information communications technology
NALSAS	National Asian Languages and Studies in Australian Schools
NALSSP	National Asian Languages and Studies in Schools Program
NEAF	National Ethics Application Form
NMC	New Media Consortium
NSW	New South Wales
PW	picture–word
REDI	Research Engagement, Development and Innovation
ROSETE	Research-Oriented School/Industry-Engaged Teacher Education
SERAP	State Education Research Application Process
TILT	translation in language teaching
VE	virtual environment
YCT	Youth Chinese Test

Abstract

This research explores the potential value of online comics in Chinese as a foreign language (CFL) education for nonbackground learners in the context of Australia. Mixed research methods, quantitative and qualitative, were adopted to investigate the affordances of online comics in CFL education, examining their effectiveness in improving students' word recognition ability and exploring how students' attitudes towards online comics influence their word recognition ability. During the time of the research, when the researcher was a teacher–researcher in the research school, data was collected from 60 students and one mentor teacher, through pre- and post-tests, artefacts, survey questionnaire, interview, and the teacher–researcher's self-reflective journals.

It was found that online comics' affordances were connected with the characteristics of meaningful learning, which afforded CFL teaching and learning by showing it as usable with everyday life content, by making it useful through online comic creation, and by creating a fun and conducive teaching and learning environment in the classroom. In addition, the quantitative data analysis indicated that as the main teaching and learning method, the strategy of using online comics to teach Chinese language and allowing students to create online comics with the taught Chinese characters may have improved their word recognition ability. Moreover, students' attitudes towards online comics had significant influence on their Chinese word recognition ability. Students' perceptions of online comics' effectiveness, regardless of year and gender, were found to be related to their improvement in word

recognition ability. On the other hand, students of different years and genders had different preferences towards online comics, and such preferences had different influences on their word recognition ability. Specifically, Year 6 students' perceptions of online comics increased their motivation and were found to influence improvement of their word recognition ability. Girls' opinions of thinking online comics were interesting in CFL learning were found to influence their improvement in word recognition ability. This thesis hopes to illuminate online comics in CFL teaching and learning. The findings of this research suggest the importance of adopting effective teaching approaches that align with students' preferences.

Chapter 1

Background of the Research

1.1 Overview of the Chapter

Chinese as a foreign language (CFL) education has caught significant attention across the world. In Australia, CFL education has been important to language curriculum policy since last century. However, CFL learners in the Australian context, especially non-Chinese-speaking learners, face challenges in learning the language due to the difference in language systems between Chinese and their mother tongue. A growing body of research concerned with CFL teaching and learning pedagogies has appeared to help non-Chinese-speaking learners with CFL learning (Moloney & Xu, 2015; Tsung & Cruickshank, 2010). This study especially considered technology, exploring the potential of online comics for CFL education in the Australian context.

This chapter provides the background for this research. In the following sections, the rising global popularity of learning Chinese language is first presented. The second section is mainly about the current situation of CFL teaching and learning in Australia, especially the discourses on challenges and pedagogies for CFL education. The third section introduces this research, including the research questions, significance, and research context. In this section, three research questions are raised pertaining to the suitability and effectiveness of using online comics in CFL education, followed by the significance of this research. The last section summarises this chapter

and outlines the research.

1.2 Rise of the Chinese Language as a Global Language

The population of non-Chinese speakers learning Chinese language has significantly resulted from China's Economic Reform and Opening-Up policy in 1978 (Duff et al., 2013). This policy was mainly established to promote China's economy at that time. Since then, China's economic structure has been reformed from the collectivisation of agriculture to the socialist market economy. The Reform and Opening-Up policy has in particular permitted other countries and foreign entrepreneurs to invest and start new businesses in China (Jacques, 2012; Wall, 1993). Since China's Economic Reform and Opening-Up policy, many non-Chinese have begun to "engage with Chinese organizations and opportunities" (Duff et al., 2013, p. 1) in the economy, and there has been a rise in the number of Chinese language learners around the world.

China's fast development and international standing in the 21st century have encouraged a rising motivation among non-Chinese speakers in the world to learn its language and culture (Latham & Wu, 2013). Chinese language is now a global language (Tsung & Cruickshank, 2010) and is said to be the most widely spoken language in the world, with more than one billion of native speakerss speaking Chinese or its dialects (Duff et al., 2013) and more than two million of non-Chinese learners (Confucius Institute Headquarters, 2016). According to the United States Census Bureau (2013), Chinese language was the third most widely spoken language

in the United States in 2011. Government and nongovernment agencies and organisations in the United States have invested substantially in Chinese language education (Wen & Grandin, 2010). In Canada, a large population of non-Chinese learners are learning Chinese language in language institutes (Duff et al., 2013; Tsung & Cruickshank, 2010). In Europe, Chinese Sunday Schools have been popular in communities since Chinese immigrants arrived there (Benton & Pieke, 2016).

Hanban, the Office of Chinese Language Council established by the Chinese government, has been significantly promoting Chinese language education in the world. It aims to promote and expand Chinese language education in non-Chinese-speaking countries by promulgating Chinese language learning policies, organising Chinese language teaching and learning activities, supporting Chinese language studies, including setting up cultural exhibitions, and establishing Confucius institutes and Confucius classrooms in non-Chinese-speaking countries (Confucius Institute Headquarters, 2016). According to Confucius Institute Headquarters (2016), Confucius institutes are independent institutes, whereas Confucius classrooms are culturally decorated classrooms built in schools to support Chinese language teaching and learning on a smaller scale. Both Confucius institutes and Confucius classrooms are nonprofit organisations initiated to provide specific help and support for Chinese language education in non-Chinese-speaking countries, which include qualified Chinese language volunteer teachers from Hanban every year and considerable teaching and learning resources (Confucius Institute Headquarters, 2016). In a recent report the Confucius Institute Headquarters (2016) showed, by the end of 2016, there

were 513 Confucius institutes and 1,073 Confucius classrooms in 140 countries in the world. A total of 115 Confucius institutes were located in 32 countries in Asia, 48 in 33 countries in Africa, 171 in 41 countries in Europe, 161 in 21 countries in the Americas, and 18 in three countries in Oceania. On the other hand, there were 100 Confucius classrooms built in primary and secondary schools in 20 countries in Asia, 27 in 15 countries in Africa, 293 in 29 countries in Europe, 554 in eight countries in the Americas, and 99 in four countries in Oceania (Confucius Institute Headquarters, 2016).

With the support from Hanban, Chinese language education has been introduced into the school curricula in many countries. For example, according to the Asia Education Foundation, Chinese language has been taught in Sweden for many years, and by 2020, it will be taught in all schools (Gillard, 2012). In Canada, in 2008, students in bilingual schools spent up to half their school days learning Chinese language (Zhao & Huang, 2010). In the United Kingdom, in 2007, about 400 to 500 secondary schools offered CFL education, and in the United States, in 2006, 1,000 schools offered CFL education (Huang & Zhao, 2010). In Australia, Chinese is one of the four Asian language components in the Australian Curriculum (Gillard, 2012).

1.3 Chinese Language Education in Australia

Similar to other non-Chinese-speaking countries, Chinese language education programs have been introduced into Australian school curricula since the late 1980s. Since then, several different language policies have been implemented for promoting

Chinese language education among students. However, even though the importance of learning Chinese language is emphasised by the Australian government, the challenges of learning CFL that students face discourage them from learning it. This section briefly introduces Australian Chinese language policies and the main challenges of learning CFL in the Australian context, and discusses the advocated CFL teaching and learning pedagogies.

       1.3.1 Australian language policies on Chinese language. In Australia, it has been more than 30 years since the Australian government initiated the first Chinese language education programs (Parliament of Australia, 2012). In 1987, the National Policy on Language promoted Asian language studies, including Chinese, Indonesian, and Japanese, mainly because of the geopolitical significance for learning these languages (Parliament of Australia, 2012). The Australian Language and Literacy Policy issued in 1991 made similar declarations to the National Policy on Language (Parliament of Australia, 2012). During 1996 to 2002, the National Asian Languages and Studies in Australian Schools (NALSAS) strategy was conducted to improve the teaching and learning of Asian language studies in schools across Australia. Six years after NALSAS ceased, in 2008, the National Asian Languages and Studies in Schools Program (NALSSP) took effect with support from the Australian government, aiming to enable 12% of Year 12 students to graduate from school with a fluent speaking skill in one of the four Asian languages—Mandarin, Japanese, Indonesian, and Korean—by 2020 (Parliament of Australia, 2012). It also introduced bilingual

education in four primary schools in New South Wales (NSW), and Chinese was one of the four priority languages (Fielding & Harbon, 2014). However, the NALSSP ceased in 2012 due to shortage of funds and other challenges in implementing Chinese language education. In 2012, Chinese language education was raised again by Julia Gillard (2012), former prime minister of Australia, who emphasised the significance of learning Asian languages in the White paper *Australia in the Asia Century*, which was an official announcement providing a roadmap for transforming Australia into "a land of increased opportunity, prosperity and fairness" (p. ii). It was asserted by Gillard (2012) that "the languages component of the Australian Curriculum will enable all students to learn a language other than English—a curriculum for Chinese (Mandarin) is one of the first in development" (p. 168).

1.3.2 Challenges of CFL education in Australian context. According to Chen (2015), although supported by the government, Chinese language education remains problematic, especially to non-Chinese-speaking learners in Australia. None of the past Chinese language programs has succeeded in arresting the declining number of students who study Chinese language (Chen, 2015). Investigated by Orton (2008), 94% of students who enrolled in Chinese programs quit Chinese language learning before Year 11. Most students who continued Chinese language programs were first-language speakers of Mandarin (Department of Education, Employment and Workplace Relations, 2010). For a *nonbackground learner* who is not "raised in a home where Chinese is spoken" (He, 2006, p. 1), where at least one family member

understands the language and is to some degree bilingual in both Chinese and English, s/he would take "3.5 times longer to master Chinese language than to master a European language" (Orton, 2008, p. 28).

Orton (2008) argued that nonbackground learners often find it hard and meaningless to learn Chinese language in the Australian context where English is widely spoken and used in schools and other domains of students' daily lives. Many scholars have echoed concerns about the following three main challenges of Chinese language teaching and learning in Australia: (1) the Chinese language system, which is different from the Australian English language system (Orton, 2008), (2) Chinese language teaching pedagogy, which needs to be revised to be suitable for students and the Australian learning context (Chen, 2015; Moloney & Xu, 2015), and (3) students' attitudes towards Chinese language, which are challenged in a nonbackground environment (Chen, 2015).

First, Chinese language, with its tones, homophones, and characters, is fundamentally different from English, which is based on an alphabet (Orton, 2008). It is hard for English speakers to understand Chinese language's pronunciation system and its logographic writing system. Students tend to find the differences between Chinese language and English language peculiar and perceive Chinese as "inaccessible and impossible to learn" (Zhang & Li, 2010, p. 93), and they hardly gain an interest to continue to learn the language (Orton, 2008). As a result, there has been a high drop-out rate in learning Chinese across Australia (Orton, 2008).

Second, ineffective teaching pedagogies have become a widely cited challenge

because of the shortage of qualified Chinese language teachers in Australia (Department of Education, Employment and Workplace Relations, 2010; Orton, 2008; Sturak & Naughten, 2010). As it is hard for English-speaking teachers to acquire adequate Chinese language skills, 90% of Chinese teachers in Australian schools are native Chinese speakers from China (Orton, 2008; Sturak & Naughten, 2010), which has resulted in ineffective teaching methods influenced by Chinese teaching pedagogies that focus on dictation, rote learning, vocabulary, sentence memorisation, translation, and systematic study of grammar (Chen, 2015; Hu, 2002; Moloney & Xu, 2015). Zhang and Li (2010) argued one of the reasons students quit learning Chinese language is that they do not have a good learning experience in class due to the teacher's inappropriate teaching methods. On the other hand, in defence of Chinese language teachers in Australia, Chen and Zhang (2014) pointed out that one fact accounting for the ineffective teaching pedagogies is the lack of adequate and suitable teaching resources. There is a lack of professional development courses to support Chinese teachers in expanding their repertoire of pedagogies in Australia (Chen & Zhang, 2014).

The third main challenge that has led to the decline of Chinese language learners, according to Chen (2015), is students' attitude towards Chinese language education in Australia. In the Australian context, students have hardly any access to a Chinese-speaking environment. Hence, they have few opportunities to use the language they have learnt, which in turn affects their attitude towards learning the language (Chen, 2015). It was agreed by Curnow and Kohler (2007) that students are

interested in and continue language learning when they see the relevance in their daily lives. In the Australian context, although Chinese language education in schools has gained support through various language policies, Chinese language application in daily life is still not being stimulated enough (Huang & Lin, 2011). Nonbackground-Chinese language learners in particular tend to think that Chinese language as a communication tool is useless because they do not have the opportunity to use the language they have learnt. Stronger support from society and families is needed to materialise the benefits of Chinese language and create the environment for Chinese language application in daily life (Chen, 2015).

1.3.3 CFL program and discourse on pedagogies in Australia. To tackle the challenges in Chinese language teaching and learning, innovative Chinese language programs and research studies are being developed to bring about positive interventions in CFL education. This section first introduces the innovative research program in which this study was based. It then presents the discourse surrounding CFL pedagogies.

1.3.3.1 ROSETE program. In response to all kinds of language policies since the 1980s, the federal government has organised several programs to promote Chinese language education in Australia. One of these is the Research-Oriented, School/Industry-Engaged Teacher–Researcher Education (ROSETE) program. This international program, which is supported by the NSW Department of Education and

Communities, the Ningbo Municipal Education Bureau (China), and Western Sydney University, has been defined as "an innovative, flexible and intellectually challenging program that has Chinese graduates researching the teaching of Chinese to non-background speakers" (Centre for Educational Research, as cited in Li, 2016, p.6). As this research was part of the ROSETE program, it is important to note that the aim of the ROSETE program is to "make Chinese learnable" (Singh & Han, 2014, p. 403) by positioning learners and their sociolinguistic knowledge at the centre of the effort to teach Chinese (Zhu, 2010). To make Chinese learnable, according to Singh and Han (2014), is to make connections between Chinese language and English language so that students can learn the language by applying their existing knowledge to the language, which benefits the students in the process of learning Chinese language. The ROSETE program's aim is also to make Chinese language practical and useful in students' daily lives, where students get the most rewarding sense of learning the language. The program also points out that to make Chinese language learnable in the Australian context is to stimulate students' desire and interest to continue learning Chinese language and knowing about Chinese culture. The goals of the ROSETE program align with the aim of the Chinese K–10 Syllabus NSW, that the Chinese language curriculum should be designed to enable students to "communicate with others in Chinese, and to reflect on and understand the nature and role of language and culture in their own lives and the lives of others" (NSW Education Standards Authority, 2017, p. 13).

1.3.3.2 Pedagogies in CFL education in Australia. Teaching pedagogies have a significant role to play in CFL education in the Australian context. According to Orton (2008), most Chinese language teachers in Australia had not accepted training from or been familiar with the Australian educational system before they stepped into work. This has led to a traditional teaching "schema" (Moloney & Xu, 2015, p. 6) applied in CFL education. Under this schema, the majority of Chinese language teachers follow the teaching pedagogy of how English is taught and learnt in China based on their own experiences, which is basically by "grammar-translation, memorization of structural patterns and vocabulary, rote learning, and systematic study of grammatical patterns", expecting students to devote their "deep commitment and painstaking effort" (Moloney & Xu, 2015, p. 6) in CFL learning by themselves under the pressure of examination. However, these Chinese language teachers fail to notice that CFL learners in the Australian context do not have the same pressure from examination as students in China do. Slaughter and Lo Bianco (2009) said that "good teaching is the single most important controllable variable in successful language learning" (p. 28). In CFL education in Australia, such teacher-centred and authoritative approaches can affect Australian students' attitudes and discourage their motivation in learning CFL (Chen, 2015). Various innovative and effective teaching pedagogies are being called for in CFL education (Moloney & Xu, 2015).

Contrary to the teacher-centred approach, student-centred CFL teaching and learning approaches are becoming popular and are being investigated by researchers. During his time as a teacher–researcher, Li (2016) explored student-centred content

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and teaching resources for CFL education, as well as teaching strategies, by designing lesson plans and teaching words related to students' everyday lives, for example, family, pets, and schools. Before that, transnational learning featured, as students' language acquisition in the target language country drew attention in the field of CFL education to maximise learners' experiences in both linguistic and cultural learning (Moloney & Xu, 2015).

It has also become a trend for researchers to investigate innovative pedagogies with authentic teaching materials and meaningful content. A typical example is *content and language integrated learning* (CLIL). CLIL has been introduced into some Australian schools as a Chinese language teaching and learning program, seeking to expand and provide meaningful and experiential learning (Moloney & Xu, 2015; Richards & Rodgers, 2014). Cultural teaching resources are also being developed, as explained by Díaz (2015), to provide students with authentic teaching resources. As cultural and linguistic differences have led to challenges in CFL education, Moloney (2013) designed an intercultural learning project, helping students acquire critical thinking through cultural comparisons.

As technology has developed, an abundance of innovative opportunities given by technology has gained attention. Technology enables students to create and complete online tasks without the distance limitation and engages students' language and culture learning with games and multimedia (Gee, 2012; Moloney & Xu, 2015; Scarino & Liddicoat, 2009). New e-learning tools on mobile and iPads, such as digital flash cards for Chinese character recognition, are being developed as educators

assume that students are more than capable to become autonomous learners with the help of technology. Gee (2012) asserted that learning by technology is "a domain where young people of all races and classes readily learn specialist varieties of language and ways of thinking without alienation" (p. 4). In other words, Gee (2012) claimed that students find themselves more motivated and willing to learn languages through technological methods. It raised the researcher's interest to explore the use of technology to engage nonbackground learners in CFL education with authentic and meaningful learning content.

1.4 Research Study

As part of the ROSETE program, the aim of this research was to make Chinese learnable in the Australian context, especially by using technology. Some researchers have studied technology application in language education. For instance, Chen and Chung (2008) evaluated an English vocabulary learning system with the use of handheld mobile devices. They found that students gained significant improvement in memorising words by using handheld mobile devices, which allowed them to enhance vocabulary ability at any place and any time. Abrams (2003) examined the usefulness of asynchronous online chat based on a computing network and found that students who used this technology produced a larger quantity of output words in face-to-face discussion in the post-test than those who did not use it. Giand, Huang, and Pasfield-Neofitou (2014) examined the use of 3D virtual world simulation and found it helped to lessen students' foreign language anxiety in using the learnt language.

In recent years, a rising number of research studies are about the virtual world for language learning, applied in the language classroom as a simulated real-world teaching and learning method (Melchor-Couto, 2018). Similar to the virtual world, comic strips were strongly advocated by Cary (2004) for language teachers to provide a virtual environment for students to use the learnt language. Through his experiences as an English teacher, he showed the effectiveness of using comics for teaching and learning English as a second language. Mills (2011) found that children are keen to learn the language using online comics. She found in her study that children prefer to transfer their handwritten texts into online comics with images and short texts, which facilitates their language competence. Yang (2003) asserted that, as a modern technical tool with attractive images, online comics could catch students' attention and raise their interest in learning and practising language.

Although the use of online comics has been put forward in educational research, there are few studies on how online comics can afford CFL education. Yang's (2003) study pointed out the benefits of online comics and their potential for language education. It was the interest of this research to explore the potential benefits of online comics for CFL education for nonbackground learners in the Australian context.

1.4.1 Research questions. With the purpose of exploring the potential of online comics for Chinese language learning, the intention of this research was first to explore how online comics can assist CFL teaching and learning in Australia. Chinese

has two language systems, a sound system and a written system, and as most nonbackground-Chinese language learners in Australia find it hard to recognise Chinese words, it was in particular the intention of this research to explore how online comics can help Australian nonbackground learners with Chinese word recognition. Second, it was the interest of this research to examine whether online comics are effective for nonbackground learners in Australia in recognising Chinese words. Third, it was the purpose of this research to explore what students' attitudes towards online comics are and how they might influence their ability to recognise Chinese words. Importantly, it was noted from Orton's (2008) research that students' attitudes towards Chinese language learning determine whether they will continue to study Chinese language when they finish compulsory lessons (compulsory lessons vary from school to school, but most of them have several Chinese language lessons as compulsory curriculum in the school). To summarise, this study intended to answer the following research questions:

RQ1: How do online comics afford the teaching and learning of Chinese to nonbackground learners?

RQ2: How effective are online comics for mastering Chinese word recognition in the context of teaching nonbackground learners?

RQ3: How do students' attitudes towards the use of online comics influence their ability to recognise Chinese words?

To address the three research questions, data was collected using mixed methods from an Australian bilingual public school that taught both English and

Chinese language. Quantitative data was collected in the form of pre- and post-tests on students' word recognition ability and questionnaires designed using a Likert scale pertaining to students' attitudes towards online comics. Qualitative data was collected from the teacher–researcher's self-reflective journals, students' artefacts, and an interview with the mentor teacher from the research school.

1.4.2 Research significance. The issues raised in Section 1.3.2 lead to the significance of this research. The results of this research hope to contribute to the ROSETE program, Chinese language teachers and students in the school, and the field of language education.

1.4.2.1 Significance for the field of educational research. By investigating the potential of online comics for teaching and learning CFL, this research fills a gap in the study of online comics used in the field of CFL education for nonbackground students in Australia. This research also provides insights into meaningful learning with technology in CFL education, which provides a new pathway for Chinese language research and educators.

1.4.2.2 Significance for students and Chinese language teachers. Based on the challenges that nonbackground students in Australia face when learning CFL, this research provides insights into exploring online comics' affordances and presents online comics' effective usage for CFL lessons. In this way, it hopes to present

students a customised technological tool, with which situations in daily life can be created online and provide Chinese language teachers in Australia with an innovative teaching method, especially when challenged with a lack of useful resources for teaching Chinese language.

1.4.2.3 Significance for ROSETE program. This thesis is part of the ROSETE program, which is a combination of teaching practice and educational research conducted by Chinese language teacher–researchers. All the teacher–researchers in this program seek effective pedagogies to make Chinese learnable in Australia. In the past 10 years of this program, it has been rare for teacher–researchers to adopt technology for CFL teaching and learning. By investigating the use of online comics, this research hopes to shed light on technology use among teacher–researchers in the ROSETE program.

1.5 Summary of the Chapter

Chapter 1 provided the information of CFL education globally, particularly in Australia. It highlighted that the lack of an interactive environment in the Australian context has caused challenges for both nonbackground learners and Chinese language teachers in CFL education. Technology, especially online comics, may increase the connection between CFL education and students' everyday lives.

1.6 Overview of the Thesis Structure

In this thesis, Chapter 1 provided the background of this research and introduced the research topic and research background. Chapter 2 reviews the technology trends in education, particularly CFL education. The characteristics of meaningful learning with technology are also mentioned. It concludes that the use of online comics in Chinese language teaching and learning has the potential to make CFL learning meaningful to nonbackground learners. Chapter 3 elaborates the methodology adopted in this research, which uses a mix of qualitative and quantitative methods, to explore the potential of online comics in CFL education and addresses the research questions. Key findings are presented and discussed in Chapter 4, Chapter 5, and Chapter 6. Chapter 7 summarises the findings and discusses the implications and limitations of this research.

Chapter 2

Meaningful Learning with Technology for Chinese as a Foreign Language Education

2.1 Overview of the Chapter

As mentioned in Chapter 1, nonbackground-Chinese language learners in Australia face challenges (1) from Chinese language itself, which is different from the English language system, (2) of ineffective teaching pedagogies, which makes it hard for them to learn Chinese language, which (3) leads them to feel meaningless in learning CFL. Thus, this chapter mainly reviews the literature regarding the technology used in CFL education that assists effective CFL teaching and learning. By investigating the characteristics of meaningful learning with technology, this chapter also tries to discover online comics' value for meaningful learning in CFL education. The aim of this research was to identify a gap in the existing research studies and to locate this research in the field of teaching and learning CFL by online comics.

2.2 Technology in CFL Education

Technology has been used in education for a long time, from cassette, satellite broadcasts, video recording, and computer-based instruction to mobile software applications , e-dictionaries, and so on (McLaren & Bettinson, 2016; Wang, 2015; Schifter & Stewart, 2010). For learners in the 21st century, their daily lives are strongly tied with technology (Moloney & Xu, 2015). It is therefore unsurprising that

technology is used for educational purposes to teach millennials, including teaching them Chinese language. In this section, the affordances of technology are first reviewed, followed by the introduction of some typical features of Chinese language, which together lead to the trends of technology in CFL education, especially Chinese character learning for nonbackground beginning learners. Online comics' potential in CFL teaching and learning is then explained, together with how it can fill the gap in the study of CFL teaching and learning for nonbackground learners in Australia. Last, meaningful learning is highlighted for shaping online comics' use in CFL education for nonbackground learners.

2.2.1 Affordances of technology. In the field of technology for education, the potential of technology is discussed using the concept of *affordances*: "Affordances are opportunities for action, the perceived and actual fundamental properties of a thing that determine how the thing could possibly be used" (Norman, 1988, p. 9). By definition, according to Kirschner, Strijbos, Kreijns, and Beers (2004), there are two conditions for affordances of a thing to happen—a "reciprocal relationship" between the thing and user and "perception-action coupling" (p. 49), which will invite and guide the user to take advantage of its affordances. In other words, the affordances of technology are designed to satisfy the users' needs. For educators who are investigating the affordances of technology, it is agreed that when the technology mediates educational contexts for specific learning behaviours, technology is affording learning and education (Kirschner et al., 2004). There are three affordances

of technology as Kirschner et al. (2004) described: technological affordances, social affordances and educational affordances. Tan and Zammit (2016), based on the Kirschner et al.'s notion (2004), furtherly explained that technological affordances of technology enable tasks to be done based on the technical features of the technology; social affordances "foster the social interactions among the users of the technology"; educational affordances enact the possible instructions and learning activities or behaviours (p.3).

Technological affordances of technology equip teaching and learning activities with substantial online resources and interactions between the internet and learners. Many applications on both smartphones and iPads provide students with fun in language learning. For example, *Quizlet* is a flashcard system that has an interesting auto define function allowing the user to see/choose definitions that other Quizlet users have entered for that term (Godwin-Jones, 2011). *Chinese Skill* is an application for learning Chinese words, functioning as a flashcard of words with interesting sounds, which can be used on smart phones.

Social affordances of technology help to build a collaborative learning environment in virtual reality (Greenwald et al., 2017), which makes it possible for social interaction among users. For instance, Beck, Kunert, Kulik, and Froehlich (2013) extended a 3D environment with the help of technology for a remote collaboration group study. In the field of foreign language teaching and learning, technology is able to provide learners with authentic language learning opportunities with native speakers. Golonka, Bowles, Frank, Richardson, and Freynik (2014)

reviewed some of the innovative technology that helped establish a collaborative learning partnership between early foreign language learners and native speakers, which helped students with foreign language learning. More commonly, online language tasks that need group work enhance language learning among peers, as shown by Teepe, Molenaar, and Verhoeven's study (2017) in which online storytelling enhanced preschool children's vocabulary knowledge.

According to Gee (2012), technology with educational affordances makes education learning accessible in and out of school. Richards and Rodgers (2014) agreed that, with the help of videos, music, and smart notebooks, as well as considerable authentic online teaching and learning materials, technology has broadened access to education. Jonassen et al. (2008) advocated open-ended and student-directed research projects for learning knowledge with the help of technology, rather than having to remember specific questions provided by teachers. In these projects, students are encouraged to find the answers by using online resources, which benefits them with new perspectives and experiences for understanding the questions (Jonassen et al. 2008).

According to Kirschner et al. (2004), technological affordances are mainly about the *usability* of the technology, referring to functions that allow "for the accomplishment of a set of tasks in an efficient and effective way that satisfies the user" (p. 50). On the other hand, the social and educational affordances of the technology determine its *utility*, which refers to "the set of functionalities a system incorporates" (Kirschner et al., 2004, p. 52). The usability of technology concerns the

properties that are embodied in an object to make it usable to users, while utility emphasises whether the object is valuable or useful to users by achieving their needs. Usability and utility form the usefulness of technology to users (Kirchner et al., 2004). In other words, three affordances are interlinked to achieve effectiveness for technology in education (Tan & Zammit, 2016).

2.2.2 Chinese as a foreign language. Lam (2011) pointed out in her study that, when learning CFL, learners are usually more interested in exploring why the characters are written in a certain way, which is different from English. Furthermore, students, especially at the beginning stages of learning Chinese, are curious about the generation of Chinese characters or even the roots of Chinese characters. Thus, it is important to know about the Chinese language system and the formation of Chinese characters.

2.2.2.1 Chinese language system. Chinese is recognised as a tone language, with four tones in standard Chinese (Mandarin). Its sound system Hanyu Pinyin, that is, duì (correct), serves as the pronunciation system for the Chinese written character 对 (correct). Chinese language is also regarded as a *logographic writing system* (Perfetti & Dunlap, 2008); that is, 对 (correct) has different written words or characters representing "lexical morphemes" (Ma, Gong, Gao & Xiang, 2017, p. 816), which are 又 (again) and 寸 (inch). In other words, Chinese language mainly comprises two systems: Hanyu Pinyin serves as a sound system and Chinese

characters or words serve as a written system. Most of the written words have more than one morpheme.

Hanyu Pinyin, the sound system of Chinese characters, is often taught to beginning learners when they first start to learn Chinese language, including *initials, finals,* and *tone marks* (Ma et al., 2017). For example, in Hanyu Pinyin, in duì (correct), "d" is the initial and is similar to a consonant in English, and "ui" is the final, like a vowel. The mark on the top of "i" is the tone mark that provides the specific sound for this word. There are four tone marks in Chinese, making variations in Chinese characters. Different tone marks, even with the same initials and same finals, can stand for different words and meanings in Chinese.

As for the Chinese characters, different from the alphabet-based English language, basic Chinese written characters derive from visualised objects combined with the imaginings of ancient Chinese people (Shen, 2010a), typically, *pictographic characters*. Another type of featured Chinese characters are *ideographic characters,* which are compound words with components of pictographic words; some serve as strokes in settled physical structures (Wang, 2015). For example, 对 (correct) is the left and right physical structure, and the left part 又 (again) serves as its stroke. Other than this left and right physical structure, there are other different physical structures of the words. For instance, 国 (country) has the full surround structure and its stroke 口 (mouth) surrounds the other part 玉 (jade). 会 (can) is the half surround structure with the stroke part 人 (people) on the top of the other part 云 (cloud). According to Ma et al. (2017), CFL education should include mastering the sounds, shapes, and

meanings of the Chinese characters. For CFL learners, they are expected to be able to recognise Chinese characters and acquire skills in reading and writing Chinese characters (Ma et al., 2017). For beginner learners reading and writing Chinese characters, it is better to learn the words from its formation, which means that learners can learn to recognise a word's meaning by the pictographs and ideographs.

2.2.2.2 Introduction to pictographic characters and ideographic characters.

As mentioned in Section 2.2.2.1, Chinese is a logographic writing system, and Chinese words or characters are mostly constituted by one or more than one morpheme. For example, originally, the word 对 (correct) was [image]. It combines two parts: [image] (a light) and [image] (a hand) which originally means 向着 (towards). Its common meaning now is correct; however, it has kept the original meaning in some words such as 面对 (face towards). The part [image] is a visual transcription from a light, and [image] is like a hand, which are pictographs in Chinese words. When joining them together, [image] is another word with another meaning. The logographic writing system explains how meanings of Chinese characters are related to the images of things. It shows the formation of the words. There are six categories of Chinese characters: pictograph, simple ideograph, compound ideograph, semantic–phonetic compound, phonetic loan characters, and derivative cognates, while the basic forms of Chinese characters are *pictographic characters* and *ideographic characters* (Liu, 2017; Wang, 2015).

Pictographic characters are the "icon symbols" (Wang, 2015, p. 21) of the

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forms of the concrete objects. For example, 日 (sun) is a pictographic character that is evolved from ☉ which indicates the sun. Pictographic character 人 (person) is evolved from the picture 𐎛 which profiles a standing person. Pictographs are the basic forms of the Chinese words, with most of the strokes rooted in ancient inscription (Wang, 2015). For example, 亻 is derived from the inscription of the standing person 𐎛 so it can be speculated that most of the Chinese characters with 亻 have some meaning related to a human being, like 你 (you) and 伴 (partner).

Ideographic characters "were created by combining two or more pictographs to express abstract meaning" (Shen, 2010b, p. 486). For example, the pictographic character 人 (person) is simplified and has evolved from 𐎛 . When putting two persons together, 从 (follow) is constructed.

2.2.3 The trend of technology in CFL education. Li et al. (2016) found that almost all CFL learners think Chinese characters are the most difficult part to understand and remember in learning CFL. With the help of technology, there are two main trends for CFL teaching and learning regarding Chinese character recognition: (1) learning Chinese words by embodied animation and (2) learning Chinese words in a virtual environment created online.

2.2.3.1 Embodied animation for Chinese characters learning. A branch of educators design technology for Chinese characters learning under the theory of *embodied cognition*. Lu (2011) advocated that embodied cognition is characterised

"as action and perception in human cognition" (p. 38). She emphasised that Chinese words are highly visual in orthography, and with the help of a designed system by technology, CFL learners are able to mimic Chinese characters by moving their body (Lu, 2011). Mind is embodied and cognition happens when the body engages with the physical and cultural world (Gibbs, 2006). In this dynamic progress, the body simulation of Chinese characters and output by the technology (as shown in Figure 1 and Figure 2) enhance the orthographic knowledge in the process of CFL, specifically in form, sound, and meaning (Xu, Chang, Zhang & Perfetti, 2013).

Figure 1. Embodied animation system (Lu, Hallman, & Black, 2013).

Figure 2. Interface of embodied animation system (Daily et al., 2014)

2.2.3.2 Virtual environment for use of Chinese characters. Based on embodied cognition theory, which emphasises acquiring a foreign or second language

by the interactions between the learner's perception, body, and environment (Barsalou, 2008; Lan, Fang, Legault, & Li, 2015), there is a trend in technology for creating a virtual environment in language education, including CFL education. Online virtual environments, such as Second Life, Active World, Open Simulator, and so on provide language learners with a 3D simulated environment that enables language learners to experience a simulated life with the target language (Lan et al., 2015). Lan et al. (2015) compared learning Chinese vocabulary in the virtual environment (VE) with picture–word (PW) associative learning. The finding of their study suggested that VE contexts may provide "an important facilitatory platform that enhances second language vocabulary acquisition, especially for later stages of learning" (Lan et al., 2015, p. 685). The difference between learning Chinese vocabulary in a VE and by PW in Lan et al.'s study (2015), as shown in Figure 3, is that in VE, participants learn the Chinese vocabulary (e.g., 狮子 [lion], 大象 [elephant], 兔子 [rabbit]) in a simulated situation (e.g., a zoo) with participants using their own avatars, while in PW learning, participants learn the words by looking at pictures and remembering words.

Figure 3. VE context and PW context.

2.2.3.3 Discussion of technology for CFL nonbackground learners. Many

nonbackground language learners are keen on rote memorisation as they find that mechanical memorisation is effective in helping to learn the new words; they can learn not only more words, but also grammar and sentence structure, by spending time on rote memorisation (Yang, 2003). There are many software applications such as digital flash cards, digital character writing programs and digital Chinese literacy reading help nonbackground learners learn and memorize Chinese characters (McLaren & Bettinson, 2016). Rote memorisation helps them to develop memory strategies (Yang, 2003). However, although rote memorisation may help students to improve their amount of vocabulary in a short period, it can also reduce students' interest in the language itself as learning progresses (Dobinson, 2014). For a comprehensive communication skill of the language, students need more than rote memorisation (Yang, 2003). Ribot, Joff and Burridge (2017) stressed that language teaching and learning should be developed alongside language use.

For nonbackground learners in CFL education, embodied animation and the VE are creative strategies that can help them understand, remember and use Chinese characters in the real-world life situations. However, the approach of embodied animation for CFL teaching and learning is based on the features of Chinese characters, which are orthography and pictography. It can be difficult for nonbackground beginning learners to learn words that are ideographs. Embodied cognition also requires a specific online animation system for Chinese characters learning, and this places a heavy financial investment on schools. On the other hand, the VE provides language learners with a good scene by which to remember the

vocabulary; however, although a game-based VE might be practical for advanced and adult language learners (Lan et al., 2015), it may not necessarily be useful for nonbackgound beginning learners to practise using the target language. Nonbackgound beginning learners are mostly primary students in Australia, and they do not have enough control of themselves in the game-based virtual world.

Nevertheless, these two trends of technology for CFL education, especially for Chinese character learning, highlight that it is effective to learn and master Chinese characters by learning their formation and to practise using the words in a real-world situation. In the recent New Media Consortium (NMC) technology report, the requirements of technology for Chinese K–12 also showed that learning based on real-life situations should be brought into the classroom with the help of technology to facilitate students' Chinese language learning (Johnson et al., 2016). Although the NMC technology report (Johnson et al., 2016) gave the outlook for K–12 educations in China, the following three points inspired this study towards CFL education in the Australian context:

(1) "Growth of discovery-based learning" is one of the short-term trends of technology designed for education in 2017 or 2018 (Johnson et al., 2016, p. 6). In other words, it aims to encourage students to draw on the knowledge learnt in the classroom as well as their life experience to solve the problem in real-world situations.

(2) "Redesigning learning spaces" is one of the trends for the following three to five years (Johnson et al., 2016, p. 6). By redesigning the learning environment, the "classroom will start to resemble real-world work and social environments that

facilitate organic interactions and cross-discipline problem solving" (Johnson et al., 2016, p. 6).

(3) *"Shift from learners as consumers to creators"* is one of the important long-term trends for technology applied in the education area (Johnson et al., 2016, p. 5). Via interaction with technology, learners can make and create content, other than simply consume it. With the guidance of technology, learners' creativity through hands-on learning can be cultivated (Johnson et al., 2016).

For nonbackgound learners, learning CFL is more abstract than native language learning. When learning an abstract language, as Oller (1983) pointed out in his theory, a logical structure and conclusion in a dialogue or text can essentially help students to recognise and memorise knowledge learnt in language classes. Oller (1983) also explained that "texts (oral or written forms of discourse) which are more episodically organized can be stored and recalled more easily than less episodically organized material" (p. 44). Carey (2004) advocated the use of comics in English language teaching and learning as an example of short but organised materials with a logical structure. As online comics are becoming popular, they are recommended for use in language teaching and learning as they can be easily created and designed based on real-world situations.

In the field of technology for language education, online comics are not as well-known as online virtual world websites. However, online comics with situational images are a simplified virtual world, and with contextual clues, they have value in language education to help students memorise the meaning of words, and review and

understand the language (Combs, 2003). Online comics have rarely been adopted in CFL education by Chinese language teachers in the Australian context. The intention of this study was to locate online comics in CFL education as a method to bridge the gap between classroom language teaching and learning, and real-world language use.

2.2.4 Online comics for CFL teaching and learning. Comic strips first appeared in the 19th century in the United States and quickly became popular (Garrity, 2011). In 1985, the first online comic was released in the internet. In 1993, David Farley built the first website especially for online comics (Garrity, 2011). According to Garrity (2011), online comics could not become universal at that time because few people had access to the internet. With the development of websites and technology, from 1995, online comics were generalised by some cartoonists and published on some websites for students. By the time of 2011, online comics had been adapted by social media and mobile devices, and they became more interactive among readers (Garrity, 2011). Now anyone can create, publish, and share their own online comics with the help of apps.

Modified from printed comic strips, online comics have kept the feature of showing a logical structure in a storyline visually. On the other hand, they have more advantages than printed comics do. McCloud (2006) emphasised that online comics utilise the infinite canvas of the internet, which is a more flexible platform than traditional printed comics. Targeted audiences have more access to reading online comics and sharing them with others through the internet than traditional, printed

comics.

As online comics are a highly visualised art, researchers have noticed they are useful in language teaching in the following aspects:

(1) Motivating: Online comics can capture learners' interest in learning a language since human beings have a natural attraction to pictures (Yang, 2003). Readers tend to receive intuitively the information conveyed by the pictures, which encourages them to learn the language and content using multimodal communications. Faulkner (2009) claimed that online comics spur students to write. Bledsoe (2010) added by following the sequence of ideas, more proficient students can acquire the written language skills to create a beginning, a body, and draw a logical conclusion.

(2) Visual: Images/cartoons/artwork within online comics are added with text to tell a story that emotionally connects students with the characters depicted in the various situations (Versaci, 2001). The situations and conversations in online comics promote students to recall their prior experiences, which are needed to understand the texts they read or compose.

(3) Permanent and flexible: Williams (1995) explained that comics have permanent and visual components. Different from films and animations, which decide the pace of viewing the content and guide the audience's pace of thinking, online comics are a text medium that is permanent, and audiences can read and recall the information at their own pace. It provides language learners with flexible time to read and think about the language points and structures.

(4) Meaningful learning: Hutchinson (1949) argued that "there should be harmony between the child's ongoing life activities and his experiences in the school—new learning always is a continuation or expansion of learning already possessed by the learner" (p. 236). Technically, online comics allow users to design their own comics. Teachers can design online comics with social events and combine language knowledge with students' daily routines to use as teaching resources, by which to recall knowledge connection with the target language (Kallinikos, Leonardi, & Nardi, 2015). When students create online comics, the composition process helps to build their language use (Wilujeng & Lan, 2015), as well as promote social interactions when they create comics with their peers. In addition, online comics encourage students to "become critical consumers of media messages" (Morrison, Bryan, & Chilcoat, 2002, p. 759). Analytical thinking skills can be developed by using online comics. Students can not only learn language but also learn the contemporary lifestyles and values of the target language through online comics.

There are a few examples of printed comics and online comics used in teaching and learning a foreign language. In 2001, English professor Rocco Versaci at Palomar College in the United States used online comics to explain abstract concepts and abstruse literature. Versaci (2001) said that unlike traditional literature, online comics are able to blend words and pictures to show the meaning of literacy by forming images in the reader's mind through illustrations. Liu (2004) also pointed out that comics are especially effective for students' reading comprehension when learning a second or additional language. In Csabay's (2006) study on using comics in

an English as a foreign language (EFL) class, he pointed out that comics help students remember words, expressions, and grammatical forms more easily. Having the same but more functions than comics, online comics provide scaffolding to students and support their language ideas, such as in reading and writing, with images (Yunus, Salehi, Tarmizi, Syed, & Balaraman, 2011). In Yunus et al.'s (2011) study on using online comics for EFL, they found that creation of online comics is a great approach for students to practise vocabulary and grammar. With the situation, or story setting, in an online comic, words can be introduced, and grammatical points, which are embedded in the online comic's settings, can be recalled and practised. In addition, the visual nature of online comics helps students deal with both spoken language skills and nonverbal communication. Based on life-like situations, colloquial expressions are used, preventing students from recalling and speaking bookish language. Since online comics show gestures and body language of the characters, students acquire cultural models that fit the situations shown in online comics (Csabay, 2006).

Wilujeng and Lan (2015) adopted online comics as a teaching and learning method in their study to help students with Chinese words learning. Practised in CFL lessons, their study found that students in the experiment group who used online comics for teaching and learning showed more positive results of vocabulary skills and a more positive attitude towards learning CFL then the control group who did not use online comics. Wilujeng and Lan (2015) argued that when non-Chinese-speaking students create comics on the internet, they gain improvement in their Chinese

language skills, specifically in terms of their ability to recall and use new words. The characters and images of situations in online comics help students organise their thoughts and recognise words (Bledsoe, 2010).

2.3 Meaningful Learning with Online Comics

In the process of learning, students tend to feel that learning is meaningful to them when they are engaged in a meaningful task willingly, termed *meaningful learning* (Jonassen et al., 2008). Meaningful learning happens when the teachers help students to learn "how to recognise and solve problems, comprehend new phenomena, construct mental models of those phenomena, and, given a new situation, set goals and regulate their own learning (learn how to learn)" (Jonassen et al., 2008, p. 2). In foreign language teaching and learning, students get a meaningful sense of learning the language when they use the learnt language to solve the problems in the real world (Singh & Han, 2014). Whether or not students gain a sense of meaningful learning influences their learning results and attitudes (Curnow & Kohler, 2007; Jonassen et al., 2008). This research is inspired by Jonassen et al. (2008) and agrees that it is important to build a meaningful learning environment with online comics for nonbackground students when learning CFL.

2.3.1 Characteristics for meaningful learning with technology. The term meaningful learning was first proposed by Ausubel (1963); learning can be claimed to be meaningful when it has linkages to learners' existing knowledge and life

experiences, and learning content is consistent with learners' cognitive structure. Since then, Ausubel's definition has been developed. There are many dimensions for evaluating meaningful learning, but Jonassen et al.'s (2008) definition of meaningful learning is mostly suggested by researchers when the learning is combined with technology. This research therefore adopted Jonassen et al.'s (2008) definition of meaningful learning with technology as a learning that is "active, constructive, intentional, authentic and cooperative" (p. 2). The following five dimensions were suggested by Jonassen et al. (2008) as the main criteria for evaluating the use of technology for meaningful learning:

(1) Active: Meaningful learning requires technology to engage learners actively. In this learning process, the learners manipulate objects and generate their own understanding through observing the effects and results of the manipulations.

(2) Constructive: Technology tasks are required to guide learners to articulate and reflect on their activity and observations. It is essential that learners are able to construct the mental models to explain their observations with their prior knowledge.

(3) Intentional: Technology is required to engage learners to represent their understanding of the knowledge. In this process, driven by the goal, learners are intentional and are able to learn more in a meaningful way.

(4) Authentic: Technology need to integrate the real-world life situations into learning contexts. "Learning should be embedded in real-life" (Jonassen et al., 2008, p.4), and technology needs to promote learners to practise and apply the learnt knowledge in useful contexts.

(5) Cooperative: Technology is required to promote collaborative learning among learners, where learners discuss opinions and exchange ideas to solve problems. Working together is a natural phenomenon in human society, from which learners are able to learn multiple solutions to problems.

Through these criteria, Jonassen et al. (2012) suggested that meaningful learning occurs when technology engages learners in knowledge construction, discussion, articulation, collaboration, and reflection. Technology for meaningful learning should function as an intellectual tool kit that allows users to build their personal understanding of the knowledge using technology based on the course requirement.

As one technology tool, it was important to assess meaningful learning with online comics and then shape meaningful learning for this study based on the dimensions above. Carter (2011) suggested that online comics are attractive, short content with a logical sequence of stories; they can engage students in learning a language, especially students learning a foreign or additional language. It was also implied that students' procedure in creating online comics helps them construct and connect with their knowledge of authentic life situations and helps to strengthen cooperation among peers while they are creating online comics (Cary, 2004; Carter, 2011), which is a constructive and cooperative process with intention. Moreover, content of online comics can be designed as a real-world situation by both teachers, when combined with course knowledge to teach, and by students when they create online comics by themselves (Yang, 2003).

Jonassen et al. (2008) argued that students get meaningful learning when using technology but not from it. Technology should not be used as a delivery vehicle for instructional lessons (Jonassen et al., 2008). Curnow and Kohler (2007), in their research about factors that influence students' interest and decision to continue learning a foreign or additional language, argued that the connection between the learnt language and its value to students' current daily lives is a deciding factor. Students look for the value of learning a language by themselves at the same time as they are learning the language. In Curnow and Kohler's research (2007), for example, some students were willing to learn French or German because they had family members at home speaking those languages. Orton (2008) also found in her study that most of the students who continued to learn CFL in Australia were background learners with a Chinese background. For nonbackground learners, the lack of environment in their countries for them to use the language becomes a negative impact on their learning outcomes and attitudes towards learning the foreign language (Bartram, 2010). Online comics, as suggested by many educators, can take advantage of designing online comics to incorporate everyday life activities and situations (Carter, 2011; Cary, 2004; Yang, 2003). In the Australian context, if students use the learnt Chinese language to create online comics with their own life situations, they can practise the language knowledge they acquire.

Through the literature review, this study was inspired to explore how online comics assist nonbackground learners in CFL education when they create online comics, as well as how it influences their attitudes to CFL learning.

2.4 Summary of the Chapter

In this chapter, the current research on technology in teaching and learning CFL was reviewed, and it was found that most of the methods for Chinese words teaching underlie the features of Chinese character formation, which are pictography and ideography. The trends of technology indicate that it is effective if learners learn CFL in a VE, which means to bring a real-world life situation into the classroom. It was further discussed that for nonbackground learners in Australian, who are mostly primary school students, establishing a computer game-based learning environment in the classroom is neither suitable nor practical. Therefore, online comics may be more suitable for this group of learners. It is an innovative technological tool that allows users to incorporate real-life situations with teaching and learning content. In this research, online comics was used and examined to fill the gap of using online comics for nonbackground learners in CFL education in the Australian context. In addition, the importance of meaningful learning was explained and emphasised. This study aimed to have a positive influence on nonbackground learners in CFL education by providing them with a meaningful learning environment using online comics.

Chapter 3

Methodology Design in Exploring Online Comics Used in Chinese as a Foreign Language Education

3.1 Overview of the Chapter

As discussed in Chapter 2, research has shown that online comics are useful for teaching CFL. Yet, not many studies have examined its use in Chinese language teaching and learning for nonbackground learners in a non-Chinese-speaking society. The intent of this chapter is to detail the methodological procedures used in the present investigation in using online comics for Chinese language teaching and learning for nonbackground learners.

In this research, there were three research questions: a qualitative question, a quantitative question, and a mixed methods research question. It was suggested by Creswell and Clark (2018) that, in a mixed methods study, it is useful to present all three types of questions to make explicit the research purpose statement. In this research, RQ1 asked, "How do online comics afford the teaching and learning of Chinese to nonbackground learners?" By using a qualitative method, this research question aimed to explore online comics' affordances and to understand online comics' usage in CFL teaching and learning. RQ2 asked, "How effective are online comics for mastering Chinese word recognition in the context of teaching nonbackground learners?" This quantitative research question intended to measure the online comics' effectiveness in Chinese language education. RQ3, "How do students' attitudes towards the use of online comics influence their abilities to recognise Chinese words?"

is a mixed methods research question. By converging both qualitative and quantitative data, this research question investigated students' attitudes towards online comics in Chinese language education and explored the relationships between students' attitudes and their improvement in Chinese word recognition ability.

In this chapter, the first section describes the researcher's worldview of pragmatism and explains the preference for the paradigm used in this mixed methods research in underlying the view of pragmatism. The second section is about research design, showing the approaches to collecting data in both the quantitative method and qualitative method. The third section elaborates the synthesis of the qualitative and quantitative methods to bring greater insight to the mixed methods research question. The reliability and validity of the design, the ethics of this study, and a summary are presented in the last three parts of this chapter.

3.2 Pragmatism and Mixed Methods

Philosophical assumptions, also described as a worldview, consist of "a basic set of beliefs or assumptions that guide inquiries" (Creswell & Clark, 2018, p. 35), providing a foundation for using mixed methods (Creswell & Clark, 2018). According to Creswell and Clark (2018), four worldviews are most useful for informing mixed methods research: post positivist, constructivist, transformative, and pragmatist. It is important to note that the pragmatist worldview shaped mainly the process and conduct of the mixed methods in this research.

3.2.1 Pragmatism. As a typical worldview associated with mixed methods, pragmatism is centred on problems and oriented by real-world practice (Creswell & Clark, 2018). Summarised by Creswell and Clark (2018), pragmatism has the following elements:

a) Singular and multiple realities (e.g., researchers test hypotheses and provide multiple perspectives);

b) Practicality (e.g., researchers collect data by "what works" to address the research question);

c) Multiple stances (e.g., researchers include both biased and unbiased perspectives);

d) Combining (e.g., researchers collect both quantitative and qualitative data and mix them);

e) Formal or informal (e.g., researchers may employ both formal and informal styles of writing). (p.38)

Research embracing pragmatism as the optimal worldview is based on real-world practice and is "a practical and applied research philosophy [that] should guide the methodological choices" (Creswell & Clark, 2018, p. 39). It opens up to many ideas, valuing both objective and subjective knowledge, and adopts approaches that work for the research questions. Teddlie and Tashakkori (2003) said, on the primary importance of the research questions, that pragmatism may adopt both quantitative and qualitative research methods in a study. In this research, with the hypothesis that online comics with their pictorial feature can affect Chinese language teaching and

learning for nonbackground learners, mixed methods were applied, guided by a pragmatist stance, to explore the influences of online comics and the extent to which they affect Chinese language learning and teaching for nonbackground learners. The following section discusses the essentials for using both qualitative and quantitative methods in this research.

3.2.2 Mixed methods. Less well known than quantitative or qualitative approaches, it was not until 1959 that the mixed methods approach was first adopted and encouraged for use in studies by Campbell and Fisk (cited in Creswell & Clark, 2018). It is widely acknowledged that mixed methods can neutralise the biases of using one method, that is, either quantitative or qualitative (Creswell & Clark, 2018). Calfee and Sperling (2010) said that with the database from two methods "sitting" together and "talking" (p. 3) with each other, the shortcomings of using only one method can be filled.

Qualitative research is known to be useful for understanding the contextual and background factors associated with a study and providing perspectives from the participants (Creswell & Clark, 2018). For instance, Kelly and Bruen (2015) conducted a qualitative study on translation as a pedagogical tool in the foreign language classroom to explore 12 participants' attitudes towards translation in language teaching (TILT). Adopting a qualitative research design enabled them to obtain each participant's perspective on TILT, which indicated positive attitudes and support. However, limited by the small number of case studies in their study, this

research does not account sufficiently for the other negative attitudes towards TILT held by many educators. It is also suspected that personal interpretations by the researcher tend to cause bias in purely qualitative research (Creswell & Clark, 2018).

Quantitative research, on the contrary, does not have the weakness in generalising findings to a large group (Creswell & Clark, 2018). For instance, Llorente, Gómez, and García-Peñalvo (2016) adopted a quantitative research design to pursue students' perspectives of asynchronous tools (podcast, videocast, online tests, online glossary, and forums) in teaching English grammar in English as a second language (EFL) education. Based on the data of questionnaires collected from 358 participants, their study indicated the positive attitudes students had towards asynchronous tools in English grammar learning in general. However, this study was not able to explain enough the reasons for the positive attitudes, which could only be addressed if they had done a qualitative design of data collection and analysis.

Adopting both qualitative and quantitative methods benefits pragmatism with the potential of "a comprehensive answer to the research question" (Denscombe, 2008, p. 274). This research agreed with Feilzer's (2010) opinion that, even adopting both qualitative and quantitative methods as mixed methods, having absolute certainty and a complete understanding of the data to solve research questions is unlikely, as the data collected is part of the research, and uncertainty of data needs to be acknowledged. Nevertheless, Feilzer (2010) pointed out that using mixed methods can minimise this uncertainty and echoes the principles of pragmatism. Since this research was based on pragmatism, it relied on qualitative data from students', the

mentor teacher's, and the researcher' perspectives, to provide rich accounts of how the students think and behave in Chinese lessons when online comics are used. There was an established practice of measuring students' word recognition abilities using a word test. Hence, effectiveness was understood in this research by numerous quantitative data.

The definition of mixed methods has evolved through many years of reviewing mixed methods studies. In the latest edition of Creswell and Clark's book (2018), instead of giving a specific definition of mixed methods, they incorporated diverse viewpoints of the definition and stressed the core characteristics of mixed methods research, which

> collects and analyses both qualitative and quantitative data rigorously
>
> in response to research questions and hypotheses, integrates (or mixes
>
> or combines) the two forms of data and their results, organizes these
>
> procedures into specific research designs that provide the logic and
>
> procedures for conducting the study, and frames these procedures
>
> within theory and philosophy. (p. 5)

These core characteristics are evident in this research. First, the research questions were developed according to Creswell and Clark's (2018) recommendation to develop three types of research question: a qualitative question, a quantitative question, and a mixed methods question; hence, both qualitative and quantitative data were collected to answer the three research questions. Accordingly, qualitative and quantitative analysis methods were adopted to pursue the research inquiries (see

Section 3.4, Data Collection and Analysis), especially for RQ3, which required synthesis of the analysis from both qualitative and quantitative data. Suggested by Creswell and Clark (2018), this research adopted a convergent design, where "qualitative and quantitative data are collected in parallel, analysed separately, and then merged" (p. 155).

To develop a deeper insight of how students' attitudes towards online comics influenced their abilities in learning CFL, the researcher merged both qualitative and quantitative data analyses. The next section details the research design.

3.3 Research Design

According to Creswell and Clark (2018), the context of the sampling in the research decides both the qualitative and quantitative data collection method, as well as the procedures for collecting data. This section elaborates the choice of this research design: the convergent design and the procedures for collecting and analysing both qualitative and quantitative data based on the research context.

3.3.1 The convergent design. Pragmatism provided "an umbrella worldview" (Creswell & Clark, 2018, p. 69) for this study, which assumed that the convergent design of merging qualitative and quantitative data to answer the research questions was well suited for this study. Nevertheless, it is necessary to know why the convergent design was adopted in this research after comparing with other mixed methods designs.

According to Creswell and Clark (2018), there are seven types of mixed methods designs: the explanatory sequential design, the exploratory sequential design, the mixed methods experimental design, the mixed methods case study design, the mixed methods participatory social justice design, the mixed methods evaluation design, and the convergent design. The convergent design was adopted in this research. With a convergent design, the data collection involves gathering both quantitative and qualitative data at roughly the same time, analysing the two databases separately, and then merging or comparing the results from the two databases.

The purpose of this study was to explore online comics' affordances, their effectiveness, and the influences of students' attitudes towards online comics on students' vocabulary recognitions abilities. According to Creswell and Clark (2018), qualitative studies value the changes of phenomena, while quantitative studies are about influences of the variates. In this research, the focused phenomenon started to change when online comics were used in the process of CFL teaching and learning. The influence ceased only when this variate, online comics, stopped affecting the CFL education procedure. The two types of data collected in this research were paralleled to explore the influence of online comics on nonbackground learners in CFL education; the types of data were separate but prioritised equally, as described in the convergent design (Creswell & Clark, 2018). It was beneficial to this research that, in the convergent design, participants' perspectives gathered in an open-ended way (e.g., semistructured interview) were combined with perspectives drawn from the researcher's standpoint (e.g., questionnaire) and compared to obtain a complete

understanding of the research problem (Creswell & Clark, 2018). "Researchers are able to give voice to participants as well as report statistical trends" (Creswell & Clark, 2018, p. 72).

3.3.2 Research site. As one of the Chinese language teacher–researchers in the ROSETE program, the researcher was appointed volunteer Chinese language teacher at the Lakeside Public School (pseudonym). It was the first bilingual school in NSW to teach both Chinese and English (K. Tan, personal communication, December 15, 2016). Two thirds of the classes in the school were bilingual. However, Chinese was taught in both bilingual and nonbilingual classes. In the bilingual classes, Chinese was taught five hours per week, while nonbilingual classes were taught one hour per week. Students could opt to enrol in bilingual classes.

It should be noted that Chinese language teaching and learning at Lakeside Public School was supported by Hanban in terms of Chinese teaching materials, financial support, and assistance of Chinese language volunteer teachers. One Confucius classroom was established in the school, providing students with a special classroom facilitated with Chinese books, videos, and Chinese musical instruments, which could better facilitate the teaching and learning of Chinese language and Chinese culture. As a bilingual school, there were five Chinese language teachers in the school and two Chinese language volunteers from Hanban. The school adopted the CLIL program, which combines language learning with school subjects (Orton, 2008; Moloney & Xu, 2015). Chinese language teachers in the school designed

Chinese language programs and prepared lesson plans based on CLIL and the NSW Chinese K–10 Syllabus (Board of Studies NSW, 2003). The researcher's Chinese lesson plans were designed in accordance with the school Chinese language programs but with the integration of online comics.

3.3.3 Research participants. As a volunteer Chinese language teacher, the researcher was accompanied by a mentor teacher in the school who guided the researcher with lesson preparation and delivery. The mentor teacher was also an experienced Chinese language teacher, and the researcher was teaching in her classes, that is, one class of 30 students in Year 5, and in the other, 30 students in Year 6. All 60 students in the classes and the mentor teacher were invited as participants in this research.

3.3.3.1 Students. The students were from one Year 5 class (aged 10 to 11) and one Year 6 class (aged 11 to 12) with a total of 60 students. These two classes were both bilingual classes, in which the students had been learning Chinese language since they attended kindergarten at the same school. All the students were nonbackground-Chinese language learners (K. Tan, personal communication, December 15, 2016). They took the Youth Chinese Test (YCT) in 2015, which was organised by Hanban as an assessment of students' proficiency level through listening and reading tests. The results showed that these students were able to master more than 100 Chinese words. In other words, they were able to recognise word meanings by matching words with

pictures and words with Pinyin, the Chinese phonetic alphabet with four tones. They were also able to construct simple sentences in Chinese. However, students were always struggling to learn new Chinese words or to remember the learnt words (K. Tan, personal communication, December 15, 2016).

3.3.3.2 Mentor teacher. In this research, the mentor teacher from the research school was invited as one of the participants. The mentor teacher was an experienced Chinese language teacher who had taught Chinese language in this school for 10 years. She helped the researcher with teaching practice and classroom management, and she observed all the researcher's lessons with online comics, giving the researcher feedback after the lessons. She was invited to take part in this research and answered some questions about online comics in an individual interview.

3.3.4 Teaching and learning sequences using online comics. As a teacher– researcher, the researcher was appointed to teach 40 minutes in each class out of the mentor teacher's two-hour Chinese language lessons. In other words, in the same Chinese language lesson, the mentor teacher would teach Chinese language with her content for one hour and 20 minutes, while the researcher would teach for 40 minutes with her online comics content. As a bilingual school, the school had their own Chinese program, and the researcher's lesson plans were required to be consistent with the school's learning goals. Following is a detailed introduction to the word list and lesson plans for this research.

3.3.4.1 Word lists for Chinese language teaching and learning. During the time this research was being conducted in the school, the school's Chinese language program had its own required vocabulary list, which is shown in Table 1. It means that, in the first part of the two-hour lesson, the mentor teacher would teach students some of these words.

Table 1

Vocabulary List from the School Chinese Program (in Chinese and English Versions)

地图 map	图表 graph	多样性 diversity	设计 designs	图案 patterns	书法 calligraphy
经度 longitude	纬度 latitude	符号 symbols	收藏 collections	风格 style	宣纸 rice paper
庆祝 celebration	联系 connections	古代 ancient	惯例 ritual	横 horizontal	砚 ink stone
祖先 ancestors	传统 tradition	形式 forms	影响 influences	平衡 balance	花鸟 flowers and birds
当代的 contemporary	画卷 scrolls	灵感 inspiration	创作 composition	毛笔 brush	墨 ink
线 line	符号 symbols	价值 value	山水 landscape	花卉 flowers/blossom	雕刻 engravings
演绎 interpretation	艺术 art work	统一的 unified	人物 figure/people	动物 animals, birds and insects	象征 symbolic

The requirement of the researcher was to teach Chinese language content associated with these words in the last 40 minutes of the lesson. To avoid the repetition of learning the same words, the words in Table 2 were chosen by the mentor teacher for the teacher-researcher's Chinese language lessons with online comics for

this research. The mentor teacher and the teacher-researcher had both noticed that students had limited capacity to recognise words, although they had some years of experience in learning Chinese language. These words were chosen for the purpose of examining students' word recognition ability. They were also chosen because they connected the online comics lessons with the list of words from the mentor teacher's lessons.

Table 2

Vocabulary List for Online Comics Lessons (in Chinese and English Versions)

我会	椅子	笔直
I can	chair	straight
对吗	怎样	握住
correct	how about	hold
用	特色	黑色
use	specialty	black
放	淡淡的	白色
put	light	white
桌子	写字	沾一下
desk	write	dip

In the school's Chinese language program, Year 5 and Year 6 were together included as Stage 3, who shared the same Chinese language teaching and learning content at that time. Thus, students in Year 5 and Year 6 were taught the same Chinese language knowledge, including knowledge received from both the mentor teacher and the researcher, during the research period.

On the other hand, as the Chinese language teaching program in the school was based on CLIL, it is important to note that the vocabulary list in the research

period mainly consisted of words related to the subjects of calligraphy and geography. This leads to the reason for the chosen words in the vocabulary list for online comics, which was designed to match the mentor teacher's vocabulary. For instance, the words 我会 (I can) and 用 (use) in the word list were designed to match 毛笔 (brush) in the mentor teacher's vocabulary list. The same reason applied to 沾一下 (dip) to match with 墨 (ink). It was the researcher's purpose to make sentences in the online comics, using the mentor teacher's words, to make up conversations in designed situations. It was also a requirement of the K–10 Syllabus NSW (Board of Studies NSW, 2003) that a student at Stage 3 needs to be able to connect, organise, and respond to key points in the familiar context. The vocabulary chosen for online comics lessons allowed students to create a meaningful context, which could be designed and built into the online comics to enhance students' language knowledge.

3.3.4.2 Online comics tool for teaching and learning Chinese characters.
There are many online comic creation tools (Vassilikopoulou, Retalis, Nezi, & Boloudakis, 2016) such as *Toondoo*, *Comic Life, Comics Head Lite,* and *Pixton*. These online comic tools allow users to create and design their own customised comics. Among them, the websites Toondoo and Pixton require registration and sign-up for comic creation and review. Although they have rich graphics and images, it is considered inconvenient for primary students to create comics. Comic Life and Comics Head Lite have application (app) versions on iPad and do not require registration for use, but Comic Life does not have a free version. Comics Head Lite is

free to use on iPad and is easier for primary students. As Figure 4 shows, images in categories can be chosen by users, such as panels, background, characters, photos, text bubbles, and other functions to allow primary students to create online comics. Since students in this research had used iPads regularly for learning and were familiar with using apps on an iPad, Comics Head Lite was chosen as the online comic tool for both teaching and learning Chinese language in the researcher's lessons.

Figure 4. Screenshot of Comics Head Lite app ("Nextwave Multimedia Inc", 2017).

3.3.4.3 Outline of teaching and learning sequences. In the 10-week term, the unit of work started with a pre-test in both classes. Students attended the pre-test one by one in a separate room. Every word in Table 2 was printed out and shown to the students randomly. Students were required to recognise each word with its pronunciation and its meaning. The number of recognised words was recorded after the student left and before the next student was called into the room. In the following weeks, students were taught vocabulary with online comics, arranged to create online comics using the learnt words in two lessons' time. At the end of this research,

students were required to do the post-test, which was in the same form as the pre-test. After that, students were required to choose the answers to items in a questionnaire about online comics. The outline of the unit of the lessons is shown in Table 3 (there were no Chinese lessons in some weeks due to school events).

Table 3

Outline of the Unit of Lessons

	Year 5	Year 6
Week 1	Pre-test	Pre-test
Week 2	我会 (I can) 用 (use) 对吗 (correct)	我会 (I can) 用 (use) 对吗 (correct)
Week 3	No Chinese lesson due to competing school event	No Chinese lesson due to competing school event
Week 4	放 (put) 桌子 (desk) 椅子 (chair)	放 (put) 桌子 (desk) 椅子 (chair)
Week 5	写字 (write) 黑色 (black) 沾一下 (dip) 笔直 (straight) 握住 (hold) 白色 (white)	No Chinese lesson due to competing school event
Week 6	怎样 (how about) 特点 (speciality)	写字 (write) 黑色 (black)

	淡淡的 (light)	沾一下 (dip) 笔直 (straight) 握住 (hold) 白色 (white)
Week 7	Planning comics on the worksheet by students	怎样 (how about) 特点 (speciality) 淡淡的 (light)
Week 8	Creating online comics by students	Planning comics on the worksheet by students; creating online comics by students (two lessons; one was a make-up lesson)
Week 9	Students' presentations of online comics	Students' presentations of online comics
Week 10	Post-test and questionnaires	Post-test and questionnaires

The researcher designed her own online comics with Comics Head Lite for teaching Chinese language. For example, Figure 5 shows the online comic used for the first lesson. The key words and key sentences were designed to be in accordance with the mentor teacher's lesson. In the mentor teacher's lesson, the key learning words were 地图 (map), 经度 (longitude), and 纬度 (latitude), and the key sentence was 上海在北纬 30 读度，东经 120 度 (Shanghai is at 30 degrees of north latitude, 120 degrees of east longitude). Thus, the key words in the online comics, 我会 (I can), 用 (use), 对吗 (correct), were designed to connect with the last lesson. For example, 我会用 (I can use) and 地图 (map) could be connected as 我会用地图 (I can use the map). The conversations in the online comics were designed so that students were

required to describe the situations in the online comics and guess the meanings of the words referring to the situations. In this way, students reviewed the vocabulary (地图 map) and sentences in the previous mentor teacher's lessons and learnt the teacher-researcher's key vocabulary words (我会用 I can use) with the help of designed online comics.
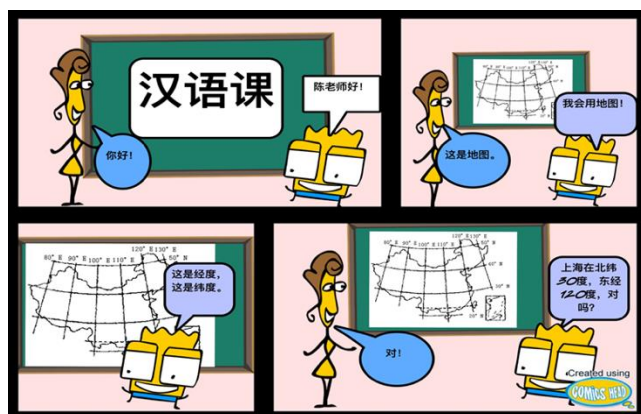
Figure 5．Screenshot of first lesson using online comics.

Apart from learning the words in the online comics, some of the Chinese characters were also explained by pictography or ideography as a scaffolding strategy to help students understand the formation of the words. Pictographs or ideographs explain the connections between Chinese words and the visual images from which the words derive (Shen, 2010a). This is one of the typical features of Chinese characters and a good entry to Chinese culture (Wang, 2015). Figure 6 shows the Chinese word 会 with a picture of Sun Wukong (a Chinese mythological figure) on a special cloud. The researcher told students the story of Sun Wukong (Monkey God), who in Chinese legend was regarded as an almighty monkey who could fly fast with his special cloud. The upper part of the picture looks like the word 人 (person) with his two legs apart, and the bottom part is 云 (cloud). These two parts, when joined together, form the

word 会 (can). This scaffolding of pictography helped students to remember the formation of the word 会 with the story of Sun Wukong, a person who can (会) do lots of things when he rides on the cloud.
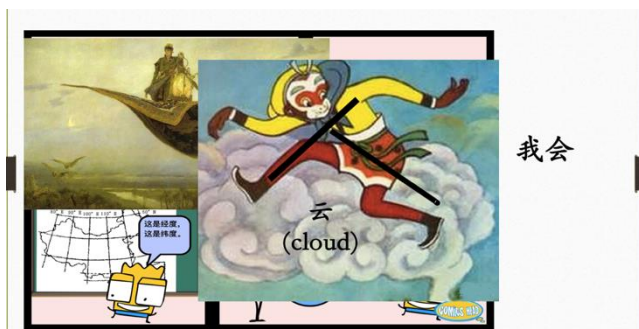
Figure 6. Screenshot of PowerPoint.

After the vocabulary words were taught, students created their own online comics in groups over two lessons; as suggested by Jonassen et al. (2008) and Schank, Berman, and Macpherson (1999), learning by doing is one of the essences embodied in meaningful learning. Students were separated into groups of three and were first required to plan drafts on the worksheets (see Appendix 1) and then create online comics on the iPads. In this way, students could focus on the topics they planned when using iPads and save time choosing images. Kim, Tan, and Bielaczyc (2015) suggested that in groups, students' knowledge is enhanced. Students' online comic creations were collected and were important to the research as students' understanding of new concepts or knowledge could be reflected in their artefacts (Kim et al., 2015).

The week after all students had created their online comic, each group of students were asked to present their created online comics on the screen at the front of the class. Group presentation raises the involvement of students in a class, as implicated in Karjo's (2008) study, as well as boosting students' responsibility for

group work and self-confidence. They were required to explain the content they had designed and the language they used in their online comic. As suggested by Cary (2004), when students explained the Chinese language they used in their comic, their memory of the words' meaning was brought back and organised into logic based on the situation they had created in the online comic, and in this way, students' language competence was enhanced. It also benefited the teacher to monitor students' improvement (Karjo, 2008).

As suggested by Brown (2001), information about attitudes is better collected after the participants' experience, and so in the last lesson of the term, a questionnaire (see Appendix 2) designed to understand students' attitudes towards online comics was delivered to students. Students were asked to circle the answer to each question and answer two open-ended items at the end of the questionnaire. After the students had completed the questionnaire, the post-test was delivered for the research purpose to compare with the pre-test to measure the online comics' effectiveness in CFL education.

3.4 Data Collection and Data Analysis

With mixed methods, the intent of data collection is to develop answers to the research questions (Teddlie & Yu, 2007). In this research, data collected by a qualitative method was analysed to address RQ2 concerning online comics' affordances in CFL teaching and learning, and data collected by a quantitative method was analysed to answer RQ2 relating to the effectiveness of using online comics in

CFL education. Merging both quantitative and qualitative data brought a deeper insight into RQ3 pertaining to the influence of nonbackground learners' attitudes towards online comics on their word recognition ability in CFL education.

3.4.1 Quantitative data collection methods. In this research, under the hypothesis that online comics (the variant) influence CFL education among nonbackground learners, two quantitative data collection methods were designed: (1) pre- and post-tests and (2) questionnaire. This section introduces two quantitative data collecting processes in the class.

3.4.1.1 Pre- and post-tests. According to Dwyer, Hogan, and Stewart (2015), the use of pre- and post-tests is a typical assessment model designed to determine and examine any change in a group. In this research, pre- and post-tests were used to measure the change in the number of words recognised by the participants and then to determine online comics' effectiveness in CFL education. Pre- and post-tests have been used in many other language acquisition studies. In the project of Chee, Yahaya, and Ibrahim (2017), by using pre- and post-tests, they found out the effectiveness of a mobile learning application in improving students' Chinese language in terms of reading skills. The post-test result in their study showed that, by using a mobile learning application, students attained higher scores (Chee et al., 2017). Pre- and post-tests were also used in Gooch, Saito, and Lyster's (2016) study, where they measured the effects of recasts and prompts on second language pronunciation development.

They found that participants in the prompts experimental group performed better than the other groups by comparing the results in the pre- and post-tests.

While control and experimental groups are normally used to compare pre- and post-tests, there was no control group in this research because of the researcher's role as a teacher–researcher. Under the role of teacher–researcher, this study was limited by the time of teaching and ethics requiring that the research project should not impact the normal education program at the research site. This deficit is covered in this research by a paired t-test, which can address whether there are statistical differences between pre- and post-tests (Johns, Hayes, Scicchitano, & Grottini, 2017). The same strategies were adopted in Hunt and Feng's (2016) study, in which they examined the effectiveness of direct vocabulary instruction through pre- and post-tests administered to the same group of students and the effectiveness determined by a t-test. Similar to Olson's (2018) study, the effectiveness of explicit vocabulary instruction with elementary English language learners was investigated by collecting data from pre- and post-tests and then analysing the results by t-test.

There were 15 phrases, including 26 words, printed for the pre- and post-tests (see Figure 7). These words were chosen for the tests according to the requirements of the school's Chinese language program and the teaching content of Chinese lessons during the research period.
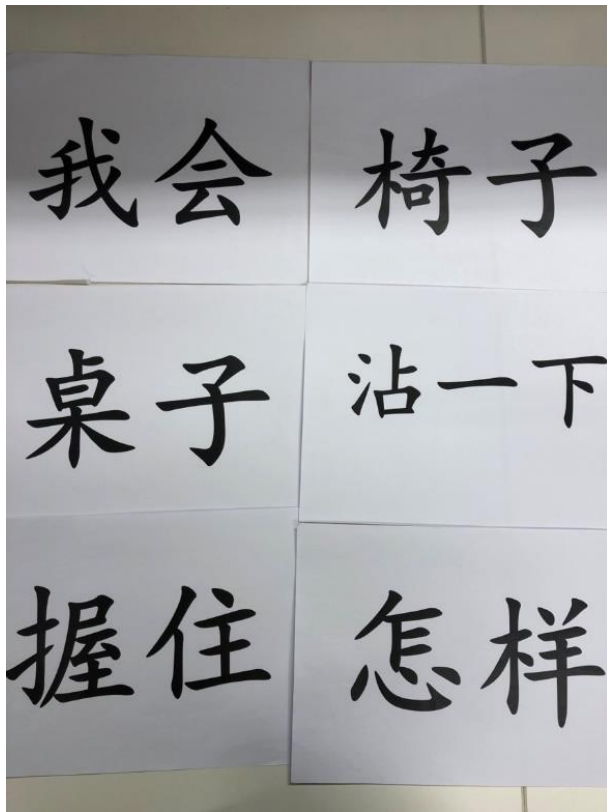
Figure 7. Words in the pre- and post-tests.

The pre-test was conducted in the first week of the teaching term and the post-test was in the 10th week. Each test took about approximately three minutes for each student. Students attended each test individually in a separate room during Chinese language lessons. They were required to recognise the words, including both word pronunciation and meaning, by looking at it, which is the *sight reading test*. From a psychological viewpoint, the sight reading test helps to check pattern recognition, which is memory (Lehmann & McArthur, 2002). The number of words recognised by the students was recorded as the result of their test (see Figure 8, the marking paper). It is noted that the testing words presented in the paper are phrases, while in the marking paper are individual words, which is because some students could recognise

one or two words in a phrase while not the whole phrase, for instance, 我 (I) in 我会
(I can) and 一 (one) in 沾一下(dip).

Figure 8. Marking paper for the pre-test.

3.4.1.2 Questionnaires. According to Brown (2001), questionnaires are "any
written instruments that present responders with a series of questions or statements to
which they are to react either by writing out their answers or selecting from among
existing answers" (p. 4). Many researchers adopt a questionnaire when they want to
know the participants' attitudes and opinions (Brown, 2001). The term attitude,
according to Hudson and Rosen (1953), is to "predict and describe behaviour by
means of verbal reactions to either oral or written stimuli" (p. 142). The attitudes
explored in this research were mainly students' attitudes towards online comics, for
example, whether they liked online comics, and felt interested or motivated. When
exploring students' attitudes towards online comics, although subject to change by the
environment or interaction with people, "questionnaires can be designed to minimize,

but not eliminate, dishonest, and careless reporting" (Aiken, 1997, p. 58). However, students' interviews can be affected by individual bias, the teacher–student relationship, or the interview environment (Aiken, 1997). In this research, the designed questionnaire was administered to the students in the class in the last week of the teaching term, before students took the post-test, in case the results of the post-test affected students' responses in the questionnaire.

Different genders and year levels of students were involved in this research. Many studies have suggested that gender and age differences can result to the differences in students' attitudes towards language learning (Ghazvini & Khajehpour, 2011; Sung, 2010; Sung & Wu, 2011). It was found that girls have higher language art self-efficacy than boys while boys have higher self-efficacy in computer, mathematics and sciences than girls (Hunag, 2010; Ireson & Hallam, 2009), which results to the difference of self-beliefs and interest in the certain areas (Yeung, Lau & Nie, 2011). On the other hand, students' motivation of learning languages is also indicated to decline with the age (Ghenghesh, 2010; Sung, 2013). It leads to one of the interests of this research to explore whether different genders and different year levels of students have different attitudes towards online comics in CFL education.

In this research, the questionnaire was based on measuring usability with the USE questionnaire by Lund (2001), which suggests developing the questionnaire to investigate technology from three dimensions: usefulness, satisfaction, and easiness. It was designed using a Likert-type scale as McLeod (2008) suggested attitudes can be measured by points. The Likert scale was created by Likert (McLeod, 2008), who

developed the principle of measuring attitudes by asking people to respond a series of statements about a topic, which tapped into the cognitive and affective components of attitudes. In this research, a five-point scale was adopted, where 1 point stands for "agree" and 5 for "strongly disagree". According to Dawes (2008), a five- or seven-point scale is likely to produce a higher relative mean score, which leads to more reliable research results.

As seen in Appendix 2 (questionnaire), there were five one-choice items and two open-ended items. In the five one-choice items, students were asked whether they liked online comics, perceived them to be effective for learning CFL, perceived the usefulness of online comics, felt motivated, and hoped to use online comics in future CFL lessons. In the two open-ended items, they were asked to write down the reasons why they liked and/or disliked online comics. Students were asked to choose the answers for five one-choice items and write the answers to the open-ended items in the questionnaire. Students were allowed to leave the questionnaire blank if they did not want to complete it, as required by ethics requirements. In the classes, students completed the first part of the questionnaire quickly where they were asked to select a single choice, while it took them more time to answer the two open-ended items. Some students left the open-ended items blank without any written comments on the paper. The whole process took about 10 minutes during class time.

3.4.2 Quantitative data analysis. Quantitative data was analysed using both descriptive and inferential statistical strategies in this research. Descriptive statistics

(such as frequencies and percentages) display the general trends of student data collected (Creswell & Clark, 2018). SPSS statistical software (IBM SPSS Statistics 24) was used to calculate frequencies and percentages of the sample's demographic profile. Furthermore, statistics including means, percentages, medians, ranges, and variances are calculated, as appropriate for all variables including students' attitudes towards using online comics in CFL education. Means and standard deviations of the pre- and post-test scores of the sight reading tests (word recognition) were also examined.

Inferential statistics were used to examine all quantitative data collected to address research questions related to the effectiveness of using online comics to master word recognition of Chinese vocabulary. In addition, inferential statistics were used to measure any relationships between the students' results of the pre- and post-tests and their attitudes, which were measured by the questionnaire using a Likert-type scale.

According to Hills (2010), it is necessary to examine the normality of the data beforehand to decide on the appropriate strategies for analysing the data. Since it was mainly the difference between the post-test result and pre-test result (Difference = W2-W1) that was being used for analysis to address the research questions, the difference between the data was checked for its normality. A Shapiro–Wilk test was conducted, as Hills (2010) suggested that this was advisable to check whether the data was normally distributed, or not. With the help of SPSS, the result of the Shapiro–Wilk test is shown in Table 4.

Table 4

Tests of Normality of the Data

	Kolmogorov-Smirnov[a]			Shapiro–Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Difference	.100	60	.200*	.968	60	.120

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

As Table 4 shows, the significance (*p* value) was 0.120, which is greater than 0.05. According to Hills (2010), if $p > 0.05$, the data is assumed to have come from a normal population, which indicates that the collected data is normal. A visual examination of the spread of data was also conducted (see Figure 9). As the data was normally distributed, a *dependent-sample t-test* and *correlation analysis* were conducted in this research.
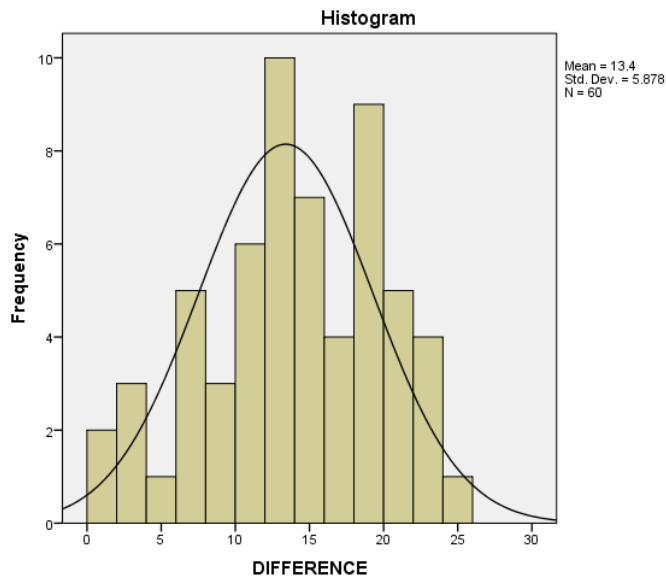
Figure 9. The spread of the data.

3.4.2.1 Dependent-sample t-test. According to Hills (2010), the dependent-

sample *t*-test is used "when there is one group of participants, but there are two DV [dependent variable] scores from those participants obtained under different levels of an IV [independent variable]" (p. 64). It is normally used in the design of pre- and post-tests where the researcher wants to "know if there is a difference between the means" (Hills, 2010, p.64) on the pre-test and post-test. In this research, a dependent-sample *t*-test was used in the pre- and post-tests of the sight reading word tests, from which the difference of the pre-test and post-test was explored as well as the significance of the difference. As the dependent-sample *t*-test was based on the difference scores, the hypothesis was that the mean difference was 0, while "to be extra sure about the presence of any difference" (Hills, 2010, p. 65), the alpha was set to 0.1 in this research. It was suggested by Hills (2010) that if the *p* value (calculated probability) is less than alpha, the *t* value (the calculated difference represented in units of standard error) is significant, which means the mean difference is significant. In this research, the significance of the mean difference of the pre- and post-tests are examined and discussed in Chapter 5.

3.4.2.2 Correlation analysis. In this research, correlation analysis was used to address statistically whether there was a relationship between students' attitudes towards online comics and their improvement in word recognition ability, which addressed RQ3, "How do students' attitudes towards the use of online comics influence their ability to recognise the Chinese words?" RQ3 aimed to investigate whether there was a predictable influence of students' attitudes on their ability, not

only the relationship between two variates. Data from the designed Likert scale questionnaire was analysed to determine the correlated relationship in students' attitudes and their word recognition ability.

There were five themes of students' attitudes in the questionnaire to examine the influence on word recognition ability: "like", "feel effective", "feel interested", "feel motivated", and "feel needed". These five themes were examined respectively, with the results of the score difference in the pre- and post-tests, with the help of SPSS. On the other hand, the five themes were also examined respectively with the score difference from different genders and different year levels of students. In other words, five themes of students' attitudes were examined separately with all students' score results, girls' score results, boys' score results, Year 5 students' score results and Year 6 students' score results through SPSS. It was suggested by Hills (2010) that when the p value is less than the alpha set of 0.05, there is a statistically significant correlation between the two variates, which are the students' attitudes towards online comics and their improvement in word recognition ability. In other words, if the correlation between any theme of the students' attitudes and the difference of the scores in pre- and post-tests was statically significant, it would indicate a predicable influence on students' word recognition ability. This is mainly analysed in Chapter 6.

3.4.3 Qualitative data collection methods. Qualitative data was needed in this research to investigate online comics' affordances and learners' attitudes towards online comics used in learning CFL in the research context. It was collected in the

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form of the teacher–researcher's self-reflective journals, the students' artefacts of online comics, and transcripts from the individual interview with the mentor teacher. Students' answers to the two open-ended items in the questionnaire were also one component of qualitative data. In this section, each data collection method is described in detail.

3.4.3.1 Self-reflective journals. According to Thorpe (2004), reflective journals are written documents for gaining "insights into self-awareness and learning" (p. 328). Self-reflective journals help form a systematic reflection. As Boud, Keogh, and Walker (1985) pointed out, self-reflective journals consist of the response of a person to a situation or event, "what he or she thinks, feels, does and concludes at the time and immediately after" (p. 18).

Instead of writing self-reflective journals, many qualitative researchers write field notes when conducting participant observations. Field notes enhance and enrich the context for analysis (Phillippi & Lauderdale, 2018) as this is what researchers see and hear in the field (Bernard, 2002). Compared with reflective journals, field notes require being "restricted to statements of fact with little or no interpretation" (Wu, 2010, p. 99).

As a teacher–researcher, it is hard to reconcile classroom teaching activities, simultaneously or afterward, with writing field notes, recording, and describing as many facts as possible. The class time was tight, and the researcher had to help other Chinese language teachers with their lessons after her own teaching. Thus, in this

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research, writing self-reflective journals was more viable. The teacher–researcher's self-reflective journals were relied on to study online comics' affordances and record the researcher's observations of students' behaviours needed to infer their attitudes to the use of online comics. The reflective journals were recorded as soon as the teaching finished so that the reflections in the lessons could be captured in time. Details such as the date, the class, the number and name of students who did not attend the lesson, and the topic of the lesson were recorded in each journal. Activities that happened in the lessons, students' behaviours, teaching methods of using online comics, and the mentor teacher's feedback after the lessons were the main content in the reflective journals. With the use of reflective journals, the researcher adjusted her teaching strategies several times to better engage the students and enhance the teaching content delivery of the lessons. The excerpt shows an example of one of the teacher–researcher's self-reflective journals:

Date: 24 July, 2017

Class: 5G

Lesson: Mandarin

Students: 28

Absent students: Mike, Amy

Key words: 我, 会，用，对，吗

In this lesson, first I demonstrated my plan of this term. Then I started my Chinese language teaching with online comics. Students have been familiar with my teaching method with online comics since last term. After I turned on the screen with a comic, some students raised their hands hoping to read out some words they know, such as "你好", "汉语课". I encouraged students to guess the content of the

dialogue in the comics. Student were quiet that time, I think they were not confident with the words in the dialogues. I explained that it was based on the situation where they just had the lesson in the morning with Ms Tan. I told students one character in the comics is Ms Tan and the other could be Max (fake name), who is very clever and knows much about Chinese language but he is naughty and likes to make sound to disturb the class. After hearing this, the whole class laughed. Max smiled and shyness shown on his face. Max behaved better after I used him as an example. He was able to concentrate in class and he even raised his hand before answering or asking questions.

The whole class was attracted to the online comics. I went through the content in the online comics and asked students to speak the words as if they were the characters in the comics. The lesson turned out to be effective. Even the students who were quiet and shy to speak Chinese language before could read the sentences in the comics. Some students could create sentences with the key words in the comics when I guided them to think about a similar situation. My mentor teacher commented that it was an excellent lesson. I felt happy with my teaching method.

I think the students were attracted to the characters in the online comics, especially the exaggerated ones. I may need to create online comics with funny characters. I felt that students like to guess and memorise the words in the dialogues in the online comics, which even helped the shy students gather confidence; at least they had the content to refer to.

3.4.3.2 Students' artefacts. Educators are keen to understand classroom literacy practices by collecting students' *artefacts* to illuminate aspects of students'

learning in class (Alexandersson & Limberg, 2003; Tan, 2013). Artefacts reflect students' "literal, extended or even creative meaning of the real-life context" (Wong, 2012, p. 202), which combines the knowledge learnt in class with students' daily lives. They show traces of students' thinking, values, culture, and identities (Kim et al., 2015), which can be important information to the schoolteachers. In Tan's (2013) study, by comparing students' artefacts of a storyboard on both paper and a technical software that allows students to create digital animation with multimedia functions, she found that technology helped to shape students' artefacts. Kim et al. (2015) suggested in their research that technology provides authentic and meaningful contexts, where students acquire skills to become "skilful problem-solvers, network collaborative and distributed in nature" (p. 552). In an iterative digital environment, in Tan's (2013) study, students were engaged in "production on a trial-and-error basis and let the effects of their production choices on the spot guide their actions" (p. 99). In Wilujeng and Lan's (2015) case study on online comics used in Chinese language learning, they agreed that technology engages students to accomplish the comic creation task. Students "showed no signs of distractions such as playing around, chatting with other, etc" (Wilujeng & Lan, 2015, p. 48) when creating online comics collaboratively in a group. Their case study, conducted among a higher level of Mandarin learners, also proved Rule and Auge's (2005) research result that students who learn using comics can achieve higher test scores and feel more enjoyment creating comics (Wilujeng & Lan, 2015).

In this research, to investigate online comics' affordances, students' artefacts were collected, including both their planning sheet and online comic created using Comics Head Lite as described in Chapter 3. Also, in light of Wilujeng and Lan's (2015) research result that students enjoy creating online comics collaboratively, the students were divided into groups of three when they created their online comics. There was one iPad in a group, either from students or borrowed from the school. In addition, having discussed with the mentor teacher and considered students' confidence in using the words, the worksheet (see Figure 10) was provided as a form of scaffolding tool for each group before they worked on the iPad. It was mainly for students in groups to discuss and make plans for the online comics they were going to design. Students' names were removed to protect their identity as required by ethics that students' names should not be disclosed. Students were given about 40 minutes in one lesson for planning on the worksheet before they used Comics Head Lite to create online comics on the iPads. They were encouraged to use as many Chinese words as possible in the identified situations in the online comics. Chinese key words with translation and Hanyu Pinyin were provided for the students as a scaffold. As students were still at the beginning level of learning Chinese, they did not know all the words when they were creating online comics, under which circumstance, they were allowed to use English words to script the dialogues for their comics on the worksheet. During this process, there were students who wrote the dialogues in both English words and Chinese words, some of them sought help from the researcher to check their translation of English script, and some used Google Translate and copied the words.

Figure 10 shows an example of an online comic that was made by Amy, Bella, and

Kate (a pseudonym was given to each student).

Figure 10. Amy, Bella, and Kate's comic planning worksheet.

All the students' worksheets were collected and handed out in the lessons for

creating online comics on the iPads. Figure 11 shows the example of Amy, Bella, and

Kate's online comic creation by using Comic Head Lite. This creation was about

three girls who made the room messy and dirty, and then they cleaned up the room on

the request of their mother. It took two lessons (about 90 minutes) to create online

comics until all the groups in the class had finished their creations. The students took this much time because they were keen to choose the characters and icons for the content of their online comic. They were meticulous in choosing the characters' facial expressions and environment to make the stories in their online comic logical as well as creative.
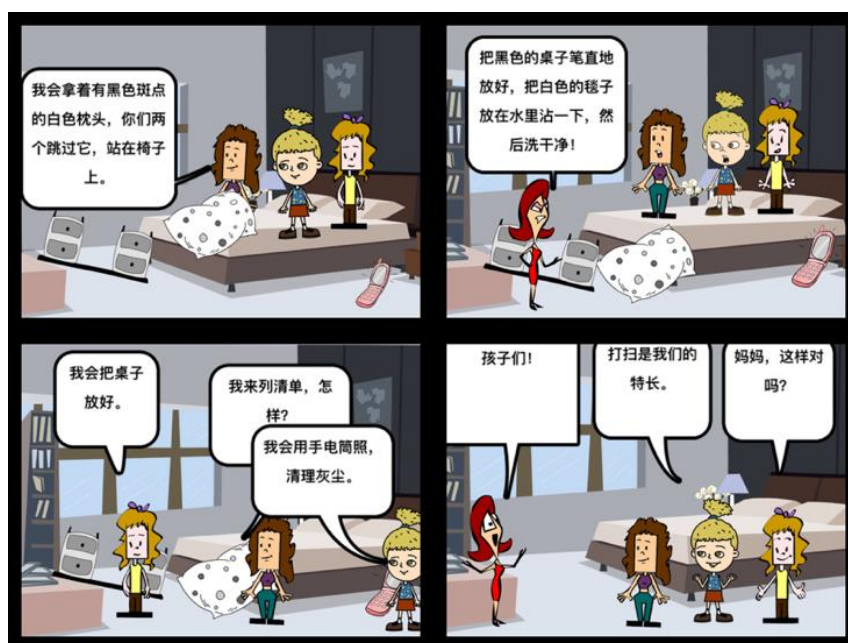
Figure 11. Amy, Bella, and Kate's online comic creation.

3.4.3.3 Open-ended items in the questionnaire. Questionnaires often include open-ended items for profound exploration (Jenkins, 2014) through "the range of possible answers" (Dörnyei & Taguchi, 2009, p. 36). Open-ended items are widely used in questionnaires that explore attitudes. For instance, Ishikawa (2016) investigated Japanese university students' attitudes towards their English through open-ended items in the questionnaire. By asking, "In your view, what is positive and/or negative about Japanese people's English?" (p. 89), "What experiences make

you say 'positive' and/or 'negative'?" (p. 91), "What word(s) would you use to describe your own English? (for example, 'beautiful')" (p. 91), as well as five other open-ended items, Ishikawa (2016) was able to find out not only what the students' attitudes were but also the reasons underlying those attitudes. This research followed Ishikawa's (2016) practice to explore and understand students' attitudes towards online comics in CFL education by asking open-ended items.

Jenkins (2014) emphasised that asking open-ended questions needs to consider the respondents' capabilities to express themselves. In this research, considering that the participants were Year 5 and Year 6 students, the open-ended questions for them in the questionnaire were easy and understandable for their age. Wilujeng and Lan (2015) found that students had both positive and negative attitudes towards online comics. The two open-ended items in Part B of the questionnaire in this research (see Appendix 2) were (1) What do you like about creating online comics for learning Chinese? and (2) What do you not like about creating online comics for learning Chinese? This was mainly for understanding students' reasons for liking and disliking when creating online comics for learning CFL. However, Part A (see Appendix 2) in the questionnaire was designed to generalise in a quantitative way what students' attitudes towards online comics were in CFL education. In a word, the questionnaire was conducive to RQ3 by exploring both "what" students' attitudes were (Part A) and "why" (Part B). By collecting students' answers to the two open-ended items along with other data, it was the intent of this research to investigate students' attitudes

towards using online comics in CFL learning and teaching, as well as help them with Chinese word recognition.

3.4.3.4 Transcript from audio recorded individual interview. Interviews allow researchers to conduct "an in-depth exploration of a particular topic or experience" (Charmaz, 2006, p. 25). It is one of the most knowledge-producing practices in the world and is especially used in human and social sciences and critical psychology (Brinkmann, 2014). Compared to questionnaires, interviews allow interviewees more chances to express their opinions (Brinkmann, 2014). According to Brinkmann (2014), interviews can be structured, semistructured, or with little pre-set structure. Structured interviews are "standardized questions open to quantitative procedures" (Brinkmann, 2014, p. 1008), while less structured interviews sometimes operate with a single opening question. Semistructured interviews, based on the focus of the research, are used in most qualitative interviews (Brinkmann, 2014). With the structured questions guiding the interview, such semistructured interviews "work flexibly with the [interview] guide and allow room for the respondent's more spontaneous descriptions and narratives" (Brinkmann, 2014, p. 1008). Open-ended and nonjudgmental questions in semistructured interviews allow for unexpected statements from the interviewee (Charmaz, 2006).

Drawing on Brinkmann's (2016) arguments about semistructured interviews, this study conducted the semistructured interview with a mentor teacher who observed all the lessons in the study. It was the purpose of the semistructured

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interview with the mentor teacher to find out her opinions of online comics used in CFL teaching and learning.

The questions were focused on her views about online comics' affordances in Chinese lessons and her suggestions for more effective teaching strategies in terms of online comics. At the same time, space was provided for the mentor teacher to control the conversational flow so that themes could be identified. The semistructured interview, which lasted for approximately 40 minutes, was undertaken in the last week of teaching so that the mentor teacher could have a full understanding and detailed observations of the whole term of Chinese language teaching and learning by using online comics. The mentor teacher was asked to describe students' classroom behaviours when using online comics. The mentor teacher usually took notes of the researcher's lessons when she was observing in the class, and her notes were instrumental when she referred to them during the interview. The mentor teacher's extensive experience enriched her judgement of the affordances using online comics, which provided insights into the changes online comics brought for the students' Chinese learning experience. Appendix 3 shows the list of questions used for the semistructured interview with the mentor teacher. The whole interview process with the mentor teacher was audio recorded on the researcher's phone and transcribed by the researcher after the interview. The transcript of this interview was used to analyse qualitative data.

3.4.4 Qualitative data analysis. There were four types of qualitative data

collected in this research: the teacher–researcher's self-reflective journals, students'

artefacts, students' written answers to the two open-ended items in the questionnaire,

and the transcripts of the individual interview with the mentor teacher. In the process

of analysing the qualitative data, *coding* was necessary (Creswell & Clark, 2018).

"Coding is the process of grouping evidence and labelling ideas so that they reflect

increasingly broader perspectives" (Creswell & Clark, 2018, p. 214). In coding, the

researcher "categorizes segments of data with a short name that simultaneously

summarises and accounts for each piece of data" (Charmaz, 2006, p. 43). In this

research, to explore online comics' affordances and students' attitudes towards online

comics, some principles of Charmaz's (2006) *grounded theory methods* were adopted.

Grounded theory methods provide systematic and flexible guidelines for analysing

data, generating coding labels, and summarising "grounded in the data themselves"

(Charmaz, 2006, p. 2). In other words, it characterises an open start to all the

qualitative data in the study and helps to construct data from data rather than to apply

it to an earlier frame created by the researcher (Charmaz, 2006). Grounded theory

methods emphasise using empirical evidence through the data from the participants

(Charmaz, 2006), which is in line with the pragmatism guiding this study. Tan (2013)

stated that grounded theory methods enable the researcher to be close to the data and

analysis to be coherent in the logic. It is emergent and iterative to allow for constant

comparisons of the various types of qualitative data collected. In this research, online

comics' affordances in CFL education and students' attitudes were grappled with

through *initial coding* and *focused coding*.

3.4.4.1 Initial coding. According to Charmaz (2006), the process of initial coding should stay close to the data but remain open to allow possibilities to be discerned from the data. The codes from the initial coding are "provisional, comparative, and grounded in the data" (Charmaz, 2006, p. 48), which are emergent and can be reworded and improved to best fit the data. This principle of initial coding was well suited to this research as it aimed to explore online comics' affordances and students' attitudes towards online comics in CFL education, which required acquiring empirical evidence from participants' experiences.

In the practice of initial coding, according to Charmaz (2006), there is word-by-word coding, line-by-line coding, and incident-to-incident coding. Word-by-word coding attends to the nuanced coding of the data word by word; line-by-line coding means to label each line of the written data; incident-to-incident coding is about comparing incidents in the observational data. Line-by-line coding was adopted in analysing the teacher–researcher's self-reflective journals and the interview transcript in this research to find open codes. Although not every line of the data was complete or had significant meaning, line-by-line coding was helpful in developing ideas by staying close to the data. By coding line by line, those ideas that had escaped attention occurred and formed a credible amount of defined data (Charmaz, 2006). It provided a strong foundation from which to crystallise the significance of the points.

However, regarding students' artefacts, it was not feasible to use the coding strategies recommended by Charmaz (2006). Inspired by Tan's (2013) study, open

coding was applied in the students' artefacts analysis, whereby students' artefacts were labelled, guided by asking the following questions adapted from Tan (2013):

      (i)   Which participants created these artefacts?

      (ii)   What key words are used in these artefacts?

      (iii)   What do situations in the artefacts stand for or represent?

3.4.4.2 Focused coding. This major phase followed the initial coding in this research. After many open codes had been established from line-by-line coding of the teacher–researcher's self-reflective journals and the individual interview transcript, as well as from the open coding system of the students' artefacts, it was time for "analytic directions" shown from the initial coding to "synthesize and explain larger segments of data" (Charmaz, 2006, p. 57). Charmaz (2006) defined focused coding as "using the most significant and/or frequent earlier codes to sift through large amounts of data" (p. 57). In other words, focused coding is a process where incisive categories are created based on the initial codes.

According to Charmaz (2006), focused codes can only be developed through comparing data to data. Thus, this study compared initial codes constructed across the teacher–researcher's self-reflective journals, the interview transcript, and students' artefacts. Nevertheless, "coding is an emergent process" and new ideas can keep emerging (Charmaz, 2006, p. 59). In the process of focused coding, to categorise the data incisively, codes are condensed and compared anew continuously. Table 5 shows

an example of the process of initial coding and focused coding when dealing with the

data in this research.

Table 5

Example of Coding

Data Type	Examples	Initial Codes	Focused Codes
Teacher–researcher's self-reflective journals	(1) Students were laughing at the postures of characters in the online comics. (2) Even naughty students raised hands before answering the questions. (3) Students were quiet and concentrated in the lesson.	(1) Laughing (2) Responding to questions (3) Concentrated	High engagement
Transcript of mentor teacher's interview	(1) Students put effort into searching animations that fit their creative thoughts. (2) They were very engaged and the language they produced was genuine and spontaneous.	(1) Careful (2) Engaged	
Students' artefacts	See Figure 10 and Figure 11.	More key words and richer in content	

3.4.5 Synthesis in Mixed Methods. This study was a mixed methods research, which is a purposeful combination of quantitative and qualitative methods (Calfee & Sperling, 2010). Using mixed methods is "not merely alternative ways of reaching the same end or answering the same questions" (Shulman, 1997, p. 9) in the research but more about integrating both to tackle certain issues together. The types of data designed to address the three research questions are shown in Figure 12. Qualitative data was used to address RQ1 pertaining to exploring online comics' affordances. Quantitative data was used for RQ2 about measuring online comics' effectiveness. Both qualitative and quantitative data were analysed and merged to solve RQ3 about students' attitudinal influences on their ability for Chinese word recognition.
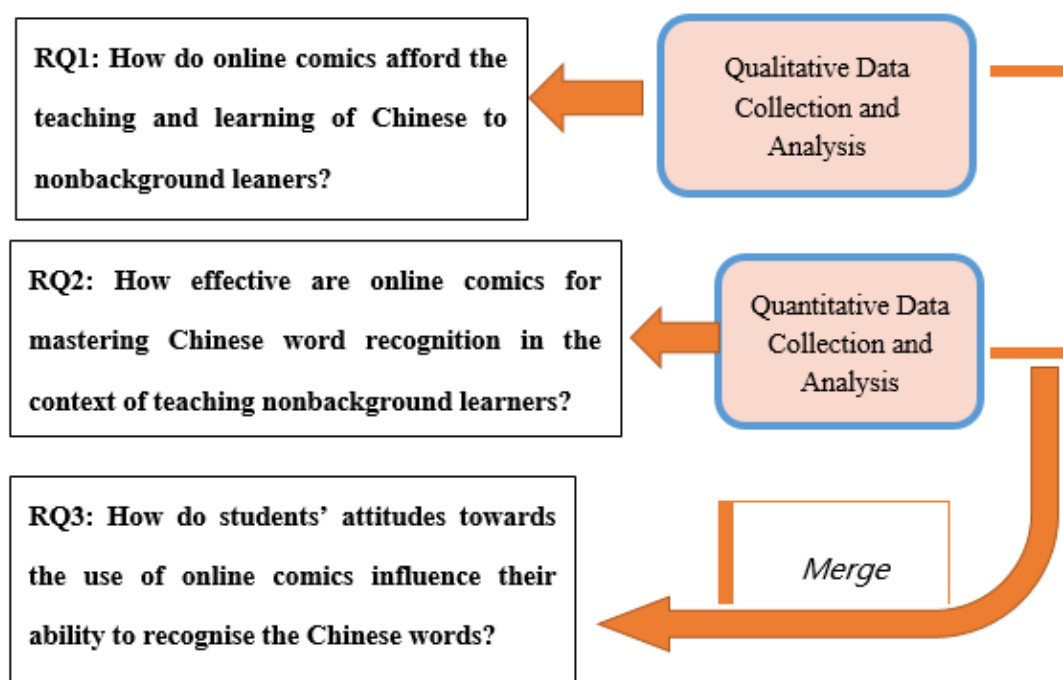
Figure 12. Diagram of research questions and data collection.

The types of quantitative and qualitative data used to answer the research questions are presented in Table 6. It presents the types of data collected to address

the qualitative RQ1, the quantitative RQ2, and the mixed methods RQ3 in this research.

Table 6

Research Questions and Data Types

	Quantitative Data	Qualitative Data
RQ1	NULL	Teacher–researcher's self-reflective journals Students' artefacts Mentor teacher's interview transcript
RQ2	Pre-test and post-test	NULL
RQ3	Questionnaire (five closed items)	Questionnaire (two open-ended items) Teacher–researcher's self-reflective journals Students' artefacts Mentor teacher's interview transcript

Based on the convergent design, RQ3 was addressed by both quantitative and qualitative data. The qualitative data comprised codes from the teacher–researcher's self-reflective journals, the mentor teacher's interview transcript, and students' answers to open-ended items in the questionnaire. Quantitative data comprised the correlation analysis of students' responses to the questionnaire and the difference between their pre- and post-test scores.

According to Creswell and Clark (2018), quantitative data with statistical results helps to examine the hypothesis, which in this research was that some students' attitudes towards online comics influenced their word recognition ability: positive, negative, and/or no influence. On the other hand, qualitative data helps to look into the cases and explain the results (Creswell & Clark, 2018). To get a full

understanding of the mixed methods research question (RQ3; How do students'
attitudes towards the use of online comics influence their ability to recognise the
Chinese words?), Chapter 6 of this thesis mainly explores the answers by (1)
examining the correlation relationship between students' answers in the questionnaire
and their score difference in the pre- and post-tests and (2) investigating the
qualitative data for supportive evidence. Figure 13 shows the convergent design for
quantitative and qualitative data collection and analysis for each research question.
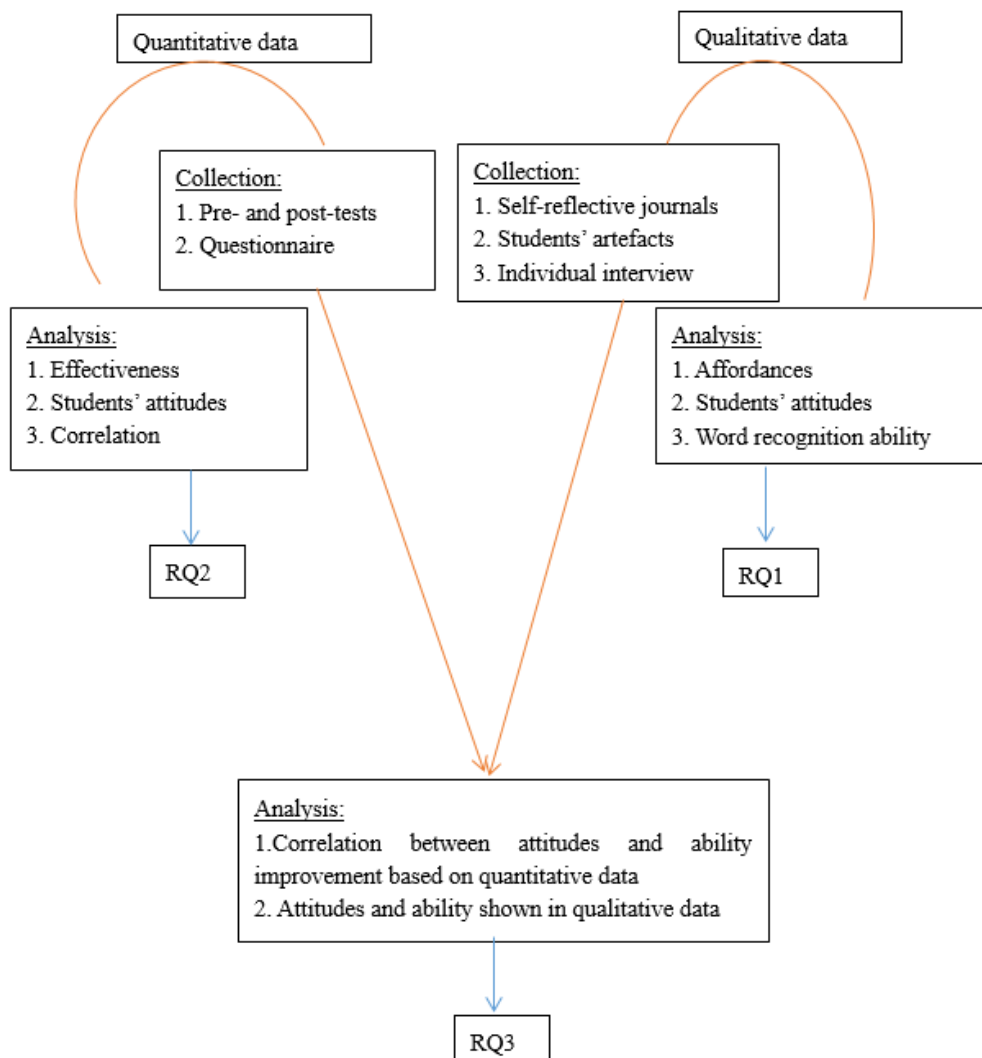
Figure 13. Research design and data synthesis.

3.5 Reliability and Validity

This methodology design was based on the worldview of pragmatism, the foundation of which is to "construct an interpretive rendering of the worlds" (Charmaz, 2006, p. 184) in the research. Thus, by adhering to pragmatism, the criterion of credibility in the qualitative data collection and analysis suggested by Charmaz (2006) was considered, as well as avoiding the internal and external validity threats as reminded by Creswell and Clark (2018).

According to Charmaz (2006), credibility is established by having sufficient data to merit the claim, systematic comparisons between empirical observations and categories, and strong links between the data and analysis and the argument. To be credible, the qualitative data was collected by many types of methods, with a range of data types, through which to obtain sufficient data. By using line-to-line coding, the categories were constructed from the data, by either continuous refining or instant comparing. The arguments emerged from analysis, which was generated from the constructed codes by using grounded theory, which allowed me to stay close to the data and keep the strong links between the data and analysed results.

The validity of the quantitative data was achieved by avoiding internal and external validity threats. As mentioned by Creswell and Clark (2018), internal validity threats can occur in the process of the experiments and/or from the experiences of the participants in the experiments, which mislead the researcher to draw incorrect data, such as testing instrumentation, participant selection, and compensatory rivalry. In the quantitative data collection and analysis of this study, pre- and post-tests, containing

the same words but in a random order, were conducted. Marking of scores occurred only when the students were not there, which was an attempt to avoid any impact on students' moods. On the other hand, external validity threats, which can arise when incorrect results are obtained from the sample data, were also considered and tacit by correlation analysis, along with the in-context explanation from qualitative data.

3.6 Ethics

As part of the ROSETE program, this study was conducted in an appointed school as the research site. The approval of National Ethics Application Form (NEAF) (see Appendix 4) and State Education Research Application Process (SERAP) (see Appendix 5) was applied for and received before the study was launched at the site. The school principal and the participants were then fully informed (see Appendix 6 and Appendix 8), consent forms administered (see Appendix 7 and Appendix 9), and data collection started only after all approvals were received.

Teaching content and activities, which were the research content, were discussed with both the research supervisors and the school mentor teacher. Under their supervision, the participants' feelings were largely considered during the research. All the participants were informed before the research launched that they could withdraw from the research at any time, but none of them withdrew. All data collected was de-identified and participants given number codes or pseudonyms before data analysis.

3.7 Summary of the Chapter

This chapter described the mixed methods research design for this research study based on the worldview of pragmatism. The convergent design was selected to collect and analyse both qualitative and quantitative data separately, and this design acknowledges that the two research diagrams were equal in addressing the research questions. Qualitative data in this research was collected from the teacher–researcher's self-reflective journals, students' artefacts of comic creation, the individual interview with the mentor teacher, and students' written answers to the two open-ended items in the questionnaire. It was coded and followed some principles of constructed ground theory. Quantitative data was collected through pre- and post-tests and a questionnaire designed with a Likert scale. The quantitative data was analysed by using SPSS as a tool for descriptive and inferential statistics.

The different types of data and results of analysis were used according to the research questions. RQ1, investigating online comics' affordances in CFL education, mainly used qualitative data, while RQ2, identifying online comics' effectiveness in CFL education, was addressed by analysing the quantitative data. RQ3, a mixed methods research question suggested by Creswell and Clark (2108), used both types of data analysis.

The detailed analysis and discussion of the research questions follow in Chapter 4, Chapter 5, and Chapter 6.

Chapter 4

Online Comics' Affordances for Teaching and Learning Chinese as a Foreign Language

4.1 Overview of the Chapter

The chapter aims to address RQ1 of this study: How do online comics afford the teaching and learning of Chinese to nonbackground learners? The discussion is based on the analysis of the teacher–researcher's self-reflective journals, the mentor teacher's interview transcript, students' artefacts (including their planning sheet and online comics), and students' written responses to the two open-ended items in the questionnaire. The structure of this chapter draws on Kirschner et al.'s (2004) notion of technology's affordances—technological, social, and educational—and Jonassen et al.'s (2008) suggestions on the characteristics of meaningful learning: active, cooperative, constructive, authentic, and intentional. It is agreed that technological affordances are interlinked (Kirschner et al., 2004; Tan & Zammit, 2016), and the characteristics of meaningful learning are synergetic (Jonassen et al., 2008). However, this chapter expounds online comics' affordances in CFL teaching and learning of nonbackground learners by interrelating online comics' affordances with meaningful learning.

4.2 Technological Affordances

From analysis of the collected data, online comics used in CFL teaching and

learning in this research invited and guided users to be active learners. It aligns with Kirschner et al.'s notion that it is important that technological affordances not only enable learning to happen but also guide its users to use the technology by themselves and thus become active learners. Active learning is emphasised in meaningful learning, and according to Jonassen et al. (2008), it describes that learners can manipulate a technology learning tool and adapt their learning processes in this procedure.

4.2.1 Inviting learning behaviours. Online comics retain the highly visualised features of comics. With their attractive and colourful resources, online comics can easily catch the attention of students, which was supported by the mentor teacher who mentioned in the interview that "They were very engaged and eager to learn new skills such as typing in Pinyin and selecting the correct Hanzi (Chinese words). It's a great achievement for them and a positive outcome for learning Mandarin is so significant for these children". In the teacher–researcher's self-reflective journals, it was also mentioned that the "students were attracted by the online comics and then after they saw the funny characters in the online comics, the whole class burst into laughter". Norman (2002) said that pleasant things work better and are easier for learning, and online comics have features that invite learning behaviours, with their pleasant aesthetics and attractiveness (Yang, 2003).

On the other hand, online comics are more prominent than paper comics as a customised tool, which allows users to design their own comics. For instance, Comics

Head Lite, an online comic creation tool, has an interactive design that provides an "invitation" for users to use it in the process of CFL teaching and learning.

As a typical digital medium, online comics have been designed to convert users' needs and choices in this application by clicking and choosing pictures as well as typing words, representing their ideas through photographs, graphs, diagrams, written text, and so on (Yang, 2003). Comics Head Lite is a comic creation application that can be downloaded and used on an iPad. It has many functions, for example, "panels" in which users can first choose sequences for the online comic; "background", where users can choose situations for their online comic, for example, in the classroom, in the shopping centre, on the road, and so on; "characters", by which many types of cartoon characters are available to form a complete storyline; "photos", where users are allowed to insert their own pictures on the iPad, especially when there are no suitable pictures available for their scenarios; text bubbles in which users can type text to form conversations in the online comics; and "save and share" by clicking, by which the online comic can be saved and sent to other users.

The design of Head Lite Comics is intuitive and is easy to use. As shown in Figure 14, the background of an online comic was presented by simply choosing the pictures under the category of "background". The mentor teacher in the interview commented about this online comics tool: "It is a great educational tool and it is intuitive for learning a language". Some students when answering the open-ended question in the questionnaire, "What do you like about creating online comics for learning Chinese language?", commented, "It is fun and easy", "It is easy to use", and

"It is fun to create story".
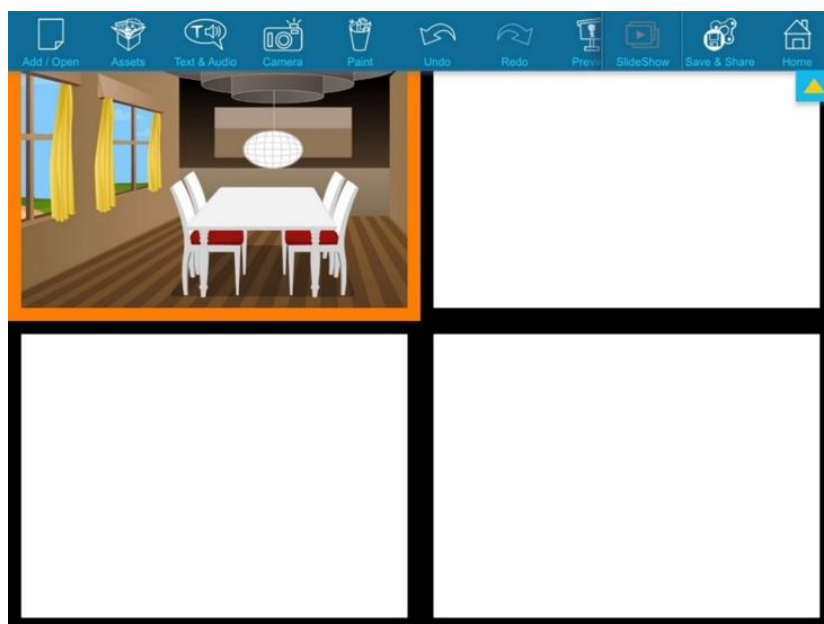
Figure 14. A screen shot of the background of an online comic.

4.2.2 Guiding users to be active learners. Other than the usability of online comics, which invites and enables learning behaviours to occur, online comics also guide users to become active learners in CFL education. A student commented on online comics in the questionnaire as "a great tool and you can adapt to it really well". The mentor teacher further commented, "The dialogue in the online comics encouraged the children to use key words". Active learning happens when learners learn knowledge while observing the effects of the interaction with the technology and adapt according to the results of their manipulations (Jonassen et al., 2008). When using online comics to learn CFL, "They [students] put effort into searching animations that fit their creative thoughts", said the mentor teacher in the interview. It is an active engagement and learners are guided by the parameters of the learning environment (Jonassen et al., 2008). "Sequencing promotes children's understanding

of the language used", the mentor teacher commented about online comics used in CFL learning.

Online comics also guided students to become active learners in the process of their online comics creation. One example is shown in Figure 10 (students' planning worksheet written by hand) and Figure 11 (students' work created by the online comics tool). By comparing those two figures, it was found that more cartoon characters appeared and more Chinese words were used in the situation in Figure 11 than in Figure 10. In the teacher–researcher's self-reflective journals, it was observed:

September 4th, 2017---Online comics creating lesson

This group took quite a long time in designing the conversation in the online comics. They typed conversation in English into Google translate and then asked me many questions, hoping to use as many Chinese words as they can and put them correctly into the conversation. They also spent time in choosing characters and designing their facial expressions in the online comics.

Students in this group engaged in creating online comics and were guided by interaction with the online comics creation tool. They were thinking actively about words used in the conversations. Similar active learning occurred among other student groups when creating online comics, who could use more key words in the conversation in the online comics than in their planning sheets. Most students liked designing online comics and making conversations in the online comics, which was mentioned by students in the open-ended question: "I like being able to write a storyline"; "I like creating online comics for learning Chinese because it's fun and to finish a sentence it pushes you to learn words".

Another example of students' artefacts is shown in Figure 15. Even though the Chinese words in the online comics are not shown, students who created this set of online comics audio recorded the conversation targeting Chinese words and included emotional words such as "hahahaha" and others sounds such as "ka-boom".

Figure 15. John, Mike, and Paul's online comics creation.

Students manipulated the online comics creating tool and actively engaged in creating online comics. Online comics guided students, in the process of creating online comics, to adapt according to interaction with the tool and try to explore the language knowledge with their own understanding. The self-reflective journal entry below further elaborated students' engagement with the online comics.

September 4th, 2017---Online comics creating lesson

       During the time when students were creating online comics on the iPads, this group of students came up to me and asked me if they can audio-record the conversation in the online comics instead of typing the words for it. They found the function for recording the conversation in the online comics with their voice even though I did

not inform them of this feature. After obtaining my approval, this group of students went out of the classroom, found a quiet place and recorded the conversation in Mandarin.

4.3 Social Affordances

In this section, it was found that using online comics in CFL education fostered social interactions between the teacher and students as well as the interactions among students. This section further presents online comics' social affordances in terms of CFL teaching and learning environment between the teacher and students and the cooperative learning environment among students. Such finding coheres with Carter's claim (2011) that the interactive design of technology not only provides good experiences between the technology and the users, but also promotes interactive experiences among users. It is also the aim of the social affordances of technology, according to Kirschner et al. (2004), to promote interactive relationships among group members.

4.3.1 Building a conducive environment for CFL teaching and learning.

It was found that students tend to be attracted by online comics as a teaching method in the CFL classroom since online comics are humorous. Cary (2004) also advocated comics to be used in teaching a second or foreign language with the feature of fun. This was recalled in the teacher–researcher's self-reflective journals on the day the online comics (see Figure 16) were presented:

August 10th, 2017----Online comics with humour

I used online comics and created a situation of "Messy Room" with desk, chair, bed, money, clock, lamp and two characters in the picture. After I presented it in the class, one student asked me: "Why doesn't he have legs?" Referring to one of the characters in the comic and started to laugh. Some other boys also laughed after it was pointed out. I could hear some students making comments of the character and laughed out: "Look at his hair. He has no hair! That is a bald child!" I nearly could not continue the lesson because lots of students were laughing at the character and not until the mentor teacher helped me to quiet the students did I have the chance to answer the question: "He looks panic because he's in a trouble". "What trouble?", a student asked and the class was quiet and waiting for my explanation. I continued the lesson and explained "Because, see, how messy his room is!".

Figure 16. Screenshot of the lesson using online comics.

Similar laughter also happened in the other Chinese lessons with online comics. Students thought it funny and would tease the characters' big eyes, little figures, funny gestures, and so on. Although it sometimes led to the class being

uncontrollable at the beginning, emotionally, students liked learning CFL with online comics. They commented in the questionnaire that "It is a fun way to learn", "I think online comics makes learning more fun and interesting". The mentor teacher also said learning Chinese language by online comics was "fun and not overwhelming". Online comics helped to build a humorous and nonthreatening learning environment for CFL teaching and learning. Humour is beneficial for building a conducive learning environment (Askildson, 2005).

Lim et al. (2003) pointed out that it is essential to create a conducive learning environment, which encourages students to develop their thinking and learning skills. In particular, psychologically, students felt relaxed in the lessons with online comics. They said, "[Online comics] makes me feel more comfortable learning Chinese" and "We get to learn words easily and it is fun". The mentor teacher commented, "It reduces children's stress in writing perfect sentences".

This conducive learning environment also provided a platform for the teacher and students to share their ideas. The mentor teacher said, "Children are not afraid to ask for help when trying to complete their task". Students were also not afraid to express their feelings in the CFL lessons that used online comics. It was recalled in the teacher–researcher's self-reflective journal that

August 10th, 2017----Argument on the culture

During the lesson, I used a prisoner picture to show students that the word '放' has something to do with the prisoner and its left part was formed from a prisoner wearing a cangue [a square wooden device on the prisoner's neck as punishment] and its original meaning

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was putting the prisoners away to the rural places as a punishment. Just like 200 years ago, British put away some of the prisoners to Australia. By explaining the stem of the word, I hoped to help students remember its meaning of "put something away". However, a boy raised his hand and told me that he did not feel happy as it sounded like racist.

At that time, the student's expression of his feeling gave me a better understanding of students and helped me to know what was unsuitable as an example in class. As commented by the mentor teacher, the social affordances of online comics, with their short information and attractive situations, "help students to think critically".

4.3.2 Building a cooperative learning environment. Apart from the nonthreatening and conducive environment that online comics helped to build for CFL teaching and learning, online comics also assisted in building a cooperative learning environment among students in the classroom, especially in the process of students creating online comics.

In the groups of students, creating online comics afforded *positive interdependence* within the cooperative group work. Positive interdependence reflects "the level to which group members are dependent upon each other for effective group performance" (Kirschner et al., 2004, p. 55). In other words, individual work in the group was accountable, the learning outcomes were the result of the whole group, and the group took responsibility for each individual group member (Kirschner et al., 2004). Thus, it was inevitable that students had conversations to share the workload of

the task. The excerpt is from the teacher–researcher's self-reflective journal of one group:

August 28th, 2017----Comics planning lesson

This was the comics creating lesson. I gave out the planning worksheet and asked the students to plan the content of comics in groups using the worksheet and try to use as many key words as they can. I noticed that one group of girls decided the topic and used words very quickly but they did a detailed work on drawing the characters and objects on the planning sheet. They were constantly discussing among themselves: "I'll draw the chair and then you write the words 椅子(chair)". "Ok. I can also draw the price tag on the 桌子(desk)". "No. I'll draw 桌子 (desk) and your job is to write Chinese words in the bubbles. Jenny [pseudonym], can you draw the people in the comics". "Ok! I'd like to do that!"

The positive interdependence or the effective cooperation in the process of group work requires each other's effort to reach the group's goals (Johnson & Johnson, 1996, as cited in Kirschner et al., 2004, p. 55). It is evident from the above self-reflective journal entry that students developed interdependence and were able to harmoniously divide tasks among themselves without much guidance. Although social cooperative learning pedagogy was not the focus of the study, the data suggests that students' cooperative skills were developed when they created online comics in groups. The mentor teacher said, "Online comics is an ideal tool for students to showcase their capabilities to work in groups when creating online comics. Their ideas were presented in a sequential manner". Students negotiated their roles and work among themselves, supported each other, and solved problems together. They

liked working with other classmates: "I like creating online comics because I get to work with my friend and it combines my creativity with learning" and "I like working with friends to make cool comics in [using] Chinese words".

Students' keenness on learning in groups echoes Jonassen et al.'s (2008) support for meaningful learning, which is to make technology a tool for learning cooperatively. They claimed that it is humans' nature to work together and "become a part of knowledge-building communities both in class and outside of school" (Jonassen et al., 2008, p. 4). Conversations occurring in cooperative learning are "the most natural way of making meaning" (Jonassen et al., 2008, p. 5). Using target words to make conversation is one of the goals in communicative language teaching for second or foreign language education (Richards & Rodgers, 2014). During this cooperative working process, students said, "It is a fun way to learn and help me remember words!", "It is a fun and interacting way of learning and gave me better knowledge of Chinese words", and "I like creating online comics with friends because I can learn to use words". Most importantly, online comics helped to build a cooperative learning environment where students could learn together and appreciate the process of building knowledge as a group. As Jonassen et al. (2008) emphasised, with meaningful learning, there is more than one way to view and solve the problems in the world during cooperative work with others.

4.4 Educational Affordances

In this section, it is described that online comics, as a technology tool,

effectively provided students with meaningful learning experiences. According to Kirshner et al. (2004), educational affordances are facilitated by "the chosen educational artefact", which is "instrumental in determining if and how individual and team learning can take place". It was found that using online comics in this research provided CFL teaching and learning with authentic context, encouraged learners to construct their own interpretation of the knowledge, and fulfilled intentional teaching for teachers as well as learning for students.

4.4.1 Providing authentic context. One of the benefits of learning CFL by online comics is that real-life situations can be designed into the online comics, which promotes learning from authentic scenarios (Vassilikopoulou et al., 2011), such as buying things in the shopping mall, waiting for the bus at the bus station, having Chinese language lessons in school, and so on. Students commented on the open-ended items that, with online comics, "We get the freedom to do whatever situation that we would [want]" and "I like how you can create any story you want". One student commented in the questionnaire that "I enjoy doing online comics because I get to create my on [own] story and then put my own sentences in Chinese". It is proclaimed by Jonassen et al. (2008) that "learning should be embedded in real life, useful contexts for learners" (p. 4) to practise learnt knowledge and skills.

Students learn Chinese words, sentences, and grammar, mostly the usage of Chinese language, from the given conversations. This underpins the view that learners' skills, including foreseen and unforeseen skills, need to be supported by technology

(Strijbos, Martens, & Jochems, 2004). As the mentor teacher said, "The written dialogue may be transferred to daily usage if they can recall what they have produced". This real-world-based learning prevents students from expressing bookish language (Csabay, 2006), which was supported by the mentor teacher claiming in the interview that "The outcomes for 'speaking and listening' are definitely achievable through using online comics". In the lesson using online comics to teach words related with calligraphy, as shown in Figure 17, students learnt not only Chinese key words, but also learnt the gestures of doing calligraphy as presented by the online comics.

August 14th, 2017----Online comics used in teaching calligraphy and calligraphy related words

I created an online comic showing how to use calligraphy. Some key words related to the calligraphy were also presented through the conversation in the online comics. I think because there are many action words in this lesson so when I reviewed word cards with students and asked them the words' meaning, they would call out the word's meaning with an unconscious action. For example, students answered the meaning of "写字" (write) with a gesture of writing, the meaning of "沾一下" (dip) with an action of pretending to dip the brush pan into the ink, and "握住" (hold) by pretending holding a brush pan for calligraphy.

Figure 17. Screenshot of the lesson using online comics.

In this lesson, a real-world situation of doing calligraphy was designed into the online comic, which helped students to understand the gestures of doing calligraphy. By seeing the gestures, it helped students understand the Chinese words related to the calligraphy. When students practised calligraphy, they were able to recall and use these Chinese words in conversations with others. In this way, online comics helped students to understand and remember the words through an authentic context. It is essential to learn from an authentic context rather than memorising general principles and theories to try to explain existing phenomena because learners tend to gain a better understanding of knowledge from an authentic context and know how to transfer and apply ideas to real-world situations (Jonassen et al., 2008).

4.4.2 Promoting the construction of learners' own knowledge. Jonassen et al. (2008) claimed that learners are supposed to construct their own knowledge by explaining the new knowledge with their prior knowledge. It is essential for meaningful learning that learners are able to articulate the taught knowledge in their

own way (Jonassen et al., 2008). Online comics used in CFL teaching and learning provided students with opportunities in this research to construct their own knowledge.

4.4.2.1 Constructing words with prior language knowledge. The situation in the online comics used in CFL lessons provided students with scaffolding to understand and construct their own interpretation of the knowledge of Chinese language. One of the usual instructions the teacher-researcher gave out in the class was to ask students to first guess the meaning of the conversation that was presented by the characters in the online comics. As shown in Figure 5 (Chapter 3), the situation was designed to combine the previous Chinese lesson about geography taught by the mentor teacher with the researcher's Chinese lesson using online comics.

July 24th, 2017-----First lesson with online comics

After I turned on the screen with a comic created by myself, some students raised their hands, hoping to read out some words they know: "你好" (hello), "汉语课" (Chinese lesson). I encouraged students to guess the content of the dialogue of the comic based on the situation that pictures show. Students were quiet that time. I implied that it is the lesson they just had in the morning with Ms Tan. "Geography! This is geography lesson" a student called out. "I know, map . . . 地图! Map map!" another student called out. I said "Yes! Correct!" I described to students that one of the characters in this online comic is Ms Tan and the other is Jay [a student in the class], who is clever and knows much about Chinese language but always called out the answers without raising his hand. Students laughed and some of them were able to recall the words and they raised hands to

read the other words they know: "经度" (longitude), "纬度" (latitude) and also the sentence "上海在北纬 30 度，东经 120 度" (Shanghai is at 30 degrees of north latitude and 120 degrees of east latitude).

Then I read the conversation and asked students to guess the meaning of any new word based on the situation and conversations between two characters. One student raised her hand and answered: "Does 这是 means *This is*?" I said "Correct"! Some other students raised hands and said: "I think *对吗* means *Is it correct*". I smiled and said "对!" (correct). The lesson was going well and students were able to understand and remember the key words.

In this lesson, online comics effectively helped students recall their prior knowledge about a Chinese lesson and Chinese words. The familiar words gave them clues and confidence in guessing the meaning of key words. "Children are able to think critically about the topic when learning Chinese language using online comics," said by the mentor teacher. More importantly, students learnt to know how to connect the previously learnt words with key words and make a Chinese sentence. Students said, "Learning Chinese language by online comics gave me a better knowledge of Chinese words", "I like online comics because I can learn to use the words", and "Creating online comics help me with coming up with sentences". In this way, students could better remember the new words and use the language (Cary, 2004; Csabay, 2006)

4.4.2.2 Constructing knowledge with existing life experiences. On the other hand, the students' artefacts, which were students' online comic creations, showed the process of how students articulated their understanding of the words and language

knowledge. According to Wong (2012), students' artefacts reflect their knowledge combination of prior knowledge and new knowledge. It reflects students' thinking traces that have been embodied with their culture and values in the life (Kim et al., 2015).

Students' online comic creation surprised the teacher-researcher with the difference in culture they experienced in life from that of Chinese culture, which was embodied and shown in the online comics. Comparing Figure 16 and Figure 11, which have similar topics about a messy room, Figure 16 (which I created) includes one mother and one child, while Figure 11 (made by the students) has one mother and three children. The difference in the social culture surprised the researcher and it was recorded in the teacher–researcher's self-reflective journal:

September 11th, 2017----Online comics presentation

When I first saw this online comic created by the students, I guessed the three kids in the online comics were friends while the lady was the mom of one of the kids. However, I found out later from the dialogue that the lady was the mom of all of the three kids. It reminded me that it is normal to see three kids in a household while in China, in my generation, there was mostly one child because of the one-child policy at that time. I mentioned this in the class after this group of students had done the presentation. Students were surprised, "So teacher you don't have any brothers or sisters?" "I don't like my brother and I wish I could be only one child at home". "Teacher, teacher, how about now? Is it allowed to have more than one child in China now?" Students were curious and I explained to them why China had the one-child policy before and the current situation. They seemed to have more knowledge about China after that.

A group of girls created an online comic named "Going to IKEA" (see Figure 18), in which they designed a situation where three girls drive a car to a shop and select furniture for them. It also reminded the researcher of the different shopping habits in China that people hardly go shopping to the shops but always shop online. After the group of students had presented to the class, the researcher introduced this difference to the students, which is shown in the following self-reflective journal extract.

September 11th, 2017----Online comics presentation

I showed students how do people in China do their shopping, mostly is online shopping on Taobao [an online shopping platform]. I showed the process of shopping on Taobao and they were surprised by the variety of goods on Taobao as well as the cheap prices. I showed to them that you can buy anything from Taobao including the big furniture and they will always be delivered to you. And students call out: "This is amazing! I want to live in China!"; "It's so convenient!"

Figure 18. Bianca, Lily, and Daisy's online comics creation.

Online comics provide students a chance to construct new knowledge based on existing knowledge. Students were creative on the topics of creating online comics. Even though the researcher had suggested some topics to students before they started to create online comics, most of the students did not follow the suggested topics. In their chosen topics, they designed into the online comics social life situations they were familiar with. It presented the researcher with students' knowledge of life and provided a good entry through which to introduce differences between Australian culture and Chinese culture. In this way, online comics gave the researcher the chance to introduce Chinese culture as well as Chinese words to her students. Introducing culture is an important aspect of CFL teaching and learning; as the mentor teacher said in the interview, "Online comics are effective for CFL education because they can help to transcend language and cultural boundaries".

Online comics make Chinese language learning meaningful to nonbackground learners in this research as it allowed students to construct their own knowledge of Chinese language with their previously learnt Chinese language, as well as with their life experiences. Students could learn more about the language and its embedded culture and integrated it into their own experiences. They could form their own understanding of the Chinese language and at the end achieved the goal of recognising Chinese words. As students said in the questionnaire, "Creating online comics helps me to memorise the Chinese characters" and "[I like creating online comics because] you can recognise the characters".

4.4.3 Fulfilling intentional teaching and learning. It was found that online comics in this research had the capability to help teachers fulfil their teaching goal and students to achieve their aim of making creative online comics. As Jonassen et al. (2008) claimed that humans naturally work to fulfil their goals. When humans fulfil their intentions, they tend to think and learn more actively and willingly. The educational affordances of technology include the fulfilment of users' needs (Kirschner et al., 2004).

4.4.3.1 Enabling teaching goals. As a teacher–researcher in this research study, online comics helped the researcher with effective lesson planning. With its technological affordances, the researcher could design lessons flexibly. According to school requirements, the researcher's lesson plans and teaching goals should align with the school's Chinese language teaching and learning program. Therefore, most of the lesson plans were made a few hours before the lessons as the researcher tried to combine her lesson with the mentor teacher's lessons on that day. On the day of teaching, the researcher would meet and discuss her lesson plan with the mentor teacher. Then she started to design the online comics with the key words she wanted to teach based on the mentor teacher's suggestions and requirements.

As shown in Figure 5 (Chapter 3), the online comic was designed with the situation of the mentor teacher's lesson, which was teaching Chinese geography words and sentences. It turned out that students were able to recall the situation and

words. They also remembered key words based on that situation. The researcher had similar experiences from the lesson, which are shown in Figure 17. The mentor teacher requested the researcher to teach students Chinese calligraphy, especially the gestures of calligraphy writing. Students learnt the words and the gestures in the online comics. The mentor teacher said that one of the advantages of online comics is that "It is less time consuming to create an interesting story". In addition, online comics help teachers to structure the lesson well enough to achieve the teaching goal. The mentor teacher said, "Online comics are effective in teaching online comics because the lessons are well structured by using online comics". Presented with pictures and characters in a situation, teaching instructions can be clearly delivered to the students (Csabay, 2006; Yang, 2003). The following self-reflective journal entry further elaborates how online comics helped students understand and follow the researcher's instructions in the lessons, even when the lesson was delivered in Mandarin.

August 22nd, 2017---The fifth lesson of teaching Chinese language using online comics (Figure 16)

This is the fifth lesson for me using online comics in the class and suggested by the mentor teacher, I tried to deliver the lesson in Mandarin, which means I spoke Mandarin in the lesson even when giving the instructions. Out of my expectation, students could understand my instructions and follow my pace of the lesson. Students knew I would first talk about pictures or things in the online comics. When I asked students, "这是什么?" (What is this?), some students called out, "Brush!" I pointed at the desk and students called out

"Desk!" I asked them to speak in Mandarin, "请说中文" (Please say it in Mandarin). One student answered "桌子!" (Desk). I pointed at the chair and students would answer "椅子" (chair). I felt the lesson was smoothly delivered and students were more even focused in the lesson since the instructions they heard were in Mandarin.

4.4.3.2 Satisfying students' needs in learning. Technologies have traditionally been used to support teachers' goals and should be used in engaging students to articulate and represent their understanding of the knowledge (Jonassen et al., 2008). Online comics give students the chance to represent their knowledge so that they can understand more and are "better able to use the knowledge that they have constructed in new situations" (Jonassen et al., 2008, p. 4). In this research, students were able to use the learnt Chinese words and knowledge to create their own online comics. "It helps children to provide information in the most interesting and interactive way", said the mentor teacher. Online comics provide a platform for students to build their learning intentions and engage in meaningful learning.

Students like using online comics to create their own stories, and it was observed by the mentor teacher that "Children who are creative were very engaged. They were eager to learn new skills such as 'typing in Pinyin and selecting the correct Hanzi'". Students said in the questionnaire that they liked using online comics for Chinese language learning, as online comics allowed them to "pick the characters and backgrounds" and "create your own story". Online comics had become the showcase of students' creativity, where they put much effort into creating impressive plots and

surprising scenarios with the learnt Chinese words. As shown in Figure 19, this group

of students used online comics to create a story in which two superheroes compare

super powers with each other and then talk about exploring in a black and scary forest.

Students tried to make it a funny story so they designed an angry human who shocked

both of the superheroes by suddenly jumping out of the black forest. In the end, the

whole online comic story turned out to be a boy's dream which shocked him from

sleeping. As observed by the researcher, this group of students put much effort into

making the details of the situation when they were creating the online comics. Online

comics had helped to fulfil students' needs to represent their understanding and

manipulate the technological tool to achieve their target during the process of learning.

Students collaborated intentionally to engage with the task or solve a problem

(Jonassen et al., 2008).

Figure 19. Kal, Adam, and Bill's online comics creation.

4.5 Discussion of the Findings

By interrelating technology affordances with meaningful learning, it was

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found in this research that online comics have the potential to afford meaningful learning in CFL education to nonbackground learners in the Australian context. To achieve meaningful learning in CFL teaching and learning with online comics, three key points emerged from the findings, and these are elaborated in the following sections.

4.5.1 Making CFL usable with everyday life content. In CFL teaching and learning, with online comics' flexible and customised affordances, it is essential to design the content of online comics in relation to students' everyday lives. In this way, students create their own awareness of how Chinese words and sentences are used in daily life. Nonbackground learners are able to realise that Chinese language is learnable when they are aware of the practical usage of Chinese language in real-life situations (Singh & Han, 2014).

Using everyday life in online comics, students are able to learn the language meaningfully as they observe and construct their own understanding of the words' meanings from the online comics' content (Bolton-Gary, 2012; Jonassen et al., 2008). Bolton-Gary (2012) claimed it "enables students to construct knowledge in more than one modality" (p. 391), such as visual cues (Bolton-Gary, 2012), prior knowledge (Jonassen et al., 2008), and emotions (Slavin, 2012; Woolfolk, 2009) as online comics designed with life situations are close to learners' everyday lives.

4.5.2 Making CFL useful by creating online comics. One of the biggest

challenges for nonbackground-Chinese language learners in Australia is that they hardly have the opportunity to use the language they have learnt, which causes the students to think that learning Chinese language is not useful to them (Chen 2015; Moloney & Xu, 2015). The process of creating online comics themselves with the learnt Chinese words helped students to acquire linguistic skills (Vassilikopoulou et al., 2011).

Students are keen to create online comics as they can "apply their imaginations and use their cultural experiences" (Vassilikopoulou et al., 2011, p. 126) for creating texts in online comics (Wilujeng & Lan, 2015). Students gain a sense of control and manipulate the situations through creating their own online comics in Chinese, and in this way, "learners can tailor the learning experience to meet their specific needs and interests" (Kirschner et al., 2004), which makes Chinese language learning meaningful to students (Jonassen et al., 2008).

4.5.3 Making CFL teaching and learning a fun environment. Psychologically, using online comics for CFL teaching and learning can provide a needed emotional release to students learning knowledge in the classroom (Bolton-Gary, 2012). Psychologists Woolfolk (2009) and Slavin (2012) have both used printed comics and found that they helped to increase students' interest with the humour in the comics. The same effect of humour was found in this research when using online comics for CFL education. Humorous situations can often lead to positive emotions in the classroom (Martin, 2007), and this was evident in this research.

It is important to make CFL learning fun. Without interest in and good experiences of learning CFL, students think that CFL is hard and dull to learn since they cannot find meaning in it (Zhang & Li, 2015). Funny characters, situations, dialogue, and short information about CFL knowledge can be included in online comics, which can be learnable by students at the beginning stage and can increase their engagement in the lesson. From here, students become active learners in a meaningful learning environment (Jonassen et al., 2008).

4.6 Summary of the Chapter

In this chapter, the findings of online comics' affordances for teaching CFL to nonbackground learners were illustrated in terms of technological affordances, social affordances, and educational affordances. Mainly, the findings are in accordance with Jonassen et al.'s (2008) advocating for meaningful learning with technology. Online comics enable meaningful learning in CFL teaching and learning by fostering active learning with its technological affordances, helping to build a cooperative and authentic learning environment with its conducive social affordances, providing authentic context to promote the construction of knowledge, and building learning intentions through activating prior knowledge.

In summary, educators must seek to consider the key aspects of integrating online comics in CFL with their teaching for nonbackground learners in the Australian context. These are (1) relating learning content to students' daily lives to enable students' awareness that CFL is practical, (2) providing students with opportunities to

create their own online comics and the autonomy to decide on their learning tasks and goals, and (3) injecting humour into online comics to engage learners. This chapter highlighted how online comics can be used to afford CFL teaching and learning in this research to nonbackground learners in a meaningful way.

Chapter 5

Measurement of Online Comics' Effectiveness in Chinese as a Foreign Language Education

5.1 Overview of the Chapter

This chapter presents the results addressing RQ2 of this study: "How effective are online comics for mastering Chinese word recognition in the context of teaching nonbackground learners?" To investigate this research question, data was collected from 60 students' pre- and post-test results at the research site. The pre- and post-tests were conducted before and after the eight weeks of using online comics for teaching and learning CFL. In the following sections, a dependent t-test and interactive effect test were conducted and presented to measure online comics' effectiveness in mastering Chinese words. The discussion of the findings is in the last section of the chapter.

5.2 Analysis Tests on Online Comics' Effectiveness for Chinese Word Recognition

In this section, two tests are presented in measuring how effective are online comics for Chinese word recognition. First, a significance test was conducted to determine whether the score difference between students' pre- and post-tests was significantly different. Second, interaction effects were investigated to check whether the year difference had any impact on the score differences between Year 5 students and Year 6 students.

5.2.1 Significance test for the mean scores in the pre- and post-tests. Data collection started with a pre-test of Year 5 students ($n = 30$) and Year 6 students ($n = 30$) at the research site. As mentioned in Chapter 3, the pre-test was a sight reading test, in which students were required to recognise words on printed paper. By recognising, students were required to tell the researcher the meaning and pronunciation of the words. Words printed on paper were shown in random order. Each word carried one mark, and the maximum mark possible was 26. The pre-test was followed by eight weeks of integrating online comics into teaching and learning CFL. After eight weeks of using online comics for CFL teaching and learning, the same test was conducted with the same students as a post-test.

Descriptive analysis of the test scores are shown in Table 7. The descriptive analysis indicated that students performed better in the post-test compared to the pre-test. In the pre-test, 45% of students could recognise more than five words ($M = 5.06$), while in the post-test, 100% of students could recognise more than five words. In the post-test, more than 53% of students achieved higher scores than the average score ($M = 18.48$) but no students could recognise 18 words in the pre-test. The maximum score the students in the pre-test attained was 10. It was also found from the data that 14 of 60 students reached full marks (score 26) in the post-test while none of them made it in the pre-test.

Table 7

Student Performance in the Word Recognition Pre- and Post-Tests

	Pre-Test	Post-Test
Number of students	60	60
Mean score	5.06	18.48
Minimum score	2	5
Maximum score	10	26
Median score	4.00	20.50
SD	2.00	6.56

A dependent *t*-test was conducted on the difference between the pre- and post-test scores (Table 8), where alpha was set at 0.1, and the assumptions of normality were met (see Chapter 3). The result indicated a statistically significant difference between pre-test and post-test means, t (59) = 17.66, $p < .001$. The mean of post-test of 18.48 ($SD = 6.56$) was statistically significantly higher than the pre-test mean of 5.06 ($SD = 2.00$). The results suggest that online comics, as the main teaching and learning method in teaching and learning Chinese language during the research period, may have led to an improvement in students' scores in the word tests. The following sections show the further analyses carried out to seek further support for this finding.

Table 8

Significance Testing of the Mean Score Difference Between the Pre- and Post-Tests

	Mean	*SD*	*t*	df	Sig.(2-tailed)
Observed difference in group means	13.400	5.878	17.659	59	.000*

*significant at 0.001 level

5.2.2 Year levels vs. online comics' effectiveness. As the sample consisted of students from two different age levels (Year 5 and Year 6), further analyses were conducted on the mean score difference and discussed in this section. This was to inspect whether or not the results were subject to students' varying maturity levels across the years the students were in. The difference in test scores was examined separately for each of the two years (see Table 9). The results show that the findings were consistent across the two years, where both years of students showed a marked improvement in their post-test scores.

Table 9

Score Means of Year 5 Students and Year 6 Students

Year	Year 5 Students ($n = 30$)		Year 6 Students ($n = 30$)		
	Pre-Test Mean (W1)	*SD*	Post-Test Mean (W2)	*SD*	Difference in Means (W2-W1)
Year 5	4.07	1.848	16.23	7.454	12.16
Year 6	6.1	1.647	20.73	4.646	14.63

Figure 20 shows that when Year 6 students gained about 14 words improvement in the post-test than they had on average in the pre-test, the Year 5 students improved about 12 words more than in the pre-test. As the difference in means of pre- and post-tests slightly varied across the year levels, a finer analysis comparing the pre- and post-test scores of Year 5 and Year 6 was conducted with a split-plot mixed-design ANOVA (two-way repeated measures ANOVA).
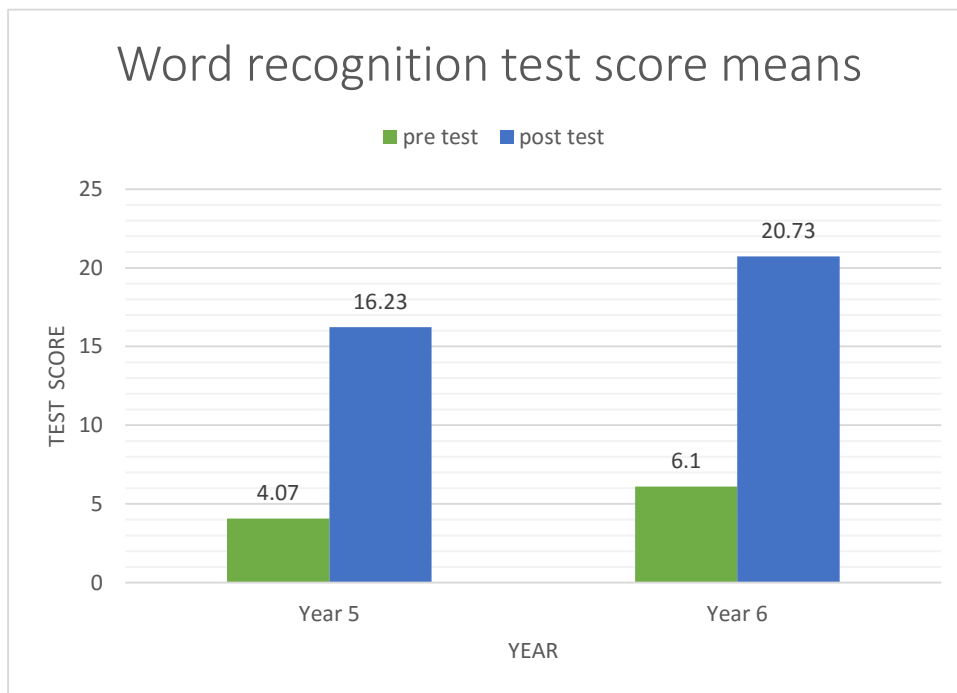
Figure 20. Means of test scores across years.

Split-plot mixed-design ANOVA allowed the researcher to test whether both groups performed significantly differently in the two tests and whether the year of the students had an interaction effect on the difference in means. The 2x2 mixed-plot ANOVA design (see Table 10) consisted of one within-subject variable (test score), with two levels (pre- and post-test), and one between-subjects variable (year), with two levels (Year 5 and Year 6).

Table 10

2x2 Mixed-Plot ANOVA Design Matrix

	Pre-Test	Post-Test
Year 5	Year 5 Pre-test	Year 5 Post-test
Year 6	Year 6 Pre-test	Year 6 Post-test

Mauchly's test of sphericity was irrelevant as there were only two levels of the

within-subjects variable. Using an alpha level of 0.05, the main effect for scores was significant (F (1, 58) = 320.917, p = 0.000, ηp^2 = 0.847). This indicated that there was a significant improvement for post-test means for both groups. Interaction effect was more critical in this analysis, and this was revealed by scores*year term. There was no significant interaction between scores and years of students in terms of word recognition test scores (F (1, 58) = 2.719, p = 0.105, ηp^2 = 0.045). This implied that the year of the student did not change the students' test results in the pre- and post-tests. This is visually evident in the profile plot of both groups shown in Figure 21. This figure shows that both years of students made progress across the time when they were taught CFL by online comics as well as using online comics to create their own comics in eight weeks. The fine-grained analyses at year level indicated that both groups showed significant improvement after using online comics for word recognition in CFL education.
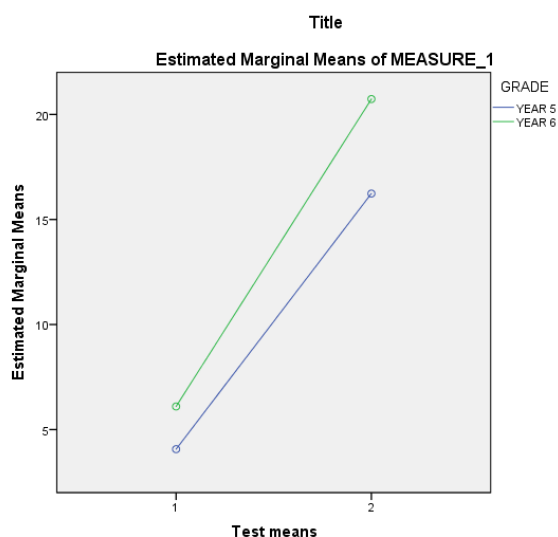
Figure 21. Mean scores for both years across time.

The findings from these three tests suggest that using online comics in CFL

teaching and learning was effective for nonbackground learners mastering Chinese word recognition. Statistically, as the main teaching and learning method in the lessons, the use of online comics during the eight weeks of the research period is significantly correlated with students' improvement of Chinese word recognition in the pre- and post-tests. Students' year differences had no interaction effects on online comics' effectiveness in CFL education.

5.3 Discussion of the Results

In this section, the effectiveness of online comics in helping students gain improvement regarding Chinese word recognition is presented based on the descriptive analyses from students' pre- and post-tests. It is also discussed with online comics' affordances, which were particularly explored in Chapter 4.

The analysis of the pre- and post-tests indicate that online comics had the potentials in helping students gained marked progress in recognising Chinese words in CFL education. As Table 7 shows, students could recognise 13 more words on average in the post-test than they could in the pre-test. A total of 23% of students in the post-test could recognise all the words, but no one got full marks in the pre-test. The highest frequency of the word scores was four words; about 32% of students could recognise four words in the pre-test, while in the post-test, 32% of students could recognise more than 23 words, in which 72% of students could recognise 26 words. The median scores changed from 4 in the pre-test to 20.50 in the post-test. Together, these findings from the comparison of pre- and post-tests imply that

students' level of word recognition ability was improved. It echoes the findings of Wilujeng and Lan's study (2015) that students who used online comics in learning Chinese vocabulary outperformed students who did not use online comics.

The findings suggest the potentials and practical uses of online comics for language learning. According to Golonka et al. (2014), technology provides learners with an increased access to target language input and interaction opportunities. Ribot, Hoff, and Burridge (2017) added that the use of language can dramatically contribute to language development. In this research, when students were taught by online comics, they were exposed to Chinese language with image-formed situations and short language texts. In this way, students could understand and remember the words' meanings along with the usage, which echoes online comics' effectiveness in language learning found by Yunus et al. (2011). Yunus et al. (2011) also emphasised that online comics offer a great tool for students to practise using the target language. It facilitates language output by providing students with the technological guidance to design preferred situations with their articulation of the language knowledge (Yunus et al., 2011). Particularly in this research, when students created online comics by themselves, they were required to use as many Chinese key words as possible to form conversations in their online comics, the premise of which was to recognise and understand these key words' meanings. In this process, students were provided opportunities to use the words they had learnt. This comics creation process, as it was found in Vassilikopoulou et al.'s study (2011), could help students in acquiring linguistic skills through applying their imaginations to language texts.

The measured effectiveness of online comics is highly related with its affordances as a technology tool, which has been described in the previous chapter. Its iterative technological feature tends to guide students to create online comics by themselves, which increases students' active learning in CFL education. Its social affordances also provide students with opportunities for cooperative learning and facilitate a conducive CFL learning environment. Furthermore, online comics help students construct their own interpretation of CFL knowledge with their prior knowledge in the authentic content, and in this way, students were able to achieve recognition of Chinese words. Online comics' affordances promoted meaningful learning in CFL education to nonbackground students by making Chinese language usable and useful in their everyday life situations and, most importantly, making Chinese language learning fun in the classroom for students. Online comics afford meaningful learning in CFL education and make it effective for word recognition in classroom teaching and learning.

5.4 Summary of the Chapter

This chapter examined the data collected from 60 students' pre- and post-test scores to measure online comics' effectiveness in CFL education. The analysis results from a dependent *t*-test and interaction effects examination indicated that students gained improvement in Chinese words recognition after eight weeks of using online comics for CFL teaching and learning. According to the findings, online comics seem to have fostered students' learning, leading to an improvement in their Chinese word

recognition in this research. The effectiveness of using online comics in CFL education from statistical results aligns with online comics' technological, social, and educational affordances in affording CFL learning to meaningful learning. It is discussed that the effectiveness of online comics in improving students' Chinese words recognition ability was a combined result of harnessing the online comics' affordances and adopting appropriate pedagogical approach of using online comics for language learning. It is or paramount to explore the use of online comics for teaching Chinese words and allowing students to represent their understanding through the creation of online comics.

Chapter 6

Students' Attitudes Towards Online Comics Influencing Chinese Character Recognition Ability

6.1 Overview of the Chapter

The chapter aims to answer RQ3 of this study: "How do students' attitudes towards the use of online comics influence their ability to recognise Chinese words?" The analysis is based on the quantitative data, which includes students' responses in the questionnaire (Part A), students' pre- and post-test results, and qualitative data, which includes the teacher–researcher's self-reflective journals, the mentor teacher's interview transcript, and students' artefacts (including planning worksheets and online comic creations). Both quantitative data and qualitative data were used to investigate the relationship between students' attitudes towards online comics and their word recognition ability in CFL teaching and learning. The discussion of the findings and summary are presented at the end of this chapter.

6.2 Relationship between Students' Perceptions of Online Comics' Effectiveness and Chinese Word Recognition Ability

This section explores the relationship between students' attitudes towards online comics and their Chinese word recognition ability. It focuses on students' perceptions about online comics' effectiveness and influence on their word

recognition ability. Analyses were generated from both quantitative and qualitative data.

6.2.1 Descriptive statistics. A survey questionnaire (see Appendix 2) including five closed items (Part A) and two open-ended items (Part B) about students' attitudes towards online comics in CFL education was administered to 60 students from Year 5 ($n = 30$) and Year 6 ($n = 30$) in the 10th week (which was the last week of the research). Part A items were as follows:

Q1. Do you like learning Chinese language by creating online comics?

Q2. Does creating online comics make it effective for you to recognise Chinese words?

Q3. Do you find it interesting to learn Chinese by online comics?

Q4. Do you find that you are more motivated to learn Chinese when creating online comics?

Q5. Do you hope to create online comics in future in your Chinese class?

Table 11 shows the descriptive statistics of students' responses (on a 5-point Likert scale, where 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neutral*, 4 = *Agree*, and 5 = *Strongly Agree*) to items in Part A. The results indicate that students had positive attitudes towards online comics as the mean scores for each of the five items were above the midpoint of 3. Students mostly agreed that they were more motivated in learning Chinese when creating online comics ($M = 4.27$) (Q4), followed by their liking for online comics ($M = 4.12$) (Q1). Students agreed the least that online comics

were effective in assisting with word recognition ($M = 3.79$) (Q2), but the average

mean was still above the midpoint of 3.

Table 11

Descriptive Statistics of Questionnaire (Part A) Answers

	N	Mean	Std. Deviation
Q1	60	4.12	.739
Q2	60	3.79	.809
Q3	60	4.05	.999
Q4	60	4.27	.821
Q5	60	3.98	1.000

6.2.1.1 Correlation with online comics' effectiveness. Correlation tests were

conducted to examine the correlative relationships between students' answers to each

item (Q1, Q2, Q3, Q4, and Q5) in the questionnaire and their score difference (D) in

the pre- and post-test (see Table 12). A small but significant positive correlation

between students' perceptions of online comics' effectiveness (Q2) and their

improvement (D) of Chinese word recognition ability was found ($r = .457$, $p < 0.01$).

This suggests that when students perceived online comics were effective in terms of

Chinese word recognition, they performed better in the tests. The findings also show

that there was no statistically significant correlation between students' improvement

and the other four items on the survey questionnaire.

Table 12

Correlation of Questionnaire Answers and Difference in Pre- and Post-Tests

	N	Correlation	Sig.
Q1 and D	60	.173	.187
Q2 and D	60	.457**	.000
Q3 and D	60	.132	.314
Q4 and D	60	.090	.494
Q5 and D	60	.016	.903

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Further analyses were conducted to determine whether students' perceptions varied by gender and year (see Table 13). There was no statistically significant difference between girls' and boys' perceptions of online comics' effectiveness in CFL teaching and learning (t = .957. p = .219). There was also no statistically significant difference in the students' perceptions of online comics' effectiveness in relation to students' years (t = 1.244, p = .343).

Table 13

Variable Items of Students' Perceptions of Online Comics' Effectiveness

Variables	*N*	Mean	*SD*	*T*	DF	Sig. (2-tailed)	Mean Difference	Std. Error difference
Boys	24	3.54	.779	.957	58	.219	.270	.212
Girls	36	3.81	.822					
Year 5	30	3.60	.894	1.244	58	.343	.200	.209
Year 6	30	3.80	.714					

Thus, in summary, the correlation analysis between questionnaire data and pre- and post-test scores suggests that when students perceived online comics to be effective for Chinese word recognition, their ability in this area was likely to be improved.

6.2.2 Effective learning shown from qualitative data. The qualitative data, which was generated based on students' responses to two open-ended items in the questionnaire (Part B), the teacher–researcher's self-reflective journals, and mentor teacher's answers in the interview, seem to support the findings from quantitative data that when students perceived online comics as useful and effective for CFL learning, their ability of Chinese word recognition was improved.

6.2.2.1 Students' opinions about online comics as an effective tool. The two open-ended items from the questionnaire asked for students' perceptions of online comics in relation to Chinese language learning. Most students wrote an average of one sentence in response to each item, and these were coded accordingly. Following are the two items from the questionnaire (Part B):

Q6. What do you like about creating online comics for learning Chinese language?

Q7. What do you not like about creating online comics for learning Chinese language?

From the qualitative coding, it was found there were two main types of responses that students like about online comics for Chinese language learning (Q6). In general, students perceived them either as an effective learning tool or as a way to work with their peers. Some students identified online comics' functions and features as a useful tool for Chinese language learning. For instance, student Jay who scored 6

and 26 in the pre- and post- test said, "I like online comics because it is a great tool and you can adapt to it very well". Student Marry who scored 8 and 26 in the pre- and post-tests said, "I like creating online comics for learning Chinese because it's fun and to finish a sentence it pushes you to learn new words". Other students commented that they liked to use online comics in Chinese language learning because they were able to work together with their friends. For example, student Jacob who scored 4 and 10 in the pre- and post-tests said, "[I like that] I get to work with friends and it combines my creativity with learning". Student Daniel who scored 6 and 26 in the pre- and post-tests said, "[I like] working with friends to make cool comics in Chinese word". It seems that students preferred online comics as they perceived them to be an effective tool for learning Chinese words, and they provided them with the opportunities for team working or study with friends.

6.2.2.2 Observable evidence. The teacher–researcher's self-reflective journals and students' artefacts also provided supporting evidence for online comics' effectiveness with regard to Chinese language learning. Some students did not like drawing comics in the planning sheet but found it interesting in creating comics online, some students spent substantial time designing the storyline and characters in the online comics, and some students developed the conversation in the online comics to use as many key words as possible. It is interesting to note that not only did students willingly collaborate to complete the online comics, but they also made efforts to negotiate and to consider various options for their work. The following

cases explain students' learning process with online comics through creating online comics.

Case 1: Ethan, David, and Aaron's comic creation
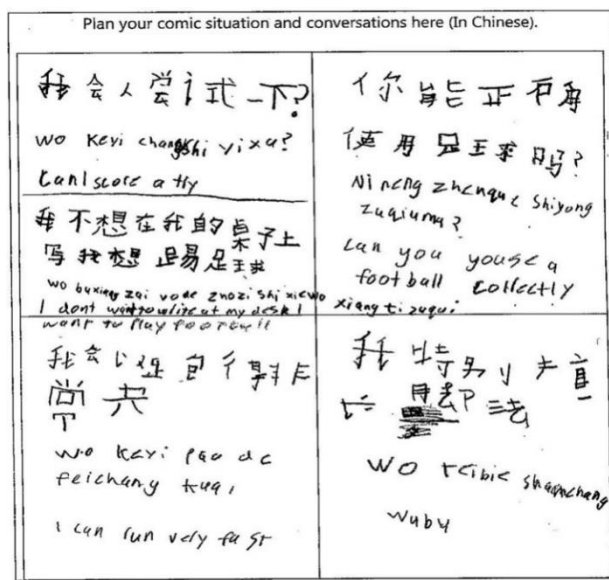
Figure 22. Ethan, David, and Aaron's comic planning sheet.

Figure 23. Ethan, David, and Aaron's online comic creation.

This group of boys (Case 1: Ethan, David, and Aaron's comic creation) had no interest in drawing comics on the planning sheet. As shown in Figure 22, there is no picture describing the situations in the comic but only words on their planning sheet. During the planning lesson, these students first discussed the idea together, and then

one of them wrote the words on the paper in English and copied the Chinese words from Google Translate, while the other two students were talking irrelevant topics in the class. During the online comics creating lesson, on the contrary, these students showed interest in selecting pictures and character images for their online comic (see Figure 23). They discussed their opinions on background pictures, and they shared laughter when the funny character images made the story funny. They also considered using as many Chinese key words as possible in the online comic. In the word recognition pre- and post-test, these three students gained improvement of seven words, 16 words, and 12 words, respectively.

Case 2: Sana, Alisa, and Shirley's comic creation.

Figure 24. Sana, Alisa, and Shirley's comic planning sheet.

Figure 25. Sana, Alisa, and Shirley's online comic creation.

This group of girls (Case 2: Sana, Alisa, and Shirley's comic creation) also did not draw pictures on the planning sheet (see Figure 24). However, they were observed to be task oriented. The group had some difficulty generating ideas for using key words in the comic when they were planning on the worksheet. Compared with their planning sheet, their online comic creation included a greater variety of words used in the conversations based on the situation they created (see Figure 25). With the researcher's assistance, the students could type Hanyu Pinyin using the keyboard and select the Chinese words by themselves. Students in this group gained an improvement of recognising 19 words, 14 words, and 13 words, respectively.

Students behaved differently in the lesson planning their comics on paper and creating online comics on the iPad. They showed more discipline and were more focused on creating online comics than they were in the planning lesson. This perhaps shows that while they were eager to quickly move onto creating online comics, the quality of their creations was not compromised and did not impede their learning of Chinese words. In these two examples, the planning sheet, which was meant to be a

scaffold, played a lesser role in scaffolding students' learning. It was also observed that they were more willing to use Chinese words and to learn new Chinese language knowledge when creating online comics, as described in the teacher–researcher's self-reflective journal:

September. 18th, 2017—A lesson of creating online comics on the iPad

The majority of the class were focusing on creating online comics using the iPad. Mentor teacher kindly gave two hours for students to create online comics. Most of the groups would spend one hour for selecting background and characters for online comics. When it comes to make conversations for online comics, I noticed students tried hard to use as many key words as they can for forming the sentences. Most of them would make English sentences first and then use Google Translate for the respective Chinese words. However, the order and words used in the Google Translate were not always correct.

I quieted the class and told them "Let me tell you a method and you can do better than Google Translate". Students were all looking at me curiously. I told students there is a huge difference between Chinese language and English. I explained to them that Chinese language values more on the situation so the words indicating time and location are always in the front of the sentence while in English, these mostly come at the end of the sentences. Students tried this strategy in their online comics and showed to me. Most of the sentence were in correct order. They seemed proud of knowing this new way to organising a Chinese sentence. I also showed students how to type Hanyu Pinyin using the iPad and some groups followed and learned to make Chinese sentences directly by typing in Pinyin and selecting the correct words. I think students were meticulous when creating online

comics as they attempted to create a meaningful story using Chinese language.

From the researcher's self-reflective journal, it is inferred that creating online comics not only provided students with opportunities to use the Chinese words they have learnt, but also allows them to apply Chinese language knowledge (e.g., Pinyin and sentence structure). Online comics made students feel that it was useful to learn Chinese language as they could create a meaningful story in Chinese in relation to their daily life situation, and in this way, online comics were effective for CFL teaching and learning.

In the interview with the mentor teacher, who had observed all the lessons using online comics in Chinese language teaching and learning in this research, she highly recommended online comics as an effective tool for Chinese teaching and learning (see the excerpts below).

Researcher: What do you think about teaching Chinese language by using online comics?

Mentor teacher: It is a great educational tool especially for learning a language. The dialogue in the online comics pushed the children to use new words. They were able to discover new language form to use in their story. Sequencing also promotes children's understanding of the language used.

Researcher: Do you think online comics are effective for teaching and learning Chinese? Tell me your reasons or options.

Mentor teacher: It is effective as it can help to transcend language and cultural boundaries for teachers to teach the language. For children, it

is an ideal tool to showcase their capabilities to work in groups and
their ideas were able to be presented in a sequential manner.

Therefore, the findings from both quantitative data and qualitative data
suggest that students' attitudes towards online comics increased their Chinese word
recognition ability, especially students' perceptions of their effectiveness for Chinese
language learning. Online comic creation enabled students to apply the learnt Chinese
language knowledge to their own preferred life situation in the online comics, which
led to a meaningful learning process for the students.

6.3 Different Years' Attitudes Towards Online Comics for Chinese Word Recognition Ability

Two classes of students were involved in this research (Year 5 and Year 6).
This section examines the relationship between Years 5 and 6 students' attitudes
towards online comics and their improvement in Chinese word recognition ability.

**6.3.1 Correlation between attitudes and word recognition improvement
with respect to year.** Table 14 shows the correlation between Year 5 students'
answers in the questionnaire and their score difference (D) in the pre- and post-tests.
It is concluded that for Year 5 students ($n = 30$), students' perceptions of online
comics' effectiveness (Q2) was the only item that significantly correlated ($r = .468$, $p
= .009$) with their improvement in Chinese word recognition ability. None of the

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other items significantly correlated with their improvement in Chinese word recognition ability.

Table 14

Correlation of Year 5's Answers in Questionnaire and Their Score Difference in Pre- and Post-Tests

Year 5	N	Correlation	Sig.
Q1 and D	30	.069	.716
Q2 and D	30	.468**	.009
Q3 and D	30	.009	.961
Q4 and D	30	.086	.650
Q5 and D	30	.090	.636

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 15 shows further analyses conducted to determine whether Year 5 students' perceptions of online comics' effectiveness varied by gender. The result showed there was no statistically significant difference between girls' and boys' perceptions of online comics' effectiveness in CFL teaching and learning ($t = .493$, $p = .626$).

Table 15

Variable Items of Year 5 Students' Perceptions of Online Comics' Effectiveness

Variables	N	Mean	SD	T	DF	Sig. (2-tailed)	Mean Difference	Std. Error difference
Year 5 Boys	12	3.50	.905	.493	28	.626	.167	.338
(Q2) Girls	18	3.67	.907					

As for Year 6 students ($n = 30$), similar to the findings from Year 5 students, Table 16 shows that Year 6 students' Chinese word recognition improvement was significantly correlated with online comics' effectiveness (Q2) ($r = .405$, $p = .027$) and their perception of online comics increasing motivation in learning Chinese

language (Q4) ($r = .379$, $p = .039$). Other items had no statistical significance in relation to their Chinese word recognition ability.

Table 16

Correlation of Year 6's Answers in Questionnaire and Their Score Difference in Pre- and Post-Tests

Year 6	N	Correlation	Sig.
Q1 and D	30	.337	.068
Q2 and D	30	.405*	.027
Q3 and D	30	.321	0.084
Q4 and D	30	.379*	.039
Q5 and D	30	.119	.530

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Further analyses were conducted separately to determine whether Year 6 students' perceptions of online comics' effectiveness (Q2) and their perceptions of online comics increasing motivation (Q4) in learning CFL were varied by gender (see Table 17). The results indicated that there was no statistically significant difference between girls' and boys' perceptions of online comics' effectiveness ($t = 1.377$, $p = .179$) or their perceptions of online comics increasing motivation ($t = .806$, $p = .427$).

Table 17

Variable Items of Year 6 Students' Perceptions of Online Comics' Effectiveness and Variable Items of Their Perceptions of Online Comics Increasing Motivation in Learning Chinese Language

	Variables	N	Mean	SD	T	DF	Sig. (2-tailed)	Mean Difference	Std. Error difference
Q2	Boys	12	3.58	.669	1.377	28	.179	.361	.258
	Girls	18	3.94	.725					
Q4	Boys	12	4.42	.793	.806	28	.427	.250	.310
	Girls	18	4.17	.857					

Thus, it appears that both Year 5 and Year 6 students were more likely to experience improvements in word recognition ability when they perceived online comics as effective in helping them to recognise Chinese words. There were no differences according to gender, and such quantitative findings corroborated with the qualitative evidence presented earlier on in the two cases. It was found that boys' and girls' attitudes towards online comics that online comics have made Chinese word learning effective were identical, and this aligns with the quantitative findings that no significance differences were found between girls' and boys' perceptions of online comics' effectiveness in CFL teaching and learning. In addition, the test results show that when Year 6 students felt they were motivated to learn Chinese language by creating online comics, they were more likely to gain improvement in their Chinese word recognition ability. Such finding was not shown to be statistically significant among Year 5 students.

6.3.2 Year 6 students' motivation and improvement in word recognition ability. At the beginning of this research, the researcher felt Year 6 students lacked motivation in learning Chinese language, as she reflected in her self-reflective journal of the first lesson:

July 20th, 2017-----First lesson in Year 6 class

Today I had the first lesson in the Year 6 class. I did the pre-test with the students first and then I asked students "why do you learn Chinese language?" Some boys and called out: "Because we are in the bilingual class!" "Because my parents want me to learn Chinese". I felt that students learn Chinese for many reasons but they have little knowledge about Chinese language or culture.

I presented some pictures and videos of modern China to the students and also introduced my hometown in China. Students looked amazed by the photos. Suddenly, a boy called out, "Miss, do you like China or Australia?" I replied I love my country China. "If you think China is better, then why do you come here to Australia?" that student asked and then he laughed, together with other students. It was embarrassing and the mentor teacher helped me explain to students that I come to Australia to study and to do research to help Australian students to learn Chinese language. "I won't go to China anyway", that student called out casually. I think students in Year 6 learning had little motivation in learning Chinese language.

It was noticed that the mentor teacher, in her Chinese language class, used stickers to reward students who had good classroom manners, especially in the Year 6 class. In the researcher's Chinese language lessons with online comics, interestingly, these students engaged in the lessons:

August 23rd, 2017-----Using online comics to teach calligraphy in the Year 6 class (see Figure 17)

I showed this online comic to the students, where shows a student doing calligraphy and the other character explaining the gestures of doing calligraphy in Chinese. As usual, students showed

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interesting in the funny characters and commented on the characters for one or two minutes. I waited until the class calmed down and introduced the plan of today's lesson was to learn some words about calligraphy and also do calligraphy with the correct gestures as the online comic showed. Students were excited. During the lesson, they looked attentively at the online comics and could follow my teaching pace and remember the Chinese words presented in the online comics, along with the gestures of doing calligraphy. In the later part of the lesson, when students were doing calligraphy by themselves, they would look back at the online comics on the screen and saying to each other, "笔直! 握住!" (Straight! Hold it!); "把毛笔沾一下" (Dip the brush!); "墨水! 我要墨水!" (Ink! I want Ink!).

As described in the teacher–researcher's self-reflective journal above, with its attractive images and brief stories, online comics engaged these students in the process of language learning and therefore motivated them to learn the language Moreover, it was found that Year 6 students were motivated in learning Chinese language while they were creating online comics (See the following cases).

Case 3: Dylan, Mason, and Lucas' comic creation
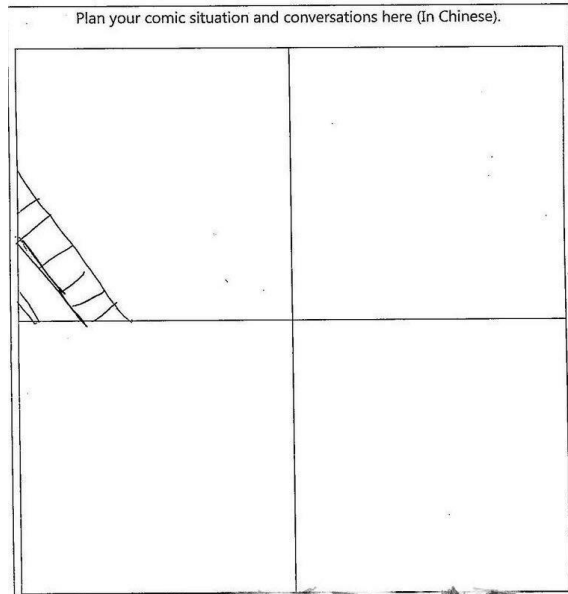
Figure 26. Dylan, Mason, and Lucas' comic planning sheet.

These three boys (Case 3: Dylan, Mason, and Lucas' comic creation) hardly engaged in the Year 6 class. As shown in Figure 26, they did not plan any comics on the planning worksheet; however, they created an online comic with four different background pictures and meaningful dialogue in Chinese (see Figure 27). In the comics planning lesson, these three boys talked about their computer games through the lesson and pretended to plan comics when the researcher came close to them. On the contrary, when they used the iPad to create online comics, they spent time planning, discussing, and choosing backgrounds with much interest. Such behaviour is similar to the first two cases presented. This group of students asked the researcher about Chinese words they were using in the dialogue when she approached them. From Figure 27, it is apparent that this group of boys created an interesting story with appropriate use of Chinese words and meticulously planned scenes.

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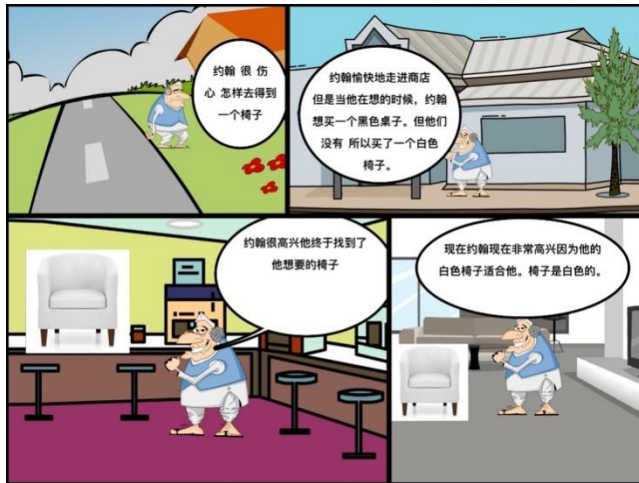
Figure 27. Dylan, Mason, and Lucas' online comic creation.

In the questionnaire, all three boys chose *Strongly Agree* to indicate that online comics made them more motivated to learn Chinese when creating online comics (Q4). Regarding the two open-ended items, Dylan commented, "It's fun" in answer to the question "What do you like about online comics?" (Q6) and "Nothing" to "What do you not like about online comics" (Q7). He scored 7 in the pre-test and 21 in the post-test. Mason, who scored 7 and 22 in the pre- and post-tests, answered, "I like that we can be in a group and be on our iPad" (Q6) and "Nothing, it was fun" (Q7). Lucas scored 7 and 23 in the pre- and post-tests, saying "[I like] that you can have fun creating it without the teacher guiding you" (Q6) and "Some of it was hard when you had to transfer some things" (Q7). The improvement in terms of Chinese word recognition among these boys was consistent.

It is inferred from Case 3 that online comics motivated the students to learn Chinese language with its affordances of making learning engaging. This is supported by the mentor teacher, who claimed that online comics motivated students by engaging them in learning Chinese language, and students gained a sense of

achievement from using the learnt Chinese language knowledge in creating online comics by themselves:

> *Researcher:* What are the differences you observed when online comics are used in teaching?

> *Mentor teacher:* Children can work at independent levels and learn to be self-disciplined [when creating online comics]. They were very engaged. They were eager to learn new skills such as typing in Pinyin and selecting the correct Hanzi. It's a great achievement for them and the positive outcome for learning Mandarin is so significant for these children.

This echoes Wilujeng and Lan's study (2015), that students who create online comics by themselves show satisfaction in learning Chinese. Through creating online comics, students felt the learnt Chinese words and knowledge was useful and easy to master (Wilujeng & Lan, 2015).

These findings provide supportive evidence for Section 6.2, which indicated that for both Year 5 and Year 6 students, their perceptions of online comics' effectiveness correlated with their improvement in word recognition ability. It is also indicative that Year 6 students' opinions, that online comics increased their motivation in learning CFL, had a significant influence on the improvement of their Chinese word recognition ability.

6.4 Preferences of Different Genders in Terms of Attitudes Towards Online Comics for Chinese Word Recognition

In this section, boys' and girls' attitudes towards online comics and the influences on their Chinese word recognition ability are investigated. A total of 24 boys and 36 girls were involved in the research, including students from both Year 5 and Year 6.

6.4.1 Correlation between attitudes and word recognition improvement with respect to gender. Tables 18 and 19 show the correlation of results of boys' and girls' attitudes towards online comics and their score difference (D) in the pre- and post-tests, respectively.

Table 18 suggests that for boys ($n = 24$), their perceptions of online comics' effectiveness (Q2) was the only item that significantly correlated ($r = .410$, $p = .047$) with their improvement (D) in Chinese word recognition ability, while other items had no significant correlations with improvement (D) in Chinese word recognition ability. Further analyses (see Table 19) suggest that boys' perceptions of online comics' effectiveness did not vary by year. There was no statistically significant difference between Year 5 boys' and Year 6 boys' perceptions of online comics' effectiveness in CFL teaching and learning ($t = .257$, $p = .800$).

Table 18

Correlation of Boys' Answers in Questionnaire and their Score Difference in Pre- and Post-Tests

Boys	N	Correlation	Sig.
Q1 and D	24	.036	.867
Q2 and D	24	.410*	.047
Q3 and D	24	.143	.506
Q4 and D	24	.141	.512
Q5 and D	24	.026	.906

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 19

Variable Items of Boys' Perceptions of Online Comics' Effectiveness

Variables		N	Mean	*SD*	*T*	DF	Sig. (2-tailed)	Mean Difference	Std. Error difference
Boys (Q2)	Year 5	12	3.50	.905	.257	22	.800	.083	.325
	Year 6	12	3.58	.669					

As for girls (*n* = 36), Table 20 indicates that their perceptions of online comics' effectiveness (Q2) significantly correlated with their improvement (D) in Chinese word recognition ability (*r* = .474, *p* = .003). Moreover, girls' opinions of thinking online comics were interesting for Chinese language learning (Q3) also had a statistically significant correlation (*r* = .377, p = .023) with their improvement (D) in Chinese word recognition ability. The results in Table 21 show there were no significant differences in neither Year 6 girls' and Year 5 girls' perceptions of online comics' effectiveness (*t* = 1.014, *p* = .318) nor their opinions of thinking online comics were interesting (*t* = 1.861, *p* = .071). These perceptions correlated with the improvement of word recognition ability and did not vary by year.

Table 20

Correlation of Girls' Answers in Questionnaire and Their Score Difference in Pre- and Post-

Tests

Girls	*N*	Correlation	Sig.
Q1 and D	36	.256	.132
Q2 and D	36	.474**	.003
Q3 and D	36	.377*	.023
Q4 and D	36	.073	.672
Q5 and D	36	.006	.973

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 21

Variable Items of Girls' Perceptions of Online Comics' Effectiveness and Variable Items of

Girls' Opinions of Thinking Online Comics Are Interesting for Learning CFL

	Variables	*N*	Mean	*SD*	*T*	DF	Sig. (2-tailed)	Mean Difference	Std. Error difference
Q2	Year 5	18	3.67	.907	1.014	34	.318	.278	.274
	Year 6	18	3.94	.725					
Q3	Year 5	18	4.06	.802	1.861	34	.071	.444	.239
	Year 6	18	4.50	.618					

The quantitative data in Table 21 indicates that for both boys and girls, their perceptions of online comics' effectiveness were positively and significantly correlated with their Chinese word recognition ability. Moreover, girls' opinions of thinking online comics were interesting for Chinese language learning were also positively and significantly related to their Chinese word recognition ability. The supports the findings in Section 6.2, that when students, boys or girls, perceived online comics effective for recognising Chinese words, they were more likely to gain improvement in word recognition ability. It also suggests that when girls thought

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online comics were interesting for Chinese language learning, they were more likely to improve their Chinese word recognition ability. Interestingly, when it comes to online comics' effectiveness, girls tended to differentiate between perceiving it as "effective" and "interesting", while the boys did not distinguish between these two notions.

6.4.2 Different genders' interest in online comics and improvement in word recognition ability. From girls' responses to the open-ended items in the questionnaire, it was inferred that the main reason they liked online comics (Q6) was that they were fun, and the girls were able to create and design stories in the online comics according to their own preferences. For instance, Olivia, who scored 4 and 26 in the pre- and post-tests, said, "It is fun and interactive way of learning and gave me better knowledge of Chinese words"; Mia, who scored 8 and 23 in the pre- and post-tests, said, "I liked being able to write a storyline". Regarding the boys, most commented that it was fun learning by online comics, and they liked working with their friends when creating online comics. For example, Wyatt scored 4 and 21 in the pre- and post-tests and said, "I like creating comics because it's fun to work with people on comics"; Mark scored 3 and 15 in the pre- and post-tests and said, "[I like it because I am] able to work in groups". From students' answers, it was interesting to find that girls preferred online comics mostly because it enabled them to create their own stories, while boys preferred online comics because they liked working with their friends in creating online comics.

The teacher–researcher's self-reflective journals support and explain the idea that girls placed more importance on the effects online comics had for Chinese language learning, while boys preferred to share fun and laughter in the groups when creating online comics:

July 24th, 2017----First lesson with online comics (see Figure 5 in Chapter 3)

Students seemed very attracted to the characters in the online comics which I made and they laughed at the characters for a while. I noticed that boys were more into commenting on the funny part of the characters while girls were more calm in the lesson. More girls raised hands than boys when I asked students to guess the meaning of the Chinese words in dialogues in the online comics.

September 4th, 2017---Online comics creating lesson

Students in this lesson were creating online comics in groups. I noticed that boy groups would always laugh out and it seemed that they had found funny characters while girl groups were quieter. Girls were carefully selecting the backgrounds and words, aiming to use as many key words as they could in the online comics. In this lesson, girls asked for my help with words more than boys did.

It was noticed that boys tended to be interested in the exaggerated images that amused them in the online comics for Chinese language learning. Girls appeared to be attracted by cute images and cared about detail in the online comics. Evidence was also found in the following students' artefacts.

Case 4: Vincent, Weston, and Brandon's online comic creation (boy group)
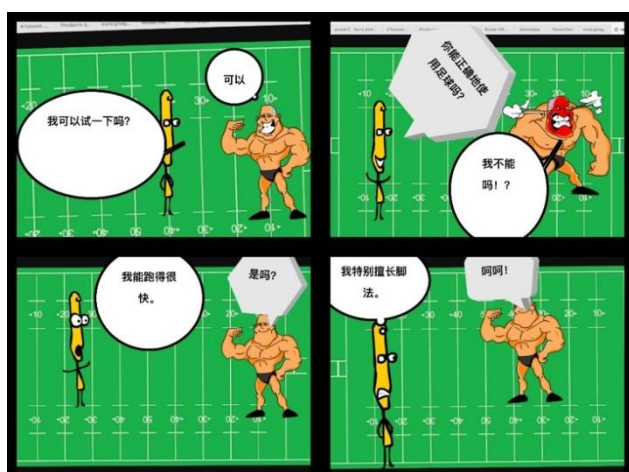
Figure 28. Vincent, Weston, and Brandon's online comics creation.

Case 5: Sophie, Zoe, and Julia's online comic creation (girl group)

Figure 29. Sophie, Zoe, and Julia's online comic creation.

As shown from the two groups of online comic creations (Figures 28 and 29), the boys liked to use exaggerated images to create funny stories in the online comics. The girls' artefact had more detail to make cute images and interesting stories in the online comics. For both boys and girls, online comics provided them with fun, which was commented by the mentor teacher in the interview:

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Researcher: What are the advantages you observed when online comics are used to teach and learn Chinese?

Mentor teacher: Creating online comics is fun and not overwhelming. It helps children to provide information in the most interesting and interactive way. Children would put effort into searching animations that fit their creative thoughts.

It is outlined in the analyses of quantitative and qualitative data that boys and girls had different preferences in online comics used for Chinese language learning. Girls' perceptions of thinking online comics were an interesting way to learn Chinese language would more likely be a factor in their improvement of their Chinese word recognition ability based on the statistical evidence.

6.5 Discussion of the Findings

It is concluded from the quantitative and qualitative data analysis that students' attitudes towards online comics may influence their Chinese word recognition ability. The main finding is that, regardless of year or gender, students' perceptions of online comics' effectiveness were significantly and positively related to their Chinese word recognition ability. When students believe that a language learning strategy is effective, it indicates that their knowledge and understanding of this learning strategy can guide them through the language learning (Hu & Tian, 2012). Students' perceptions of the language learning process have been recognised as important determinants for learning results (Bernat & Gvozdenko, 2005; Hu & Tian, 2012). This

suggests that managing students' perceptions by using effective pedagogical tools is to be considered for meaningful learning to occur.

There are also two interesting findings with respect to the year level and gender differences for attitudes and the improvement of Chinese word recognition ability. First, it was found that students in both Year 5 and Year 6 claimed in the questionnaire that online comics increased their motivation in learning CFL, but this perception was only in relation to Year 6 students' improvement in Chinese word recognition ability, not Year 5 students' improvement. This finding echoes other empirical findings that older students' motivation in learning the language is more significantly related to their academic achievement (Ghenghesh, 2010; Li & Lynch, 2016). Ghenghesh (2010) explained in his research that students' maturity in motivational perspectives leads to this significant relationship between older students' motivation and their academic achievement, which means, "those who feel motivated and responded accordingly in the questionnaire really mean it" (p. 132). Second, it is indicative from the data that girls and boys had different learning preferences for online comics. Boys preferred exaggerated characters and stories that provided them with amusement in the online comics, while girls preferred the cuteness of the characters and situations in the online comics and tried to make meaningful sentences in creating online comic stories in Chinese. Such findings correspond with linguists' findings of gender preferences towards literacy, which clarify that boys prefer literacies that are masculine, funny, or slightly gross to show they are a bit subversive, while girls prefer literacies focusing on feelings, and thought expression, and

comprehension (Senn, 2012). It also explains the result from further analyses that girls' perceptions of thinking online comics are interesting for CFL learning had significant influence on their Chinese word recognition ability, since girls' language learning focuses more on useful and effective strategies (Cáceres-Lorenzo, 2015), which in this research was provided by online comics. With such findings, it is important for educators to take note of year and gender differences (Bonomo, 2010; Yeung, Lau, & Nie, 2011) when integrating online comics into their teaching so that associated teaching strategies can be applied to cater for different groups of students. Although it was not the intention of this study to examine the effectiveness of the planning sheet as a scaffolding tool, it was found that students were less reliant on the planning sheet as they quickly moved into creating their stories using the online comics tool. In this case, the planning sheet played a lesser role in assisting students' planning, but this did not impede their learning nor did it compromise the quality of their comic creations. This finding aligns with Wilujeng and Lan's (2011) finding in their study that students using online comics gain higher scores in the word recognition post-test than students who simply plan the comics on paper. Could this suggest that the online comics platform itself is a scaffolding tool? This is likely the case given that it fulfils the three types of affordances that were mentioned in Chapter 4.

When all three findings are combined, it is possible to assume that Year 6 students were motivated to learn Chinese language through online comics because they could use online comics as an effective learning tool to improve Chinese word

recognition. Also, even though boys and girls had different preferences in their online comics, online comics fulfilled both their interests, and it was then regarded as an effective tool in helping them to memorise and recognise Chinese words.

6.6 Summary of the Chapter

In this chapter, the relationship between students' attitudes towards online comics and the improvement of their Chinese word recognition ability was investigated using both quantitative and qualitative data. Three main findings were presented from the quantitative and qualitative data analysis. First, students' perceptions of online comics' effectiveness, regardless of year and gender, were related to the improvement in their Chinese word recognition ability. Second, Year 6 students' opinions of thinking online comics increased their motivation in CFL learning positively influenced their improvement in Chinese word recognition ability. Such influence was not found among Year 5 students. Third, boys and girls in this research had different preferences towards online comics. In particular, girls' perceptions of thinking online comics were interesting for CFL learning had a positive relationship with their improvement in Chinese word recognition ability. Such relationship was not found among boys.

It was discussed that students' perceptions of online comics' effectiveness show their comprehension of using online comics as a strategy for CFL learning, and therefore they gained improvement in Chinese word recognition ability. It further emphasised the importance of adopting a pedagogical approach that students perceive

to be effective. That students' preferences towards online comics varied according to year and gender suggests that teaching approaches should be aligned with students' needs.

Chapter 7

Conclusion and Recommendations

7.1 Overview of the Research

This research aimed to investigate the use of online comics in CFL education in the context of Australia, specifically, online comics' affordances in CFL teaching and learning, their effectiveness in helping nonbackground students recognise Chinese words, and the influence of students' attitudes towards online comics on their word recognition ability. Mixed research methods, including both quantitative and qualitative data analysis, were adopted in this research. The seven chapters of this thesis are summarised respectively as follows.

Chapter 1 introduced the background of this research, where there is a rising trend of learning Chinese language in the global context, specifically in the context of Australia. Although supported by government policies, three aspects of Chinese language are regarded as the main challenges of CFL education: (1) Chinese language system, (2) Chinese language teaching pedagogy, and (3) students' attitudes towards Chinese language. As most Chinese language nonbackgound beginning learners in Australia are born in the digital age, there is support for using technology, particularly online comics, to resolve the challenges of CFL education. Research questions for this study were presented in this chapter: (1) How do online comics afford the teaching and learning of Chinese to nonbackground learners? (2) How effective are online comics for mastering Chinese word recognition in the context of teaching

nonbackground learners? (3) How do students' attitudes towards the use of online comics influence their ability to recognise the Chinese words? Last, this chapter introduced the significance of this research in terms of educational research and Chinese language learning pedagogy in the Australian context. It also discussed the contribution it could make to the ROSETE program, which is one of the first to make Chinese learnable in Australia.

Chapter 2 reviewed the literature, which mainly focused on the pedagogies of using technology in CFL education and the characteristics of meaningful learning. It first introduces the features of the Chinese language system, which includes both Hanyu Pinyin as the sound system and Chinese characters as the writing system. It was found that for nonbackground learners, Chinese characters are hard to learn and remember since it is largely different from the system of their mother tongue. Based on the literature review, there are two trends in technology for CFL education, and they are particularly appropriate for learning the special features of Chinese characters. Embodied animation and creating a VE for teaching and learning Chinese characters are both technology-based pedagogies aiming to engage Chinese language learners in learning Chinese characters and help them to recognise and apply the words. These two approaches may not be suitable for nonbackgound beginning learners in Australia, but this research was inspired by the point of teaching and learning Chinese characters by learning their formation and using the words in real-world situations. In particular, for nonbackground beginning learners, it was suggested that online comics could be integrated into CFL education for effective learning. The feature of customised design

for any situation with words was then introduced, and its potential value for CFL teaching and learning was discussed based on the literature. In the last section of this chapter, the researcher reviewed the concept and characteristics of meaningful learning and discussed the possibilities of using online comics for meaningful learning in CFL education. It was the intent of this research to explore online comics' potential used in CFL education for making CFL learnable and CFL education meaningful.

Chapter 3 elaborated on the methodology of this research. It first introduced the researcher's pragmatist stance, which led to the decision of adopting a mixed methods design for this research. After comparing mixed methods designs, a convergent design was adopted in this study for collecting both quantitative and qualitative data. In this research design, the researcher's role was as teacher–researcher in a public school in the Western Sydney region of Australia. The research site and research participants, 60 students and one teacher participant, were introduced. This chapter outlined the researcher's teaching and learning sequences using online comics during the research period. Quantitative data included pre- and post-tests of students' word recognition ability, and a questionnaire that was administered to the students. These were analysed through a dependent-sample t-test and correlation tests using SPSS version 24. Qualitative data was collected from the teacher–researcher's self-reflective journals, artefacts of students' comics, and the transcript of the mentor teacher's responses in the individual interview. These were analysed by initial coding and focused coding. Ethical issues were declared, which

were resolved by meeting the requirements of the human ethics office as well as receiving approval from all participants before collecting data at the research site.

Analysis Chapters 4, 5, and 6 addressed the three research questions, respectively. Chapter 4 mainly discussed the qualitative data analysis method in exploring online comics' affordances in CFL education, whereas Chapter 5 discussed the quantitative data and examined online comics' effectiveness in helping students recognise Chinese characters. Chapter 6, in addressing RQ3, discussed both qualitative and quantitative data analysis methods, investigating the relationship between students' attitudes towards online comics and their Chinese word recognition ability.

The last chapter of this thesis is the conclusion chapter, which provides an overview of the entire research. This chapter also summarises the essential findings regarding the three research questions. Discussions of the implications for the research field and pedagogy of CFL education are made. Limitations and recommendations of this research for further studies are also presented in this chapter.

7.2 Findings

This research mainly explored online comics' affordances in CFL education, examined the effectiveness of using online comics on students' Chinese word recognition ability, and students' attitudes towards using online comics for learning Chinese words. The summaries of the findings are shown in the following sections.

7.2.1 How do online comics afford the teaching and learning of Chinese to nonbackground leaners? To address RQ1, Chapter 4 was framed based on three technology affordances: technological affordances, social affordances, and educational affordances. From the analysis of the data collected from the teacher–researcher's self-reflective journal, students' artefacts, and the mentor teacher's interview, these three dimensions of online comics' affordances achieved meaningful learning in CFL education in this research.

The technological affordances of online comics engaged students in CFL lessons with their attractive images and short conversations that were easy to understand. During the time when students were creating online comics, the online comics guided them with interactive functions, which enabled active learning to occur when students observed the effects of manipulations and adapted accordingly. The social affordances of online comics were noted to establish a conducive and nonthreatening teaching and learning environment, which reduced students' stress of learning and facilitated teaching; it also promoted the exchange of ideas during lessons between the teacher and students. When students were creating online comics, it was also apparent that a cooperative learning environment was naturally formed among students where they were able to study together, cooperate to complete tasks, and learn from each other. Most importantly, it was found that the educational affordances of online comics provided authentic teaching and learning materials for the lessons, which were based on everyday life situations. It also helped students to construct their own language knowledge through creating online comics. Online

comics fulfilled the teacher's intentions of teaching words and language culture through designing situations and conversations using the online comics platform, and it also satisfied students' needs of representing their learnt knowledge and creativity through creating online comics.

The result provided in this thesis suggested that online comics afforded CFL teaching and learning by making Chinese usable in students' everyday experiences. Moreover, online comics afforded students to learn CFL in a useful way, by which they were able to apply learnt language knowledge and develop ownership of learning when creating online comics by themselves. Last, online comics afforded building a conducive environment for both the teacher and students where they felt less stressed and more engaged in meaningful CFL teaching and learning.

7.2.2 How effective are online comics for mastering Chinese word recognition in the context of teaching nonbackground learners? To address RQ2, quantitative data collected from students' pre- and post-test word recognition tests was analysed in Chapter 5 to measure online comics' effectiveness for CFL teaching and learning. Mean scores of the pre- and post-tests and the interactive effects of year difference on the score improvement were computed.

The descriptive test result of the data showed that, in the pre-test, students could recognise five words on average, while after eight weeks of using online comics for learning Chinese language, the average was 18 words in the post-test. Data analyses regarding the different year levels of students and test results showed that

year level did not affect the students' test results in both pre- and post-tests. These results suggest that as the main teaching and learning tool in the eight-week research period, online comics had the potential in improving students' word recognition ability when online comics were used for CFL teaching and learning.

It was discussed that online comics' potential in improving students' word recognition ability effectively was through its practical uses for language learning and its affordances in facilitating meaningful learning in CFL education in this research. When online comics were used to teach students Chinese language, with their attractive images and short texts, online comics increased the target language input effectively (Golonka et al., 2014). On the other hand, online comics as a technology tool provided students opportunities for language output (Ribot et al., 2017), which is during the time when students were creating their own online comics, students' understanding and memory of the words were strengthened through using the words. Effective language input and output are essential for language learning (Yeung, 2011). In addition, online comics' potential in helping students' with Chinese words recognition was also discussed to be related to its affordances in CFL education that make CFL learning meaningful. It was concluded that the effectiveness of using online comics in CFL education relies on exploiting the affordances of online comics and approaches on using online comics for teaching Chinese language. More importantly, there must be opportunities for students to create online comics with the learnt words.

7.2.3 How do students' attitudes towards the use of online comics influence their abilities to recognise the Chinese words? To address RQ3, qualitative data and quantitative data were analysed in Chapter 6. Both data were mainly used in investigating the relationships between students' attitudes towards online comics and the influence on their Chinese word recognition ability.

The investigations were conducted among all students, between two different years, and between different genders in this research. The results first suggested that students' perceptions of online comics' effectiveness were related to their ability in Chinese word recognition in a positive way, regardless of students' year or gender. Second, it was found that students' attitudes towards online comics were different among Year 5 and Year 6 students. While students in Year 6 in particular showed improvement in their Chinese word recognition ability when they believed that online comics increased their motivation for learning CFL, this was not the case for Year 5 students. Third, boys and girls showed different preferences for online comics, and their attitudes towards online comics had different influences on their Chinese word recognition ability. When the girls believed that using online comics in CFL learning were interesting, they did better in their Chinese word recognition, while the same result was not found among boys.

The significant influence of students' beliefs towards online comics on their language learning was discussed. Students' perceptions of online comics' effectiveness indicated that students' knowledge and understanding of online comics as a learning strategy could guide them through language learning, which could lead

to improvement in academic achievement (Bernat & Gvozdenko, 2005; Hu & Tian, 2012). Students' positive perceptions of online comics increased their motivation in CFL learning varied according to the year, which could be the reason that students' maturity in motivational perspectives is different. Older students seem to be more mature and respond accordingly (Ghenghesh, 2010). Their motivation is more related to their academic achievement (Ghenghesh, 2010; Li & Lynch, 2016). Girls' and boys' preferences related differently to their academic achievement. Girls' interests in learning CFL through online comics focused more on the function of designing meaningful conversations with learnt Chinese words, which was related to online comics' effectiveness in Chinese word learning (Cáceres-Lorenzo, 2015). Boys' interests were more about the amusement of exaggerated characters and stories in the online comics, which could have less effect on their academic achievement (Senn, 2012).

7.3 Implications

In this section, the main implications are discussed. These implications could be beneficial to subsequent research and future teaching practices.

7.3.1 Research implications.
This research examined online comics' effectiveness in helping students recognise Chinese words. The statistical analysis results showed that students improved 13 words on average in the word recognition tests, which is half the total amount of the test's words. The findings of this research

may imply that online comics are indeed a useful tool to foster word recognition. However, it is not known whether the same result would be observed in different age groups of learners. Also, as this research only focused on word recognition, it is not known whether online comics can indeed foster deep learning.

The findings of this research also show that boys and girls display different interests in online comics for CFL learning. Boys preferred the amusing part of online comics, for example, funny characters with exaggerated facial expressions, more imaginative plots, and surprising outcomes of stories. Girls, on the other hand, preferred cute characters in happy but not shocking situations. Boys used fewer words in the online comics than girls did, and girls tended to use various sentences and words to enrich the online comics story. This implies that gender difference may be a factor that interacts with the CFL learning process (Cáceres-Lorenzo, 2015). This is consistent with Sung and Wu's (2011) findings, that boys and girls tend to use different memory and metacognitive strategies in Chinese language learning. It could be an important focus for future CFL education research in exploring the gender differences in CFL teaching and learning in relation to the use of online comics.

7.3.2 Pedagogical implications. This research found that online comics have great potential in assisting Chinese characters teaching and learning. First, it was suggested from the findings that when the content is related to students' daily lives, using online comics could afford students' CFL learning effectively. This suggests that authentic content based on real-world experiences is essential for language

learning. In addition, it was indicated that students preferred creating online comics, and they were attentive in learning and creative in designing online comics. This suggests that giving students opportunities for language use and autonomy in learning can better engage students in CFL learning. It was also found that humour embodied in the online comics could engage students and make students feel comfortable in learning CFL. Injecting humour into the lessons could help establish a conducive CFL learning environment, which would benefit both teachers and students in CFL education.

Moreover, the findings in this study suggest that students' attitudes towards online comics influenced their academic achievement. Students' perceptions of online comics' effectiveness were related to their academic improvement. In CFL teaching, it is important to adopt effective pedagogy so that students perceive its positive usefulness but not just from teachers' perspectives (Hu & Tian, 2012). Teachers could manage students' perceptions through effective pedagogical approaches to help students improve their academic outcomes. Moreover, it is important for teachers to conduct CFL teaching and learning approaches that align with students' needs. For instance, this research found that students' motivation in Year 6 was more related to their academic achievement than it was to students in Year 5. This is supported by previous research that has highlighted the importance of motivation for older students in CFL education (Ghenghesh, 2010; Li & Lynch, 2016). Regarding gender differences, the findings showed that boys' and girls' preferences in CFL language learning were different. Boys were interested in comical instances produced by online

comics while girls liked the fact that they were able to express their feelings and intentions (Senn, 2012) in the language that they learnt when creating online comics. Girls' interests in using online comics for CFL learning were related to their academic achievement. It suggests that boys and girls need to be guided in CFL teaching and learn differently to engage them effectively in CFL learning.

7.4 Limitations and Recommendations

No research is free from flaws, and this research is not exempted from limitations that arise from its research design and methods. However, the researcher has attempted to address the limitations through various means. These limitations may need to be addressed by further research to conduct more robust analysis on online comics' effectiveness and clarify its values in CFL education. This section presents the limitations of this research and gives recommendations for subsequent research.

7.4.1 Research design. The lack of a control group in this research for investigating the online comics' effectiveness is one of the main limitations of this research. As a teacher–researcher in the research school, the researcher was assigned to teach in the allocated classes a set of stipulated content without disadvantaging any of the mentor teacher's students in the learning process. Thus, it was not feasible to include a control group in the research design. The lack of a control group limits assessment of online comics' effectiveness (Bouma & Carland, 2016) for Chinese language learning. According to Bouma and Carland (2016), an experimental research

with experimental group and control group provides "the most rigorous test of a hypothesis" (p. 100). To mitigate this weakness in the research design, the researcher attempted to collect other forms of data (Creswell & Clark, 2018), for example, pre- and post-test results from both her classes (Year 5 and Year 6) for comparison. She also included analysis on gender and year differences.

This research is also constrained by the small sample size from a specific school in the Western Sydney region of Australia. This limits the generalisability of the findings since sample size is vital for assessing feasibility and generalising implications for other research (Flight & Julious, 2016; Zheng et al., 2017). Therefore, it is suggested that subsequent research could set a control group in a wider CFL teaching and learning context. To increase the reliability and validity of such research, researchers may also consider increasing the sample size and extending it to different types of schools. As this study was conducted with only Years 5 and 6 students, it would be interesting for studies to be conducted with both a younger cohort and high school students to establish the values of online comics for Chinese language learning.

7.4.2 Capturing the dynamics of learning. The second limitation of this research relates to data collection. This research did not collect data on the process of students' learning due to time and resource constraints. Specifically, the learning process that took place in the classroom while students were creating online comics could have been video or audio recorded. Birmingham and Wilkinson (2003) suggested that video- or audio-recording could provide the researcher with a record of

participants' behaviours in a natural setting and their interactions with others. Such data would be valuable in examining the dynamics that take place during group work and the intricate learning process that occurs in the classroom context (Birmingham & Wilkinson, 2003; Wang & Lien, 2013). To address this limitation, the researcher documented her reflections on every lesson in the form of a self-reflective journal. It is acknowledged that the self-reflective journals might include bias which could due to the teacher-researcher's limited familiarity with the Australian classroom and students. Therefore, the teacher-researcher wrote the reflective journals based on the framework of affordances of online comics and meaningful learning, and interviewed the mentor teacher at the end of the research.

Subsequent research may continue this line of inquiry to explore the dynamics in the classroom context to further determine the influences of individual differences on learning Chinese language with online comics. Such studies may provide information on the way teachers devise their pedagogical approaches and strategies for meaningful learning. In addition, it may be of value to explore to what extent students' keenness on online comics and their willingness to use online comics in CFL lessons influences their Chinese word recognition ability, as these were not explored in this research. Such investigation could suggest the teacher adjusts the pedagogy to align with students' needs.

As this research focused only on word recognition and with only Years 5 and 6 students, it is not known whether a different age group of students could achieve higher levels of cognition through online comics. Similar research may further

explore the use of online comics in improving a different age group of students' word recognition ability and their deep learning with the use of online comics, for instance, whether they can transfer what they have learnt in the classroom to other contexts. This research also found an interesting aspect of online comics. Through not intentional, it was observed that online comics can indeed be a tool to scaffold learning. Future research may examine the use of scaffolding and examine whether online comics, as a technology tool, can be a scaffolding tool for students learning Chinese language.

7.4.3 Integrating online comics for Chinese language teaching and learning. The third limitation in this research is the teaching and learning content. Since the researcher was a teacher–researcher at the research site, she was required to deliver content related to the school's existing Chinese language program, which restrained this research from examining online comics' potential in teaching and learning other aspects of Chinese language knowledge, such as sentence structure, grammar, culture, or more challenging vocabulary. These findings would be beneficial to Chinese language teachers in integrating online comics into Chinese language knowledge teaching.

Moreover, this research was limited by the time for giving students more opportunities to create online comics. In teaching and learning practices, it is suggested to give students more chances to create online comics as it was found in this research that students were able to manipulate and construct their own Chinese

language knowledge through creating online comics by themselves, which aligns with meaningful learning (Jonassen et al., 2008). Peer review is also suggested to further develop students' ownership of learning in the process of producing their own online comics. To and Carless (2016) found that peer review and discussion is essential for students to generate ideas and is helpful in establishing a supportive learning environment. Moreover, students' online comic creations could be organised and used as text books for Chinese language teachers in lessons as students were found to be creative and responsible to use as many key words as they could in creating their online comics.

7.5 Conclusion

This research began from the gap in research studies exploring the potential value of online comics in CFL education for nonbackground beginning learners. Through analysing both qualitative and quantitative data, it was found that online comics have great potential in making Chinese language learning meaningful for students. With appropriate pedagogical approaches, online comics is a useful and effective technological tool in helping students learn Chinese language. The results also suggest that students' attitudes towards online comics have significant influence on their academic achievement.

This research may illuminate Chinese language researchers in investigating online comics in CFL education. It hopes to benefit Chinese language teachers and students in using online comics for Chinese language teaching and learning, in

particular using online comics for Chinese language use and practise. Given students of different genders and different years have different preferences, students' attitudinal influences on their academic achievement in this research implies the importance for teachers in conducting pedagogical approaches that are effective and which align with students' needs.

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Appendix 1: Planning Worksheet

wǒ huì
我会 I can   椅子 chair   笔直 straight

Duì Ma   Zěn Yàng   Wò Zhù
对吗 Correct?   怎样 how about   握住 hold

Yòng   Tè Sè   Hēi Sè
用 use   特色 specialty   黑色 black

Fàng   Dàn Dàn De   Bái S è
放 put   淡淡的 light   白色 white

ZhuōZ i   Xiě Z ì   ZhānY ī Xià
桌子 desk   写字 write   沾一下 dip

Group member:	
Key words used:	
Comic topic:	

Appendix 2: Questionnaire for Students

Part A. Please circle the number that shows what you think about using online comics

to learn Chinese language

Q1: Do you like learning Chinese language by creating online comics.

(1). Strongly Agree (2). Agree (3). Neutral (4). Disagree (5). Strongly Disagree

Q2: Does creating online comics make it effective for you to recognise Chinese words.

(1). Strongly Agree (2). Agree (3). Neutral (4). Disagree (5). Strongly Disagree

Q3: Do you find it interesting to learn Chinese by online comics.

(1). Strongly Agree (2). Agree (3). Neutral (4). Disagree (5). Strongly Disagree

Q4: Do you find that you are more motivated to learn Chinese when creating online

comics.

(1). Strongly Agree (2). Agree (3). Neutral (4). Disagree (5). Strongly Disagree

Q5: Do you hope to create online comics in future in your Chinese class.

(1). Strongly Agree (2). Agree (3). Neutral (4). Disagree (5). Strongly Disagree

Part B. Please answer the following questions

Q1: What do you like about creating online comics for learning Chinese?

Q2: What do you not like about creating online comics for learning Chinese?

Appendix 3: Interview Questions for Mentor Teacher

Q1: What do you think about teaching Chinese language using online comics?

Q2: What are the advantages and disadvantages you observed when online comics are used to teach and learn Chinese?

Q3: What are the differences you observe when online comics are used to teach Chinese language as compared to previous teaching methods?

Q4: Do you think online comics are effective for teaching and learning Chinese? Tell me your reasons or opinions.

Q5: What are your suggestions for using online comics to teach Chinese effectively?

Appendix 4: Approval of Human Research Ethics Committee (NEAF)

Locked Bag 1797
Penrith NSW 2751 Australia
Research Engagement, Development and Innovation (REDI)

WESTERN SYDNEY UNIVERSITY

REDI Reference: H12121
Risk Rating: Low 2 - HREC

HUMAN RESEARCH ETHICS COMMITTEE

25 May 2017

Doctor Lynde Tan
School of Education

Dear Lynde,

I wish to formally advise you that the Human Research Ethics Committee has approved your research proposal H12121 "Online Comics for Chinese Language Teaching and Learning in the Australian Context", until 31 March 2018 with the provision of a progress report annually if over 12 months and a final report on completion.
In providing this approval the HREC determined that the proposal meets the requirements of the National Statement on Ethical Conduct in Human Research.

This protocol covers the following researchers:
Lynde Tan, Jessy Abraham, Ting Zhang

Conditions of Approval

1. A progress report will be due annually on the anniversary of the approval date.

2. A final report will be due at the expiration of the approval period.

3. Any amendments to the project must be approved by the Human Research Ethics Committee prior to being implemented. Amendments must be requested using the HREC Amendment Request Form:
https://www.westernsydney.edu.au/__data/assets/word_doc/0012/1096995/FORM_Amendment_Request.docx

4. Any serious or unexpected adverse events on participants must be reported to the Human Research Ethics Committee via the Human Ethics Officer as a matter of priority.

5. Any unforeseen events that might affect continued ethical acceptability of the project should also be reported to the Committee as a matter of priority

6. Consent forms are to be retained within the archives of the School or Research Institute and made available to the Committee upon request.

7. Project specific conditions:
There are no specific conditions applicable.

Please quote the registration number and title as indicated above in the subject line on all future correspondence related to this project. All correspondence should be sent to the e-mail address humanethics@westernsydney.edu.au as this e-mail address is closely monitored.

Yours sincerely,

Professor Elizabeth Deane
Presiding Member,
Western Sydney University Human Research Ethics Committee

Appendix 5: Approval Letter of State Education Research Approval Process (SERAP)

NSW | Education
GOVERNMENT | Public Schools

Miss Ting Zhang
27 Illoura Way
JORDAN SPRINGS NSW 2747

DOC17/573497
SERAP 2017120

Dear Miss Zhang

I refer to your application to conduct a research project in NSW government schools entitled *Online Comics for the Teaching and Learning of Chinese Language in the Australian Context*. I am pleased to inform you that your application has been approved.

You may contact principals of the nominated schools to seek their participation. **You should include a copy of this letter with the documents you send to principals.**

This approval will remain valid until 31-Mar-2018.

The following researchers or research assistants have fulfilled the Working with Children screening requirements to interact with or observe children for the purposes of this research for the period indicated:

Researcher name	WWCC	WWCC expires
Ting Zhang	WWC1148840V	25-Oct-2021

I draw your attention to the following requirements for all researchers in NSW government schools:
- The privacy of participants is to be protected as per the NSW Privacy and Personal Information Protection Act 1998.
- School principals have the right to withdraw the school from the study at any time. The approval of the principal for the specific method of gathering information must also be sought.
- The privacy of the school and the students is to be protected.
- The participation of teachers and students must be voluntary and must be at the school's convenience.
- Any proposal to publish the outcomes of the study should be discussed with the research approvals officer before publication proceeds.
- All conditions attached to the approval must be complied with.

When your study is completed please email your report to: serap@det.nsw.edu.au
You may also be asked to present on the findings of your research.

I wish you every success with your research.

Liliana Ructtinger
Relieving Manager, Research
9 June 2017

School Policy and Information Management
NSW Department of Education
Level 1, 1 Oxford Street, Darlinghurst NSW 2010 – Locked Bag 53, Darlinghurst NSW 1300
Telephone: 02 9244 5060 – Email: serap@det.nsw.edu.au

Appendix 6: Participant Information Sheet – Parents

Dear_____**,**

My name is Ting Zhang. I am a Volunteer Chinese Teacher in the school and a Master student from Western Sydney University. I am writing to seek your approval for your child, who is a student in my Chinese language class, to participate in a research study entitled *Online Comics for the Teaching and Learning of Chinese Language in the Australian Context*. This study will be conducted by me as the Chief Researcher under the supervision of Dr. Lynde Tan and Dr. Jessy Abraham from the School of Education of Western Sydney University.

This study will help your child to improve their recognition of Chinese vocabulary in a fun and effective way. Specifically, the study will involve your child in creating online comics using the Chinese words and cultural knowledge they have learnt in my classes.

How is the study being paid for?

This project is funded by Ningbo Education Bureau, Department of Education NSW, and Western Sydney University.

What will my child be asked to do?

Your child will be asked to participate in this study in the following ways.

1. Participate in a pre-and-post sight reading word test
2. Complete planning sheets and create online comics in groups

3. Participate in a questionnaire individually

How much of my child's time will it take?

The 10-minute questionnaire will be conducted as part of my regular teaching during class, and will not take additional time.

What benefits will my child, and/or the broader community, receive for participating?

Participating in this study will help your child reflect on and understand how to learn Chinese using online comics.

Will the study involve any risk or discomfort for my child? If so, what will be done to rectify it?

The study is conducted as part of the ongoing Chinese language classes with a mentor teacher' supervision. All the activities in the class will be discussed with the mentor teacher before each lesson. My mentor and the class teacher will supervise me for all the activities.

How do you intend to publish or disseminate the results?

It is anticipated that the results of this study will be published in a research thesis and possibly presented in academic conferences.

Will the data and information that I have provided be disposed of?

Please be assured that only the researchers will have access to the raw data your child provides and that your child's data will not be used in any other projects. Your child's name will not be disclosed. Pseudonyms such as Student A, Student B etc. will be given to each participating student. The class and school of each participating student will also not be disclosed. A pseudonym will be given to each of the two classes and the school from which the participating you child is studying in. The data your child provided will be stored for 5 years. The data and information your child has provided will be securely disposed of.

What if I require further information?

Please contact *Ting Zhang* should you wish to discuss the research further before deciding whether or not to participate.

- Email: 18790522@student.westernsydney.edu.au

Alternatively, you can call my principal research supervisor to discuss this study:

- Lynde Tan Office Phone: 9772 6277

What if I have a complaint?

If you have any complaints or reservations about the ethical conduct of this research, you may contact the Ethics Committee through Research Engagement, Development and Innovation (REDI) on Tel +61 2 4736 0229 or email humanethics@westernsydney.edu.au.

Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

If you agree for your child to participate in this study, you may be asked to sign the Participant Consent Form. The information sheet is for you to keep and the consent form is retained by the researcher.

This study has been approved by the Western Sydney University Human Research Ethics Committee. The Approval number is *H12121.*

Appendix 7: Consent Form – Parents

Project Title: Online Comics for the Teaching and Learning of Chinese Language in the Australian Context

I hereby consent for my child to participate in the above named research project.

I acknowledge that:

•   I have read the participant information sheet (or where appropriate, have had it read to me) and have been given the opportunity to discuss the information and my child's involvement in the project with the researcher.

•   The procedures required for the project and the time involved have been explained to me, and any questions I have about the project have been answered to my satisfaction.

I consent for my child to:

- *Participating in a pre-and-post sight reading word test*
- *Completing planning sheets and create online comics in groups*

- *Answering the questions in a questionnaire*

I consent for my child's data and information provided to be used for this project.

I understand that my child's involvement is confidential and that the information gained during the study may be published but no information about my child will be used in any way that reveals my child's identity.

I understand that my child can withdraw from the study at any time without affecting my child's relationship with the researcher, and any organisations involved, now or in the future.

Signed:

Name:

Date:

This study has been approved by the Human Research Ethics Committee at Western Sydney University. The ethics reference number is: H*12121.*

What if I have a complaint?

If you have any complaints or reservations about the ethical conduct of this research, you may contact the Ethics Committee through Research Engagement, Development and Innovation (REDI) on Tel +61 2 4736 0229 or email humanethics@westernsydney.edu.au.

Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

Appendix 8: Participant Information Sheet – Mentor Teacher

Dear Kim,

My name is Ting Zhang. I am writing to invite you to participate in a research study entitled *Online Comics for the Teaching and Learning of Chinese Language in the Australian Context*. This study will be conducted by me as the Chief Researcher under the supervision of Dr. Lynde Tan and Dr. Jessy Abraham from the School of Education of Western Sydney University.

This study will help you understand how to teach Chinese language by using online comics, especially how to teach Chinese vocabulary in a fun and effective way.

How is the study being paid for?

This project is funded by Ningbo Education Bureau, Department of Education NSW, and Western Sydney University.

What will I be asked to do?

You will be asked to participate in an individual interview, which will be audio recorded.

How much of my time will I need to give?

The individual interview will take you up to 40 minutes.

What benefits will me, and/or the broader community, receive for participating?

Participating in this study will help you understand how to teach Chinese language by using online comics, especially in teaching Chinese vocabulary.

Will the study involve any risk or discomfort for me? If so, what will be done to rectify it?

This study will not involve any risk or discomfort for you.

How do you intend to publish or disseminate the results?

It is anticipated that the results of this study will be published in a research thesis and possibly presented in academic conferences.

Will the data and information that I have provided be disposed of?

Please be assured that only the researchers will have access to the raw data you provide and that your data will not be used in any other projects. Your name and your details such as the school you teach in will not be disclosed. A pseudonym will be used instead in the thesis and publications. The data you provided will be stored for 5 years. The data and information you have provided will be securely disposed of.

Can I withdraw from the study?

Participation is entirely voluntary and you are not obliged to participate. If you do participate, you can withdraw at any time without giving any reason.

If you do choose to withdraw, any information provided will be deleted.

What if I require further information?

Please contact *Ting Zhang* should you wish to discuss the research further before deciding whether or not to participate.

- Email: 18790522@student.westernsydney.edu.au

Alternatively, you can call my principal research supervisor to discuss this study:

- Lynde Tan Office Phone: 9772 6277

What if I have a complaint?

If you have any complaints or reservations about the ethical conduct of this research, you may contact the Ethics Committee through Research Engagement, Development and Innovation (REDI) on Tel +61 2 4736 0229 or email humanethics@westernsydney.edu.au.

Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

If you agree to participate in this study, you may be asked to sign the Participant Consent Form. The information sheet is for you to keep and the consent form is retained by the researcher.

This study has been approved by the Western Sydney University Human Research Ethics Committee. The Approval number is H12121.

Appendix 9: Consent Form – Mentor Teacher

Project Title: Online Comics for the Teaching and Learning of Chinese Language in the Australian Context

I hereby consent to participate in the above named research project.

I acknowledge that:

•   I have read the participant information sheet (or where appropriate, have had it read to me) and have been given the opportunity to discuss the information and my child's involvement in the project with the researcher.

•   The procedures required for the project and the time involved have been explained to me, and any questions I have about the project have been answered to my satisfaction.

I consent to:

- *Participating in an interview, which will be audio recorded*

I consent for my data and information provided to be used for this project.

I understand that my involvement is confidential and that the information gained during the study may be published but no information about me will be used in any way that reveals my identity.

I understand that I can withdraw from the study at any time without affecting my relationship with the researcher, and any organisations involved, now or in the future.

Signed:

Name:

Date:

This study has been approved by the Human Research Ethics Committee at Western Sydney University. The ethics reference number is: H*12121.*

What if I have a complaint?

If you have any complaints or reservations about the ethical conduct of this research, you may contact the Ethics Committee through Research Engagement, Development and Innovation (REDI) on Tel +61 2 4736 0229 or email humanethics@westernsydney.edu.au.

Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.