

The Development of Digital Skills in Adapting to the
UK Learning Environment - A Learner Experience
Study on Chinese International Postgraduate Students

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Abstract

This research focuses on the digital practice among Chinese international students during the transition from undergraduate study to postgraduate, and how they refine their skills to adapt to digital practice in the UK at the level of master's study. The research questions are: What are digital practices among Chinese international students during the transition from undergraduate study to master's study? How have Chinese international postgraduate students' digital skills developed during master's study? How can Chinese international students be supported in enhancing their digital skills to adapt to learning in a UK university?

The research was conducted in a UK university, using mixed convergent design. The study took place during 2014-2016 academic year. Data sources include: survey with 409 postgraduate students; photographic journaling with 4 participants; mind map activities with 14 participants; semi-structured interviews with 30 participants; and observation with 4 participants.

The study found that participants had challenges in digital practice upon arrival; however, they are able to refine their skills to make adjustment. Students' agency and reflective practice with social support are important factors for development of digital skills. However, there seems to be a disconnect between students' use of digital technologies in their own time and those determined by institutions. With students bringing their own cultural scripts (e.g., their existing patterns of using technologies) to postgraduate study and appropriating digital technologies for their own use and students' digital practice tends to be constrained by the context in which each student is situated. Students' digital skills and issues ought to be better understood within a context. It is hoped that more research attention can be directed towards 'bottom up' research, to hear the student voice and to study students' digital practices in day-to-day situations.

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List of frequently used abbreviations

ACRL	Association of College and Research Libraries
CERNET	China Education and Research Network
CMS	Course Management Systems
CNKI	China National Knowledge Infrastructure
CNNIC	China Internet Network Information Centre
ICT	Information and Communication Technology
IHE	Internationalisation within Higher Education
JISC	Joint Information Systems Committee
LMS	Learning Management System
MDE	Modern Distance Education
MOOC	Massive Open Online Courses
OER	Open Educational Resources
SCONUL	Society of College, National and University Libraries
TEL	Technology Enhanced Learning
UGC	User Generated Content
UNESCO	The United Nations Educational, Scientific and Cultural Organization
VLE	Virtual Learning Environment

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PREFACE

Personal rationale: My studying experience as a student in China

When I was nine, one day I left the school, came home and spotted a desktop computer in the living room. I was thrilled to see this latest technology. I switched it on, but I was disappointed that I could not do many things with it. In the fourth grade of primary education, I joined a computer interest group and learnt the basics of the Logo and C programming languages. I can recall how excited I was when I first drew a graphic figure after writing a Logo program. In junior high school, one day a classmate asked for my “QQ (Chinese instant message) number” and described how people can communicate online. I was amazed by this fact. One day I visited my grandparents and registered for a QQ account at their place. I started my QQ account by building my personal profile, and selecting my avatar. This was my first online identity. However, my parents perceived the computer to be a distraction to my studies at that time, and I was mostly only allowed to use educational software installed on the computer.

During my second year of junior middle school (age 14), I was transferred to a boarding school that adopts military management. The school was very strict with students’ digital devices. Students were not allowed to bring mobile phones, digital cassette or any other digital devices to the school. If these were found, they would be confiscated. A single tutor was assigned to each dormitory to be in charge of daily routines. During the class, they all sat in a line at the back to observe the students’ behaviour. The lifestyle was very structured. All students wore uniforms. We had limited time to fold beds and clean the dormitory in the morning. We walked in a procession to the canteen and then walked back in the same way to have morning classes. Sometimes we had physical training in the afternoon. We finished self-study by around 9.30 at night, so students only had around half an hour to do other things before the lights were turned off at 10pm by regulation.

Therefore, for the last two years of my junior school, the only time that I could use the Internet was every other weekend when I came back home. However, one outstanding characteristic of that boarding school was its audio lab for English teaching. Lectures were broadcast to students live in high quality audio, and we could do pronunciation exercises and have audio discussions. The use of the audio lab did provide me with more comfort. In a normal classroom, I would have been very nervous when a teacher asked a

question and pointed at me, and sometimes I kept quiet even I knew answers, because I was afraid of making mistakes. However, in the audio room, all the students sat randomly; numbers were assigned according to where we sat, and the teacher called a number to let a student answer a question. Therefore, I felt that many students were not be able to recognise my voice if I made a mistake.

In the first year of my senior high school, I replaced my ‘BubuGao’ digital cassette (it can adjust the speed and repeat audio) with a CD player. Exercise books sold on the market started to offer audio on CD rather than digital cassette. Recalling my experience, I often listened to them and wrote down the content/lyrics in a notebook and then it came the emergence of MP3, and then MP4, MP5. In the school, teaching was highly based on textbooks. Only the geography teacher used PowerPoint for teaching; other teachers wrote things with chalk on the blackboard. Digital devices were forbidden at school, with only a digital dictionary being permitted in the classroom. Almost every student had a digital dictionary. My impression of senior high school was stressful: travelling between home, school and cram school. I was almost cut off from the Internet, and my parents always reminded me how fierce the ‘Gaokao’ (the entrance exam for the university in China) is.

In college, the environment was fortunately more lenient. The college library provided us with an Internet room, and some dormitories were connected to the internet through broadband arranged by students themselves. However, many classmates used the Internet for online shopping, socialisation and reading online news – very few were using it for education-related activities. Digital technology has always been viewed as a disruptive thing by tutors in formal education; knowledge was learnt from textbooks, and strategies to pass the exams were built on doing exercises and memorisation. Hence, students did not perceive the educational benefits of the Internet.

When preparing for the International English Language Testing System (IELTS examination), I was enrolled in two English institutions outside of my formal education. I then discovered that the Internet has the potential to provide a wide spectrum of learning possibilities. Not only previously used downloadable resources/podcasts, but also forums (such as <http://forum.putclub.com/>) and discussion boards. There was also synchronous

technology that allowed me to talk to native speakers worldwide who could provide structured feedback on my audios. However, many of these abundant resources were not introduced to me by the formal education.

Taken together, one could see how my practice has changed alongside the development of digital technologies. Such as from listening music on digital cassette and CD players and writing down the lyrics/content in a notebook, to playing music and text in MP3 and MP4, and lately tablets such as the iPad. Some skills were picked up gradually and new skills were always required. My interpretation of the experience is that the potential of digital technologies was often overlooked and sometimes was seen as a distraction during my formal education in China.

However, as observed, students use technologies differently. Therefore, maybe some students are less competent in harnessing digital technology for learning, while some are better at making informed decisions towards technology use. For this reason, it would be interesting to investigate how students experience technology for learning differently, especially in informal settings.

Personal rationale: My studying experience as a student in the UK

In 2011, I embarked on the journey to seek for a postgraduate degree at a UK university; however, the first few months were tough. In my previous higher education experience in China, critical writing was not practised often and I wrote my undergraduate dissertation in a descriptive way. Students who had pre-sessional English courses learnt the skills for academic writing. However, I started my postgraduate programme straight away. Without sufficient preparation and understanding of the British learning context, I felt puzzled about whether I had paraphrased a source with proper attribution or whether I used the proper referencing style, and I was always concerned about how to write essays critically and how to avoid plagiarism.

In my undergraduate study, I had experience with the China National Knowledge Infrastructure (CNKI) and other databases. However, at the beginning of the postgraduate programme, I was not familiar with university databases that I could use to search for scholarly articles in English, or the library A-Z database. Once, I purchased a journal article on Google Scholar without knowing that actually I could get this article free from

the university database. I also could not identify specific journals for my subject. Gradually through tutorials, and discussions with peers, I built my skills for academic writing and learned about a range of digital tools that can be planned for different activities. For example, I knew that by adjusting the default setting, I could have a Leicester e-link shown next to certain journals on Google Scholar, which allowed me to download academic articles. If some articles were not free and did not have the Leicester e-link, I then tried the University library database or other databases. Through this experiment, I also discovered other practical tools. For instance, I found that I could request articles from the author on the ResearchGate (<https://www.researchgate.net/home>). I also came across Mendeley (<https://www.mendeley.com/>) when searching for articles. I download Mendeley onto my laptop and later recognised that it can be used as a personal library as well as to manage my references.

During the Master's programme, I also had experiences with different kinds of assessments such as presentations. In my experience of education back home, presentation was not counted as a type of assessment. When told that we needed to make slides for a presentation, some Chinese classmates were more digitally competent and suggested Photoshop, while others were using a more easily mastered tool (PowerPoint). And for the poster presentation, some students designed their poster using a laptop and printed it out, while others used more traditional technologies (paper of different colours, marker, glue) to design their posters. This reflects differentiation of technology use and skills among students.

On a study skills session, one tutor asked us to contribute to a Wiki to write about aspects of different research methods. I asked a Chinese classmate next to me "What is a Wiki?", but it turned out that we were in the 'same boat'. 'Wiki? I do not know. Wikipedia?' she replied to me. Because much emphasis of my formal studying experience in China was placed on individual efforts, so I hardly had team assignments that required students to work collaboratively. The team assignment using a wiki made me feel that educational technology has the potential to provide an online environment that allows people to work collaboratively with a sense of community.

Under the influence of peers from other cultural backgrounds, I adopted Facebook and Twitter, and discovered a lot of resources (e.g., YouTube) which were ‘hidden’ in China. Before writing the dissertation, I was introduced to RefWorks and SPSS during the teaching session. Near the end of the course, I participated in the ‘Pelicans’ study (<https://www2.le.ac.uk/departments/beyond-distance-research-alliance/projects/pelicans/about-pelicans>), which investigated international students’ digital skills. Through taking part in this research project and discussions with the project leaders, I was informed of more learning possibilities offered by web technologies that can be used in self-directed learning, such as the vast learning materials that can be found on SlideShare and Massive Open Online Courses (MOOCs).

Reflecting on my own experience of encountering two learning cultures, there were personal efforts made in order to understand the UK learning tasks. There were also other factors, such as tutor’s support and peer help, that assisted my adjustments to adapt to the postgraduate requirements, and that developed my digital skills. Firstly, Chinese international students seem to have academic shock and experience learning challenges due to their unfamiliarity with the Western academic requirement and potentials afforded by Western Web technologies, as well as available recourses provided by the internet. Secondly, this personal rationale has depicted my own learning trajectory, which might suggest that my experience with digital technology is different from that expected by UK tutors. But what about other Chinese international students?

My Masters dissertation project investigated the changing patterns of web technology use among Chinese international students, and it suggested a complexity of digital tools used by them. However, the Masters dissertation focused on the digital tools used for learning, while students’ experience and skills were not researched in depth. As Chinese international students now constitute a significant proportion of taught postgraduate students, their voice is also important. Therefore, it seems both interesting and worthwhile to investigate Chinese international students’ digital practices and digital skills.

Chapter 1 - Introduction: Changing educational context and student diversity

1.1 Introduction

In 21st century, Information and Communication Technology (ICT) has had a fundamental impact on practice in business and government, and it also had an impact on education. There is a growing body of research examining the benefits these technologies offer to education, and factors that affect the uptake of ICTs in educational settings (Oliver, 2003). Cultural and social practices associated with technology use have transformed the means of communicating, the meaning making process, working and learning habits. This transformation poses new challenges – learners need to develop a set of competences, and attributes that will underpin their learning in the digital age.

There is a vast literature on the changing digital environment and corresponding competences as educators seek to combine 21st Century structures with skills related to digital technology (Voogt, Mishra & Dede, 2011). There are endeavours to define and measure these dynamic skills that enable learners to be proficient in the digital world. Different names have been used for these skills, using words such as broader concept of information or digital literacy (Murray & Pérez, 2014), and more specific terms ‘digital skills’ (Hauge & Williamson, 2009).

Definitions and research on digital literacy is complex and do not provide a unified approach. According to Meyers, Erickson and Small (2013), conceptualisations of digital literacy have been associated with different focuses, which can be categorised into: (1) Digital literacy as skills required in the ‘information age’. This perspective often regards digital literacy as a set of discrete, observable and measurable skills; (2) Digital literacy as the development of ‘habits of mind’. This perspective deems digital literacy as the extent to which students can apply cognitive frameworks to academic and daily situations. It addresses high-order skills such as critical thinking and indicates the importance of informal learning contexts as providing students with real-world situations to practise their ‘habits of minds’; (3) Digital literacy as social practices in a participatory culture. This view regards digital literacy as social practices and participation arises out of

different social contexts as a ‘way of being’. These practices are socially constructed and situated, but not pre-determined.

For the purpose of this work, I adhere to the term *digital skills*. According to van Deursen and van Dijk (2014, p. 18),

‘literacy primarily refers to reading and writing, and information denotes knowledge. However, using digital media, such as the Internet, is more than the primarily mental operation of reading, writing and gaining knowledge. It also involves (inter)active operations of working with hardware and software, communicating with people, and performing transactions of goods or services.’

As the issue with the broad concept of ‘digital literacy’ is that ‘it confuses non-digital skills and processes that might make use of digital tools (Walker, 2015)’. Chapter 3 will provide a discussion on the rationale for the choice for terminology and its connotations. Digital skills, as a broader concept, encompasses several skill-sets (e.g., the competences to use software and digital devices; a variety of complex cognitive, and sociocultural skills) and related literacies involving information evaluation and knowledge gathering (Martin & Madigan, 2006).

This thesis examines different perspectives on digital skills and to build a holistic understanding of digital skills from the perspective of Chinese students studying in UK universities. The definition of digital literacy provided by the Joint Information Systems Committee (JISC) as ‘the capabilities which fit someone for living, learning, and working in a digital society’ (Beetham, McGill & Litterjohn, 2009) is used as a starting point.

This chapter begins by defining the scope and the aims of the study. It then discusses how existing studies are conceptualised, and the importance of this study from the education point of view. Particularly, it illustrates why the study focuses on the students’ experience, behaviours and attitudes towards uses of technology, and why the study is concerned with Chinese international postgraduate students. The chapter then introduces the technological conditions and media landscape in China with a discussion of the digital

divide. Such discussions would pave the way to the foundations of understanding the transitions of digital practices in the changing educational context.

1.2 Research questions

A focus on Chinese students in the UK Higher Education (HE) is because UK currently benefits by more than £14 billion from the international education market¹, with Chinese students compose of the majority of UK international students. Recently, the necessity of researching international students' needs has been recognised. For example, the JISC-funded project 'Digital Literacies as a Postgraduate Attribute'² was started in August 2011 and it investigated issues of learning, teaching and technologies related to increasing international students and developing pedagogies.

This thesis explores the adaptation of Chinese international postgraduate students during the transition from undergraduate study in China to postgraduate study in the UK, with particular reference to their digital practices and development of digital skills. The overarching focuses of the thesis are encapsulated in three main research questions:

1. What are digital practices among Chinese international students during the transition from undergraduate study to master's studies?
2. How have Chinese international postgraduate students' digital skills developed during master's study?
3. How can Chinese international students be supported in enhancing their digital practices to adapt their learning in a UK university?

1 Contribution to prosperity and growth. Available at <http://www.britishcouncil.org/organisation/facts/key-issues/contribution-international-development>, accessed 10 October 2014.

2 Digital Literacies as a Postgraduate Attribute, Available at <http://www.jisc.ac.uk/whatwedo/programmes/elearning/developingdigitalliteracies/DigLitPGAttribute.aspx>, accessed 01 December 2013.

1.3 The study

The study was conducted in a UK university with Chinese international postgraduate students. It is a ‘learner experience’ study, employing a mixed method research methodology. The term *Learner experience research* is drawn from a review of papers that call for people to concentrate on the learners’ experiences (Sharpe, Benfield & DeCicco, 2005).

1.3.1 Educational Rationale and justification of the research context

This section articulates how existing studies have failed to focus on a key issue (Chinese international students) to the research problem in the particular context, and how the research contributes to the educational sector.

The initiative of carrying out learners’ experience studies is inspired by my overseas studying experiences in the UK. In my own learning trajectory of the mater’s programme in the academic of 2011, I developed my understanding about the potential of educational technologies; make sense of those technologies and using them selectively to accomplish different tasks wherein my digital skills have also been enhanced (as discussed in preface).

Internationalisation within Higher Education (IHE) is one of the drivers that have led to research on digital skills from international students’ perspectives. China has witnessed tremendous economic development and the improvement of individuals’ living standards. There is a strong belief that education is an investment towards future salary. The majority of the Chinese people now can afford and are willing to invest in higher education as a way of securing a good income and social status in society (Li, Morgan & Ding, 2008). However, the increasing demand for HE is not always satisfied by domestic supply. Therefore, seeking an HE degree in English-speaking countries has become popular and HE institutions are competing actively in the global marketplace (de Wit, 2001).

Within IHE, the United States, United Kingdom and Australia are the leading destinations for international students (van der Wende, 2003; Choudaha & Chang, 2012). In the UK, there has recently been a decrease in international student recruitment from India, Saudi Arabia and Nigeria, influenced by visa restrictions, but students from China have

continued to rise. The number of Chinese postgraduate (PG) student enrolments far exceeds any other nationality, at 91,251 during the academic year 2015-2016 (Higher Education Statistics Agency, 2017). The British Council (2014) stated that available economic and demographic data suggest a tendency for UK universities to rely on China to increase their PG students. China is forecast to be the largest source of international PG students by 2024, with international overseas student numbers hitting 338,000 (accounting for 44% growth in inbound PG student to the UK).

However, international students experience various challenges associated with learning approaches. Gill (2007) reported on a case study of a small group of Chinese students in a British university. She found that these students' expectations, developed through their formative years of education in China, did not match the approach to learning embedded in British HE, resulting in challenges for these students in adapting to British education. In China, many undergraduate students use the library as a physical place to study and obtain study-related materials. However, online resources are often unavailable to undergraduate students and some online information is deliberately not accessible for political reasons (Liu & Winn, 2009; Hughes, 2013). Thus, these students' previous experience and practice may cause challenges when they study abroad.

These diversity and challenges are particularly important in the contemporary context where learning becomes increasingly mediated by online technologies (Hughes, 2013). Researchers (e.g., Liao, Finn & Lu, 2007; Mehra & Bilal, 2007; Hughes, 2013) have suggested that international students have challenges in applying learning approaches that stress the important of researching and utilising online resources. Hughes (2013) conducted a qualitative research study with 25 international students at two Australian universities using semi-structured interviews and observations an information searching task. The study discovered challenges encountered by international students in terms of using online resources. For example, it discovered that students tend to rely more on general resources while overlooking discipline-specific sources that might offer a specialist focus on the topic. The study suggested that international students have strong information technology skills, but lack information literacy (e.g., their approaches are often uncritical and not strategic).

1.3.2 Digital Skills

Instead of regarding digital skills as a set of discrete skills to be mastered, this study considers students' digital practices and the development of their skills to be integral to their whole learning experience. Many studies on digital skills have focused mainly on general student groups in a Western context and have seldom distinguished nationalities among these students (Johnston & Webber, 2003; Jones & Lea, 2008; OECD, 2011; Jones & Lea, 2011). In a review of scholarly literature (Sovic & Blythman, 2013), international students were often seen as portrayed as 'victims' or 'problems', something that has emerged as an outcome of the UK's deficit model of international students in the HE. The review argues that the studies reviewed were often based on anecdotal evidence or show little methodological rigour, which seems to belong to 'a large culture paradigm (it tends to essentialise and otherwise with little consideration to cultural complexity)' argued by Holliday (1999, p. 240). The review attempts to take a moderate and neutral stance to critically examine the widespread notion of 'digital natives' (a term coined by Marc Prensky in 2001 to describe young people raised in a media saturated world who therefore demand a technology-rich environment to maintain their attention) by drawing on the voices from Chinese international students' perspectives.

Liu and Winn (2009), and Hughes (2013) studied Chinese students' uses of online resources and library services. Ku and Lohr (2003) researched how Chinese students perceive their online learning in an American university. Zhao and McDougall (2008) researched cultural influence upon Chinese students in asynchronous online learning in a Canadian University. Li and Ranieri (2010) studied Chinese students' digital skills with 317 elementary and middle school students in Jiangdong District, Zhengjia Province in China.

However, these studies were not conducted in UK universities, and participants were not specifically Chinese international postgraduate students. In addition, many of the studies were conducted at least 5 years ago, since when technology has developed very rapidly. Thus, new research is needed to understand Chinese students' experience of digital technologies and their digital literacies in today's technological and educational environment.

1.4 Research Background

This section provides background information about research. First, it gives an account of the demographic information about China. It then provides a review of the development of e-learning in China.

1.4.1 Demographic information about China and Chinese higher education

China accommodates around 1.36 billion people, making up about one fifth of the total worldwide population (National Bureau of Statistics, 2014). China is made up of 23 provinces, 4 directly controlled municipalities (Shanghai, Beijing, Chongqing and Tianjin), and 5 autonomous regions: Guangxi, Inner Monogolia, Ningxia, Tibet and Xinjiang (nuffic, 2015). The Chinese educational system took its present shape somewhere between 1977 and 1980: the duration of primary and secondary education is 12 years, and a student's admissions to university is dependent on the outcome of the national entrance examination (Gaokao) which was reintroduced in 1977; the nominal duration of a bachelor's programme is set as 4 years (nuffic, 2015). In 2013, the number of graduates, regular undergraduates and college students had reached around 639 thousand (National Bureau of Statistics, 2014).

1.4.2 Development of e-learning and technology in China

Different technology conditions, media landscapes and the proliferation of online instruction in Western countries may place Chinese international students in a relatively alien learning context (Chen, Bennett & Maton, 2008). Therefore, it is important to acknowledge varying uses of Web technologies among Chinese international students and contextual constraints. Because such understanding is important to bring forth a culturally adaptive approach to teaching and learning innovation (Zhang, 2007).

In recent years, China has experienced a social and economic shift with the transition from planned to market economy and the pursuit of technological development (Wang, 2006). There has been an ever-increasing diffusion of ICTs into a range of areas in commerce and government (Wang, 2006). The quick rise of the country's ICTs has resulted in a vision of lifelong education for all – learning systems whereby learners can choose learning resources and strategies that fit their own career and personal needs, and where they can learn at any place at any time. Lifelong education has been linked with

formal education systems to construct a Chinese education system, in line with the declaration made by the Report of Sixteenth CPC's National Conference (CCoCPC, 2002) and the New Action Plan for Invigorating Education (2003-2007) (MoE, 2003).

The incorporation of e-learning into Chinese education has gained more attention since the mid-1990s, with the Chinese government investing a large amount of money into enhancing e-learning environments at all levels of education (Wang, 2006). Two programmes – modern distance education (MDE) and e-learning – were initiated in 1998, and the Ministry of Education (MoE) has set up 'e-learning' as the essential strategy to establish a knowledge-based society (Kang & Song, 2007). MDE stands for the provision of ICT-supported distance education which utilises the Internet, multimedia and learning technologies to cater for the needs of off-campus students; e-learning refers to the incorporation of ICT, along with pedagogical innovation and curriculum reform, into all aspects of formal education, continuing education and lifelong education (Ding, Gu & Zhu, 2005).

E-learning in Chinese higher education can generally be categorised into three approaches, as follows (Zhao, 2009):

- (1) **Conventional model.** In this model, learning takes place in the physical teaching settings (e.g., classroom; laboratory) and the instruction is implemented with the use of educational technologies (e.g., television; multimedia).
- (2) **Blended e-learning model.** This model integrates virtual learning and face-to-face teaching with the application of a Course Management Systems (CMS). In this approach, class teaching is usually delivered in the traditional way, while post-class discussion and assignment submission are conducted on the network instruction platforms.
- (3) **Distance education model.** In this model, there are two instructional delivery methods: one is distant Classroom implemented by a CMS, whereby teachers' presentations or lectures on campus are delivered to students via digital satellites or video conferencing, with rooms for asynchronous questions, discussions and feedback (Ding et al., 2005; Zhao, 2009). The other is the autonomous learning model

in which learning materials are recorded on CD-ROMs and delivered to learners (Ding et al., 2005).

In 1998, MDE licenses were issued to Tsinghua University; Zhejiang University; Hunan University; Beijing Post and Telecommunication University (Ding et al., 2005). The China Central Radio and Television University (CCRTVU) was included in the pioneer list in 1999, and until 2003 it provided MDE across 930 branches and 22,237 study centres (ICEM of CCRTVU, 2003, cited in Ding et al., 2005). More recently, in the USA, the Massachusetts Institute of Technology (MIT) began the Open Courseware project (OCW). This acted as an impetus for the Ministry of Education of the People's Republic of China (MOEC) to launch the National Quality Course plan (Han & Liu, 2010). By 2013, more than 20,000 courses covering over 73 disciplines were available online.

As the backbone for delivery of Chinese e-learning resources, a communications network was established in 1994, working with Internet protocol, called the 'China Education and Research Network' (CERNET) It initially interconnected six of the most well-known universities in China, including Tsinghua University and Peking University (Zhao & Jiang, 2010).

In 2000, Tsinghua University, Peking University, the University of Posts and Telecommunications, Chinese Academy of Science, Beijing University of Aeronautics and Astronautics and the National Natural Science Fund of China (NSFC) jointly built the 'high-speed interconnect research network of China' (NSFCNET) and the 'China next generation Internet Exchange Centre' (DRAGON TAP) as China's next generation Internet test development (Ministry of Education of the People's Republic of China, MoE, 2003).

At the end of 2003, the CERNET backbone network reached 2.5Gbps wideband, with high-speed nodes between 36 cities and access to more than 200 cities (MoE, 2003). In addition, it had connected 1200 universities with 30 million users, which laid a foundation for the E-campus (Ding et al., 2005). From August 2002, several CERNET experts took part in the 'next generation Internet development strategy research', which was piloted in March 2004. This was China's first IPv6 backbone network, indicating the beginning of

construction of China's next generation Internet. By the end of October in 2012, CERNET had reached 100Gbps over long distance optical transmission (MoE, 2012). At present, CERNET provides a 1Gbps service to more than 2000 universities, and it provides 10000mbps to 500 of these 2000 universities (MoE, 2016). CERNET contributes to China's distance education in many ways; in addition to providing Internet services to numerous universities and research institutes, it supports many national information projects including online-college enrolment and digital libraries (MoE, 2005).

There are challenges and issues in developing e-learning in China. For example, there are issues with instructors' inexperience and inadequate understanding of how to design ICT-based resources (Ding et al., 2005). In a study (McConnell & Zhao, 2006), 24 Chinese higher education institutions' teachers, who took part in promoting and developing e-learning, were interviewed. The understanding of the concept of 'network learning' for the interviewees was of resource-based learning in which teaching material is transmitted online and students are expected to learn independently; in many Chinese higher education institutions networking learning systems are seen as delivery systems where learning material is broadcast to students with little opportunity for peer to peer communication. However, in the majority of Western versions of network learning the aim is to enhance communication among learning communities (Goodyear, Bank, Hodgson & McConnell, 2004). Therefore, networked learning in this study provides a contrasting picture to that of Western contexts, revealing the significance of the lecture method in Chinese higher education.

There are also issues with computer competence that influence one's confidence in terms of working in an e-learning environment (Dutton, Dutton & Perry, 2002). In a cross-cultural study, pre-test and post-test questionnaires were administered to participants of an e-learning course to investigate their views on major features of an e-learning environment that could promote peer discussion, critical thinking, collaborative learning, problem solving, interaction and provide learner support (Zhu, Valcke & Schellens, 2009). Despite one-third of Chinese participants reporting a positive experience with e-learning and pointing out that it was flexible, helpful and interactive, it also worth noting that half of the participants expressed that they are used to knowledge acquisition from textbooks or lectures (Zhu et al., 2009). They also mentioned issues such as Chinese

tutors' inadequate contribution to guidance and their inadequate contribution to feedback (Zhu et al., 2009).

1.4.3 Media landscape in China

It is also useful to look at the media landscape and current state of ICT provision throughout the country. As was pointed out, there is a dearth of scholarship available to reflect on current social and technological dynamics (Qiu & Bu, 2013). China's media development trajectory dates back to 1979 when China started its economic reforms and opening-up policy led by Deng Xiao Ping (Winfield & Peng, 2005). One of the comments about China's Internet is:

While the media were still Party's ideological tools, new economic roles and cultural construction were also promoted. The media functions were not just to inform, but also to entertain and sell (Winfield & Peng, 2005, p. 259).

According to the China Internet Network Information Centre (2016), up to June 2016, the Internet covered more than 50% of the Chinese households. The total number of Internet users in China grew to 710 million, which is 21.32 million more than at the end of 2015. Mobile internet users reached 656 million – an increase of 36.56 million from the end of 2015. Thus, mobile netizens (as in 'citizen of net' that describes an individual who actively engages with the Internet) make up 92.5% of the total netizen population.

According to China Internet Network Information Centre (CNNIC, 2016), there is an obvious growth in the utilization ratio of accessing the Internet through mobile and network TV compared with the situation at the end of 2015. Specifically, 90.1% of Chinese netizens access the Internet using mobile phones, and such figure increased to 92.5% by June 2016. Thanks to the accelerated development of the smart television industry, the number of Chinese people using TV to access the Internet has increased by 3.2% from 17.9% in 2015 to 21.1% in 2016. The data for using a laptop as a means of assessing the Internet remained almost stable. However, 64.6%, and 30.6% of Chinese netizens use desktops and tablets respectively to access the Internet up to June 2016, dropping by 3.1% and 0.9% from the end of 2015.

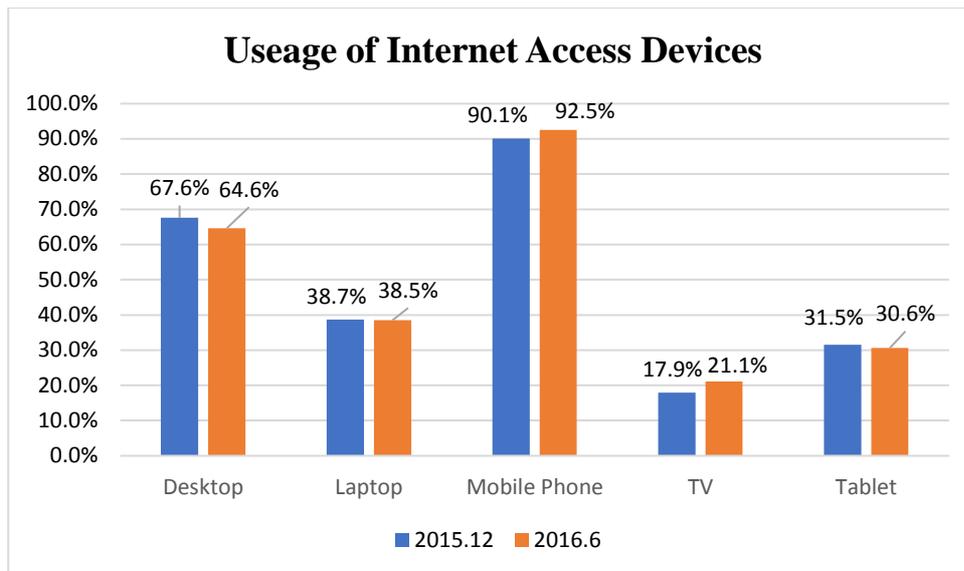


Figure 1: Usage of Internet access devices (cited from CNNIC, 2016)

Figure 1 illustrates Chinese netizens' usage of devices to access the Internet. In terms of online duration, CNNIC (2016) reported that, on average, a Chinese netizen spend 26.5 hours online a week. As for the locations at which people access the Internet, CNNIC (2016) showed that the majority of netizens access the Internet at home (87.7%). Coming next is the workplace (35.9%), followed by Internet bars (17.7%), Public places (17.3%) and Schools (16.2%). Notably, accessing the Internet in a school setting has increased by 1.1% compared to the data from 2015. Studies (CNNIC, 2015; CNNIC, 2016) have discovered that the largest proportion of Chinese Internet users are in the 20-30 age group and, of those who are students, most were educated to either undergraduate or postgraduate level.

The CNNIC (2016) report also provides data on Chinese Netizens' usage of Internet applications and mobile applications in December 2015 and June 2016, which is presented in the Table 1 and Table 2.

Table 1: Usage Rate of Internet Applications by Chinese Netizens in June 2016 and December 2015 (cited from CNNIC, 2016)

Application	June 2016	
	Number of users (10,000)	Percentage of Internet users using the application
Instant messaging	64177	90.4%
Search engine	59258	83.5%
Netnews	57927	81.6%
Online videos	51391	72.4%
Online music	50214	70.8%
Online payment	45476	64.1%
Online shopping	44772	63.1%
Online games	39108	55.1%
Online banking	34057	48.0%
Internet literature	30759	43.3%
Email	26143	36.8%
Online education	11789	16.6%
Forum	10812	15.2%
Live streaming	32476	45.8%
Online government applications	17626	24.8%

**Table 2: Usage Rate of Mobile Internet Applications by Chinese Netizens
in June 2016 and December 2015 (cited from CNNIC, 2016)**

Application	June 2016	
	Number of users (10,000)	Percentage of Internet users using the application
Mobile instant messaging	60346	91.9%
Mobile search	52409	79.8%
Mobile news	51800	78.9%
Mobile video	44022	67.1%
Mobile music	44346	67.6%
Mobile payment	42445	64.7%
Mobile shopping	40070	61.0%
Mobile games	30239	46.1%
Mobile banking	30459	46.4%
Mobile Internet literature	28118	42.8%
Mobile mail	17343	26.4%
Mobile educational courses	6987	10.6%
Mobile forum	8462	12.9%

According to Table 1 and Table 2, most of the Internet applications experienced an increase in users in the first half of 2016. It is worth noting that the number of users of instant messaging, information searching, forums, and especially online education, increased. Online education continued to be subdivided (CNNIC, 2016). According to CNNIC (2016), Chinese online educational services have flourished, and China had 118 million online education users up to June 2016. In particular, mobile education has

continued to expand, and mobile education users has reached to 69.87 million up to June 2016 (CNNIC, 2016).

1.4.4 Digital divide

The periodical indices indicate 1996 was the first time the term *digital divide* was brought to the spotlight as a core of public attention and action (Light, 2001). Attention to information ‘haves’ and ‘have-nots’ was raised by Clinton administration’s National Telecommunications and Information Administration (NTIA, 1995). Digital divide was often used to depict the situation whereby a distinct gap in accessing or using information and communication technologies (ICTs), measured by certain standards such as the quantity of Internet users or the ownership of the mobile phones in the population (Lu & Wang, 2003).

There is ongoing controversy over whether the developments in communications technology is bridging the digital divide or widening it. Research on the digital divide has explored different aspects, in particular:

- (1) demographic digital divide – the digital gap in different gender, race, age, income and educational-level groups (Dwivedi & Lal, 2007).
- (2) inequality in physical access to ICTs and high-speed internet connectivity (DiMaggio, Hargittai, Celeste & Shafer, 2004).
- (3) virtual digital divide – artificially prohibited access to information (Lu & Wang, 2003).
- (4) the participation gap and the gap in skilful usage that is closely tied to digital skills (Livingstone & Helsper, 2007; Hargittai & Walejko, 2008).

Demographic digital divide

In terms of the demographic inequality, exiting studies has shown that the rapid dissemination of ICTs contributed to closing the demographic disparities (Horriagan & Smith, 2008; van Dijk & Hacker, 2003). In addition, the sample of the present study share similar demographic characteristics of race, age, income and educational level.

Inequality in physical access to ICTs

For the physical digital divide, data show an inequality between China and the UK. The Internet World Stats (2016) reported that Internet penetration in China was 52.3% at the end of June 2016, while it has already reached 91.6% in the United Kingdom by the end of November 2015. Nonetheless, researchers (e.g., James, 2008; Selwyn, 2004) hold that physical digital disparity not only manifests between developed countries and developing countries, but also exists within individual countries. CNNIC (2016) revealed that the growth of Internet use in China has resulted in internal inequities, with the Internet user rate reaching around 73.1 % in urban areas but only 26.9% in rural areas. CNNIC (2013) reported an Internet penetration rate of 31 different provinces in Mainland China in the period of 2013-2014 and inter-provincial differences, which are presented in the figures Figure 2 and Figure 3 below:

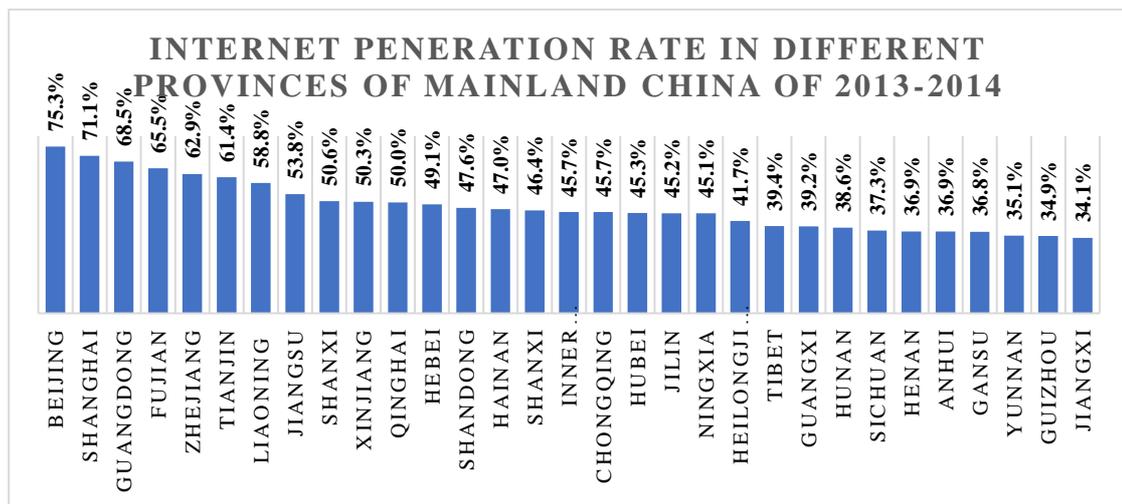


Figure 2: Internet penetration of different provinces in Mainland China in the period of 2013-2014 (cited from CNNIC, 2013)

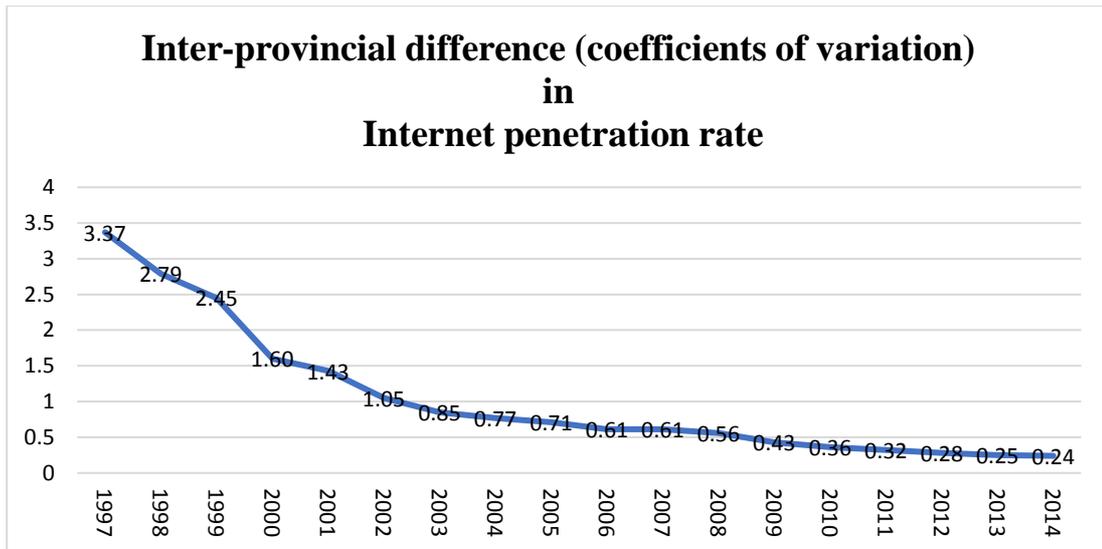


Figure 3: Growth in penetration of the Internet in some provinces of Mainland China between 2011 and 2012 (Cited in CNNIC, 2013)

Figure 2 shows that the Internet penetration rate in cities like Beijing and Shanghai is more than two times that of Jiangxi province. The rate in Beijing and Shanghai has attained the level of most Western European countries and Japan in 2013 (CNNIC, 2013). In figure 3, the X axis presents the time period from 1997 to 2014, and the Y axis represents the coefficient of variation. Between 1997 to 2014, there is a drop in the coefficient of variation from 3.37 to 1.05, suggesting that the gap of Internet penetration rate in different provinces is becoming smaller. It reveals digital divide in China is becoming smaller year by year.

Virtual digital divide

China is deemed to be a rising economic and political power, and there has been growing academic interest in China's changing social media landscape. Nonetheless, understanding China's media landscape remains a difficult task due to the rapid commercialisation of the media industry and a lack of freedom of expression. Chinese media development experienced a difficult time during the media protest involvement for pro-democracy in 1989 (the Tiananmen crackdown); it then experienced a profound commercialisation process over the following two decades, stimulated by further reforms since 1992 (Lee, 2000). China's media remains controlled by an authoritarian political system, being a tool to impose ideological hegemony enforced by the central government.

This indicates that China's media is not supposed to communicate any content that would impair or offend political authority (Winfield & Peng, 2005). Laws and regulations are devised to monitor the development of the Internet and control the flow of information (Lapres, 2000).

In line with this, researchers (e.g., Lu & Wang, 2003) called attention to another kind of digital divide known as the artificial, or virtual, digital divide. The artificial digital divide places the emphasis on the artificial prohibition of access to information, even when physical access to digital devices is provided. Much as what researchers (e.g., Menou, 2001; Lu, 2001) brought to the debate, actually being connected digitally may not necessarily lead to educational or social benefits; therefore, digital divide not only relates to technical issues but also links to social issues.

Participation gap

China accounts for the largest proportion of Internet users in the world - around 721 million people, which is more than 12 times that of the Internet users in the United Kingdom (around 59 million) (Internet World Stats, 2016). However, China's media landscape presents a different picture compared to the West's Internet. The Chinese social networking sites (SNSs) began as close imitators of those in the West's (Guo, Shim & Otondo, 2010). For example, 'JuYou' (translation: friends getting together), introduced in China in 2006, is a substitute for MySpace (Guo et al., 2010). Understanding the social media space in China is of significance for educators who try to engage Chinese international students; the inaccessibility of sites such as Facebook, YouTube and Twitter underscores how different China's Internet is compared to the Western Internet environment. As a Chinese leading social business intelligence provider that helps businesses to leverage the impact of social media, CIC's (2015) portrait of the Chinese media landscape is shown in the following figure:

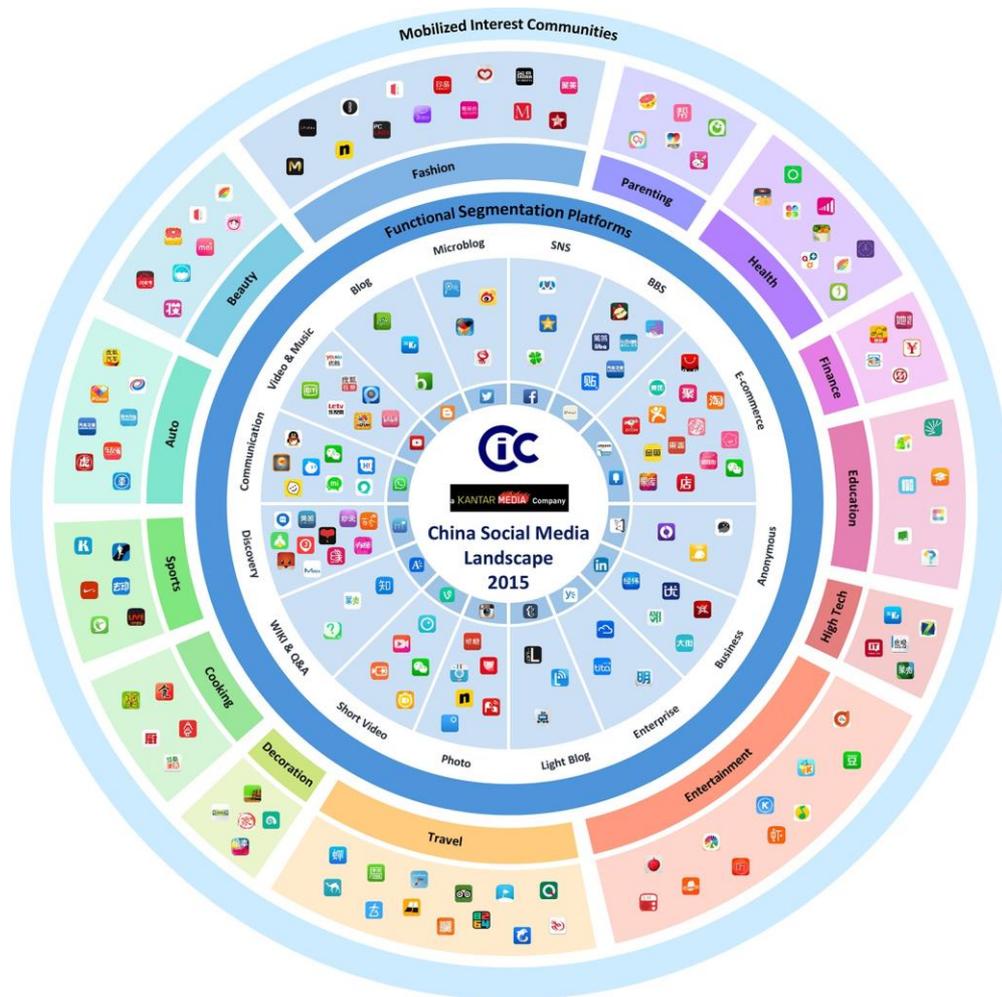


Figure 4: The Chinese media landscape (CIC, 2015)

In Figure 4, the inner circle demonstrates popular social networking sites in Western countries, such as Facebook and Twitter. Although Chinese Internet users cannot access to such social media, China has its own active and dynamic environment for social media that is equivalent to these popular Western social networking sites. Social media took off in China in 1994 with online communities and forums, instant messaging has gained popularity since 1999 and Blogging started in China in 2004. Next came the social networking sites which offer chatting, such as Renren. Sina Weibo was established in 2009, providing users with micro-blogging using multimedia. At present, it is worth noting that mobile Apps and WeChat are gaining prominence among Chinese people. WeChat has WhatsApp-like messaging, a Facebook-like news feed known as moments, and a PayPal-like wallet, together with other built in applications which seemingly does most things for users, such as, booking taxis, shopping online (CIC, 2015).

Additionally, China has its integrated knowledge resources system, namely China National Knowledge Infrastructure (CNKI), which contains comprehensive databases and resources such as journals, doctoral theses, masters' dissertations, e-books, newspapers and so on (Wan, Hua, Rousseau & Sun, 2010). CNKI is an electronic platform established in June 1999 by the Tsinghua Tongfang Knowledge Network (TTKN) Technology Company. Later, it became the biggest and most-used academic online library in China and it has established links with more than 5,500 clients, most of which are Chinese universities, libraries and hospitals, and growing number of interests outside China, such as the British Library (Wan et al., 2010).

Wise (1997, cited in Selwyn, 2004) commented that in policy documents, access to the technologies (making them available) often focuses solely on the provision of physical artefacts. Arguably, access to communication technologies and information is inevitably unbalanced in different contexts. Therefore, it is meaningful to study Chinese international students' transitions in experience with ICTs due to the inequity of access to resources and the diversification of communication technologies. However, when international students study in the UK, their understanding, knowledge and skills seem to be more important than physical access, because they are immersed in an 'over-saturated' environment of Internet services (for most of which they lack previous experience).

van Dijk (2006) stated that differences in Internet users' experience and skills could result in a more serious digital divide than socio-economic factors and physical access. Given this, recent investigations of the digital divide have often concentrated on digital skills, with much attention paid to students who lack access and experience (Vie, 2008). According to a CNNIC survey (2015; 2016) most people surveyed selected the option 'lack of skills' as the main reason of not using Internet.

It is believed that the development of versatile skills, such as technical skills, communication, creativity, strategic use of technological architecture based on experience, and networking skills, are now prerequisites for meaningful access and effective uses of the Internet (Lee, Park & Hwang., 2015). Therefore, developing digital skills has become increasingly important for bridging the digital divide (Mossberger, Tolbert & Stansbury, 2003; DiMaggio et al., 2004; van Dijk, 2005). Warschauer (2003)

argues that developing digital skills involves social practices in which it is essential to have access to physical artefacts, content, skills and social support. Therefore, variations in digital skills presented by Chinese international students need to be identified.

1.5 Chapter Summary

In summary, new technologies have permeated the lives of an unexpectedly wide population, prompting the need to develop a new form of skills. In the current highly competitive global market, digital skills are acknowledged as ‘pertinent and indispensable’ (DG information Society and Media Group, 2008) and is one of the main competencies in the 21st Century (Veugelers & Newly, 2009). In the digital era, what matters the most is not the transmission of factual knowledge, but the need to equip learners with skills to research and select useful information, and to take advantage of the potential of ICTs to develop students’ creativity and productivity (Agudo-Prado, Pascual-Sevillana & Fombona-Cadavieco., 2012). Developing students’ digital skills is required at all educational levels and sectors, from primary school to higher education (Meneses & Mominó, 2010). Hughes (2009) argued that Higher Education (HE) plays an essential role in helping students to refine cultural and social practices around their experience of web-based technologies, and to extend as well as articulate various skills (Hughes, 2009).

However, Duggan (2013) asserted that although the significance of amplifying digital skills is stressed in today’s workplace, many higher education institutions have failed to provide sufficient preparation for their students in developing digital skills. Arguably, this becomes even more challenging with the Internationalisation within Higher Education. The diversification of international students’ experiences and skills may differ from UK tutors’ expectation. For Chinese students, certain attributes, such as a lack of former experience and the different media landscape, may lead to digital skills issues during their sojourn in the UK.

This thesis examines the transition of Chinese students’ digital practices, the challenges they have in developing digital skills during postgraduate study, strategies and transferable skills they applied to overcome such challenges, and other forms of support. The findings provide recommendations to enhance Chinese international students’ studying experiences during their postgraduate study at UK universities.

1.6 Structure of the thesis

The remaining chapters of the thesis are structured as follows:

Chapter 2 reviews how educational technology has developed in its availability and functionality, with a review of development of educational technologies. I then critically examine the challenges to this optimistic view by drawing on learners' experience of studying with the use of technology. Chapter 3 discusses Chinese learners and introduces the concept of 'third space' which conceptualises their adaptation to the UK learning environment. After that, it provides a review of digital skills and a working conceptual framework for the present study. Chapter 4 discusses the methodology taken for the research. It provides an explanation of the rationale to employ mixed-parallel design in the empirical research. It also describes the research instruments and data collection procedure, as well as ethical considerations and data analysis methods. Chapter 5 reports on data to answer the first research question. It found that the adoption of Western Web technologies amongst Chinese students is mainly limited to those determined by institutional factors. Students try to make informed choices for technology use. Chapter 6 reports on data to answer the second research question. It found that Chinese international students enhanced their academic writing, ethical knowledge and critical thinking skills. Chinese international students try to modify their skills to adapt to the UK learning environment. Chapter 7 reports on data to answer the underlying factors that influence students' development of digital skills. It found that students' use of technology is mediated by the context and influenced by their motivation, preference and goal. Social support and resources is essential to their digital skills development. Chapter 8 summarises the empirical findings. It discusses the contribution of the thesis and highlights for the need for more in-depth research on the learner experience.

Chapter 2 - Changing educational practices and learners' experience with educational technology

2.1 Introduction

This chapter aims to discuss digital practices and pedagogy in relation to the development of educational technologies and the importance of studying students' digital practices to better help them develop their digital skills. Firstly, it gives an account of how educational technology has developed in its availability and functionality, followed by a discussion of the learning theories. The chapter then examines the concept of affordances in order to bring about the impact of student agency. In other words, students' previous experience, attitudes and motivations also impact on their uptake and use of technologies for learning. Given the 'digital natives' rhetoric, many teachers and practitioners believe that students have a good command of digital skills, and learners are increasingly drawn towards the adoption of educational technologies. The chapter finally critically examines the challenges to this optimistic view by drawing on learners' experience of studying with the use of technology.

2.2 Continuity and Development in Technology-enhanced learning

Technology-Enhanced Learning (TEL) explores learning through incorporating digital technologies in transformative ways involving issues such as the design of learning materials and learning experiences (Duval, Sharples & Sutherland, 2017). TEL has evolved accompanied by the evolution of its supporting technology, from the early development of interactive multimedia resources, to the emergence of the Internet and the Web, and to mobile technologies, augmented technologies and artificial intelligence in the recent years (Gros & García-Peñalvo, 2016).

Different attempts have been made to conceptualise the development of TEL, including using 'generation' concept (Downes, 2012) and a timeline (Conole, 2013). In his blog, Downes (2012) wrote about a series of 'generations' of technologies to characterise the development of e-learning. It starts with 'generation zero' based on the concept of placing multimedia online learning content alongside the idea that computers can represent both content and activities in a sequence, catering to students' choices. Next comes generation

one, after generation zero has matured, which consists of the idea of a network with tools, such as email and Gopher, which enable online communication. The next generation, which emerged in the 1990s, essentially concerns the gamification of education using computer games. Generation three places a learning management system at the centre of the TEL, followed by the fourth generation which is promoted by Web 2.0 and e-learning 2.0 (Downes, 2012). Conole (2013, 2017) used a timeline to introduce the key technological milestones in e-learning over the last 30 years. Figure 5 shows a timeline adopted by Conole (2013), with a selection of the corresponding educational technologies that have impact on educational practices.

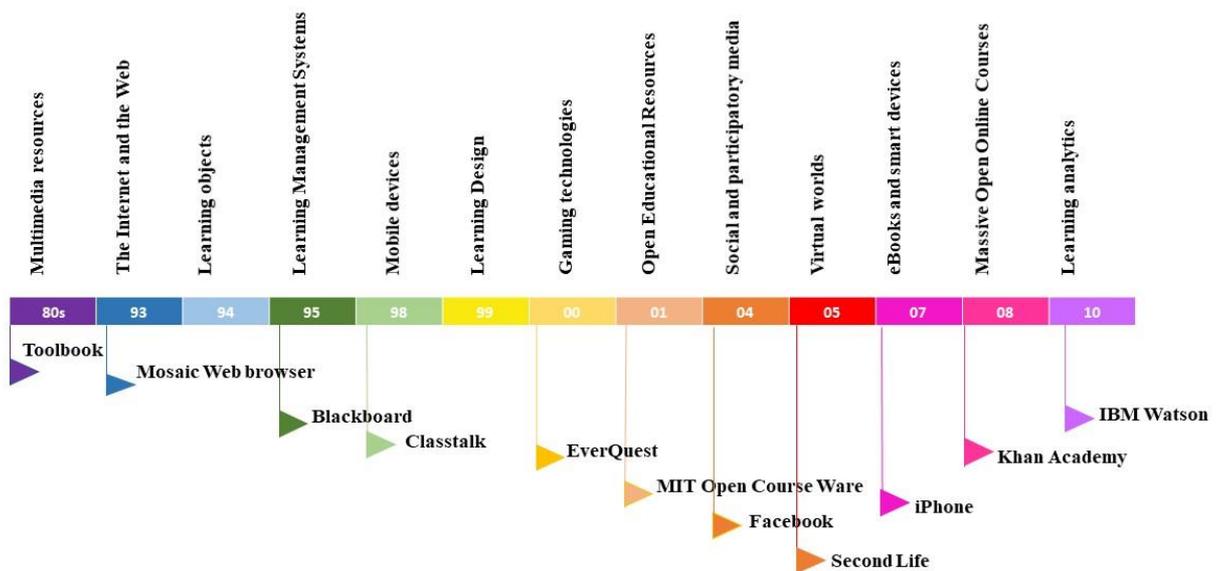


Figure 5: The e-learning timeline (adapted from Conole, 2013)

Figure 5 sets out the innovations in technologies that have had the most impact on education between the late 1980s and 2010. The starting point of the timeline is the evolution of multimedia authoring tools such as Authorware Professional and Toolbook. The creation of Web was another milestone which gave rise to the institutional Web pages, followed by work on learning objects (Conole, 2013). A learning object is generally described as ‘an independent and self-standing unit of learning content that is predisposed to reuse in multiple instructional contexts’ (Polsani, 2003). Among many definitions, the

conceptual requirements of learning objects are captured as ‘accessibility, reusability and interoperability’ (Smith, 2004; Polsani, 2003). Learning objects are the forerunner of the Open Educational Resources (OER) movements (Conole, 2013).

The remainder of Conole’s article touches on the increasing importance of technologies such as learning management systems (LMS), e-books, smart devices, massive open online courses (MOOCs), and to the recent application of learning analytics (‘data-driven decision-making practices’) to optimise teaching and learning (Conole, 2013). As there are a wide spectrum of choices for the major milestones of technological development, different educators may tell a slightly different story. For example, LMSs began to surface in 1993 before learning objects (Conole, 2017; Downes, 2014). In addition, Usenet, the precursor to Internet forums, and mailing lists were important components of online learning between the late 1980s and early 2000s. Downes (2014) suggest including the introduction of RSS (Really Simple Syndication), the Open Archives Initiative, and the Budapest Open Access Initiative in 2002 to the description of the e-learning timeline, since they are an important precursor of the OERs.

Nevertheless, by viewing the broad proposals of the development of technology-enhanced learning, it can be found that Stephen’s (2012) generation idea can coexist with the timeline of the e-learning. A vast type of technology can be used to enhance learning, including both hardware such as interactive whiteboards, mobile devices and tangible objects, and software such as application software, computer-supported collaborative learning systems and educational simulation (Goodyear & Retails, 2010; Ng, 2012). Arguably these technologies have transformative potential in education, and five more recent transformative technologies were suggested by Conole (2017), on which the following section is structured.

2.2.1 The Web

One of the most prominent incidents in TEL is the emergence of the Web, after which the development of e-learning mode is inextricably associated with the evolution of the Web (Gros & García-Peñalvo, 2016). The Web has brought transformation to every walk of life, including the way we look for information, communicate with others and learn through online courses (Conole, 2017). In the early 1990s, many computer scientists

announced that the World Wide Web had developed into a worldwide network, however, it did not fully realise the original vision of Tim Berners-Lee that everyone can contribute (Ebner, 2007). This is because websites are hierarchically organised with content principally mastered by a small group of providers, where users mainly access and obtain information represented by semantic Web pages (Cormode & Krishnamurthy, 2008, p. 1).

Since the conference hosted by Tim O'Reilly and MediaLive International in 2004 when O'Reilly and Dale Dougherty noted that novel applications and websites may indicate a turning point for the Web, the concept of 'Web 2.0' was popularised (O'Reilly, 2007). Other terms such as 'social media' (Lenhart, Purcell, Smith & Zickuhr, 2010) and 'the social web' (Boyd & Ellison, 2007) were also used interchangeably. Web 2.0 works as a convenient reference to a more socially connected Web that encourages user-generated content (McManus, 2005, cited in Greenhow et al., 2009). This is driven by the use of blogs, video sharing websites, social networking sites, social communities, wikis, podcasting, and social bookmarking that epitomise a new form of collaboration (Ebner, Lienhardt, Rohs & Meyer, 2009).

The current Web has provided internet users with vast amounts of information that they have not had access to before, and has provided tools for users to produce content as well as to consume the existing content, contributing a certain degree of creative effort and knowledge building on these platforms (van Dijck, 2009; Conole, 2017). Presumably, the design of the Web 2.0 technology corresponds with a dialogical structure, and users can potentially communicate easily with others. Under these circumstances, a primary element of the interaction is user generated content (UGC) – those who receive and answer the message then become the producers and senders (Kergel, 2018).

Some examples of students being content creator are: Lapp, Fisher, Frey and Gonzalez (2014), who documented how students at different grades contribute to information creation through reviewing a peer's poetry scrapbook on an app called *ShowMe*, building social course pages on Facebook; developing individual analysis of drama characters on Wiki and sharing short stories, reflections as analysis on Weebly.

However, without a collaborator, social software such as Twitter and Wiki cannot fulfil their potential to foster interactive dialogue. This has led Stephen Downes (2005, para. 26) to understand the significant feature of ‘e-learning 2.0’ as a ‘social revolution’ rather than ‘technological revolution’ in which the underpinning concepts are connections of people (‘networks’) instead of computers (‘Web’).

There are also critics around the nature of UGC and methodology on UGC research. How the extent and nature of the creative efforts of UGC are defined remains in question, for example, can a picture of someone’s meal be regarded as UGC? (Wunsch-Vincen & Vickery, 2007). Brake (2013) points out one potential issue of measuring online content creation using surveys, which tend to measure the adoption of particular tools instead of measuring the purpose of uses across these tools. Wunsch-Vincent and Vickery conducted research in which behaviour such as posting messages to chat rooms, using file sharing websites and building websites are regarded as potential representation of UGC, while Brake (2013) commented that while it is likely that most peer-to-peer sharing was aimed at consumption of professionally created content, chat rooms are often used for interpersonal communication. Lenhart and Fox (2006, p. 8) also found that UGC activity tended to be a small proportion of the overall banal online activities: documenting and sharing personal experiences (50%); contacting friends and family members (37%); storing important information (28%).

2.2.2 Learning Management System (LMS) and Virtual Learning Environment (VLE)

Learning Management System (LMS), as a more generic concept of the virtual learning environment (VLE), emerged in 1993 (Conole, 2017). Weller (2007, p. 5) defined LMS and VLE as a ‘software system that combines a number of different tools that are used to systematically divert content online and facilitate the learning experience around that content’. LMSs or VLEs provide a range of tools to aid the educator to create content and resources for students to choose from through editing and uploading material. VLEs also accommodate tools to establish online collaboration and interactions through discussion boards and students’ blogs (Conole, 2017). Moreover, the current generation of LMSs or VLEs are able to track and retrieve a large amount of data about interactions among

different agents registered on a given course, from which useful data can be extracted and used to optimise learning and teaching issues (Agudo-Peregrina et al., 2014).

One study discovered that the elements of VLE that were valued the most by staff lay in the flexibility it afforded them with regard to how information and content is delivered, such as through publishing announcements, module guides, learning materials and students' feedback. Yet the uses of discussion boards and other synchronous tools to facilitate collaborative work remains limited (Heaton-Shrestha, Edirisingha, Burke & Linsey, 2006). Because of VLE's potential to facilitate communication, collaborative peer-directed learning activities, and especially with current improvement of user experience through mobile devices and cloud solutions, it attracts provision among higher education institutions globally (Benson & Morgan, 2013).

2.2.3 Open Educational Resources (OERs) and Massive Open Online Courses (MOOCs)

Under the influence of Open Educational Resource (OER) movement, many universities, colleges and schools were encouraged to use open resources under a Creative Commons license. In 2001, the Massachusetts Institute of Technology (MIT) pioneered its first OpenCourseWare (OCW) which contributed to making course content available on the internet (Goldberg, 2001).

To date, there are thousands of OER repositories. To name a few:

- (1) iTunes U (<http://www.apple.com/education/ipad/itunes-u/>), as Apple's iTunes Content delivery system, it primarily features podcasts and videos from universities, museums and other cultural institutions;
- (2) OpenLearn (<http://www.open.edu/openlearn/>), The Open University's educational website for its open online resources, mostly taken from courses delivered to fee-paying students at the University;
- (3) Saylor Academy (<https://www.saylor.org/>) started its free education initiative in 2008. Saylor act as an aggregator, assembling openly available educational resources into complete courses and making it accessible to users without the need to register an account. Saylor works with consultants and subject experts to compile the content

under Creative Commons when existing open content is inadequate (Farrow, de los Arcos, Pitt & Weller, 2015);

(4) Curriki (www.curriki.org), a community of educators, learners and experts who contribute to a repository of free and open-source instructional materials (Solomon & Schrum, 2014).

More recently, Massive Open Online Courses (MOOCs) have served as an important mechanism for non-formal learning through the prism of ‘Connectivism’ (Siemens, 2005). An online open course initiated through ‘Connectivism and Connective Knowledge (CCK08)’ was developed by George Siemens and Stephen Downes, aiming to harness the affordances of participatory media to facilitate learning (Margaryan, Bianco & Littlejohn, 2015). Early generations of MOOCs termed ‘Connectivist MOOCs (cMOOCs)’, tend to be decentralised and networked. They engage learners together through blogs, learning communities and participatory media platforms in which emphasis is placed on conversation and exploration instead of instructor-provided content. In cMOOCs, learning takes place in a distributed network in a way that learners can select places of interaction such as discussion forums (Mackness, 2013). Later, commercial providers such as EdX, Udacity, Coursera, and FutureLearn worked in partnership with universities to develop more didactic MOOCs known as ‘xMOOCs’. These courses follow a more linear structure with content presentation of text, modularised video-lectures, automated quizzes and feedback over interaction opportunities (Margaryan, Bianco & Littlejohn, 2015).

MOOCs also came into the spotlight in China driven by China’s Ministry of Education (MoE)’s policy. The ‘12th Five Year Plan’ stated that China’s MoE support ‘985 Project’ universities take the lead in building MOOCs courses with a purpose of making about 200 courses available through the national boutique resource sharing system named ‘Ai Ke Cheng (iCourse, <http://www.icourses.cn/home/>)’. Tsingha University released an open online course platform called ‘Xue Tang Zai Xian (<http://www.xuetangx.com/>), which aims to build the world’s leading Chinese language large-scale online education platform (Kang, 2014). According to MoE of China (2017), by the end of November 2017, the centralised examination had decided to hold about 490 courses as ‘National

boutique online open course' with iCourse, while in total, there are 2741 courses on the platform with 2.65 million new registrars.

Although millions of people are learning with MOOCs, there are still critics about the effectiveness of using MOOCs for learning and systematic analysis of the quality of instruction in MOOCs (Liyanayawardena, Adams & Williams, 2013). Others have pointed out that demographic data shows that the majority of the MOOC learners are already educationally privileged (Koller & Ng, 2013; Emanuel, 2013; edX, 2015; Milligan & Littlejohn, 2017). For example, a study of Coursera course provided by the University of Pennsylvania implies that these courses are predominantly enrolled by highly educated students, with 83.0% of participants being educated to bachelor degree and 44.2% being educated to postgraduate level (Emanuel, 2013).

2.2.4 Social media

Social media seems to have been used first by Darrell Berry in 1994 when he was developing an online media environment named Matisse. He wrote the paper 'Social Media Spaces', 1995 in which he archived his work on social media spaces where users can meet and interact with others (Bercovici, 2010). Social media started as a place to enable social communication and is seen to have a powerful effect through aggregating 'the wisdom of crowds' and as one of the important means for lifelong learning (Hermida, 2010). Surowiecki's (2004) book 'The Wisdom of Crowds' proposed the idea that problems could be tackled more effectively by people functioning in a group – under certain conditions – than by an individual working alone. This could mean that an essential feature of social media, such as Facebook, and blogs is that they may promote active engagement with contrasting ideas and serve as a type of filter that harnesses the collective intelligence to produce good quality discussions and debate. Some other important educational social media include:

- (1) **Social bookmarking.** Online tagging systems allow anyone to add tags to the content, thus generating the massive phenomenon of 'collaborative tagging' (Golder & Huberman, 2006). One of the practices of collaborative tagging is the 'social bookmarking' exercised by del.icio.us. Social bookmarking can be annotated with tags (a tag is a key word attached to a digital file in the form of a picture, video clip

or website to describe it) for easy navigation, filtering and retrieval later. Users can add their own free-text descriptions to these bookmarks in the form of personally significant metadata (Damianos et al., 2006). Flickr (a digital photo sharing website and service), YouTube (a video-sharing website), and blogging communities often integrate online tagging systems with their services, thus allowing an array of digital artefacts to be socially tagged (Anderson, 2007).

- (2) **Blogs**, short for ‘Web logs’, termed by John Barger (1997) to mean “a web page where a blogger ‘logs’ all the other web pages she finds interesting”. A user starts posting after registering with a blog and becomes a ‘blog host’. A post is usually ‘tagged’ with a few keywords in order to categorise the post by subject and to file it using a theme-based menu system. Most blogs allow readers to leave comments. The term *blogosphere* refers to all weblogs and their interconnections; bloggers read other weblogs, link to posts and reference them in their writing (Du & Wagner, 2006).
- (3) **Wikis and collaborative editing tools**, websites where web pages can be edited, modified and deleted by people with allowed access in collaboration with others, are considered as useful tools for group working (Lamb, 2004). Wikis often has a particular reference to ease of use (e.g., flexibility and open access). A well-known example is that of Wikipedia, which has been widely cited as an instance of the wiki concept as a collaborative tool which facilitates creation of group work (Anderson, 2007).

2.2.5 Mobile devices

Digital technologies have increasingly become portable, networked and pervasive in everyday life. Handheld wireless devices such as smart phones, tablets and laptops have the potential to achieve large-scale impact on teaching and learning due to their relatively lower price, portability, and communication features (Newhouse, Williams & Pearson, 2006; Roschelle & Pea, 2002; Roschelle, 2003). Based on early discussions, handheld wireless devices enable new types of user interaction due to their dynamic, graphical, pervasive animate, and multi-representational possibilities of displays, which may mediate social construction of knowledge. Through connecting handheld devices to establish a joint network that is overlaid in a shared learning space, students are able to

move effortlessly from working on their own to contributing in group collaboration (Roschelle & Pea, 2002; Roschelle, 2003).

Examples about in-classroom application of the mobile devices include classroom response systems, for example, *Classtalk*. It is used to aggregate students' responses toward choice questions which are instantly presented in the form of usually a histogram to work as a shared reference for discussion (Abrahamson, Davidian & Lippai, 2000). Another well-documented example is the application of the virus simulation games that model the spread of disease at the MIT media lab (Colella, 2000). Specifically, a small wearable computer called 'Thinking Tags' was developed to allow children to keep track of players who have developed epidemic symptoms. By wearing tags designed with a double-digit number pad and five LEDs, players become agents engaging themselves in the simulation of an epidemic, observing information displayed on the tags and discovering the underlying aspects of a viral epidemic. Such combinations of participants and tags create a digital ecosystem in which children interact with each other in a computationally mediated system consisting of peers and their tags (Colella, 2000).

Over the last two decades, mobile devices such as personal digital assistants (PDAs), laptops, mobile phones, e-book readers and tablets have been introduced to the educational contexts and significant efforts have been invested into developing infrastructure, content and resources regarding the incorporation of mobile devices into learning environments (Johnson, Smith, Willis, Levine & Haywood, 2011). This has led to the gradual establishment of mobile learning in its own right with researchers demonstrating interest in this evolving landscape. Definitions on mobile learning vary and emphasise the following aspects: mobility (Sharples, Taylor & Vavoula, 2007); ubiquity (Kukulka-Hulme, 2009); access (Parson & Ryu, 2006); situativity (Cheon, Lee, Crooks & Song, 2012); immediacy and convenience (Kynäslähti, 2003), and contextuality (Kearney, Schuck, Burden & Aubusson, 2012).

Sharples, Taylor, and Vavoula (2007) conceptualise mobile learning as both encompassing learning that is supported by mobile devices and also learning in a time characterised by the mobility of people and knowledge. A very relevant project in this regard is the MOBIlearn project conducted between January 2002 and March 2005 that

adopted a self-reported diary-based system to capture participants' learning episodes for two weeks. A learning episode in this context, means 'a group of learning activities, which are formed by virtue of their spatial, temporal, and thematic proximity (Vavoula, 2005).' The study suggests that mobile learning episodes tend to be more active and interactive compared to the non-mobile ones, and learners of mobile episodes eventually learnt more to meet their curiosity, enjoyment and develop their skills. Reflecting on this study, Sharples and his colleagues proposed that people can transfer knowledge and skills across contexts such as school and home and mobile technologies can be designed to fulfil learning in small gaps of time during transition. (Sharples et al., 2007).

Although previous literature documented issues for the adoption of mobile phones for learning, such as environmental factors and cost issues, free Wi-Fi hotspots driven by mobile users are likely to stimulate the adoption of mobile phones (Kukulska-Hulme et al., 2011). In China, three major mobile operators are China Mobile, China Unicom and China Telecom. The International Telecommunication Union (ITU) 2017 report reveals that there were 213 mobile phones owned per 100 urban households and 198 mobile phones owned per 100 rural households by 2012. More than half of mobile subscriptions used LTE services by the end of 2016 and operators are piloting 5G networks aiming at launching commercial networks by 2020 (ITU, 2017).

Evaluation is also being undertaken in the area of mobile learning to provide personalised learning context and realise a sense of authenticity for the language learning experience (Demouy, Jones, Kan, Kukulska-Hulme & Eardley, 2016; Demouy & Kukulska-Hulme, 2010). Kukulska-Hulme and her colleagues (2011) conducted a cross countries online survey and found that a high percentage of mobile phone use appears to be universal, and it also discovered a versatility in students' uses of mobile phones. Ducate and Lomicka's (2013) provided an account of a project in which students are involved in social networking sites (e.g., YouTube; Google; Twitter) using iPod Touch both for class and home activities.

2.3 Pedagogical considerations related to educational practices

On one hand, there have been consistent efforts to look at how technology could go hand in hand with pedagogical considerations (McLoughlin & Lee, 2007), such as socio-

constructivism and personalised learning (Conole & McAndrew, 2010). On the other hand, there seems to be an arousing desire of alignment between the affordances of digital networked media, which emphasises user-generated content, and collective collaboration (Conole & McAndrew, 2010). The next section provides a review of pedagogical considerations related to educational practices and the affordance of educational technologies. In discussing the theories of learning, Mayes and de Freitas (2004) proposed three broad perspectives that provide insight about what is essential for understanding learning: the associative / empiricist perspective (learning as activities), the cognitive perspective (learning through understanding) and the situative perspective (learning through social practices). In the context of this study, it is believed that the cognitive perspective and situative perspective of learning are highly relevant, and there follows a discussion of those perspectives.

2.3.1 Cognitivism and information processing

The focus of cognitivism is placed on ‘information processing’ to demonstrate the development of thinking and argumentation (Conole & Alevizou, 2010). Today’s students need to develop cognitive abilities and adeptness to operate in complicated digital environments that involve juggling text, popup boxes and hyperlinks (Leadbeater, 2004). In an area where access to information has become ubiquitous and inexpensive, the challenge for students is to develop new skills to deal with complex information – to infer meaning and understanding (McDowell, 2002, cited in Quinton, 2009).

Specifically, the traditional way of accessing information is through printed books and encyclopaedias, while novel technologies in recent years have introduced a variety of additional information resources presented and accessed via the Internet. To locate globally distributed sources and digitised information as one chooses, assisted by key word searching tools, to embed interrelated connections among different forms of electronic information, with the help of hyperlinks, and to understand electronic media presented from multiple perspectives –these all require advanced analytical and interpretive skills (Feltovich, Hoffman, Woods & Roesler, 2004, cited in Quinton, 2009). In this context, it is believed that the objective of learning is inherently more comprehensive, requiring the cognitive activities of reflecting, processing and analysing, which describe the major characteristics of metacognition – the process that involves

‘thinking about thinking, knowing what we know and what we do not know’ (Blakey & Spence, 1990, p. 1).

2.3.2 Learning in social contexts and constructivism

In Europe, mainstream cognitive approaches to teaching and learning stress constructivism: understanding is acquired through an active process of building assumptions and developing new understanding through activities (Mayes & de Freitas, 2004). Piaget’s constructivist theory of knowledge (1970) emphasised the importance of active experimentation and observation for learners to absorb knowledge. By the same token, Collins, Brown and Newman (1989) proposed that knowledge could be better understood through interacting with other learners instead of direct teaching, and through the search for meaning rather than through self-containing entities delivered to the learner.

Bandura (1977) stated that learners do not necessarily need to learn everything by trying it themselves; instead, a replacement for learning through trials is to learn through observing and modelling other people. According to Bandura (1977), students’ patterns of study are influenced by consistent interaction between cognitive, behavioural and environmental factors; learning through observation is made up of four essential stages: (1) paying heed to the characteristics of modelled behaviour, (2) retaining, memorising, and classifying the behaviour, (3) imitating and practising the behaviour, and (4) enhancing the motivation through valuing the outcomes and reinforcing the modelled behaviour.

Vygotsky’s ‘zone of proximal development’ (ZPD) addresses the additional achievement of the self-directed learning the learner can make with the scaffolding of adults with greater expertise (Vygotsky, 1978). Vygotsky (1978) pointed out that a person’s cognitive development follows an outside-in process, happening at two-levels: first learning with the help of people at the social level, and then inside the person at the individual level (Vygotsky, 1978). Therefore, social constructivism, based on of Vygotsky’s idea, emphasises the important role of a more skilled peer or tutor in assisting a student’s development, with that student actively engaged in learning within his or her ZPD. Based on Vygotsky, Bruner (1987, cited in Willett, 2007) used the term ‘scaffolding’ to represent

interactions, involving structures based on an understanding of the underlying learners' schema, in order to help them understand and apply new information, or master tasks.

2.3.3 The situative perspective and communities of practice

The situative perspective of learning views knowledge as distributed socially. Brown, Collins and Duguid (1989) state that knowledge is situated in the product of the activity and the learning context wherein it is developed, and the interpretation of the context is socially constructed through interactions. They propose the concept of 'cognitive apprenticeship', in which students can observe, practice and acquire a robust understanding (Brown, Collins & Duguid, 1989). Researchers (Brown et al., 1989; Lave & Wenger, 1991) stress the situated role of learning regarding the progressive acquisition and development of concepts through activity, context and culture, and social interaction.

According to Barab and Duffy (2000), there are two main interpretations of situated learning: the first interpretation can be deemed as the socio-psychological account of situativity, which stresses the significance of context-dependent learning in informal settings with design of constructivist activities. An important element of context-dependent learning is providing authentic learning environment in which in which skills and knowledge are embedded. Examples within this approach can be problem-based learning (Savery & Duffy, 1996), and the cognitive apprenticeship (Collins et al., 1989). Mayes and de Freitas (2007) comment that the focus of this approach is placed on the relationship between the essence of the educational learning task and the wider learning environment.

The second interpretation of situated learning builds upon the concept of communities of practice – the emphasis is placed on the relationship between individuals as members of the community, rather than the relationship between the educational activities and the wider learning context. There are three main characteristics of communities of practice: (1) **The domain.** A community is not just a network of people – members are bound together by a shared domain of interest; (2) **The community.** In mutual activities and discussions, members interact and share information with one another, and establish relationships which allow them to progress; (3) **The practices.** Over time and after sustained interaction, members will produce a shared repertoire of resources, such as

experiences and artefacts (Wenger, 2011). Lave and Wenger (1991) propose that situated learning can occur within the frame of communities of practice through the mechanism of legitimate peripheral participation.

2.4 Impact of educational technology, affordances and learners' choices

Many aspects of the education industry have used educational technologies to extend students' control over the learning process (Dabbagh & Kitsantas, 2012). Today's learners are privileged to choose from many different resources and sites, as well as when, how and where to use them, for example, through mobile learning (McLoughlin & Lee, 2007). Educational technologies, especially mobile devices have huge potential to offer students 'just-in-time' and 'at-your-fingertips' opportunities that can support a range of learning activities, such as collective contribution through Twitter, co-production through Wikis, shared documents through Google Docs, and self-expression through blogs (Rahimi, van den Berg & Veen, 2015). Terms such as 'ubiquitous learning' and 'seamless learning' came into being to propose a new phase in the development of technology-enhanced learning (Cope & Kalantzis, 2009; Sharples & Spikol, 2017). As it can be seen, the development of educational technology is often coupled with discussion on their impact on education and technological affordance. The next section provides an insight into affordances concerning how digital tools can be regarded as artefacts of distributed intelligences and what new possibilities they offer to contribute to activities.

2.4.1 Affordances of educational technologies

Uses of affordances in the literature are inconsistent. The term 'affordance' was introduced by the psychologist James Gibson (1977; 1979) to describe a mutual relationship between an organism and 'action possibilities' latent in a specific feature of its environment. Gibson's work on visual perception (1979) is one of the influential psychological approaches that have been denoted as ecological, in which the notion of affordances of objects that connect perception and action is principal. Gibson's ecological theory of perception indicates that an affordance is neither a property of an object nor that of an actor; rather, it refers to the relationship between the two. In Gibson's view, affordances are objectively measurable and are not decided by an individual's capability

to recognise them, but are always dependent on an object's physical abilities and in relation to agents (Gibson, 1979). Conole and Dyke (2004) believe that affordance ought to be understood as having both positive and negative connotations. They propose a taxonomy of ICT affordances that outlines 10 taxonomic units derived from 'themes and commonalities' found in their research, which makes up the taxonomy of ICT affordances. Draw on Conole and Dyke (2004), and McLoughlin and Lee (2007), some affordances of educational technologies can be described as below:

(1) Connectivity.

Social media such as Skype, Adobe Connect and Facebook could support synchronous (real-time communication) and asynchronous (communication that is read or replied by the recipient at a different time) interaction, varying from communication, collaborative activities, sharing and other (Dron & Anderson, 2014; Palaigeorgiou & Grammatikopoulou, 2016). Ellison, Steinfield and Lampe (2007) studied 800 Michigan State University (MSU) college students' use of Facebook and found a positive correlation between intense Facebook use and students increased social capital (which broadly stands for the resources accumulated through the relationships between people), and increased subjective well-being (e.g. satisfaction with MSU life and self-esteem).

However, the challenges of using social media cannot be ignored. Koroleva, Krasnova and Günther (2010) discovered the issue of information overload on Facebook when users expand their networks; the increasing amount of irrelevant information on the newsfeed and failure to deal with information overload may lead to reduced activity on the newsfeed and a return to a more traditional means of communication. Meanwhile, it also requires students to be equipped with both social and communication skills, and simultaneously become engaged in the participatory culture (McLoughlin & Lee, 2007).

(2) Accessibility

Conole and Dyke (2004, p. 117) describe today's range of ICTs as providing comparatively easy access to information through various mechanisms. 'Speed of change' can lead to plentiful and dynamic information mediated through diverse technologies. 'Concepts such as open content, open data and open sources, together with the increase in transparency and ease of access to information, are becoming of value to education.

Specifically, users are allowed to mix content, modify it collaboratively, and publish it for the public to make comments and revisions (McLoughlin & Lee, 2007). However, the fast-pace of information change may lead to issues of massively conflicting information which challenges critical information analysing skills. Moreover, the corollary of this speed may lead to issues of information overload, as well as a lack of quality of sources and lack of space for reflection (Conole & Dyke, 2004).

For example, Twitter is often of particular interest for higher education as a means to facilitate students in following professional communities, and to allow students to take part in discussions or post questions across the network (Jacquemin, Smelser & Bernot, 2014). A study conducted by Junco, Heiberger and Loken (2011) discovered that the use of Twitter has the potential to empower students, which can translate to a growth in content retention and course enjoyment, as well as student achievement. Other studies found negative issues in relation to the use of Twitter. In a survey study Bontcheva, Gorrell and Wessels (2013) collected 587 responses through university email services and professional social media presence, and found that 70.4% of the participants reported having difficulty locating important posts. Overall, they concluded that people who use Twitter in a professional way are more likely to perceive that they receive too many posts and so are overloaded with information.

(3) Diversity

From the perspective of Boud and Walker (1998), learning is a comprehensive activity that is embedded in a social, economic and cultural context, and associated with people's life experience. Therefore, Boud and Walker (1998) proposes the value of learning from others' experience, from sharing experiences and from expressing critical comments to others. ICTs contribute to a diversity of experience that can inform learning, such as by offering access to overseas websites with exposure to diverse experiences beyond the learner's own communities. However, one of the possible issues is the authenticity of others' experience as mediated by the technology; for instance, the 'reported' experience may not fully describe the reality of the lived experience (Conole & Dyke, 2004).

One example of using technology for experiential learning is the use of the 3D immersive virtual world of 'Second Life' to teach cultural competence (Henderson, Fishwick, Fresh,

Futterknecht & Hamilton, 2008). Henderson and her colleagues (2008) proposed using the pedagogical value of an immersive cultural learning environment to provide an authentic or situated learning environment to teach cultural competence to U.S. government personnel from diverse backgrounds. They applied several pedagogical considerations when designing the virtual cultural learning environment, including access to authentic context and activity, access to expert performances and modelling, collaborative knowledge construction, space for reflection, scaffolding, and authentic assessment. Specially, a 3D immersive virtual space called *Second China* was created in Second Life to let users experience cultural content. The 3D immersive environment was linked to traditional 2D content to provide more information about the elements the users experienced (Henderson et al., 2008).

In terms of the affordances of Second China in the above case, it resolves the constraints of both distance and time, and provides a cost-effective approach to provide ‘just in time’ learning. It emphasises two important features (i.e., information and experience) which are central to the development of cultural awareness, with a better approximation of reality than classroom teaching. However, there were some challenges and constraints during the development stage, such as technical challenges and the diverse needs for different levels of learning among the group of learners (Henderson et al., 2008).

(4) ‘Communication and collaboration’

Educational technologies potentially open up new ways of communicating and sharing information, such as from subscription to mailing list to engagement in discussion forums. This social aspect of learning aligns well with Vygotsky’s social constructivism approach to learning (Vygotsky, 1978) and Wenger’s concept of Communities of Practice (Wenger, 2011; 2013), as discussed previously. Social media is regarded as having the potential to facilitate participatory learning and knowledge creation, primarily due to its characteristics of being user centric, interactive, social and adaptive (Dron & Anderson, 2009; McLoughlin & Lee, 2007). However, one issue could be that individuals may try to be involved in many communities at the same time, so that they cannot give enough attention or time to any individual community.

For example, clinical education at the University of Plymouth in the UK uses blogs, wikis, and podcasts for virtual collaboration. Before implementation, advantages (e.g., ease of use; availability of open source software) and disadvantages (e.g., wikis are prone to vandalism) were examined. Safeguards monitoring and moderating wiki and blog posts, and using these tools in a ‘closed environment’. The wikis, blogs, and podcasts were then made available to students for sharing, for production of their own content, and for fostering a ‘community of practice’ (Boulos, Maramba & Wheeler, 2006).

Building on previous section, which discussed some affordances of educational technologies, with examples of the implementation of these technologies in the classroom. One implication is that it helps us to avoid thinking in terms of technological determinism (a reductionist theory that assume technology drives the development of social structure and cultural values), by revealing that there is no deterministic relationship between education and technology.

2.4.2 User agency and learner’s choice

Wright and Parchoma (2011) comment that the origin of affordance was positivistic and that uses of ‘affordance’ in the literature have been inconsistent. Gibson’s investigation of the affordances of objects have been referred to as ‘real affordances’. Norman’s shift from ‘real affordances’ to ‘perceived affordances’ incorporated mental activity. Norman stated that the ‘affordances reflect the possible relationships among actors and objects’ (1988, p. 10), and he further described affordances as ‘properties of the world’ (1988, p. 10), whereby he meant the perceived properties of the things that can be utilised by users. Norman (1988) extended Gibson’s concept of affordances to be not only dependent on an actor’s physical abilities, but also dependent on his or her goals, plans, beliefs and previous experiences. It implies the effect of user agency. In this sense, the focus of ‘affordances’ has been shifted from ‘what things can offer’ (from Gibson’s original idea) to ‘user centred affordances’ (Norman, 1999, p. 39). Therefore, affordance means a prerequisite of the activity. However, having a system in which affordances are provided for some activity does not guarantee that such activity will take place (Greeno, 1994).

There is increasing notion of ‘student control’, indicating a growing student agency in terms of human capacity to make learning choices. In this sense, although reiterating the

conventional principles of social constructivist learning is still valuable, educators also call for student-centred pedagogies (McLoughlin & Lee, 2007). This can be exemplified by a pilot study at the University of Leicester, where students were involved in making podcasts (referred to as ‘profcasts’) to support learning (Edirisingha, Salmon & Fothergill, 2007). In short, learners’ attitudes and experience serve as the one of the major factors that influences individual usage of educational technology. Therefore, bringing the student voice on board can lead to a better understanding of which factors affect the learning experience and so shed some light on the design of appropriate e-learning environments for teaching and learning (Liaw et al., 2006). There is growing attention to research that investigates learners’ experience of e-learning – their needs as well as their expectations.

2.5 Understanding the ‘digital native’ thesis and a review of the learners’ study experience

Given the rapid change in educational technologies, various terms have been used to describe today’s learners, such as ‘digital natives’ (Prensky, 2001), ‘net generation’ (Tapscott, 1999) and ‘Millennials’ (Oblinger, 2003, p. 38). These have provoked over a decade of discussion and debate in the domain of educational technology. The following section will critically examine the claims and empirical studies about ‘digital natives’ and propose its relevance to this thesis.

2.5.1 Understanding the ‘digital native’ thesis

Prensky (2001, p. 2) coined the term ‘digital natives’ to represent people who used technology at an early stage in their lives, and the term ‘digital immigrants’ for their predecessors who had less experience with technologies. According to Prensky, ‘digital natives’ are growing up surrounded by digital technology such as mobile phones, computers, game consoles and other gadgets, while their parents’ generation grew up before the introduction of some of these technologies and had to learn to use these digital technologies as adults.

Prensky (2001, p. 1) states that today’s students are ‘native speakers’ of the language of digital technology, who therefore ‘think and process information fundamentally

differently from their precursors'. They are in favour of multi-tasking. They have a preference for graphics over the text. They favour random access such as hypertext. They perform better when networked, and they function well on instant gratification rather than 'serious' work. Digital immigrants, on the other hand, suggests Prensky (2001, p. 2), may learn to use technology and to adapt to a digitally enriched environment, but they would still not be able to fully master a 'new language' and somehow would retain their 'accent' ('their foot in the past'). Prensky (2001) lists numerous examples of digital immigrant accents, such as printing documents out to edit them rather than working on the computer. Debate around 'digital natives' focuses on the following aspects:

(1) Debate on 'digital natives' about the generation gap

Prensky (2001) discussed 'digital natives' and 'digital immigrants' with a radical perspective. Jones, Ramanau and Healing (2010) pointed out it was striking that Prensky did not specify the age difference between these two generational populations. However, Bennett, Maton and Kervin (2008) commented that literature associated with 'digital natives' provides neither provide theoretical nor empirical evidence to explain the generation gap (Bennett et al., 2008). Margaryan and Littlejohn (2009) categorised their research sample into two groups, 'digital natives' and 'digital immigrants', based on whether they were born before 1980 or born in or after 1980. Data showed that, apart from the use of mobile phones (68.2% among research 'digital natives' group vs. 78.3% among 'digital immigrants' group), the 'digital native' group had more reliance on using various tools for informal learning and socialisation compared with the 'digital immigrant' counterpart (e.g., 20.1% of the studied 'natives' vs. 8.7% of the studied 'immigrants'). Nonetheless, both of the groups are using technologies more for the purpose of socialising than learning (Margaryan & Littlejohn, 2009).

Lonhes and Kinzer (2007) discovered that the desire of the Net Generations' / digital natives' for cutting-edge technology has not fully translated into a successful practice of using technology to support learning. They also discuss the misconception of dividing 'digital natives' and 'digital immigrants' according to their age and ability to use new technology; instead, people's attitudes towards, and prior experience with, technology also matters significantly. Especially at a time when the majority of people are growing

up with technology, the difference between ‘digital natives’ and ‘digital immigrants’ has been reduced.

(2) Debate on ‘digital natives’ about diverse characteristics and experience

Another debate against the ‘digital natives’ claim is Prensky’s (2001, p. 1) suggestion that “it is very likely that our students’ brains have physically changed – and are different from ours – as a result of how they grew up”. Prensky (2007, p. 41) went on to state that “students are clamouring for these technologies to be used as part of their education, in part because they are things that students have already mastered”. However, researchers are wary that using generational distinctions may over-determine the relationship between students’ characteristics and technology (Bayne & Ross, 2007).

Several studies (e.g., Corrin, Bennett & Lockyer, 2010; Margaryan & Littlejohn, 2009) found a significant diversity in terms of students’ nature and preference for using technologies, especially for academic purposes. Margaryan and Littlejohn’s (2009) surveyed 160 year 3 students majoring in Social Work and Engineering, followed by interviews with 28 students from the survey sample. The study found frequent uses of the virtual learning environment (VLE), websites, Google and Wikipedia among students to facilitate their formal learning. Krause (2007) reports on research that found that the experience and understanding of technology among first year students in Australian universities differs extensively according to socio-economic background, age and gender. Given this, ‘digital native’ students may be seen as using a variety of technologies, rather than as a homogenous group. Owen (2004) commented that our understanding of today’s students should be “situated in diversity rather than dichotomy”.

(3) Debate on ‘digital natives’ about their digital skills

Another debate around ‘digital natives’ is their level of digital skills. Eynon (2010) refuted Tapscott’s description (2009, p. 1) of digital natives’ capability to use technology as “a duck takes to water” by stating that their confidence with the technology does not guarantee their competence. A JISC funded study (JISC, 2007) noted that students have mixed feeling towards uses of technology in teaching and some are reluctant to engage with these technologies unless they see obvious academic or social benefits.

Although the term ‘digital natives’ became well-publicised, recent views about a ‘net generation’ and ‘digital natives’ have been under critical scrutiny and ‘digital natives’ has remained controversial. In line with this, researchers (e.g., Bayne & Ross, 2007; Lohnes & Kinzer, 2007; Margaryan, Littlejohn & Vojt, 2011) argue against a simplistic dichotomous approach to understanding learners and the de-privileging views of teachers. They call for more empirical studies into the nature and degree of students’ uptake of technologies, in order to improve our understanding of which technologies students use and how they use them.

2.5.2 Student study experience and developing digital skills

On one hand, Shopova (2014) argues that the context of learning has changed: the interactivity of ICTs and the growth of personalised digital devices have creating an essential source of education, including self-education, and learners are increasingly engaged in cognitively complicated learning which tends to be self-disciplined (Shopova, 2014). The nature of knowledge has changed: the sheer volume of information available online has led to new methods of research, but also appeals for skills to make students more effective information processors (Agudo-Prado et al., 2012). It has given rise to an openness of market sectors and collective knowledge bases, where there is more free availability of intellectual work, but an increased problem with the protection of intellectual property (Beetham et al., 2009).

On the other hand, Burton et al. (2015) argues that there are two interrelated myths that are associated with the growing emphasis on technological delivery. One stems from the idea that the Internet, particular Web 2.0 technologies, provides a panacea for issues of increasing demand by students and that it can afford open access and interactive learning opportunities. The other concerns the view that higher education students are digital natives who have a natural ability to master technology and have the same experiences with digital technologies (Burton et al., 2015).

The view that perceives ‘affordances’ as ‘possible relationships among actors and objects’ is helpful, however, this notion of ‘affordances’ has received critical scrutiny because the focus on the properties of objects failed to take account various ways that people experience those properties and use them for their own ends (Beetham, 2013).

Sometimes there is a gap between educators' expectations of students' digital skills and their actual technology use: when students say, they use the Internet, often their Internet use tends to be different to how educators expect them to use the Internet. For example, educators may establish a project letting students make a media production with a belief that students are more familiar with the use of digital technologies for research and production than they actually are (Hobbs & Jensen, 2009). This issue may be more apparent with a large influx of international students because their voice is often not taken into account, as described in the previous studies.

Recently there has been a shift to embrace students as co-creators of the content created using technology in peer-to-peer learning environments, and to explore a range of social and cultural issues that are important to learning in terms of both participation and knowledge creation (McLoughlin & Lee, 2007). Correspondingly, there is an increasing consensus for conceptualising digital skills as a variety of characteristics instead of as a discrete checklist of skills (Pegrum, 2011). Burton et al. (2015) argued it is useful to conceptualise digital skills as a series of characteristics rather than discrete list of skills, and studying students 'characteristics is important to understand the above myths.

The introduction chapter depicts the distinct features of the media landscape in the UK and in China, and describes the situation of an increasing number of Chinese international students who seek a postgraduate degree in the UK. A holistic view of e-learning pedagogies ought to take into consideration the question of how e-learning is related to students' own experience, including their lives (Sharpe, Beetham, de Freitas & Conole, 2010). In addition, Hobbs and Jensen (2009) suggests that it is important to capture the diversity of students' perceptions and experiences that shape their digital practices in order to target digital skills education effectively. Therefore, it is anticipated that a study of Chinese international students will lead to recommendations for enhancing their experience in the area of technology-enhanced learning and develop their digital skills. With this purpose in mind, Chapter 3 discusses Chinese learners and different notions of digital skills to provide a working definition and a conceptual framework for this research.

Chapter 3 - Chinese learners and conceptual framework of digital skills

3.1 Introduction

Chapters 1 and 2 introduced two main viewpoints: (1) The development of educational technology has the potential to redefine scholarship and pedagogy, and implies the need for students to develop their digital skills; (2) A holistic view of e-learning pedagogies and effective digital skills education ought to take students' own perceptions and experience into consideration, as these shape their digital practices. This chapter first discusses Chinese learners and introduces the concept of 'third space' which conceptualise their adaptation to UK learning environment. After that, it provides a review on digital skills and a working conceptual framework for the present study.

3.2 Discussion of the Chinese learning style and Chinese learners

Amongst the vast amount of literature on Chinese learners, Chinese learners are often depicted as showing dispositions for conformity, passivity and respecting authority (e.g., Turner, 2006). The Chinese educational system advocates formality, focusing on the acquisition of declarative knowledge (information) and procedural knowledge (knowing how to perform activities) (Allinson, 1989). This widely held perception of Chinese learners' characteristics is often deemed the antithesis of the characteristics desired by Western education, such as critical thinking and the ability for self-directed learning (Ramsden, 2003).

Before going further in this discussion of Chinese learning styles and Chinese learners, it is important to note that these attributes are not the focus of the study; they can nevertheless shed some light on, and help better understand the background of these learners. This section attempts to draw some distinctions between Western and Chinese beliefs about learning and learning styles. However, it is worth noting that drawing distinctions does not necessarily mean making any claims about the two cultures. Li (2005) suggests that we can regard this as the initial step towards attaining an analytical distinction between the two cultures in order to enable the empirical study to look into the complexities and interactions between different themes.

Li (2005) points out that cultural beliefs about learning play an essential role in shaping an individual's learning beliefs and in influencing their actual learning behaviour. Beliefs about learning are one's own understanding of learning, including one's beliefs in relation to cognitive, affective and behavioural processes (Dweck, 1999, cited in Li, 2005). These beliefs are associated with learning goals (e.g., what a student aims at gaining from the learning), personal regard (e.g., to what extent a student views learning as important), affects (e.g., to what extent a student experiences joy from learning) and social perceptions (e.g., how students with different learning abilities perceive teachers). The beliefs affect students' motivation for learning and their consequent learning achievements (Li, 2005).

Li (2005) describes European American (EA) beliefs as **mind-oriented**, using different mental functions to construct understanding of the world and accomplish personal goals. Within this belief, learners participate in activities in which thinking, inquiry, and communication assume significance, to question the known, to discover the unknown and to convey the learning results (Li, 2005). While Confucianism has influenced Chinese learning beliefs, contemporary Western learning beliefs reflect intellectual traditions as exemplified by the Socratic approach (Li, 2005). The Chinese learning belief has been labelled as **virtue-oriented**, valuing self-perfection, both morally and socially (Li, 2005). It considers education as the 'social passport', being a component of the ritual development to adulthood (Allinson, 1989). Education is recognised as key to career success. However, it does not encompass fine distinctions in categorising motivation as intrinsic or extrinsic, as Chinese students are said to have both intrinsic motivation and career motivation (Kember, 2000, cited in Kennedy, 2002). Within this learning belief, students often aim at mastering material and contributing to society; developing virtues – such as being diligent, enduring hardship, being persistent and concentrating – are key elements in achieving this aim (Li, 2005).

3.2.1 Learning styles

Learning styles are defined as the “characteristic cognitive, affective and physiological behaviours that serve as relatively stable indicators of how learners perceive, interact with and respond to the learning environments” (Keefe, 1979, p. 1-87, cited in Vita, 2001). Common descriptors of learning styles involve aspects such as environmental preference

(e.g., light, seating and layout of the room), physical / modality preference (e.g., for visual, auditory learning), personality types (such as anxious behaviour) and cognitive styles (e.g., Kolb & Kolb, 2005). The next section investigates the extent to which Chinese culture / Confucian values influence the modern Chinese socio-cultural attitudes towards learning styles. It is important to examine this because such socio-cultural understanding can help UK tutors to develop more culturally sensitive pedagogies (Kennedy, 2002).

As mentioned above, Chinese learning beliefs are often attributed to ‘Confucian values’; so too are its learning styles. Rooted in the indigenous philosophy of Confucianism, the Chinese tradition emphasises harmony and social order through underscoring individual obligation, indicating that Chinese people behave in accordance with their social rules, and Chinese societies favour collectivism (Huang, 2002). Murphy (1987, p. 43) points out that Chinese students’ passive behaviour in the classroom can be attributed to the Confucian value of filial piety, together with rigidity of discipline and appropriate behaviour. Wu Lun (Relationship-defined obligations) describes the ‘five cardinal relationships’ according to the Confucian view of ethics as a social construct: ruler and minister, father and son, husband and wife, older and younger brother, older and younger friends; respect and obedience must be accorded to the former by the latter in each of these pairs (Bond, 1996, cited in Kennedy, 2002). Therefore, Chinese children are educated to respect parents as well as senior people, and respect is given to teachers whose wisdom is accepted without being questioned. Being moderate and keeping up a harmonious relationship between oneself and peers or tutors is encouraged, while individualism is not (Bond, 1996, cited in Kennedy, 2002).

The notion of ‘face’ (*mian zi*) – how one is perceived in front of others – is another important characteristic of Chinese etiquette, and it is regarded as disgraceful to make someone lose face (Bond, 1996). Chang and Holt (1994, cited in Kennedy, 2002) pointed out that taking up class time to express a personal view is not encouraged in Chinese culture and such action is considered disrespectful to teachers (students often feel that challenging teachers may cause the teacher to lose status, and students may also be afraid of being wrong, thus losing face themselves). Besides, teachers and parents often have high expectations and seldom praise or encourage children’s learning. Thus, such socio-

cultural attitudes are likely to impede students in expressing views and asking questions (Kennedy, 2002). To some degree, this explains why Chinese teachers are often deemed the embodiment of wisdom. Chinese teaching is primarily restricted to learning techniques in a linear, disciplined, didactic and teacher-centred context, while learners see knowledge as based on factual construction; questioning knowledge is not often embraced (Bruner, 1996; Allinson, 1989).

The ancient Chinese civil service examination tested candidates' knowledge of the classics and literary style. It was largely dependent on memorisation, which indicates that learning was traditionally viewed as a process of accumulating information through reading books rather than as a practical process to construct knowledge (Kennedy, 2002). This gives an account of the centrality of textbooks. In addition, in Confucian heritage it is not necessary to give credit to sources used, as educated readers are believed to be able to recognise the sources. Given this, Chinese international students may have difficulty in developing critical thinking skills and awareness of the importance – within the Western academic tradition – of acknowledging authorship and giving references, and of the concept of plagiarism (Jin & Cortazzi, 2006).

Hu (2002) summarised learning strategies that are often practised in Chinese education as the **4R's** (Reception, Repetition, Review, Reproduction) and the **4M's** (Meticulousness, Memorisation, Mental activeness, Mastery). First, with Reception, students learn via receiving and retaining knowledge transmitted by tutors and textbooks, with no preconceptions. Second, learning takes a repetitive approach to deepen understanding (Hu, 2002). In addition to reception and repetition, constant reviewing is also essential to successful learning; it allows students to consolidate learning and reach a fuller understanding of the given knowledge. This is reflected in the Confucius saying, 'by reviewing the old, one learns the new' (*wengy zhixin*) (Hu, 2002). Lastly, students are supposed to reproduce imparted knowledge, as required by teachers or tests (Rao, 1996, cited in Hu, 2002).

As for the **4M's** learning strategies, meticulousness means that Chinese students tend to pay attention to specific details of knowledge (Hu, 2002; Biggs, 1996). Biggs (1996) stated that memorisation is a popularly-practised learning strategy for Chinese students, and it

should be distinguished from rote learning, a stereotyped misconception of Chinese learning strategy by some Western commentators (e.g., Biggs, 1996). Rather, instead of memorising knowledge mechanically, Chinese students are often engaged in memorisation with understanding, during which students attend to mental activeness more than verbal activeness (Hu, 2002). Lastly, Chinese learning strategy shows little tolerance for the approximation of knowledge and aims at full mastery of knowledge (Hu, 2002). By looking at cross-cultural studies, Oxford and Anderson (1995) suggested that Chinese students tend to favour a classroom where learning is inductive and rules are set, with less autonomy provided to students.

Within a Western learning context, however, this inductive learning style, together with an unfamiliarity with the discourse expected in English academic writing, may lead to Chinese international students writing too much background information before making the thesis statements; a writing pattern that is often interpreted by British tutors as a failure to state the main ideas (Jin & Cortazzi, 2006). Chinese learners are also described as employing a *concrete-sequential* cognitive style rather than an *intuitive-random* one; this involves a preference for seeking and following clear directions (and thus often hard-to-work-with abstract ideas), as opposed to seeing the situation as a whole (Rebecca & Judith, 1995). Chinese students are said to be reflective rather than impulsive, which implies that they give preference to a stable, systematic and slow process (Jin & Cortazzi, 2008).

3.2.2 Culture and learning in the classroom

Researchers (e.g., Jin & Cortazzi, 1998; Kennedy, 2002) have pointed out that British classrooms often see a more social sense of speaker involvement as a means to induce learning through talking, and understanding through questioning. Jin and Cortazzi (1998) investigated how culture mediates actual learning in classrooms in China. In their discussion, they mention that Western teachers tend to use **simultaneous pupil talk** as a strategy in what they term ‘Western communicative classes’, often following speaker-oriented, teacher-facilitated, and learner-centred principles. That is to say, students are often involved in simultaneous talk, sometimes divided in pairs or groups, with the tutors giving feedback to the whole class later. However, it is argued that the approach of putting students into circles for extended talk tends to be unworkable for Chinese classrooms,

considering the typical large class size (around 40 to 60 students in an average class), room size and arrangement of furniture. Therefore, Chinese teachers tend to use **sequential talk** that follows the listener-oriented, teacher-controlled, and learner-trained principles in what they term ‘Chinese eclectic class’, wherein there are more extended exchanges, usually prepared, among students in sequence (Jin & Cortazzi, 1998). **I-R-F** cycles, namely Initiation (I), a tutor initiates a question, Response (R), pupils provide answers, and a Follow-up (F), a tutor evaluates answers (Jin & Cortazzi, 1998), are used by both Western and Chinese tutors in classes. Chinese tutors are more likely to ask other pupils to evaluate the first responses and continue the exchange by asking other pupils things like ‘is she /he right?’ (Jin & Cortazzi, 1998).

The issue of large classroom sizes in China gives a reason for why a linear, disciplined and teacher-in-charge pedagogy is often adopted in Chinese classrooms. However, it is also worth re-examining the argument that Chinese learners are passive learners. Jin and Cortazzi (1998) suggested that during the **I-R-F** cycle, as mentioned above, students’ minds are actively involved and they need to pay close attention to the answer provided by the first student in order to evaluate her/his answer.

In summary, the general perception of ‘Western’ and ‘Confucian’ educational systems is that critical thinking, deep learning and lifelong learning are often recognised as the result of Western education, while some undesirable activities like plagiarism and the non-critical thinking approach are often attributed to ‘Confucian’ education’. Looking at both Chinese and Western learning beliefs and learning styles, the emphasis should not be placed on the conceptual distinction between the two cultural systems, or on understanding Chinese international students through a single prism. The debate that there is a dichotomy between ‘Western’ and ‘Confucian’ approaches to learning may not be accurate as it fails to take account of the complexities among individual learners and it overlooks differences within educational systems; there also exists diverse academic beliefs, and student attributes within the two educational cultures (Ryan & Louie, 2007).

3.2.3 Student’s adaption to UK learning as in ‘third space’

In order to conceptualise the process that how Chinese international postgraduate adapt to the UK learning environment, this section provides a review on the concept ‘third

space'. Bhaba (1990) proposes the concept of 'third space' to describe the 'space' that emerges when an individual encountering two different cultures, when studying migrant communities. Burnapp, Yan and Zhao (2012) provide one interpretation of this 'space' as created by people who leave their first culture (could be 'home') and encounter a new culture (could be 'abroad') that was not defined in advance. In theorising 'third space', Burnapp et al. (2012) states that experience is very important for students to make reflections. As people spend more time in the new culture, experience will help them to familiarise the 'space'.

Burnapp (2006) studied the adaptation of international students during pre-session English for Academic Purposes, suggesting that students' narratives are more than students' adjustment – the narrative also “forms part of that adjustment”, because ‘the events related become integrated into a student’s biography by the telling’ (Burnapp 2006. p. 82). Based on this understanding, Burnapp (2006) employs ideas from phenomenological geography, such as the concept of place (Tuan, 1977). As Tuan (1977) suggests, over time the space at first unknown becomes ‘place as we get to know it better and endow it with value’ (Tuan, 1977, p. 6). In this understanding, a space is a space ‘that we perceive and construct, the space that provides cues for our behaviour’ (Tuan, 1977, p. 389), which suggests that people attach meaning to these ‘spaces’.

Burnapp and Feng, (2007, cited in Burnapp et al., 2012) later extended the concept of 'third space' to investigate the possibility of a digital third space. In their study, Burnapp and Feng (2007, cited in Burnapp et al., 2012) studied how Chinese international online distance students use the Internet and social networking sites, and concluded that Chinese international students combine Chinese and UK approaches to learning and may achieve a deep learning through making use of both Western and Chinese online resources.

In their interpretation, Welikala and Watkins (2008) discuss how 'scripts' denote the meaningful behaviours appropriate to a particular context. They extended 'scripts' to 'cultural scripts', which refers to meanings and behaviours students learn when encountering a different cultural experience. Similarly, Gill (2007, p. 171), in her qualitative study on Chinese students' postgraduate studying experience in the UK, found

that, as participants proceeded in their study, ‘new knowledge was co-constructed with the participants’ constant reflection on the reality and lived experience’.

For the present study, the concept of ‘third space’ can be useful: a ‘third space’ can be created by international students when they leave undergraduate study in China and cross the border to study in the UK. With particular reference to the digital learning environment, they may at first feel unfamiliar with the new learning environment and learning requirements. However, as time goes by, students may be able to refine their behaviour and skills (the thesis stress is in the direction of digital skills) to adapt to the learning situation. The participants’ account of these events will help me to understand their development of digital skills during their postgraduate study.

3.3 Digital skills

The introduction and the literature review have depicted a differentiation of the information infrastructure and the inequalities among Chinese international students’ access, experience and skills. Some of the main consequences lie in how students are developing their digital skills in adapting to postgraduate study in the UK and the places where support takes place. The next section provides a rationale for the term ‘digital skills’ and discusses the importance of developing digital skills.

3.3.1 Rationale of the term ‘digital skills’

In viewing the literature, I found an array of terminologies to describe 21st century skills in the digital age, and even ambiguity around the terms, concepts and constructs in relation to those skills which are often context-dependent. This thesis uses the term ‘skills’ over ‘literacy’, ‘literacies’ or ‘competence’ that are frequently seen in the literature. These terms are sometimes used separately in combination with other words or sometimes all three are used together/interchangeably, such as: media literacy (Buckingham, 2007); information literacy (Association of College and Research Libraries, ACRL, 2000); digital literacy (Martin, 2005), visual literacy (Avgerinou & Ericson, 1997); digital competence (Calvani, Fini & Ranieri, 2009); digital literacy skills (Eshet-Alkalai, 2004).

The considerable variation of terms not only reflects the fast development of digital technologies, but also reflects the theoretical research traditions and disciplines in which

they originate. For example, Livingstone et al. (2008, p. 5) describe how, in media literacy research, the focus is placed on ‘understanding, comprehension, critique and creation of media materials’, using media as an inquiry tool to explore the outside world and express ideas; the information literacy tradition emphasises ‘identification, location, evaluation and use of information materials with the information as a tool’. Koltay (2011) describes how digital literacy research often focuses on the effective use of information and communication technology.

The contribution from diverse domains to the concept has created a ‘jargon jungle not easy to breach’ (Ferrari, 2012, p. 11) and various definitions make it difficult to reach a consensus. Literacy generally brings together skills, attitude and knowledge, and is traditionally associated with books as well as printed matter (Ferrari, 2012; van Deursen & van Dijk, 2014). The concept of literacy has had a variety of meanings over time, ranging from the simplest form of literacy involving the ability to read and write as well as understand and express meanings (Bawden, 2001) to an extended concept considering literacy as a skill set needed to perform well in certain contexts within the society.

Walker (2015) points out that the issue with the term ‘digital literacy/literacies’ is that using the term ‘literacy’ can potentially lead to confusion between digital skills and modern literacy. In her blog, Walker (2015) described that technological innovation provides tools and sites for literacy practices: for example, students in many UK higher education institutions can submit their assignments through Blackboard and communicate with other people through social media. Moreover, the graphic, sensory, and multimedia properties of digital devices (e.g., tablets and smartphones which are touch screen controlled) have converted the nature of the texts. Digitally-produced texts seldom convey the meaning solely through the form of texts, instead, meanings are ‘multimodal’, constructed through a combination of various kinds of resources. Walker (2015) preferred the term ‘literacy in digital contexts’ over ‘digital literacy’ because the current connotations of ‘literacy’ have extended to include skills that can be identified and taught, such as career management and online safety, while the risk is the true digital literacy, that is to say, reading and writing multimodal will be lost. Walker (2015) also commented on Hauge and Payton’s (2010) definition on digital literacy, stating that if the

term ‘digital literacy’ is replaced with the term ‘advanced skills’, the definition would work.

The term ‘skills’ implies a ‘more (inter)active performance in media use’ (van Deursen & van Dijk, 2014). From their perspective, there is an expansion in the use of the Internet beyond’ reading and writing on screen to include other interactions such as interacting with people or programs and other behaviour such as online transactions as well as online shopping. Therefore, to be competent with the internet users requires more than knowledge, cognitive skills and tool-related skills, other specific skills are also essential to make use of information and for effective communication online (ibid, 2014). Therefore, ‘digital skills’ is used for this study to extend the meaning beyond reading, writing and understanding. It is also favoured over the term ‘competency’ because ‘competency indicates a potential rather than a capacity that is utilized’ (van Deursen & van Dijk, 2014, p. 140).

3.3.2 Development of digital skills

Among many different models of effective e-learning and digital literacy, Sharpe and Beetham’s (2010) is a widely cited one. Inspired by Maslow’s (1987) ‘hierarchy of learning needs’, Sharpe and Beetham (2010) proposed a pyramid modal of effective e-learning. *Access* is at the base of the model, representing the most fundamental requirements for learners to access technologies, resources and services. It also involves a network of people who have ideas for using technologies, time to engage and mobility. At the *Skills* stage, learners develop a set of skills including technical skills and cognitive skills that allow them to interact effectively as e-learners to work with professional groups. At the *Practices* stage, learners make informed choices of technology uses to meet their situational needs. At the *Creative appropriation* stage, learners are able to creatively appropriate available technologies (institutional technologies such as VLE and personal technologies) and learning opportunities to satisfy their own goals.

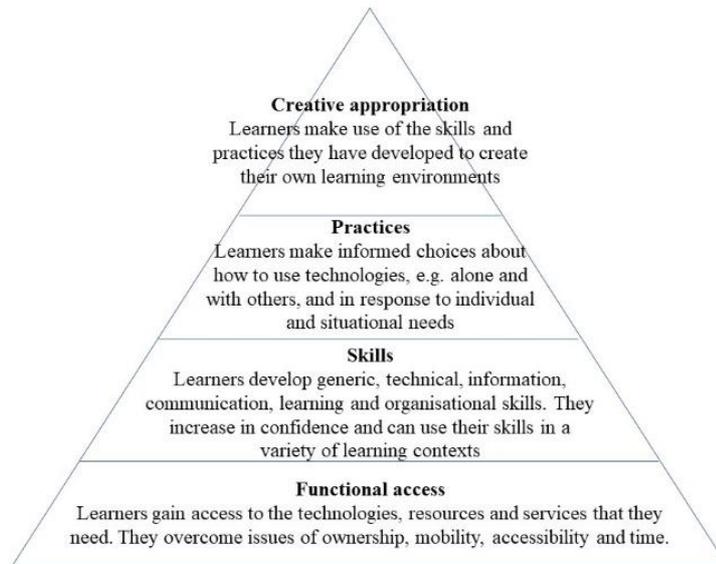


Figure 6: A Developmental Model of Effective E-learning (cited from Sharpe & Beetham, 2010, p. 90).

Jisc (2014) make reference Beetham and Sharpe’s work (2010) and suggest a digital literacy development model that modified the ‘creative appropriation’ in the original model into ‘identity’ for the JISC programme, shown in the figure below:

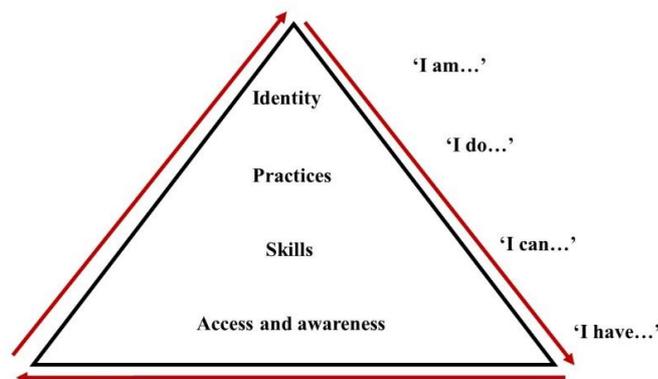


Figure 7: ‘pyramid model’ of digital literacy development model (Beetham & Sharpe, 2010)

According to the above model, the top level of the pyramid was modified from ‘creative appropriation’ to ‘identity’, which implies that effective e-learning involves more than access and skills, but also leads to the development of attributes needed to become a confident e-learner with a deep understanding of the value of, as well as the possibilities of, utilising technology to facilitate learning. Bennett (2014) commented on the value of

this model in the way that it distinguishes between access, skills, practices and attributes in a hierarchy and depicts digital literacies as social practices. However, placing *practices* on top of *skills* is not unproblematic. The model limits learners as individuals while their social relations, the cultural and political framework which shape learners' experience, is neglected (Gourlay, Hamilton & Lea, 2013). It is, however, useful to situate the development of digital skills in social practices.

3.3.3 Defining digital skills

Beetham (2010, p. 1) provides a broad definition of digital skills – ‘digital literacy defines those capabilities which fit an individual for living, learning and working.’ As discussed before, although various terms and definitions exist, theorists generally reach a consensus that digital skills not only refer to a range of interconnected and supplementary skills and competences, but many are beyond the scope solely of ‘skills’. The UNESCO (2017) report pointed out the importance of digital skills among prospective employees and argued for an existence of inequalities of access as well as digital skills, and made the case that education systems ought to take up the challenges of developing people’s digital skills so as to bridge the equity gaps. In its context, digital skills are described to include a ‘combination of behaviours, expertise, know-how, work habits, character traits, dispositions and critical understandings’ (UNESCO, 2017, p. 4). Drawing on these definitions, together with others’ work (Chaka, 2009; Pope & Walton, 2009), digital skills for this study is defined as: behaviours, habits, attitudes acquired in relation to digital media, developed and presented by learners over a period of higher education studying experience via interacting with technologies and social networks with practices that construct students’ intellectual and learning development, both as a competence base that a student is able to demonstrate and as a method by which a student approaches learning.

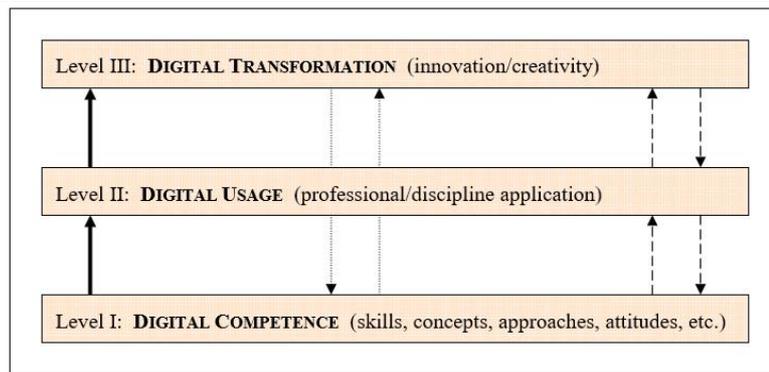
3.4 Towards the conceptual framework of digital skills

As discussed in the previous sections, the boundaries among different terms (e.g., media literacy, digital literacy, and digital competence) are blurred and sometimes overlapping. Chaka (2009) discussed the media literacy that an individual acquires and exhibits during the interaction of diverse media. Using media literacy and information literacy interchangeably, Chaka (2009) highlights their importance for higher education, and

proposed that theorising information media literacy (IML) involves multiple skills and competences subsuming a set of abilities. Many researchers also agreed that information and communications has exerted challenges on users, leading to a situation where a convergence of skills need to be developed and updated by users (Livingstone, 2005; Martin & Madigan, 2006; Beetham, 2009; Chaka, 2009). In this context, students need to be introduced to how multiple discourses feed into, and help develop, their corresponding knowledge, skills and competencies (Chaka, 2009). For the purpose of discussing analysed model on digital skills and forms of literacies, the below table provide an overview of different models and next section will discuss some of the aspects and indicators within these models:

Table 3: An overview of the analysed models on digital skills

Eshet-Alkalai (2004) Digital Literacy as a ‘survival skill in the digital era’
<ul style="list-style-type: none"> • Photo-visual literacy- interpreting visual representations • Reproduction literacy- creative re-use of the existing resources • Branching literacy- understanding ‘hypermedia and non-linear thinking’ • Information literacy- evaluating information • Social-emotional literacy – safeguarding behaviour in cyber space
Jenkins et al. (2006) New skills in ‘participatory culture’
<p>Jenkins et al. (2006) argue that ‘participatory cultures’ transformed the core of literacy from “one of individual expression to community involvement”. Therefore, they propose a set of new skills for the purpose of developing “cultural competencies and social skills needed for full involvement” (Jenkins et al., 2006, p. 8):</p> <ul style="list-style-type: none"> • Play – the capacity to experiment with one’s surroundings as a form of problem-solving. • Performance – the ability to adopt alternative identities for the purpose of improvisation and discovery. • Simulation – the ability to interpret and construct dynamic models of real-world processes. • Appropriation – the ability to meaningfully sample and remix media content. • Multitasking – the ability to scan one’s environment and shift focus as needed to salient details. • Distributed Cognition – the ability to interact meaningfully with tools that expand mental capacities. • Collective Intelligence – the ability to pool knowledge and compare notes with others toward a common goal. • Judgment – the ability to evaluate the reliability and credibility of different information sources. • Transmedia Navigation – the ability to follow the flow of stories and information across multiple modalities. • Networking – the ability to search for, synthesize, and disseminate information. • Negotiation – the ability to travel across diverse communities, discerning and respecting multiple perspectives, and grasping and following alternative norms.
Martin & Grudziecki (2006) A continuum of skills acquisition and the development of competency



Levels of Digital Literacy (cited in Martin & Grudziecki, 2006, p. 255)

In the context of Europe, the DigEuLit project (Martin, 2006, p. 156) proposed a framework of levels of digital literacy:

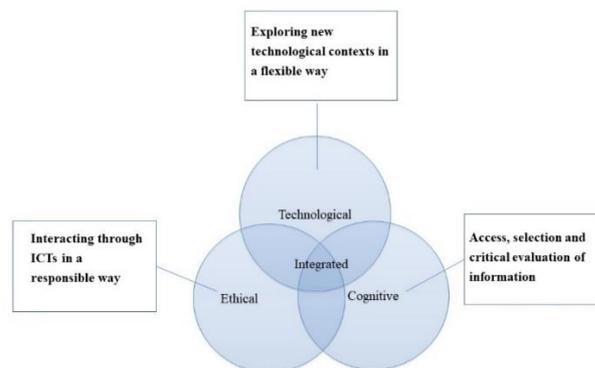
- The foundation of the system is digital competence, consisting of knowledge, understandings, attitudes and skills relating to the digital.
- The central and most crucial level is that of the application of digital competence within specific professional or domain contexts.
- The uppermost level is that of digital transformation, and is achieved when the digital usages which have been developed to enable innovation and creativity, and stimulate significant change within the professional or knowledge domain.

Buckingham (2007) ‘Media literacy and the World Wide Web’

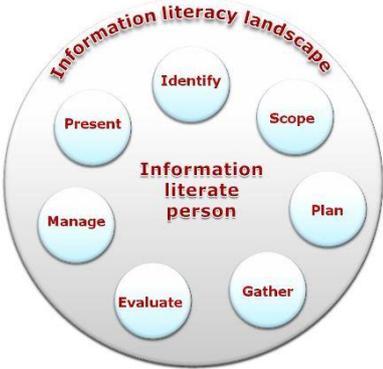
- Representation – digital media represent the world in a manner that express implicit values and ideologies
- Language – language functions in certain ways as an integral part of the Internet, which requires one to develop analytical and meta skills to understand ‘conventions of particular genres’ and ‘rhetoric’.
- Production – literacy practices demand readers to develop awareness towards the growing commercial influences and this can also be extended to the assessment of the contents by non-commercial interest groups.
- Audience – it means being able to recognise various ways in which medium is used in everyday life differently by different groups.

Van Deursen & van Dijk (2008) Four set of digital skills

- Operational skills- skills to operate internet services and applications
- Formal skills- skills to handle the structure digital media, managing browsing and navigating websites
- Information skills- skills to search, assess, and process online information
- Strategic skills- skills to employ internet and ‘network sources’ to accomplish specific goals



Digital Competence Framework (cited in Calvani et al., 2009, p. 161)

SCONUL (2011) Seven pillars of information literacy	
	
Seven pillars of information literacy (cited in SCONUL, 2011)	
Belshaw (2011) Eight essential elements of digital literacy	
Cultural Cognitive Constructive Communicative Confident Creative Critical Civic	
Ala-Mutka (2011) EC report on Mapping Digital Competence	
<ul style="list-style-type: none"> • Instrumental • Advanced skills • Attitudes 	

As it can be seen from table 3, there are various models on digital skills. Building the conceptual framework for digital skills involves reviewing different frameworks involving different forms of literacies. Rather than providing a detailed description of all existing models and types of digital skills, the next section describes an essential set of digital skills for this study drawn on important interpretations of the analysed models.

3.4.1 Operational skills/Procedure competence and formal skills

The definition of digital skills is associated closely with current trends of new devices, applications and a complex information environment that often involves altered or additional skills (Bawden, 2001). The first set of digital skills consists of operational, procedural, technical and formal skills. van Dijk and van Deursen (2014) proposed that many policy documents focus on technical competencies often called ‘button knowledge’ required to master a computer or the Internet.

From the 1970s onwards there came a development of the term ‘technological literacy’, driven by the growing recognition of potential challenges exerted by technological developments as well as awareness of the economic competition in the West put up by more technologically proficient nations (Martin, 2008). Belshaw (2012) commented that technological literacy was defined and prompted by economic needs and political concerns. By and large, technological literacy denotes the ability to utilise common information technology (IT) tools such as hardware, software, Internet tools, email and search engines (Carvin, 2000, cited in van Dijk & van Deursen, 2014). However, critical aspects, such as being able to make meta-level decisions towards uses of technology, were missing from definitions of technological literacy (Gurak, 2001, cited in Belshaw, 2012).

Parallel to the technological literacy came the development of computer literacy. In 1981, given the popularisation of the computer, the concept of computer literacy was coined and published in the Washington Post (Warschauer, 2003). Towards the end of the 1990s, the premise, that utilising computers to achieve particular outcomes formed a kind of literacy, started to be questioned by the U.S. National Research Council (1999, p. 2). In this context, literacy is seen as a fixed entity, which has a ‘skills’ connotation and seems to lack ‘staying power’ – considering that existing skills become outdated in the presence of rapid development (Martin, 2003, p. 16).

It is also argued that ‘computer literacy’ is too modest a goal to cover the intellectual ability required to use technology in a sophisticated and sustained manner, epitomising high-order thinking skills in the context of information technology. However, this intellectual capability is important as it has the potential to empower an individual to apply information technology to their advantage and to tackle unexpected problems as they occur. (U.S. National Research Council, 1999). Computer literacy was critically examined as it focusses on too narrow a set of skills demanded for computer use, which potentially lead to tool-oriented approaches thus limiting teaching to comparatively trivial software instruction (Hoem & Schwebs, 2004). Other terms have been carved out to indicate basic skills in using computer and Internet technology including technical competence (Mossberger, Tolbert & Stansbury, 2003) and IT fluency (National Research Council, 1999). Mossberger et al. (2003, p. 38) focused on technical competence and information literacy and regarded the two as related skills but distinct skills set within the

overarching item of technical literacy and they define technical competence as ‘skills needed to operate hardware and software’.

The U.S. National Research Council (NRC, 1999, p. 2) uses the term ‘IT fluency’ and proposes three types of knowledge necessary to be fluent with information technology, which are: (1) Contemporary skills, the ability to use today’s computer applications, enable people to apply information technology immediately; (2) Foundational concepts, the basic principles and ideas of computers, networks, and information, underpin the technology. Concepts explain the how and why of information technology; (3) Intellectual capabilities, the ability to apply information technology in complex and sustained situations, encapsulate higher-level thinking in the context of information technology. Capabilities empower people to manipulate the medium to their advantage and to handle unintended and unexpected problems.

Being fluent implies exercising intellectual capabilities in accordance with the information technology: literacy is not free from its context. The working group on ‘key competences’ of the European Commission’s Education and Training 2010 Programme echoed this by stating that there are few situations in which basic information and communication technology (ICT) skills are not enough for being digitally literate, because to use ICT also requires critical thinking and a wide knowledge of the media (European Commission, 2004).

In exploring how technology can support language learning, White and Walker (2013) developed a model of digital competence drawing on Canale and Swain’s model of communicative competence. Their model of digital competence consists of four elements (Walker & White, 2013, p. 8)

- ‘Procedural competence: the ability to manipulate the technology in terms of both hardware and applications’.
- ‘Socio-digital competence: understanding what is appropriate to use in different social contexts and knowledge domains, in terms of both technology and language.’
- ‘Digital discourse competence: the ability to manage an extended task, possibly using several applications and or types of equipment.’

- ‘Strategic competence: the ability to repair problems and work around the gaps in technological knowledge and skills.’

According to Walker and White (2013), procedural competence can be regarded as the basic skill of digital competence. It covers the skills and knowledge demanded to use a particular piece of technology but does not indicate skills in relation to content. This can be exemplified in that, while being able to use every function of image manipulation software, a user may lack the artistic ability to create a picture (Walker, 2015). These basic skills are demanded to use Internet services despite devices (e.g., desktop, smartphones or tablets) on which they are accessed focusing not only on the uses of websites but also on applications and Internet services such as social networking sites and email (van Deursen & van Dijk, 2014).

There are various definitions and frameworks (Martin & Grudziecki, 2006; Jenkins et al., 2009; van Deursen & van Dijk 2014; Calvani, Fini & Ranieri; 2009; Walker & White, 2013), which mainly cover the basic skills to use computers and networks. Drawing on these descriptions in literature, these basic skills are proposed as the most fundamental base of the digital skills model. These basic skills can be termed as ‘operational skills’ drawn on van Deursen and van Dijk (2014), or ‘procedure competence’ (White & Walker, 2013).

Van Deursen and van Dijk’s model of digital skills (Van Deursen & van Dijk, 2014) distinguishes between operational and formal skills. The former focus on the necessary skills to manipulate technology, while latter focus on skills to efficiently navigate the internet. Paul Gilster’s (1997, p. 1) provided an early definition of digital literacy: ‘the ability to understand and use information in multiple formats from a wide variety of sources when it is presented via computers’. Gilster (1997) presented that new media demand new skills to navigate, cognitively understand the content presented by networked media and the mastery of ideas.

Every medium represents particular formal characteristics that need to be familiarised by a user prior to his or her mastery of it. With regard to the Internet, one needs to be

equipped with the skills required to browse and navigate within different websites, as well as the ability to use various websites and menu designs (van Deursen et al., 2014). These skills are called ‘formal skills’ (van Deursen & van Dijk, 2014).

Synonyms for formal skills include ‘branching literacy/ hypermedia literacy skills (Eshet-Alkali & Amichai-hamburger, 2004)’. In the past, traditional printed and audio-visual texts enhanced a more linear way of learning where learners have little control over the flow of the information. In contrast to traditional media, modern hypermedia environments such as the Internet and digital databases provide a flexible learning environment where users can select nonlinear paths, that is to say, users can travel backward and forward through clicking on links or be directed to other sites (van Deursen & van Dijk, 2014). However, at the same time learners are confronted with the challenges of searching and understanding information in a nonlinear way primarily because the Internet landscape is complex, therefore it requires users to have a good spatial-multidimensional sense to stay oriented (Eshet-Alkali & Amichai-Hamburger, 2004). The lay-out and usability of a website can seem excellent from the developers’ point of view while it may not be the case for users, leading to a recurring problem of being disoriented (Lee, 2005). The disorientation can potentially lead to users’ frustration, lack of interest and a measurable drop in user efficiency (McDonald & Stevenson, 1998). Reducing disorientation enables more engagement in their Web interaction among users. Both operational and formal skills are medium-related skills and are a prerequisite of the content-related skills (van Deursen, 2010).

3.3.2 Information and cognition skills

The second category is information and cognition skills. Gilster (1997, p. 1) stated that ‘digital literacy is about mastering ideas, not keystrokes.’ The importance of critical cognition skills of analysing and evaluating online information is emphasised by the majority of the analysed models (e.g., Eshet-Alkalai, 2004; Jenkins et al., 2009; Buckingham, 2007; van Deursen & van Dijk, 2014; Calvani et al., 2009; SCOUNL, 2011). This perspective deems digital skills are the extent to which students can apply cognitive frameworks to academic and daily situations. It addresses high-order skills such as critical thinking and indicates the importance of informal learning contexts as providing students with real-world situations to practise their ‘habits of minds’ (Meyers,

Erickson & Small, 2013). Eshet-Alkalai goes as far as claiming that information skills have become ‘survival skills’ for scholars and information consumers (2004, p. 99).

As described in Chapter 2, Internet users are provided with exponential growth of the available information, which requires them to develop skills to assess information through evaluating subjective, biased information and commercial elements (Eshet-Alkali & Amichai-hamburger, 2004). Traditional printed and audio-visual texts are created by few people who have access to production and distribution, with resources being distributed selectively according to certain standards of editorial values, professional production conventions as well as market demands. However, this pre-filtering and construction of written information exerted less requirements on an individual to develop critical information skills as regard to identifying authoritative sources. At present, almost everyone can be the content producer and information disseminator and there are fewer filters, therefore an information literate person has to be able to find the information they need from various sources and be able to evaluate this information (Livingstone, Couvering & Thumin, 2008). Many of the models discuss the indicators of information and cognition skills under the construct of information literacy that incorporates the ability to locate, evaluate and use the needed information effectively (ALA, 1989). Such skills are also stressed in other literature on media literacy and digital literacy (Buckingham, 2007; Aufderheide, 1993).

The term information literacy was first used in the 1970s and has experienced several shifts to keep it present and relevant (Belshaw, 2012). Information literacy does not primarily depend on technology, and it was enthusiastically taken on board by librarians (Martin, 2008) and governments (Fieldhouse & Nicholas, 2008, cited in Belshaw, 2012). Among many definitions, the most widely cited in Europe is the one proposed by the American Library Association (ALA) Presidential Committee on Information Literacy: “To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information” (ALA, 1989, p. 1).

Others consider that the origin and basis of information literacy closely reside in the educational sphere. In the USA, The Association of College and Research Libraries

(ACRL) proposed competency standards for accessing the information literacy of an individual through performance descriptions and outcome expectations. The ACRL (2000) sees information technology skills as intermingled with, and supportive of, information literacy – a broader area that is more focussed on the intellectual competence and cognitive understanding of the fundamental concepts of technology. The ACRL (2015) views a rapidly transforming environment within the higher education sector, together with the dynamic information ecosystem, which demands that students build an understanding of the underlying ideas behind this information ecosystem, such as understanding their roles and responsibilities for new knowledge creation and using information ethically. The ACRL proposed a ‘Framework for Information Literacy for Higher Education’, containing six ‘frames’ for use as guidelines for teaching information literacy and highlighted information skills, such as:

- ‘Authority is constructed and contextual’ - information resources reflect their creators’ expertise and credibility, and are evaluated based on the information need and the context in which the information is used. Its implication for educational practice is that authority is a form of impact exerted by a community thus requires a student to become an informed sceptic when perceiving authority, to inspect resources through questioning origins, context and its relevance for the information need.
- ‘Searching as strategic exploration.’ - Searching for information is often nonlinear and iterative, requiring the evaluation of a range of information sources and the mental flexibility to pursue alternative avenues as new understanding develops. This implies that information seeking involves contextualised and sophisticated practices affect or affected by the cognitive, affective, social, aspects of a researcher. The potential issue here is that an inexperienced learner may be constrained by having only a few search strategies and limited search results, while a more advanced researcher is able to expand their searched resources and select the most suitable information according to the research scope and the context of the information need.

ACRL (2015) framework demonstrates that the teaching of information literacy ought not to be limited by ‘locked steps’, but rather an integrated skill set, used appropriately during the research process. Pope and Walton (2009) refers to Bloom in mapping higher and

lower order outcomes for assessing students' development toward information literacy as evidence that advanced information skills demonstrate higher order skills.

Media literacy, as a field of research, has developed since the proliferation of the mass media that has created the need for critical evaluation of information. If believed, media messages could have negative effects on Internet users, and media literacy (with its emphasis on critical evaluation) could offer protection against these negative effects (Martin, 2006). The concept of media literacy not only includes traditional media, such as newspaper and television, but more increasingly new media, such as the Internet (ibid, 2006).

The theoretical perspective of Media Literacy has been developing and it is important to discuss it. A widely accepted definition of media literacy that fits the critical approach is "the ability to access, analyse, evaluate and create communications in a variety of forms" (Aufderheide, 1993). In this definition, a skills-based approach to developing media literacy consists of four components: access, analysis, evaluation and content creation. The interconnection of these components constructs a non-linear, dynamic learning process. For example, learning to create media content helps one, in turn, to analyse content produced by others (Livingstone, 2005).

Buckingham (2007, p. 48) uses digital literacy and media literacy interchangeably. He concludes that media educators have detailed four primary conceptual aspects of media literacy:

- **'Representation.'** Digital media provides specific interpretations of the world, and selectively represents reality in such a manner as to express implicit values and ideologies. This requires Internet users to be able to evaluate the material they come across, for instance, by questioning the authority and reliability of the texts – assessing the motivations of the authors and validating the information with multiple sources (Buckingham, 2007).
- **'Language.'** As an integral part of the Internet, language functions in certain ways to compensate for the communication modality and the impact of interactivity. This requires one to develop analytical as well as meta skills so

as to understand how language works in the online environment, and to understand “conventions of particular genres” as well as “how digital media are constructed” with the use of particular rhetorics. For example, using the Internet may involve understanding “how sites are designed and structured, and the rhetorical functions of links between sites” (Burbules & Callister, 2000, p. 85-90, cited in Buckingham, 2007).

- **‘Production.’** Digital content is neither politically nor socially neutral and too little attention is paid to the commercial environment in which media content is created, marketed and circulated (Dowdall, 2009). Therefore, literacy practices demand readers to develop their awareness towards the growing commercial influences that often seem ‘invisible’ to them. Specifically, young people need to be able to tell how information is presented by commercial organisations. In a broader aspect, they need to be aware of “the global role of advertising, promotion and sponsorship, and how they influence the nature of the information” presented (Buckingham, 2007). These meta-skills can also be extended to the assessment of content by non-commercial interest groups.
- **‘Audience’.** This includes building understanding of the ‘nature of online participation’, ranging from Web polls to bulletin boards to user-generated content. It also involves “how media are targeted at audiences, and how different audiences use and respond to them” (Buckingham, 2007). It also means being able to recognise various ways in which the media is used in everyday life by different groups.

It is clear that Buckingham (2007) placed the emphasis on critical thinking and on the social, cultural and commercial implications of media literacy. He stated the need for analytical skills so that people can critically review the reliability of the media. One outstanding feature of media literacy is that, instead of being a skill set, it tends to be a ‘habit of mind’ – a way of thinking, being critical and being reflective (Meyers et al., 2013).

Apart from critical skills, the indicator of ‘problem-solving skills’ is also addressed. Problem-solving skills stands for skills to ‘identify digital needs and resources, making informed decisions on most appropriate digital tools according to the purpose or need, solve conceptual problems through digital means, creatively use technologies, solve technical problems, update own and other’s competence’ (Ferrari, 2013, p. 32). Scholars pointed out that the focus of problem solving is not placed on autonomous problem solvers as most contemporary education does, but on a collective intelligence and ‘collaborative problem-solving’ where students are ‘working together in teams, formal and informal, to complete tasks and develop new knowledge’ (Jenkins et al., 2006, p. 3). Indicators mentioned in the models use various terms such as ‘transmedia navigation’ and ‘multitasking’ (Jenkins et al., 2006) and ‘synthesize’ information/digital resources (Martin, 2005).

3.3.3 Digital communication and collaborative skills

The third category of digital skills focuses on digital communication skills. Communication skills is the ability to ‘encode and decode messages to construct, understand, and to exchange meaning in all interactive applications of the Internet’ (van Deursen & van Dijk, 2014, p. 30). These interactions include ‘both with artefacts such as websites, search engines and other Internet software, and with other humans using message systems such as email, chatboxes, and instant messaging’ (ibid, p. 30). A fair amount of the models stressed skills in relation to ‘understanding how communications media work’ (Belshaw, 2012, p. 209) and understanding ‘how digital media are constructed’ with particular rhetorics (Buckingham, 2007, p. 48). Interpreting online information well requires the ability to encode and decode messages and comprehension skills as well as cultural and social knowledge from which people can interpret ideas (Iordache, Mariën & Baelden, 2017).

Theorists who conceptualise digital literacy as social practices (e.g., Gee, 1996; Lankshear & Knobel, 2008) claim that if literacy is extended to digital literacy, it then embraces the interpretation of digital literacy as shorthand for social practices and as notions of engaging in the process of meaning making, mediated by texts created, disseminated and exchanged. Lankshear and Knobel (2008) further proposed the implication that reading and writing digital texts is often associated with various forms

of presentation. They use the example of blogs that are produced and managed with multiple purposes, such as writing personal diaries, writing academic articles, indexing resources such as hyperlinks of policy documents or any updates related to one's profession, storing photos or videos to archive memories, and so forth. Another implication, which extends the above viewpoint, is that different people interpret the same text in different ways.

Lankshear and Knobel (2008) exemplify this using the online LOLcats phenomenon (people posting images of cats, often in weird positions, with text that is often idiosyncratic and grammatically wrong). Understanding the LOLcats phenomenon requires the skills to read and write in a distinctive language, a certain cultural reference that is specific to the popular culture of the time, and understanding of particular motifs (e.g., the uses of 'k thx bye' as internet shorthand for 'okay, thanks, goodbye.'). Another recent example is Kumamon, a mascot (a rosy-cheeked bear cartoon character) originally created by the government of Kumamoto Prefecture in Japan in 2010 as part of a promotional campaign to attract tourists to the region after the opening of the Kyushu Shinkansen line (a high-speed train line) (Fujii, 2013). After Kumamon gained popularity nationwide, people started remixing pictures using Kumamon, and the character often appeared as a 'reaction image' – similar to 'Disaster Girl' in the Western context on the English-speaking Web. Lankshear and Knobel (2008) commented that these kinds of images are often generated in places like gaming and computer discussion forums, where many of the images are regarded as of conventional use by certain insiders, while they are somewhat nonsensical to outsiders. Eshet-Alkalai (2004) highlights the importance of photo-visual literacy to help people to construct effective photo-visual communication that expresses their language and to understand visual messages effectively.

Jenkins et al. (2006) argue that 'participatory cultures' transformed the core of literacy from "one of individual expression to community involvement". Therefore, they propose a set of new skills for the purpose of developing 'cultural competencies and social skills needed for full involvement' (Jenkins et al., 2006, p. 8). The indicators of these new skills also provide useful guidelines for communication skills both interacting with technologies but also with humans. For example, simulation, 'the ability to interpret and construct dynamic models of real world processes (Jenkins, 2009, p. 25)', meaning that

learners experiment with technology and different types of expression through trial and error so as to be immersed in real-world problems in a safe place. The fluidity of the new media environment brings people from diverse cultural backgrounds together where conflicting values interact, therefore it is increasingly critical to help students to develop negotiation skills which are defined as ‘the ability to travel across diverse communities, discerning and respecting multiple perspectives, and grasping and following alternative norms (Jenkins, 2009, p. 52).

In addition, collective intelligence is ‘the ability to pool knowledge and compare notes with others towards a common goal (Jenkins, 2009, p. 39). This highlights the skills required for online collaboration where people realise that it is a strength to work with team players with different strengths and backgrounds. In practice, learners acknowledge that nobody knows everything, but like-minded people can gather together on a communal platform to share ideas freely and to fulfil the same goal (Paulini, 2013).

3.3.4 Digital content creation skills

The fourth group of indicators consists of digital content creation skills. Content creation skills are skills needed to ‘create content of acceptable quality to be published on the Internet’ (van Deursen & van Dijk, 2014, p. 37). Indicators such as ‘remix media content’, ‘create content’ and ‘construct content’ were mentioned within a fair amount of the models. van Deursen and van Dijk (2014) considers content creation skills as skills to create various formats of resources (e.g., textual content; music/video content; image/photo content; multimedia content) using a broad array of technologies including blogging, podcasting, contributing to wikis and posting photos as well as videos from mobile devices.

In the context of Europe, the DigEuLit project proposed a framework of levels of digital literacy. Figure 8 shows the three levels of digital literacy and digital literacy in action (Martin & Grudziecki, 2007, p. 258).

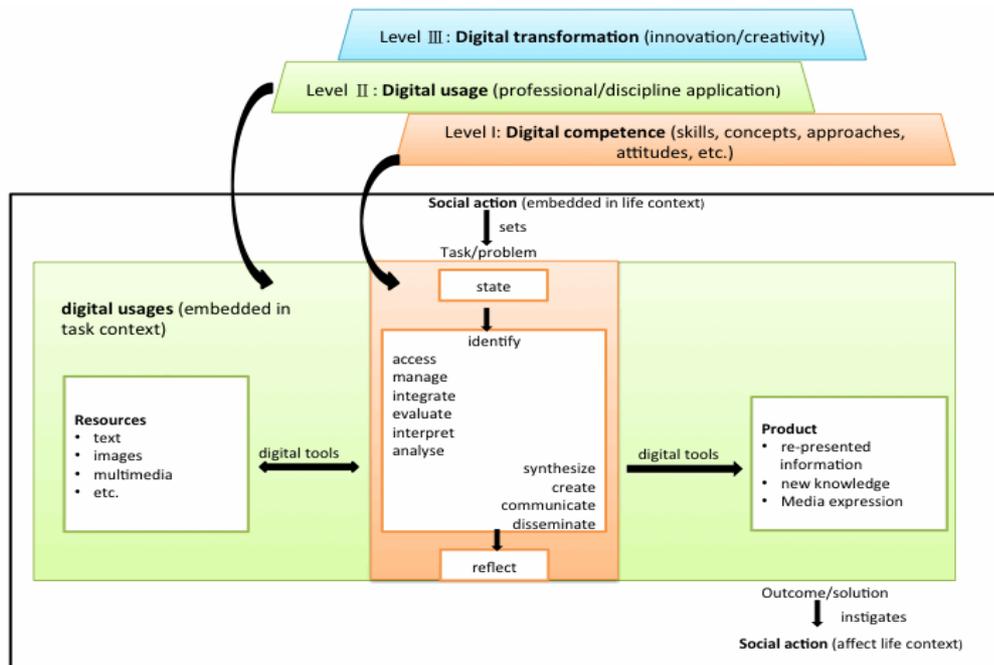


Figure 8: Levels of digital literacy and digital literacy in action
(Cited in Martin and Grudziecki, 2007, p. 258)

Martin and Grudziecki (2007, p. 156) pointed out three levels of digital literacy, which are:

- The foundation of the system is digital competence, consisting of knowledge, understandings, attitudes and skills relating to the digital.
- The central and most crucial level is that of the application of digital competence within specific professional or domain contexts.
- The uppermost level is that of digital transformation, and is achieved when the digital usages which have been developed to enable innovation and creativity, and stimulate significant change within the professional or knowledge domain.

Compared to the SCONUL framework, the processes of digital literacy as shown in Figure 8 seems to be the application of information literacy in digital environments. Martin and Grudziecki (2007) claim that it is not necessary for an individual to proceed from stage to stage sequentially. They explain that “whilst many digitally literate persons may achieve a transformative level, transformation is not a necessary condition of digital literacy” Martin and Grudziecki (2007, p. 259). One crucial implication is that digital

literacy requires the individual to be constructive, not a passive consumer of information, but a new information creator. Equivalent terms to ‘content creation skills’ include ‘constructive skills’ (Belshaw, 2012), ‘reproduction literacy’ (Eshet-Alkalai, 2004) and ‘appropriation’ (Jenkins et al., 2006). Constructive skills were drawn on DigEuLit project’s definition on digital literacy as ‘the awareness, attitude and ability of individuals to appropriately use digital tools...in order to enable constructive social action’ (Martin, 2005, p. 135-6).

Content creation skills also the skills to remix content from existing resources found online such as text, images, music and videos for a new creation (Jenkins et al., 2006). Examples include ‘mash-ups’ of content from different content providers to create new services (i.e., aggregation and recombination), and a digitally reproduction literate scholar is expected to possess satisfactory synthetic and multidimensional thinking to arrange information in novel and meaningful ways (Eshet-alkali & Amichai-Hamburger, 2004).

In addition, Content creation skills also involve dealing with and applying intellectual property rights and licences (Ferrari, 2013). Open environment provides opportunities for learners to co-authoring resources and co-orchestrating learning production, however, a challenge in computerised digital reproduction is the lack of awareness of the concept of intellectual property – students’ easy sharing of music and reuse resources may undermine their ability with respect to copyright (Okada & Ferreira, 2012). The fact that one can now easily access vast online resources creates the question, to what degree can an internet user copy or revise existing text or work before it is considered as plagiarism? (Eshet-Alkalai, 2004). ACRL (2015) stated that a rapidly transforming environment within the higher education sector, together with the dynamic information ecosystem, demands that students build an understanding of the underlying ideas behind this information ecosystem, such as understanding their roles and responsibilities for new knowledge creation and using information ethically.

International students – Asian students in particular – may encounter difficulties in understanding plagiarism because it is a concept rooted in Western culture (Scollon, 1995). In a mixed methods study with 270 Chinese undergraduates at two Chinese

universities, Hu and Lei (2012) found a significant percentage of the participants were not able to identify cases of plagiarism. They indicated that Chinese literacy practices often give priority to memorising, repeating and imitating authoritative text, and such practice is often deemed as legitimate learning strategies. Specifically, in China's education system, having the capacity to remember and reproduce authoritative content upon request during an exam is often taken to indicate that the student has internalised the essential knowledge contained in the text (Hu & Lei, 2012). These studies indicate a need for research with international students so that UK universities can support them to develop digital literacy from the start of their study. Therefore, the fourth focus of digital literacy that will be investigated among Chinese international students is the ethical aspect.

3.3.5 Strategic skills

Strategic skills are defined as the 'capacity to use computer and network sources as the means of reaching particular goals for improving one's position in society (van Dijk, 2005, p. 39). The definition of strategic skills is inspired by the classical approaches to decision-making (Miller, 2006). Strategic skills involve creative and critical decision-making about the use of digital tools and media, and are recognised as the most advanced Internet skills (van Dijk & van Deursen, 2014).

Ala-Mutka (2011) points out that technologies and particularly social media are used for a variety of purposes, and for uses of participative approaches. The focus of the primary concern shifted from ensuring access of computers to the application of usage skills and then to a confident, productive as well as critical usage in Internet environments. The participation gap is framed not only as access to computers and Internet but also as access to experiences, skills, and knowledge to prepare learners to effectively use a range of Internet platforms and services for full participation (Hague & Williamson, 2009). Apart from the tool usage skills, people also need motivation and strategic skills to innovatively use these tools within different work and life settings both for their own benefits and also for their community's benefits (Ala-Mutka, 2008).

In summary, the above section described five types of digital skills: operational and formal skills; information and cognition skills; digital communication and collaboration skills; digital content creation skills and strategic skills. Coming back to Beetham and

Sharpe's 'pyramid model' of digital literacy development, it implies that students can be digitally literate through engaging with technologies critically and gradually develop a digital mindset, thus developing digital skills required critical engagement with social practice (Bennett (2014). Therefore, building the conceptual framework situate these skills in social practices.

In the U.K., The Society of College, National and University Libraries (SCONUL, 2011) developed "seven pillars of information literacy", which identifies seven words to describe the functions of the supporting 'pillars' in developing an individual's information literacy: 'present', 'identity', 'plan', 'gather', 'evaluate', 'manage' and 'present'. The SCONUL (2011) seven pillars of information literacy introduces a comprehensive list of skills.

The SCONUL (2011) framework highlights the importance of an information literacy landscape, that is, one's aptitude, background and experience with technologies (SCONUL, 2011). The influence of one's prior experience upon the development of digital literacy can be seen from the literature. Sefton-Green (1999, cited in Buckingham, 2007) describe the process of developing two courses separately on web design and computer games in an art project in London, which recruited young people from impoverished families. Teenagers enrolled in the web design group had no prior experience with the Web and none of them knew about a Web producer's work, while those in the computer games group had prior experience of playing computer games and knew about how the games industry functions. Buckingham (2007) commented on how students' previous knowledge influenced critical discussions in the two groups and their productions: none of these students, in both groups, knew how to use the production software, but the Web course students had to improve their skills in using browsers prior to devising their Web page and sites.

Therefore, it is important to take one's prior experience and attitudes into account when developing students' digital skills. The below figure shows the conceptual framework for the study:



Figure 9: Conceptual framework - the development of digital skills

The foundation for the Figure 9 is a student's individual skill landscape. It includes the students' beliefs about the usefulness of technologies, their attitudes, and prior experience with technologies. This basis helps to account for differing standards of digital literacy among students. Above the individual landscape, there are five interconnected types of digital skills, and the development of skills are better viewed as in social practices. The five skills are:

- Operational and formal skills: skills to manipulate the technology in terms of both hardware and applications, services; to handle the structure digital media, managing browsing and navigating websites and use various menu layouts.
- Information and cognition skills: skills to analyse and evaluate online information, to evaluate the bias, authority and reliability of the sources and select the most useful information and synthesis resources.
- Communication and collaboration skills: skills to encode and decode messages to construct, understand, and to exchange meaning in all interactive applications;

understanding how particular rhetorics; to travel through diverse communities and being open-minded to multiple perspectives; to conduct teamwork with peers from different cultural backgrounds and work towards a common goal.

- Digital content creation skills- skills to create various formats of resources using a broad array of technologies, managing, constructing, remixing digital content creatively for new productions for sharing and disseminating information creatively.
- Strategic skills: skills to solve problems and work around the gaps in technological knowledge and skills, to make creative and critical decision-making about the use of digital tools and media.

It worth nothing that there are intersections among these skills, for example, producing content and synthesis information, and communication on the Internet involving use technology in an ethical manner (e.g., being aware of copyright issues) and in a safely manner (e.g., being aware of the potential risks).

Chapter 4 - Methodology

4.1 Introduction

To investigate the complexity of the transition of digital practices among Chinese international students and their experience, attitudes and skills, regarding using digital technologies for learning purposes, this chapter reports on the mixed methods design chosen for the study. The main study undertook a rigorous approach guided by the conceptual framework developed on the basis of existing literature and research (Chapter 3). The main study collected data from quantitative and qualitative sources, adopting a mixed-method design.

4.2 Research questions

Regardless of the existing body of research on digital skills as discussed in Chapter 2 and Chapter 3, little has written about facts regarding how Chinese international students experience technology for learning during the transition. With this in mind, the main research goal, drawing on Newman et al.'s (2003) classification, is to add to the knowledge base (on digital skills); to explore changes (digital practices and skills from Chinese international students' perspectives); and to generate implications. The main research goal leads to the main research objectives: to explore Chinese international students' experience with technology during their transition from undergraduate to Masters programmes, particularly those to do with academic purposes, and challenges occurred in digital practices during such transition, with three research questions identified as worthy of empirical study:

1. What are digital practices among Chinese international students during the transition from undergraduate study to master's studies?
2. How have Chinese international postgraduate students' digital skills developed during master's study?
3. How can Chinese international students be supported in enhancing their digital practices to adapt their learning in a UK university?

These research questions present a hierarchical nature which means that the first question necessitates a background picture related to participants' transitioning practices with digital technologies for learning. The first research question requires elements of

quantifying responses on multiple variables which, according to Onwuegbuzie and Leech (2006), is to present features of descriptive quantitative research questions. Building on the first research question, the second question appears to be more exploratory. It explores students' skills and experiences surrounding technology in more depth and it involves more qualitative research questions. The final research question attempts to provide reasons to explain differentiations in digital practices and skills so as to generate implications to support students' digital skills development. It is also a qualitative question, as it endeavours to gain an insight into some specific educational experiences within particular contexts (Connolly, 1998).

The ultimate intent of every research is to answer research questions, and mixed methods can provide useful means for investigating research questions (Tashakkori & Teddlie, 2003). The study adopted mixed methods research design.

4.3 The philosophical issues and research paradigm

The next section discusses the prevailing views of paradigms, the nature of the research and the rationale for using mixed methods in depth.

4.3.1 Prevailing views of paradigms and mixed methods approach

Establishing a philosophical foundation for carrying out research can be problematic, for there is no single way of understanding how to collect data or of making research robust and valid, and there are different paradigms used to discuss philosophical issues. Some researchers have understood philosophical foundation as epistemological and ontological assumptions (Bryman, 2012; Carey, 2009; Cohen, Manion & Morrison, 2011). Ontology concerns the essence of the social entities being studied (Cohen et al., 2011, p. 5; Bryman, 2012) - whether it is 'out there' or is 'created by own mind'. The former view of knowledge is associated with a 'realist' ontological position while the latter belongs to a 'nominalist' view. Epistemology is concerned with 'what should be regarded as acceptable knowledge in a discipline' (Bryman, 2012, p. 32). The position in which knowledge is 'hard, objective and tangible (Cohen et al., 2011, P. 6)' requires researchers to be 'positivist' with devotion to methods of natural science, while interpretivism can 'view the subject matter of the social sciences' (Cohen et al., 2011, p. 6; Bryman, 2012,

p. 28). Many researchers (e.g., Crotty, 1998, p. 10; Carey, 2009) argue that the ontological position is said to be typically linked to the epistemological position.

Creswell (2009, p. 6), on the other hand, used 'worldview' to mean 'a basic set of beliefs that guide action'. Creswell and Plano Clark (2011, p. 40) identified four types of worldview: 'post-positivism', 'constructivism', 'participatory' and 'pragmatism'. Accordingly, post-positivism often associates with quantitative research; constructivism and participatory research mainly involve qualitative research; and pragmatic research often involves both quantitative and qualitative data collection.

There have long been debates regarding the singular or universal approach to perceiving the world, versus the multiple or relative approach to viewing the world (Johnson, Onwuegbuzie & Turner, 2007). As Johnson et al. (2007) believe, this debate influences how a researcher views knowledge; what a researcher seeks and expects to find out, and also the way a researcher goes about exploring and justifying knowledge (Johnson et al., 2007).

For instance, Creswell and Plano Clark (2011, p. 41) articulated that the four worldviews ('post-positivism', 'constructivism', 'participatory' and 'pragmatism') differentiate in terms of the essence of reality (ontology) and how we build knowledge of what we know (epistemology). In addition, they have different implications of how we conduct research (methodology). Specifically, post-positivist is likely to 'view knowledge as singular'; constructivist seeks 'multiple perspectives from participants'; 'participatory researchers find reality is always negotiated and cast within a political context'.

However, holding the primary philosophy of the mixed method, a pragmatist attempts to understand knowledge both as singular and multiple positions (Creswell & Plano Clark, 2011, p. 41). Mixed methods research has been regarded as a response to the debate discussing the advantages and disadvantages of quantitative versus qualitative research (Feilzer, 2010), which is often referred to as 'paradigm wars' (Hammersley, 1992; Gage, 1989; Teddlie & Tashakkori, 2009). A quantitative approach often concerns attempts to examine cause-and-effect relationships, to find out whether there is a correlational relationship between variables, and to test the hypothesis stated (Creswell & Plano Clark,

2011). Qualitative approach often adopts an inductive ‘bottom-up’ method to research social reality, which presents the feature of ‘theory building’. The quantitative approach embodies the logic of reduction as ‘objective’ inquiry to social reality. Accordingly, the main paradigms that traditionally are presented as being opposed are those of positivism/postpositivism and constructivism/interpretivism (Creswell & Plano Clark, 2011).

Traditionally, reduction and induction are often regarded as ‘incompatible’ and are often associated with the debate as to which is superior to the other (Morgan, 2007). Researchers who believe that paradigms cannot or should not be mixed tend to use either a quantitative or qualitative approach (Smith, 1983; Rossman & Wilson, 1985). Those who adhere to a particular paradigm have posited an ‘incompatibility thesis’ (Howe, 1988, p. 10), and pointed out that there is no compatibility between quantitative and qualitative research because of the incommensurability between post-positivism and constructivism paradigms underlying the methods. Researchers who stick to quantitative methods endorse the objectivism of social science inquiry and appeal for rhetorical neutrality, and those who stick to qualitative methods advocate multiple-constructed realities and admit that research is value-bound (Johnson & Onwuegbuzie, 2004).

Researchers tried to close down the debate towards incompatibility of quantitative and qualitative research by pointing out the possibility of using both methods (e.g., Rossman & Wilson, 1985). Reichardt and Cook (1979, p. 11) appealed to program evaluators to integrate both quantitative and qualitative ‘methodological paradigms’ by stating ‘our view that the paradigmatic perspective which promotes this incompatibility between the method-types is in error’ and researchers ought not to limit themselves within either one of the paradigms if they could utilise the best from both. Credence to mixed methods research has also been given by researchers who have a strong qualitative background. For example, Lincoln and Guba (1985) recognised the potential for a naturalistic researcher to make the most of quantitative data. Lincoln and Guba (2005, p. 105) restated that mixed methodologies have the potential to ‘make perfectly good sense’ within each paradigm.

The formation of the ideas on using multiple research methods could date back to 1959, when Campbell and Fiske (1959) proposed the concept of ‘multiple operationalism’. ‘Multiple operationalism’ introduced the idea of ‘triangulation’, as coined and extended by Web et al. (1966). Mixed methods research was driven by a series of studies that used multiple methods, for instance, the combination of multiple quantitative methods in a study (Campbell & Fiske, 1959); the implementation of survey and fieldwork in sociology (Sieber, 1973), and the initiatives of triangulating quantitative and qualitative data (Patton, 1980).

Mixed method research is not notably superior to mono-method research and the paradigm wars are not entirely over. Mixed methods design draws on strengths of quantitative and qualitative research. If combined appropriately, they can be complementary. Crook and Campbell (1979) argued that highly quantitative studies are required to provide context wisely by drawing on some elements from narrative history (qualitative study). Besides, researchers justified the application of mixed methods research through pointing out several characteristics:

- (1) ‘methodological eclecticism’. This means that mixed methods researchers adopt the most suitable techniques from quantitative and qualitative approaches, and mix strategies to investigate a phenomenon (Hammersley, 1996, cited in Tashakkori & Teddlie, 2010, p. 8);
- (2) ‘paradigm pluralism’. This stands for the belief that ‘a variety of paradigms may serve as the underlying philosophy for mixed methods’ (Tashakkori & Teddlie, 2010, p. 9);
- (3) ‘continua’ but not dichotomies. This suggests that mixed methods research replaces the either-or option of the paradigm debate with ‘continua that describe a range of options from across the methodological spectrum’ (Tashakkori & Teddlie, 2010, p. 9).

Later on, mixed methods research has gained more prominence within educational research (Bryman, 2012). As Tashakkori and Teddlie (2003, p. x) pointed out, mixed

method research has evolved to the point where it can be deemed as a separate methodology, method, or approach to research with its own worldview and techniques.

4.3.2 The nature of the inquiry and the rationale of using Mixed Methods

For the purpose of this research, I build my philosophical views based on Creswell and Plano Clark's classification (2011). I adopted the pragmatism position, which was embraced as the best worldview for mixed methods research indicated by many researchers (e.g., Tashakkori & Teddlie, 2003; Creswell & Plano Clark, 2011). According to Howe (1998, p. 10), Pragmatism builds on pragmatic grounds and truth is 'what works'. Mixed methods research is defined as,

The type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the purpose of breadth and depth of understanding and corroboration (Johnson et al., 2007).

As an important concept in educational research, methodology is regarded as a 'way of thinking about studying social reality' (Strauss & Corbin, 1998, p. 3). Specifically, methodology provides a logical route to guide the research inquiry and the selection of methodology is largely determined by the research problems stated (Waring, 2012). According to Cohen, Manion and Morrison (2007, p. 78), 'research design is governed by the notion of "fitness for purpose". The purposes of the research determine the methodology and design of the research.' In other words, different research problems pave the way to different research approaches.

Mixed methods research combines quantitative and qualitative research methods, techniques and approaches within a single study (Johnson & Onwuegbuzie, 2004). The fundamentals of this new wave of methodology are the philosophical advances driven by scholars who argue to move beyond a quantitative versus qualitative debate, but work towards a paradigm that legitimizes empirical research choices. More specifically, instead of rejecting the discourses of either deduction or induction, advocates of mixed methods would turn predominately to the research questions stated. Such perspective is based on

abductive reasoning (Teddlie & Tashakkori, 2009), which addresses the ‘best’ understanding of the research problem or the ‘best’ inference to the explanation.

The above discussion indicates that research questions play an important role in deciding methodology. The overall purpose of this study is to make sense of how Chinese international students experience technology during the transition from undergraduate study to postgraduate study. Within this overarching aim, participants’ practices surrounding technologies, the relevance of their existing digital skills to the UK educational context and how they redefine their digital skills in order to adapt to the UK learning context is crucial for the researcher to understand the complexity of digital practices and associated skills among participants. Exploring these issues required a naturalistic research design that combines quantitative and qualitative research strategies.

Specifically, the research questions are associated with the transition of Chinese international students’ digital practices, thus suggesting the necessity to identify the overall picture of students’ experience with digital technologies for learning. A quantitative survey was designed to collect factual information about students’ ownership of digital devices, access to the Internet and overall patterns of technological uses for different activities (e.g., information seeking, communication), because a survey has the strength to describe general patterns among a large sample group (Creswell, 2009). The quantitative survey also includes Likert scale questions asking participants to report their perceived digital skills, and their beliefs about the usefulness of digital technologies as well as challenges of digital practices encountered.

However, it is possible that respondents not only interpret questions differently, but they also attach different explanatory value to the same answers (Feilzer, 2010). Therefore, in isolation, the survey itself would not have been sufficient to take account of respondents’ explicit meanings assigned to the items. Due to the limitations of tick-box, questionnaires cannot offer much insight in terms of interpreting findings (Greene, Benjamin & Goodyear, 2001). Moreover, questionnaires collect data based on participants’ self-evaluation of their skills in most situations (Kuhlemerier & Hemker, 2007), but a lack of references is unable to investigate research questions in depth. In response to this, in-depth interviews were designed to capture useful insights into the ways of how

participants respond to the standardized questionnaire on digital practices and digital skills. A quantitative survey was expected to offer a general picture of the research questions, and interviews provided more contextual understanding of the complexity of the research problem. Because digital skills development is a context based phenomenon (Talja, 2005), the study also employed mind maps that asked participants to sketch their uses of digital technologies to construct their own digital learning environment: 'day line' maps that describe their experience with technologies for studying and living within a typical day before the actual interview, and observations that demonstrate participants' digital skills.

Moreover, being a pragmatic researcher, I committed myself to uncertainty, acknowledging that causal relationships, structures and events that display patterns are flexible to shifts which rely on unpredictable occurrences (Mounce, 1997). Although I had the conceptual framework to guide the research, I was open-minded to unexpected variables emerging from interviews such as students' own motivations: beliefs about technological uses can influence their development of digital skills. In this sense, more weight is given to qualitative data, which is, to a great extent, formed by participants' own construction of the topic and the researcher's interpretation of their behaviors and subjective views.

Therefore, the rationale for this research design is 'offset' - neither qualitative nor quantitative research alone is sufficient to capture details of the situation (Chinese international students' digital practices and digital skills), therefore I am combining them to draw on the strengths of both (Bryman, 2006). Practically I collected data by the principle of 'what works' to address research questions. Mind maps and 'day line' methods helped to inform the interview questions, and interviews helped to identify participants and develop the process of observations.

Combining the quantitative questionnaire data, the in-depth interviews and contextual data from mind maps, day lines and observation can facilitate interpretation of different data sets. I analyzed different data sets separately in the first place, and then moved back and forth between data sets with the findings obtained from each one, and eventually brought them together to enable the interpretation of the data from a multidimensional

perspective. With all forms of data, I brought together a more comprehensive account of the inquiry, with each set informed, challenged and enhanced by the others. Besides, I was able to triangulate both quantitative and qualitative findings to seek corroboration and to reflect on the added value of combining quantitative and qualitative methods to address research questions (Bryman, 2006).

4.4 Research Design

The study adopted the convergent mixed methods design (Creswell & Plano Clark, 2011). The following sections discuss the research design of the study, which serves as a plan for the research process, including sampling strategy, data collection and data analyses.

4.4.1 The Convergent parallel design

The study employed a convergent parallel design (the kind of research design where quantitative data and qualitative data are collected during the same period, analysed separately and merged during the interpretation). To help with the description of the research procedure, a diagram is presented as below in Figure 10:

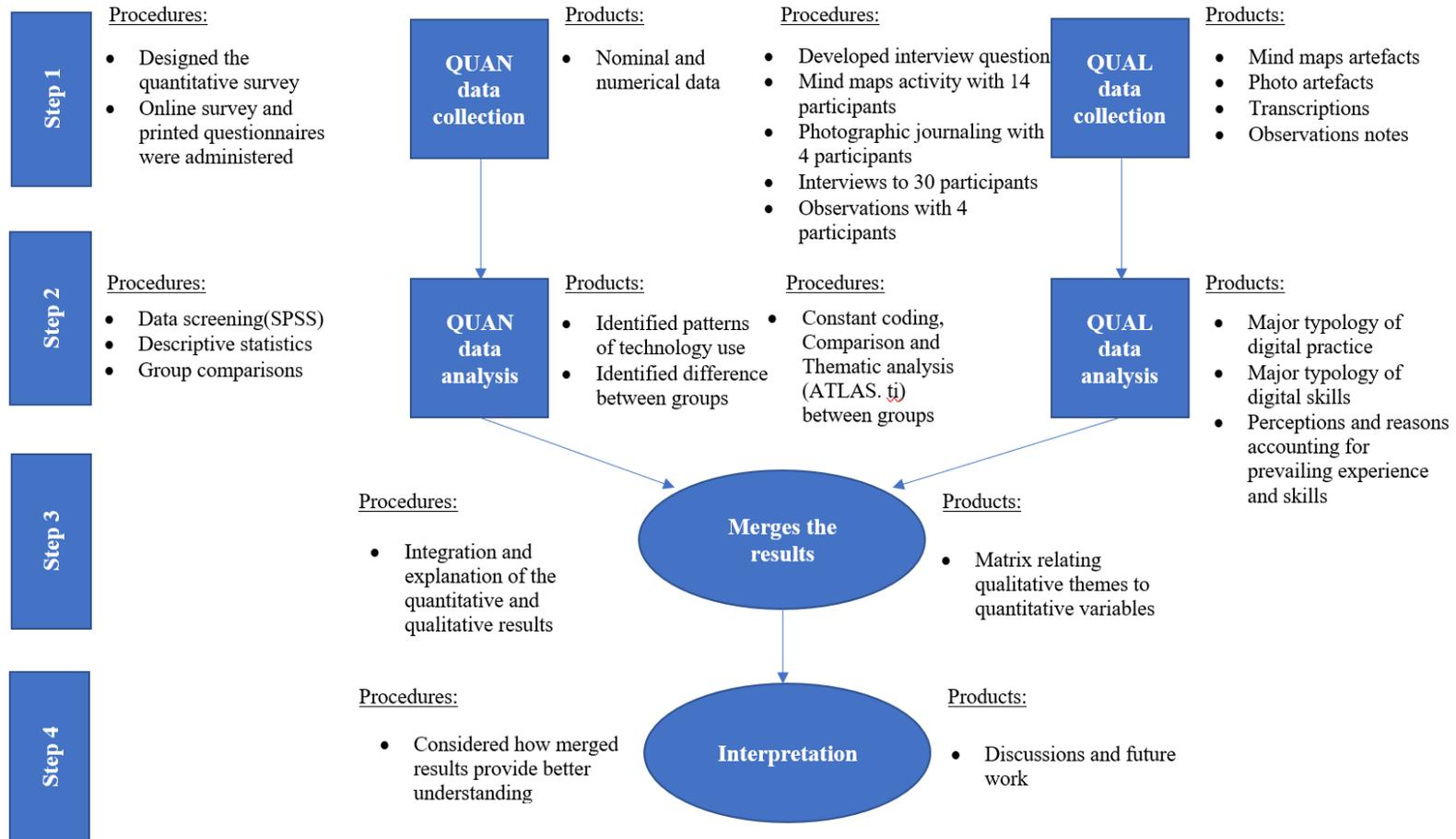


Figure 10: Data collection process

Figure 10 presents the process of data collection. The nature of the research questions suggests a simultaneous order of the quantitative and qualitative data collection, in order to build comprehensive understanding of the research problem. One important question which often arises during mixed methods research design is that the researcher must consider whether and how dominance is given to a particular method, that is, whether quantitative or qualitative is going to be prominent or both receive a balanced attention (Brannen, 2005).

Generally, in the convergent design, quantitative and qualitative data each provide a partial view, therefore both were given equal emphasis. However, more emphasis is given to the qualitative approach during this research. The research probes the digital practices and the development of Chinese international students' digital skills in their transitions from undergraduate study in China to postgraduate study in the UK academic culture. Such an exploratory nature of the inquiry requires more weight to be given to the qualitative data collection and analysis.

Notwithstanding this fact, the quantitative survey does not conflict with the nature of the inquiry. The survey was used to collect descriptive data on demographic information, overall patterns of ownership of digital devices, uses of technology for different learning purposes, methods of information evaluation, and self-perceived perception of Internet skills, as well as attitudes towards usefulness and barriers of using technology for learning. Much as Cohen et al. (2007) argued: 'surveys can be exploratory, in which no assumptions of models are postulated.' The survey of this study is mainly descriptive. The sample of the survey is larger than that of the interview, which helps to capture the overall patterns of technology uses and attitudes, while a qualitative approach provides insight into a more in-depth understanding which also accommodates extreme cases. It can be helpful to use data from both strands of findings in order to best understand research problems (Morse, 1991).

4.4.2 Data collection procedure

This section describes the overall procedure of the data collection. As discussed earlier, in the convergent design, quantitative and qualitative take place simultaneously. A

diagram that depicts the actual stages of data collections is presented as below in Figure 11.

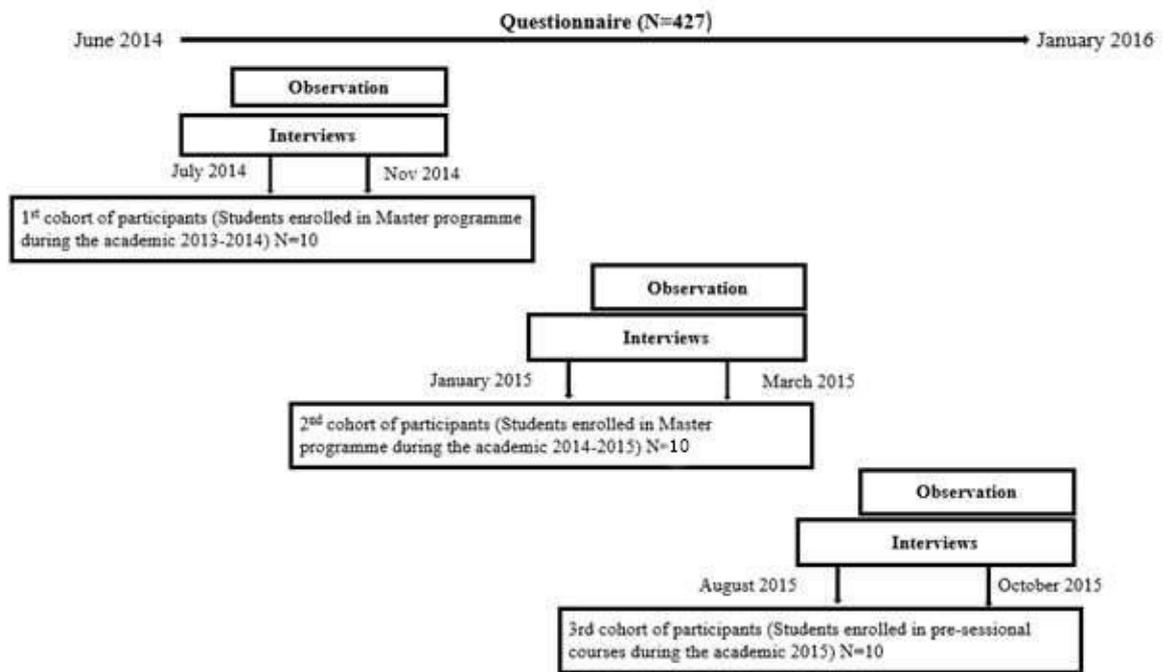


Figure 11: The overall procedure of data collection

Shown in Figure 11, the main study started in June 2014 after the pilot study, and finished in January 2016. The empirical research lasted 20 months. The survey was administered in June 2014, and closed by January 2016. In total, 427 participants completed the questionnaire. Interviews were broken down into three rounds, with each round recruiting students that had different lengths of studying experience for their postgraduate study.

The first round of interviews took place between July 2014 and November 2014, and 10 participants (enrolled in the 2013-2014 academic year) were involved. By the time of the interviews, they had completed around 9-10 months of their master's study and they were at the stage of writing their dissertations. The second round of interviews started from January 2015 and was finished by March 2015. Ten students (enrolled in the 2014-2015 academic year) participated and they had completed around four to six months of the master's programme. The third and last round of the interviews was carried out between August 2015 and October 2015, and 10 students took part. All of them were doing pre-sessional English courses at that time. During the gap between each round of interviews, I transcribed interviews, did primary data analysis and improved the interview schedule.

The next section reports the details of the data collection and data analysis of each approach.

4.5 Quantitative and Qualitative data collection

The next section reports the procedure of quantitative and qualitative data collection and data analysis.

4.5.1 Quantitative data collection method - Survey

A questionnaire was selected for quantitative data collection, because questionnaires can be easily administered and have the potential to collect data widely within a short time so as to allow the researcher to measure and describe generalized features of a large sample group as well as to gather standardized information (Newby, 2010). Moreover, surveys can be useful in terms of collecting factual information, data about attitudes, behaviours, opinions and experiences - both previous and current - therefore, integrating nominal data with participants' background and personal information with other scales such as attitudes (Aldridge & Levine, 2001).

The Questionnaire 'A Study into Development of Digital Skills among Chinese Postgraduate Students in Leicester University' was designed on the basis of the research inquiry. In order to improve the validity, the researcher drew on existing questionnaires that studied the same topic on digital skills and reviewed relevant literature. The questionnaire was piloted and developed, and the final version of the questionnaire can be seen in Appendix 1 (online questionnaire: English version) and Appendix 2 (printed questionnaire: Chinese version). Some questionnaire items (items 1.1-1.2; items 3.1-3.2) were adapted from an established survey - i.e., the 'Pelicans research project' based at the University of Leicester (<https://www2.le.ac.uk/departments/beyond-distance-research-alliance/projects/pelicans/pelicans-survey>). The questionnaire for 'Pelicans research' is also based on a PhD study conducted at Oxford. Item 4 to Item 7 were developed drawn on literature about digital skills, digital literacy and other forms of literacies. The below table maps out the link between indicators and aspects of conceptual framework, with indication of sources.

Aspect in conceptual framework	Indicators	Literature	Questionnaire Item number
Operational Skills	<p><i>Operating an Internet browser (indicators)</i></p> <ul style="list-style-type: none"> • Opening Websites by entering the URL in the browser’s location bar • Navigating forward and backward between pages using the browser buttons • Uploading files to websites or email • Saving files on the memory stick • Downloading music and files • Bookmarking websites <p><i>Operating internet-based search engines (indicators)</i></p> <ul style="list-style-type: none"> • Entering keywords in the proper field • Conducting the search operation • Opening search results in the search result lists <p><i>Operating internet-based forms (indicators)</i></p> <ul style="list-style-type: none"> • Submitting online forms/assignments 	Source: (van Deursen & van Dijk, 2011; van Deursen & van Dijk, 2014, p. 896).	Item 7
Formal skills	<p><i>Navigating on the Internet, by:</i></p> <ul style="list-style-type: none"> • Using hyperlinks embedded in different formats such as text and images. <p><i>Maintaining a sense of location while navigating on the Internet:</i></p> <ul style="list-style-type: none"> • Not becoming disoriented when navigating within a website. • Not becoming disoriented when opening and browsing through search results. 		
Communication /Collaboration skills	<p><i>‘Present’</i></p> <ul style="list-style-type: none"> • I have engaged with open publishing (i.e., I seek for the open publishing route like blogging to disseminate work). 	SCOUNL (2011)	Item 5
	<p><i>Online Identities:</i></p> <ul style="list-style-type: none"> • have online identities (i.e., I use different tools to creating discrete online presence, for example, I use Facebook to portray a part of my identities). • have a central place for my online identity (i.e., although my identity is distributed, there usually exists a central hub for distributed identities such as blog or aggregation service). • have cultivated an online network of peers (i.e., I usually engaged in a preferred social network such as blog and I regularly contribute to this network). 	Source: Weller (2011, p. 99)	Item 7

Information skills	<p>'Representation':</p> <ul style="list-style-type: none"> • use multiple resources to validate the information/data. <p>'Production':</p> <ul style="list-style-type: none"> • be aware of the influence of commercial elements upon online information (e.g., advertising/promotion/sponsorship). 	Source: Buckingham (2007)	
	<p>'Gather':</p> <ul style="list-style-type: none"> • find up-to-date information <p>'Evaluate':</p> <ul style="list-style-type: none"> • consider whether the views represented are facts (accurate) or personal opinions. • use citation metrics as an evaluation technique (e.g., citation counting, journal impact factor). • edit/peer view the work of colleagues and of my peers • assess authors' motivation/objectives for posting information and bias. 	Source: SCONUL (2011)	Item 4
	<ul style="list-style-type: none"> • selecting the appropriate website or search engine to seek information • searching for information using multiple keywords • selecting useful information on websites or from research results • evaluating the source of information found 	Source: (van Deursen & van Dijk, 2014, p. 896).	Item 7
Content creation skills	<p>'Appropriation':</p> <ul style="list-style-type: none"> • Remixing media content to produce a piece of work (e.g., making a slide/poster). 	Jenkins et al. (2006)	Item 7
	<ul style="list-style-type: none"> • I have created a range of informal output (i.e., I explore different forms of informal output such as video, podcast, slide cast and so on). • I create and share outputs (i.e., I share my presentations, ideas, suggestions or publication; such as using Slideshare to share my slides created). 	Weller (2011, p. 99)	
	<ul style="list-style-type: none"> • Citing resources using suitable referencing styles • Using other people's ideas/images with giving credit to the author • Citing resources using suitable referencing styles 	ACRL (2016) Ferrari (2013) Calvani et al. (2008)	Item 5
Strategic skills	<ul style="list-style-type: none"> • I have a developed personal learning environment from a range of tools (i.e., I developed a suite of preferred tools such as YouTube, Wikipedia and so forth for my learning based on my personal trial and error). • I use new technologies to support research (i.e., I adopt new technologies not only for personal basis but also to support professional practices, such as using Facebook to disseminate my online questionnaire). 	Weller (2011, p. 99)	Item 5

In total, there are 10 sections in the questionnaire. The questionnaire begins with a brief introduction to the research purpose. Questionnaire item 1 combines dichotomous and multiple questions that ask about participants' ownership of a set of digital devices and whether they use them to access the Internet separately for undergraduate study and postgraduate study - this provides background information about the research topic.

Questionnaire items 2.1.1 - 2.2.5 involve the use of Likert scale to rate how often participants use a range of digital devices described to carry out different learning-related activities (e.g., publication and dissemination; communication). Questionnaire items 3.1 - 3.2 employed Likert scale to explore the frequency of using listed methods to search for information and resources. Questionnaire items 4.1 - 4.2 used Likert scale to let students rate how often they conduct (conducted) a set of activities to evaluate online information separately for undergraduate study and postgraduate study. Questionnaire item 2 - 4 aim at collecting data on participants' patterns of technology use for different learning activities, and the translation of digital practices from undergraduate study to postgraduate study.

Questionnaire items 5 and 6 also used Likert scale to ask participants to rate how likely they are (were) to engage in the listed digital practices, and these two sections touch on the degree of engagement with digital technology for learning-related activities. Questionnaire items 7 and 8 applied Likert scale to explore participants' attitudes towards the usefulness of digital technologies for learning and the barriers of using digital technologies, items were developed based on Sharpe, Beetham and de Freitas, S. (2010). Questionnaire item 9 is an open-ended question which generates text-based data of participants' recommendations on how to cope with barriers of using technologies for learning. Lastly, Questionnaire item 10 asks for demographic information such as age, gender and discipline.

4.5.2 Qualitative data collection methods

The qualitative data collection used multiple methods, because the importance of informal learning spaces was stressed by researchers (e.g., Riddle, 2012; Ala-Mutka, 2009) for the gathering of evidence about digital practices in informal learning spaces.

To achieve this goal, photographic journaling and mind maps were used to collect additional data.

Photographic journaling

The use of photographic journaling was inspired by several works on social science methodologies and empirical study such as the Experience Sampling Method (Hektner, Schmidt & Csikszentmihalyi, 2007), the Day Reconstruction Method (Kahneman et al., 2004) and the Day Experience Method (Riddle & Arnold, 2007). Experience Sampling Method (ESM) was defined as a way of collecting data about context and content of participants' daily life. The purpose of ESM is often shared with other methods, but it is endowed with the unique ability to 'capture daily life as it is directly perceived from one moment to the next', thus providing opportunity to study the relationship between the 'external context and the contents of the mind' (Hektner et al., 2007 p. 6). As participants in ESM studies are prompted to provide responses regarding where they are, what they are doing and how they feel at several random points, ESM has the potential to generate a rich and intimate perspective on moments in a participant's life, while minimizing the distortions that influence the delayed recall as well as evaluation of experience (Hektner et al., 2007; Kahneman et al., 2004).

The implementation of this method was inspired by Riddle and Arnold (2007). I arranged a WeChat (instant messaging) group with participants. Specifically, with prior agreement with the participants, they were prompted at several random points by instant messages. If participants were doing study related activities, they were asked to use digital devices (mobile phones or tablets) to record their learning scenarios and the use of materials and devices they have at hand. Meanwhile, they needed to answer some questions at the time of the message, and those messages include: What time was it? Where were you? Who were you with? What were you doing? How did you feel about it? Participants were invited to share these with researchers. Four of the interview participants took part in this activity. Out of the interview participants, 4 participants have participated in the photographic journaling. The photographic journaling last for one month. Participants were invited to return message on a day each week. Out of these 4 participants, 3 replied all four messages and 1 replied three messages.

Mind maps

Mind maps were also used for qualitative data collection. Participants were invited to create two types of mind maps: one to map out the use of technology and ICT landscape that they use for educational purposes, the other to generate a day line map that describe participants' digital practices within a typical day. Participants were encouraged to provide appropriate details, such as rating the relevance of different technologies, and to write descriptions of how they use certain technologies for learning. Wheeldon (2011) explained that qualitative research serves as an important means to explore meaning through looking into the ways of how individuals construct and frame their accounts of knowledge, experience and perception. And for the depth of the qualitative data, mind maps may facilitate a more comprehensive reflection of experiences through enabling participants to develop the rehearsed narratives (Hathaway & Atkinson, 2003). Out of 30 interview participants, 14 participants have conducted mind maps activities. In total, 28 mind maps were collected (14 technology landscape and 14 day-line map).

Data from photographic journaling and mind maps were collected as a preparation for the interviews. Both the photographic journaling and mind maps demonstrated the potential to collect unsolicited data and provoked the interviewer at a later stage to investigate more in-depth responses. Reflected on the data collection procedure, some participants (e.g., P3) reflected that the use of mind maps has helped them to better recall and form their reflection of past experiences during the interviews. The next section describes the use of interviews as data a collection instrument for the study.

Interviews

The interview is one of the most widely used methods in qualitative research, and the research used semi-structured interviews. According to Cohen et al. (2007, p. 351), a semi-structured interview is regarded as a primary method to collect information that has a 'direct bearing on the research objectives' and it is often used to 'follow up unexpected results or to validate other methods, or to go deeper into the motivation of respondents and their reason for responding as they do.' Because of this, I conducted face-to-face semi-structured interview to elicit participants' viewpoints of the topic without pigeon-

holding the responses of those interviewed, and in turn semi-structured interviews allowed me to pick up unexpected things revealed by interviewees and so further probe for details. The interview was designed based on a fairly specific agenda to answer the research questions, and the preparation of the interview schedule involved translating research objectives into questions, mainly around the following aspects:

- the patterns/features of experiencing technology for learning during undergraduate study;
- the patterns/features of experiencing technology for learning during postgraduate study;
- the transition of using technology for learning purposes from undergraduate study to postgraduate study;
- the aspects of digital skills that have been developed during the postgraduate study;
- the challenges of using technology for learning and how they coped with these challenges;
- the factors/reasons that account for participants' different experiences and skills surrounding the use of technology for learning.

The interview schedule begins with demographic questions that ask about students' education background, undergraduate subject and postgraduate subject, the demographic area in China and IELTS exam results. The pilot study found that students use of digital tools varies according to differences in discipline between students, therefore the sequence of the interview questions was determined by the way in which questions were processed from general to more specific. In particular, participants were asked about their general studying experience such as the formats of the assignments and assessments, they were then asked to share their experience of using technology to study those activities, because one of the aims of the interview was to look into participants' transitions of digital practices.

In order to avoid participants' confusion of the study stage that interview questions referred to, participants were clearly informed that there were two main sections of the

interview During the first section, participants talked about their experience in undergraduate study; it was suggested they then move on to the second section discussing their postgraduate study. There were several cases where students compared undergraduate study to postgraduate study, but the overall storyline is based on chronological order.

Variables such as tutor's strategies and peer influence that may influence students' development of digital skills were noted down and were translated into understandable questions when designing the interview schedule (see Appendix 3). However, the interview schedule is not standardised and I did not have a fixed list of questions for interviews. This is because the aim of interviews was to elicit participants' descriptions of specific situations and behaviours related to digital practices and the associated skills rather than generalities. Therefore, the interview schedule was used to guide and facilitate discussion concerned in the research, while the interviewer was active through posing probing, specifying and interpreting questions to participants to expand further on their answers.

Observations

Direct observations with physical artifacts was used. Observation is useful to understand participants' actual uses of technology (Yin, 2009) and it has the potential to provide a comparatively realistic view of their Internet skills. I was able to observe 4 respondents when they had study events in the library, in their accommodation or in other informal learning spaces. During observations, participants gave me some access to their physical artefacts (technology devices, different versions of their assignments like PowerPoint and poster presentations) and demonstrated their uses with their devices. By asking participants to show me their assignments, issues of digital skills could be identified.

4.5.3 Pilot study

This is a short report of the pilot study conducted in November 2013. The purpose of carrying out a pilot study was multi-fold: to test the research instruments, to evaluate the possibility of gaining access to research participants, and to test the feasibility of the research. The pilot study used photographic journaling, questionnaire and focus group as

data collection methods. And focus group interviews incorporated the activities of drawing a mind map of participants' technological tool usage for academic purpose and a typical day description of their technologies uses, and a small test of the copyright licenses. Ethical approval was obtained for conducting the pilot study and University of Leicester ethical guidelines were followed.

Printed questionnaires were administrated from 10th of Nov to 25th of Nov, and 20 participants filled the questionnaire. Eleven out of 20 participants took part in the focus group interviews from 14th of Nov to 30th of Nov, and they were informed about how to conduct photographic journaling one week before the focus group interviews. Data from the questionnaire were entered into Microsoft Excel using descriptive data analysis, and data were presented using charts and graphs. Participants' who took part in the focus group interviews were anonymised and they are mentioned in this report using symbols I1, I2...I11. Focus group interviews were fully recorded, and transcribed. Data from the interviews were analysed using thematic analysis by noting down repeated themes. Participants' profiles were shown in the following two tables:

Table 4: The profile of the students that filled the questionnaire in the pilot study

Information of the students filled questionnaire (n=20)			
Respondent (R)	Gender	Age	Department
R1	Female	23	Museum Studies
R2	Male	24	Banking and Finance
R3	Female	22	Education
R4	Female	23	Media and Advertising
R5	Female	23	Mass Communication
R6	Female	23	Education
R7	Female	23	Mass Communication
R8	Female	23	Translation Studies
R9	Female	24	Education
R10	Female	28	Finance
R11	Female	23	Accounting and Finance
R12	Female	24	Mass Communication
R13	Female	23	Accounting and Finance
R14	Female	23	Mass Communication
R15	Female	22	Education
R16	Male	28	Business Analysis and Finance
R17	Female	21	Mass Communication
R18	Female	23	Finance
R19	Male	23	Education
R20	Female	23	Mass Communication

Table 5: The profile of the interviewees of the pilot study

I C	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10	I11
Age	22	23	22	23	23	21	23	23	23	24	23
Gender	F	M	F	F	F	F	F	F	F	F	F
Course (UG)											
TCEL	✓										
HR		✓									
CLL			✓				✓				
M&C				✓	✓						
PE news						✓					
TV news								✓			
Accounting									✓		
BE										✓	
Media											✓
Course (PG)											
E	✓	✓	✓							✓	
M&C				✓	✓	✓	✓	✓			✓
A&F									✓		

TCEL= the Teaching of Chinese to Foreigners

HR=Human Resources

CLL=Chinese Language & Literature

BE= Business English

E= Education

M&C=Media & Communication

Research question 1: What digital skills do Chinese international postgraduate students have when they start their Master's programme in a UK university?

Devices for accessing internet

The below figure is about participants' devices for accessing internet back home in China and in the UK.

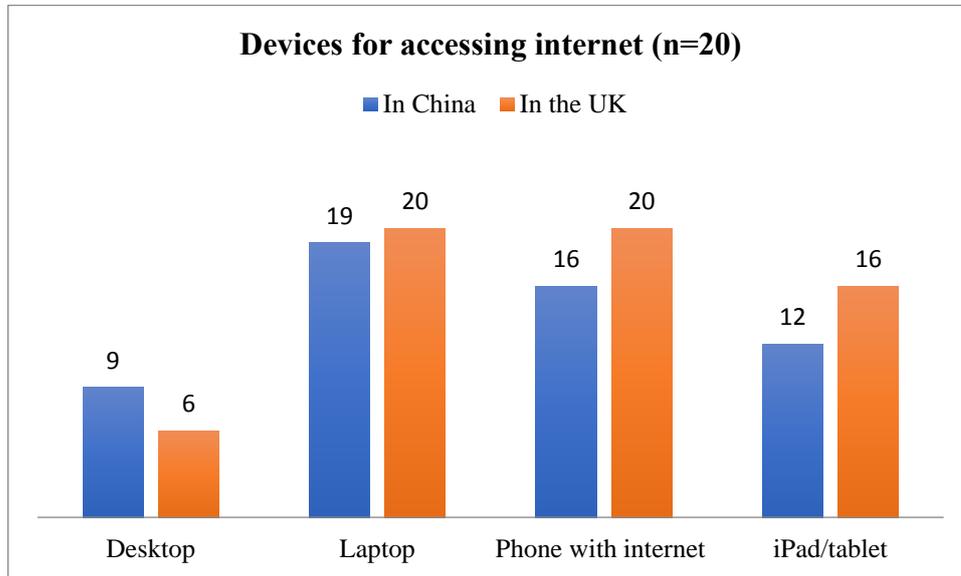


Figure 12: Devices for accessing internet -pilot study (n=20, questionnaire item 2.2)

Figure 12 reveals two points. First is that a significant majority of participants who took part in the pilot study have had access to digital devices for accessing the internet while they were already in China. The second point is that more of the participants have gained access to digital devices by the time the survey was conducted (midway through their first academic term). The number of people who use desktop computer has decreased. Participants' use of desktop was investigated during focus group study. The majority of the respondents (e.g., I5, I6, and I7) reported that they seldom use desktops in the library to carry out their assignments. I1 explained that she does not use the desktop in library often because she prefers typing on her laptop. I1 explained that she does not like using the desktop in library because the keyboard is hard that it slows down her typing speed. I3 said that she does not like using desktops in library because all the software is English version, so she needs to have an online dictionary at hand to check vocabulary and she feels it is time-consuming. And she added that the version of the Microsoft Word software is different from the one she has on her laptop, so it is confusing for her to use a desktop computer in the library. For the respondent I2, the lack of Chinese typing system on

library desktops make it difficult for him to search some Chinese related resources, but he managed to cope with it by downloading a ‘Sougou’ Chinese typing software. The statements here show students have difficulties in using university desktop due to English insufficiency; preferences and they also reflect how some students cope with these difficulties (e.g., downloading Chinese typing system on desktop). The main study will keep investigating students’ uses of university desktop and in-depth reasons behind this, and the main study will also look into how to help students to make use of the university facilitates like desktops.

Attitudes towards educational technologies

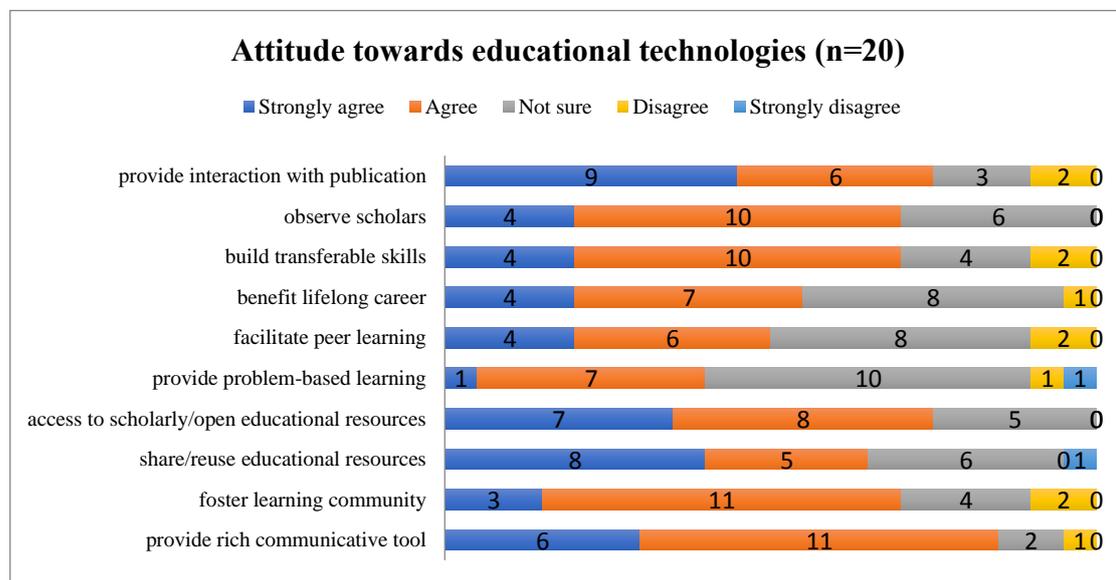


Figure 13: Attitude towards educational technologies-pilot study (n=20, questionnaire item 5.1)

Figure 13 shows that the overall attitudes towards usefulness of educational technologies are positive. Most of the participants agreed that educational technologies allow them to observe scholars’ work, foster a learning community, and so on. Students (e.g., I3) also hold critical views about the usefulness of technologies. I3 mentioned that technologies are only tools and it depends on what you use them for; if you use in them in the right way at the right time, then they can be beneficial for your learning; or it can be distractive too.

Digital skills among Chinese postgraduate students

The participants were asked to reflect on how they carried out their undergraduate assignments and assessments when they were back in China. This was to gain an insight into their digital skills before arriving in the UK. Different digital skills were found among students across different disciplines. For example, participants (e.g., I4, I5, I6, and I11) were from media background, and they had acquired the digital skills necessary for newspaper editing, Photoshop, and using software like 'Dayang'/ 'iMovie' to make advertising videos. Participant I2, from human resources background, was familiar with using databases to manage member's information. The mind map activities also reflected this: students are using technological web tool selectively to accomplish certain tasks.

Participants demonstrated that they use different approaches to manage their information. Although none of the interviewees knew about web tool that allow people to build their own personal online library like 'Mendeley', participants (e.g., I1, I3, I4, I9) used memory sticks to back up work on their assignments. And some (e.g., I2, I7) liked to send important files to their own email address because they can access the files anytime when they have access to the internet, and time shown on email can inform them about the time they finish the draft.

All the interviewees mentioned that they have more essays to do for Master's degree and they used different strategies to identify useful materials: search reading lists (I5); search articles based on similar research (I7); search information using key words (I2); use key journal articles using databases like 'science direct' in the field (I9).

Data on participants' information evaluation skills were also collected using the questionnaire:

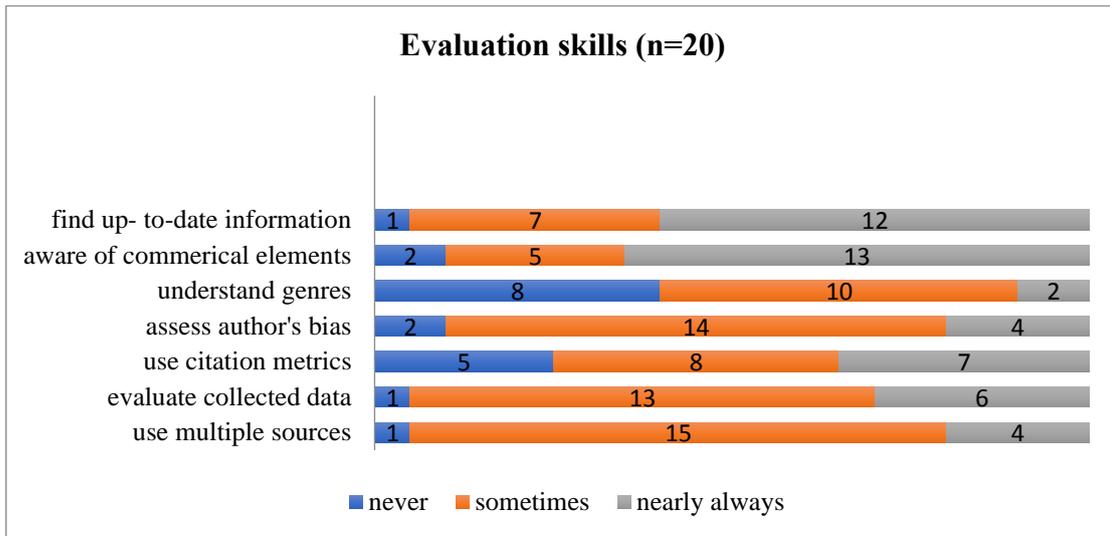


Figure 14: Evaluation skills – pilot study (n=20, questionnaire item 3.4)

Figure 14 uncovered that students often evaluate information by finding up-to-date information and assessing commercial elements, while they have less skills on understanding different genres and assessing author’s bias. The main study will continue to investigate students’ information evaluation skills and especially students’ knowledge about genres and their awareness of the author’s bias.

Research question 2: How have digital skills been developed among Chinese international postgraduate students during their Master’s programme in a UK university?

All the interviewees had around two months’ course experience since their enrolment. During the focus group interviews, most of the respondents (e.g., I2; I5) said that they were more reliant on internet and laptop for coursework since they started their course. VLE was not used while studying for a bachelor degree in China but now almost all the learning resources are on Blackboard and most of the communications with tutors are done through email. Interviews with participants showed that they need to adapt to this new digital learning environment.

Regarding the use of email, 9 out of the 11 interviewees said they have learned how to synchronise their university email accounts with their smart phones so that they can access emails from their mobile phones. I1 said that compared with their Chinese tutors back home, tutors at Leicester check email more frequently, and email is an efficient tool

to get feedback from tutors. However, I3 admitted that she feels obliged to check emails and Blackboard regularly because she was afraid of missing important messages. However, this new habit and receiving irrelevant emails messages distracts her attention on study. I8 agreed this and explained that she does not have mail pushup on phone to avoid distraction, but she formed a habit to check email every morning and evening. All participants agreed that the Master’s study here required strict adherence to referencing style, and they mentioned that plagiarism was a big concern for them. They had difficulty in understanding how to paraphrasing probably to avoid plagiarism. Some students from Education (I1, I2, I3) mentioned that they have learned Refwork to maintain and use references accurately.

Research question 3: What are the challenges of developing digital skills among Chinese international postgraduate students in a UK university?

Challenges found in questionnaire

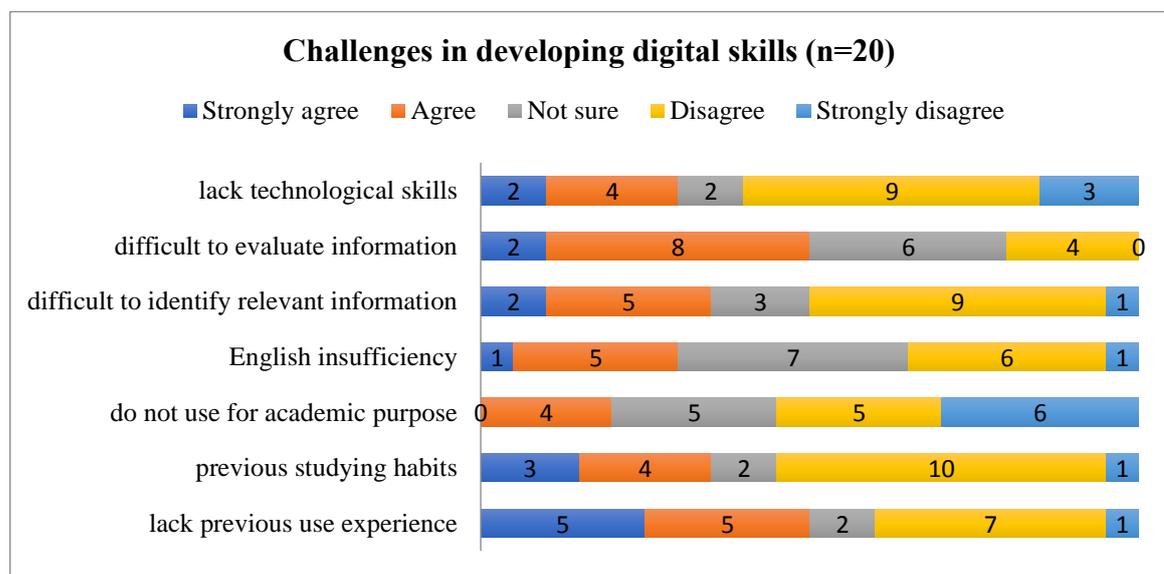


Figure 15: Difficulty in developing digital skills -pilot study (n=20, questionnaire item 5.2)

Figure 15 reveals that Chinese postgraduate students confront two main challenges in developing their digital skills are: lack previous use experience and lack of evaluative skills. Poor English language skills was highlighted by I6 who explained that she wanted to follow some academic people on twitter, but she cannot understand the language on Twitter messages and she has lost motivation to use Twitter. I8 also stated that she has

difficulty in understanding online English content when searching for academic articles so she used Google Chrome because it can show the web page in Chinese.

E-safety issues

Participants (I3, I5, and I11) discussed the e-safety in an unfamiliar online environment. I5 mentioned once she gave one online quiz application authorization of her QQ account and then her QQ account has been hacked and used for sending advertisements. I11 also described that a person from the same university wanted to add him to her Facebook friends list and later on started to ask her personal questions. E-safety was found to be an issue during the interview, and participants have shown that their understanding of this issue varied. The below figure shows the different types of information that the participants had on their profile and how they managed their online presence.

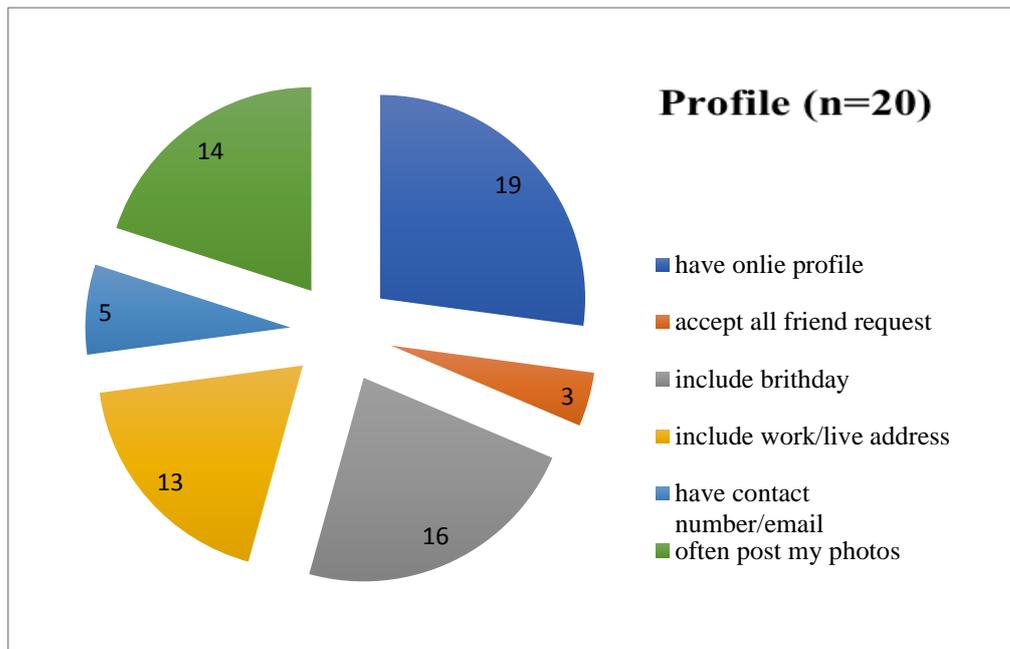


Figure 16: About participants' online profile-pilot study

Figure 16 revealed how participants manage their online profile. How to manage profile efficiently and safely remained to be a controversial issue during the focus group interview. I2 stated that it is better for people to include their education/work information and contact information more searchable, so they can have more job opportunities. While I3 argued that sometimes certain companies can take advantage of your information by sending advertisements to promote their products/services, and even sell your information

to a third party. Therefore, the main study will gain in-depth understanding of how students manage their online presence to their advantage and avoid online safety issues.

Concluding remarks

The pilot study shows Questionnaire and focus group were tested to be useful instruments for study. Pilot study found that the majority of the participants already had devices for accessing internet before they came to the UK; participants from different disciplines background had different digital skills before they started their Master's programme; participants have some challenges in developing digital skills like English insufficiency, and adoption to the new VLE; e-safety is an issue and participants have difficulty in manage profile safely and understanding intellectual property issues. The main study will look into these issues and investigate causes of these issues. The main study will include individual interview with around 10 university tutors to investigate what digital issues they have identified among Chinese postgraduate students group. And the main study will also include direct observation with physical artifacts to ask participants to demonstrate their digital device uses and to show their different versions of assignments. The main study will gain more in-depth understanding of digital skills and practices among Chinese postgraduate students to answer the last research question.

4.5.4 Main study- access to participants and sampling strategy

The procedural steps were guided by appropriate ethical principles (i.e., the University's Research Ethics Code of Practice). The application of ethical approval for the project was made through the University's ethics portal (<https://ethicsapp.le.ac.uk>) and was formally approved by reviewers. The target population is made up of students coming from Mainland China and studying postgraduate programmes at the University of Leicester, and the researcher used different strategies to access participants which are stated in the sections below.

Before administering the online survey, I became a member of the social networking group (i.e., QQ group and WeChat group) of the Chinese international students at the University of Leicester for a while. I sometimes answered new students' questions about life and study in order to leave an impression and also to make students feel that I was willing to help. The online questionnaire was administered from 11th of June 2014. I gave

a brief introduction to myself and a short description of the study together with the link to the online survey which was disseminated through the social networking groups. I also sent the link to the online survey individually to those who I had I chatted to before. At this stage, the sampling strategy I used was ‘convenience sampling’, which was based of the access to respondents (Cohen et al., 2007, p. 113).

After that, I invited six students that I had talked to online to take part in my interview, and four students agreed to arrange a time for the interview. Among these four students, one student (from the Management Department - P4 in the interview) kindly invited me to a dinner gathering with his friends. Through his introduction, I got to know more students at the dinner party and some of these took part in my research (i.e., P1, P2, P3, P5, P8, P10).

I asked about their background information such as their undergraduate university and their Masters subjects, either through face-to-face conversation or online communication. I took notes of this background information and I tried to determine which students could be put into a group for a focus group interview. To collect their background information and bring this for analysis is drawn on ethnographic tradition (Campbell & Gregor, 2002). At the same time, I was seeking their availability in order to arrange dates for interviews using WeChat. I conducted both focus group and individual interviews with these 10 students.

However, I experienced setbacks of the response rate of the online questionnaire - although there are hundreds of students on the Chinese social networking site, the response rate of the online survey was low. There were several times when participants replied saying that they were going to complete the questionnaire but, when checking back in the next few days, I found the number of people who actually completed the survey had not increased. I realised the challenge of collecting data without ‘actually knowing’ many people on the social network sites. After this I took more initiatives and approached students actively. I took small printed papers that described the study and included the link to the survey to the Student Union, library café and so on to access Chinese international students, asking for their help with the online survey and offering snacks and a cup of tea or coffee as incentives. The response rate increased but was still

low, although I expected students would be able to complete the online survey without difficulty as most of them had a laptop/desktop at hand. Nonetheless, on average only three out of 10 students completed the survey.

By February 2015, the online survey had collected 79 responses (eight months after launching it). During this period, I received some feedback for the online survey. Two students reported that they wanted to complete the online questionnaire, but there were technical issues with the online survey in the middle of the process which forced them to restart. One student mentioned that the survey could not be easily completed on the phone because there were a lot of questions.

Additionally, I had several opportunities to print out the survey and allow participants to complete it in my presence. Those participants had opportunities to ask questions if they did not understand the survey questions. It was found that, although participants were expected to understand the survey designed in English because they met the English requirement (IELTS text) to study in the UK, a few were checking a dictionary or asking for the meaning of some terms used in the survey. The pilot study didn't pick up these issues and this might be one of the reasons that students were unwilling to complete the survey. To solve this problem, the online survey was then translated into Chinese.

After translating the online survey, I printed out 100 copies and sent them to masters' students within my contacts, asking if they could help me to distribute the questionnaire to their roommates and classmates and share the link to the online survey if there were not enough printed questionnaires. 63 copies out of 100 printed questionnaires were collected back. I also 'recruited' an international student to help me to collect questionnaires at the price of one pound per questionnaire. She helped me to collect 28 questionnaires. Although I was eager to collect more responses, considering the project is self-sponsored, I could not carry on using this method to collect all questionnaires.

I discussed the issue of response rates for questionnaires with my supervisor, other colleagues at the University, other Chinese PhD students at the University, and a Chinese graduate who works for the English Language Teaching Unit (ELTU). They helped me to introduce the project to people within their contacts and through this 'snowballing'

strategy, more students were involved in the project, and participants for the second cohort of interviews were established. I followed almost the same thing with the second cohort interviews. For the last two rounds of the interviews I spent time and money on the arrangement and preparation of the interviews. I offered dinner or tea for participants if they were happy to be interviewed in my accommodation, or I offered to travel to their accommodation to conduct the interview.

In August 2015, Michelle (P28) invited me on a package tour to Cornwall which many of her Chinese friends would be attending. I regarded this as an extra opportunity for data collection. I went to Cornwall with them and managed to collect more survey responses. We rented a house near the sea and I interviewed some students during the night and established some contacts for interview after I came back to Leicester. During the interviews, I identified four informants who were willing to share their experience for the observation ('purposive sampling'). In the end (by January 2016), 409 valid survey responses had been collected, 30 students took part in the interviews. Among these 30 students, 14 students did mind maps, 4 students sent photography and 4 students took part in observations. This section reports the procedure of quantitative data analysis.

4.6 Quantitative data analysis

The data collection for the survey was finished in January 2016, and altogether 472 survey responses were returned. However, there are a number of surveys where students left many questions uncompleted, or they only ticked the option of the multiple questions for either undergraduate study or postgraduate study. I withdrew the data from these questionnaires, and in the end 409 responses were valid. A 'codebook' (Appendix 4 for example) was prepared to provide instructions to convert the information obtained from surveys into the format that Statistical Package for Social Science (SPSS) can recognise (Pallant, 2001).

Data collected from some questionnaire items such as Likert scale was pre-coded with numeric coding, and all data except open-text data were entered into SPSS and assigned to numerical codes in accordance to labels. The researcher scanned through the open-ended text and looked for common sense, and developed a coding scheme for open-ended data (see Appendix 5 for an example). Distinctive two-digit code 99 was given to non-

responses (a working example as shown in Figure 15), The SPSS sheet was completed in March 2016, and working examples are shown in the below figure:

The screenshot displays the SPSS Data Editor interface. The title bar reads 'data digital literacy mengjie.jiang.sav [DataSet1] - IBM SPSS Statistics Data Editor'. The menu bar includes File, Edit, View, Data, Transform, Analyze, Direct Marketing, Graphs, Utilities, Add-ons, Window, and Help. The toolbar contains various icons for file operations and analysis. The main window shows a data grid with 267 rows and 246 columns. The columns are labeled with question IDs and variable names, such as 'q.3.2.9.1. Interest in PG', 'q.3.2.9.2. Spe cify Interests te_PG', 'q.3.2.10. Cour sesites_PG', 'q.3.2.11. Enc ydopaedias_ PG', 'q.3.2.12. Othe r_PG', 'q.4.1.1. peerre view_UG', 'q.4.1.2. lastes tinfo_UG', 'q.4.1.3. perso nalopinions_UG', 'q.4.1.4. multip leresources_UG', 'q.4.1.5. authoi motivation_U G', 'q.4.1.6. commi ercial_UG', 'q.4.1.7. citatio n_UG', 'q.4.1.8. Other _UG', 'q.4.2.1. peerre view_PG', 'q.4.2.2. lastes tinfo_PG', and 'q.4.2.3. r'. The data cells contain categorical responses like 'SOMETIM...', 'NEVER', 'NEARLY A...', 'ALWAYS', and 'RARELY'. The status bar at the bottom indicates 'Data View' and 'Variable View' tabs, and 'Visible: 246 of 246 Variables'.

Figure 17: A worked example on SPSS-main study

As shown in figure 17, quantitative data was entered, cleared, sorted and modified onto SPSS sheet, the SPSS allows two ways of presenting data either with codes or with labels.

Descriptive statistics and description of data

Descriptive statistics was used, which involves neither inference nor predictions (Cohen et al., 2007). This is because the purpose of the survey is to investigate the overall patterns of digital practices. The descriptive statistics such as frequency, percentages and cross tabulations were performed in SPSS software. After descriptive data analysis, methods of data visualisation with the purpose of ‘fitness for audience (Cohen et al., 2011, p. 622) were planned as follows:

- Figures was created to show participants demographic information
- Frequency tables were generated to compare multiple responses, such as the percentage of cases who own different digital devices during undergraduate study
- Diverging stacked figure was used to present data collected from Likert scale
- Open-ended questionnaire items were coded and categorised into meaningful themes, and presented with histograms or tables.

Excel were used to visualise data, and two references, Guerrero (2010), Heiberger and Robbins (2014) provided technical help. Notably, the questionnaire involved a number of Likert scale questions, and I decided to use diverging stacked bar charts as the primary graphical display for data generated from such questions as recommended by Heiberger and Robbins (2014).

4.7 Qualitative data analysis

Qualitative data analysis has gone through a continuous and iterative process, which was suggested as three interactive concurrent flows of activities: ‘data condensation’, ‘data display’ and ‘conclusion drawing/verification’ (Miles et al., 2013). This section documents the process and methods of qualitative data analysis.

4.7.1 Data Processing and Preparation for analysis

Raw data (recordings, observation notes and visual maps) was organised and processed for the preparation of data analysis. First, all interviews were fully transcribed into text, formatted using word processing. Not all transcripts were translated into English, because it would have been very time-consuming. Additionally, as the interviews were conducted in Chinese, translating the transcripts into a second language may have resulted in the loss of important information. Observation notes were converted into write-ups. All qualitative data were organized into different folders, and an activity log (Appendix 6) was generated to document time and type of data collected from specific participants.

4.7.2 Initial data analysis

Having prepared data, I printed out all transcripts and started the initial data analysis. Firstly, I began with the ‘attribute coding’ (Miles et al., 2013) as the start of the data set, which basically means to notate the descriptive information such as demographic information of participants. An example is as below:

Participant (Pseudonym): Ye (P1)

Gender: Male

Age: 23

Geographic area in China: Chongqing

Undergraduate university and subject: He Hai University (English)

Working experience: No

Other overseas experience: No

IELTS: 7

Postgraduate subject: Translation

Data format: Focus group interview 1 of 2

Time frame: 21 June 2014

After the attribute coding, a table that specified participants' basic information was generated (Appendix 7). I then read through hard copies carefully, highlighting the important quotes, and making notes of any repetitions, similarities and contrasts in the transcripts which could be themes. These initial themes were as broad as 'digital practices in undergraduate study with technology', 'digital practices in postgraduate study', 'digital skills', 'digital issues' and 'factors in digital skills development'. The process of this initial data analysis enabled me to establish a general sense of the data.

After these steps, I attempted starting work with a small sample of transcripts, identifying codes (Weber, 1990). I thoroughly read nine interview scripts line by line, and wrote down the codes which could help to trigger deeper reflection on the meaning of data, as well as a table of themes with examples using word processing. However, when I tried to work with more interviews, I found it overwhelming to manage the transcripts and see the connection between codes manually.

4.7.3 Using software to manage data and the first cycle coding

Due to the above reason, I used the software ATLAS.ti to manage data. I converted transcriptions into rich text formats and then imported all transcripts into ATLAS.ti,

among which nine transcripts were ‘comments on’ transcripts. Meanwhile, images of mind maps and write-up notes were also imported into the software. After that, I started the first cycle coding with all transcripts on ATLAS.ti. The procedure of the first cycle coding was based on a ‘start list’ of coding based on conceptual framework and initial data analysis, while the researcher was open-minded to other codes emerging during the data analysis. Examples of coding on the software can be seen in Figure 18 and Figure 19:



Figure 18: Worked example of coding on ATLAS.ti

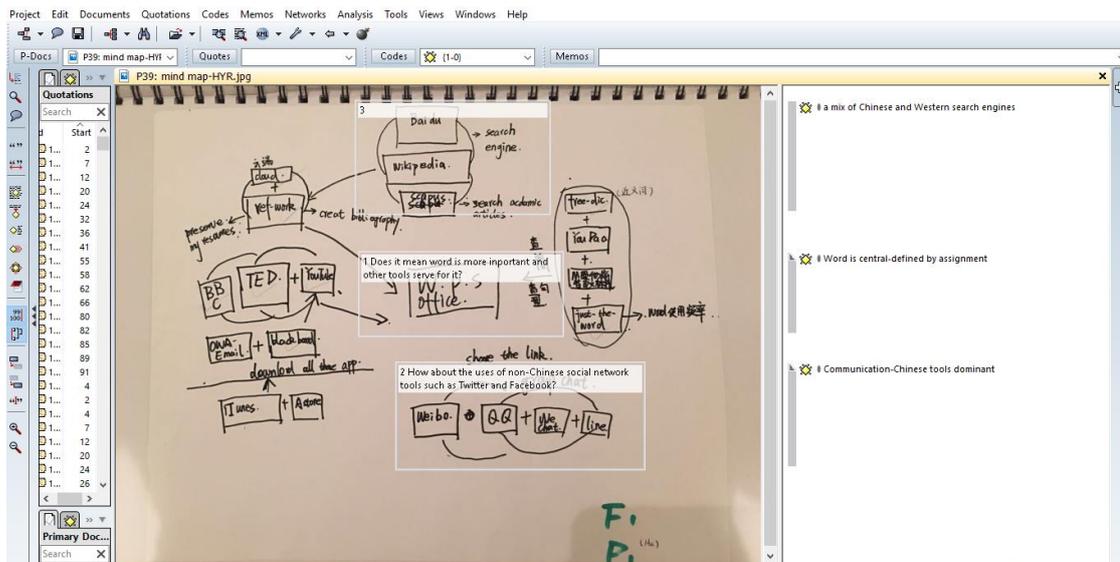


Figure 19: Worked example of coding on ATLAS.ti

Jottings, as an “analytic sticky note” (Emerson, Fretz & Shaw, 2011) was assigned to particular chunks of data and graphic data generated by mind maps. ATLAS.ti enabled the researcher to insert comments attached to specific chunks of data, for the purpose of pointing to the underlying issues of the data that deserved analytical attention. Some indicated connections (cross-reference) with other parts of data, and some suggested new data to pursue at the next contact.

4.7.4 Second cycle coding and data display

After the first coding cycle, the materials from the first cycle coding were pulled together, read and interpreted in a more meaningful way. I tried to condense large chunks of text into a smaller number of readable analytic units, and also to group the initial summaries into categories or constructs. After that, the researcher endeavored to create and disseminate the matrix and network displays of the qualitative data (Miles et al., 2013). To do that, Microsoft Word software was used to draw matrices to arrange data for easy viewing, which allowed detailed analysis and prepared for cross-cases analysis (Miles et al., 2013). In addition to that, codes network was explored through making connections among code, and identifying the ‘core variables’ that link other codes (Ezzy, 2002).

4.8 Ethical Considerations

The ethical appraisal framework developed by Stutchbury and Alison (2009) provided useful guidance in planning, analysing and reporting ethics in this research. Specifically, this section discusses ethical consideration with reference to this ethical grid (Stutchbury & Alison, 2009, p. 495-496).

4.8.1 Deontological ethical consideration: was the research done right?

Firstly, I discuss deontological ethical layer of the ethical grid, which concerns the question about whether the research was done right. The procedural steps were guided by appropriate ethical principles (i.e., the University’s Research Ethics Code of Practice), and ethical approval was approved before the project. In line with what was suggested by Bryman (2008), detailed information that discloses the objective of the study, participants’ involvement information and procedure of the data collection, as well as the disposal of the data, were provided in the research participants information sheet (Appendix 8) to make sure participants are informed of the whole research process, so as to let them make informed decisions of participation.

Additionally, the research was operated ‘in an open and honest manner with respect to the investigation’ (Denscombe, 2010, p. 335). At the beginning of the research, informed consent (Appendix 9) was requested from participants, and their participation was voluntary. Meanwhile, in order to protect participants’ interests, participants were ensured

of anonymity and data collected was kept confidential and would not be disclosed to any one that was irrelevant to the research.

4.8.2 Consequential ethical thinking: is the research worthwhile?

Consequential ethical layer encouraged the research to consider the consequences of the research for individuals, for particular groups of people and for the society. The study was believed to contribute to the knowledge on digital skills from international students' perspectives and bring potential benefits to Chinese international students and policy makers at the institutional level. In addition to these broad aspects, there were both potential positive and negative consequences on individual participants.

Specifically, the study provided an opportunity for students to reflect on their digital practices and to gain more knowledge about potential useful technologies that could be applied to their study. Moreover, some students actively took part in the research for the sake of knowing about how to conduct a research project so as to plan their own dissertation project.

While potential negative consequences cannot be ignored, for example, the initial plan for the interview was to track one cohort of students over a long period of time and interview them several times during different stages of their study (i.e., from the time when they started their master's programme to the time when they finished). However, this plan challenged the feasibility of the research when I went to the field. Firstly, when the study was implemented, the available students already had several months studying experience and I could not just wait and doing nothing for data collection.

Secondly, the study involved different data collection methods which require participants to contribute a number of hours, recruiting only one cohort of students may suffer from the risk of making them 'tired out', and either be absent or drop the study, because a number of students are mobile (travelling a lot) or return home after the submission of the dissertation. Therefore, I revised the data collection design into recruiting three different cohorts of student. Another issue which arose during the project relates to the uses of images and photos. Some participants were very sensitive to their privacy. I

therefore informed them that they did not need to include themselves in the photographs and I would not expose their identity.

4.8.3 Ecological ethical thinking: am I a responsible researcher?

Ecological ethical thinking involves the matter of ‘cultural sensitivity’. Because the researcher comes from the same cultural background, I was able understand when some potential participants expressed concern about whether the interview would be conducted in English, and regarding complexity of the interview questions. I answered their questions patiently, letting them know the interview would be pretty much like a chat or discussion about their study experience, rather than a test of their knowledge, and interview schedules were distributed to participants beforehand whenever necessary.

Meanwhile, sharing similar experiences with my participants, I briefly talked about my postgraduate study experience to elicit the interviewee’s perspective, and my familiarity with the context allowed me to understand participants making it beneficial to the research. Although someone may argue that this position might result in research bias, such attempts are not uncommon in social science research. Cohen et al. (2011, p.15) put forward that as a method of ‘dealing with the direct experience of people in specific contexts’, social science is regarded as a ‘subjective rather than objective undertaking’, therefore participants’ behaviours ought to be understood by ‘the researcher sharing their frame of reference’.

4.8.4 Relational ethical thinking: was the research conducted respectfully?

Relational ethical layer became evident during the research. At the early stage of the data collection, I attempted to establish ‘trust’ with students on the social network sites. However, I still encountered major setbacks in the collection of survey responses, which made me realise it is not feasible to collect data without establishing a relationship with some students. Therefore, I spent more time in the field approaching students, meeting students face to face, and talking to potential participants about my research. I also tried to be reciprocal to participants, for example, I participated in some students’ interviews or helped students with their assignments in an ethical way, for example suggesting some references, providing comments on their written assignment and proofreading their essays.

Notably, I found establishing relationships with some participants and being reciprocal to them helped me a lot when analysing and interpreting data. Because I showed my appreciation of students' valuable time spent on participating in the project and offered them help in turn, it led to an easier and more natural access to participants when I need to ask further questions and seek corroboration. In addition, during interviews, to avoid affecting their responses I did not justify participants' replies.

4.9 Reliability and Validity in mixed research

Validity, as a concept that has traditionally been viewed as quantitative, differs for quantitative and qualitative research (Dellinger & Leech, 2007). Quantitative validity stands for 'scores received from participants are meaningful indicators of the construct being measured' (Creswell & Plano Clark, 2011, p. 210). Researchers seeking content validity often 'judge items on a measurement instrument in terms of the specified domain being studied', criterion validity - whether the scores connect to some external standard, and construct validity - the instruments measure what they are designed to measure (Dellinger & Leech, 2007, p. 310).

Validity is a contentious issue for qualitative researchers. Lincoln and Guba (1985, cited in Dellinger & Leech, 2007) put forward the need to develop different criteria to assess qualitative validity, and these theorists developed the concept of trustworthiness, in correspondence to Campbell and Stanley's (1963) definition of internal validity, and applicability. Eisner (1991) further developed the word 'credibility' to stand for qualitative validity. Schwandt (2001) contended that qualitative validity is related to a particular context, circumstance, language system or worldview, which also referred to contextualization.

Onwuegbuzie and Johnson (2006, p. 48) recommended that validity of mixed methods research be referred to as 'legitimation'. Creswell and Plano Clark (2011, p. 239) defined the validity of mixed methods research as:

Employing strategies that address potential issues in data collection, data analysis and the interpretations that might compromise the merging or

connecting of the quantitative and qualitative strands of the study and the conclusion drawn from the combination.

Because mixed method research is associated with both quantitative and qualitative studies, particular types of validity checks need to be addressed for both strands (Creswell & Plano Clark, 2011). Several strategies were employed to maximize the reliability and validity of the study.

4.9.1 Data triangulation

As described before, due to the nature of the study and the need to answer research questions, the research integrated both quantitative and qualitative approaches. Multiple data collection instruments collected different strands of data, which allows data to be cross checked to look for convergence and corroboration of results.

4.9.2 Transferability and dependability

To establish transferability, a ‘thick description’ (Cohen et al., 2011, p. 538) detailed the context of technology use to let other researchers decide whether research findings can be transferred to similar contexts. As for the dependability, a detailed description of the methodological procedure and issues which arose during the project was documented, which allows for replication of the study, yet subject to the influence of the context.

4.9.3 Peer viewing and member checking

This is related to ‘inside-outside legitimation’ referred by Onwuegbuzie and Johnson (2006), which means the extent of the accuracy to which a researcher presents the insider’s view and the observer’s view. In social sciences, emic and etic stand for two types of research done and viewpoints collected. According to Currall and Towler (2003), emic refers to how ‘insider’ or local people to the system interpret and explain things. However, an etic approach realises that ‘insiders’ are often too involved in what they are doing to interpret the world, therefore an etic approach switches the focus from local organisation to what the research considers important, much like an ‘objective’ outsider studying the group.

Peer view is a useful strategy to obtain a justified etic viewpoint, and it involves working with other trained social science researchers outside the research project. I requested two qualitative researchers to examine codes and themes identified and also check the interpretations made. In addition, I presented my research at the department summer school and conferences, therefore it was reviewed by other researchers. Also, member checking or participant review was used as an important strategy to gain justified insider viewpoint. A summary of the findings was sent to participants in the project to let them examine whether findings were accurate reflections of their experience.

4.9.4 Introduction to the participates and the research site

The research was carried out in University of Leicester. University of Leicester is located in the East Midlands region of England. It was listed as the 32nd universities in the UK in 2017 according to the league table. It was considered as representative case of a UK university that has a good reputation both in the UK and abroad. According to the HSBC research, University of Leicester is considered as the most affordable University in Britain for first-year and second year students (<https://www.theguardian.com/money/2014/aug/14/cheapest-and-most-expensive-universities>).

The library holds over one million volumes and it provides extensive online resource. The University has around 14,000 computers at the campus. Moreover, students have access to group study room and wireless connectivity. It is considered as the most “socially inclusive of Britain’s top-20 learning universities”. According to the University website, there are over 25% international students at the campus (https://le.ac.uk/student-life/international-students/countries-list/asia/china?uol_r=d17a3218).

There are 30 students who are involved in the interview, and their profile is shown in Appendix 7. The information about online survey Participants can be seen from the below.



Figure 20: The profile of the survey participants

As it can be seen, 65% of the participants are female and 35% are male. The majority of the students (71.3%) are in the age group 20-24. Of the total participants, 16.7% of the student had working experience, and 82% of the participants did not have working experience.

Table 6: Profile of the survey participants for main study (N=409)

Demographic information of participants who filled questionnaire (N=409)					
The profile category	Sub-category	Number of respondents	Percent	Valid Percent	Missing data
PG discipline	MAIE	16	3.9%	4.0	13
	TESOL	5	1.2%	1.3	
	Media & Communication	122	29.8%	30.8	
	Museum studies	11	2.7%	2.8	
	Translation studies	3	0.7%	0.8	
	Modern Languages	2	0.5%	0.5	
	Law	4	1.0%	1.0	
	Business and Economics	195	47.7%	49.2	
	Mathematics	1	0.2%	0.3	
	Biosciences	2	0.5%	0.5	
	Chemistry	6	1.5%	1.5	
	Engineering	29	7.1%	7.3	
Study stage	Dissertation stage (enrolled in 2013)	22	5.4%	5.5	8
	Pre-sessional course (enrolled in 2014)	12	2.9%	3.0	
	Master programme (enrolled in 2014)	73	17.8%	18.2	
	Dissertation stage (enrolled in 2014)	91	22.2%	22.7	
	Master including pre-sessional course (enrolled in 2015)	203	49.6%	50.6	

Chapter 5 - Digital practices during the transition among Chinese international postgraduate students

5.1 Introduction

Chapters 5 to 7 report data analysis and findings to answer three research questions. Data analysis is based on data collected through the following methods: survey (n=409); photographic journaling (n=4); in-depth interview (n=30); mind maps (n=14); observation (n=4). This chapter reports sample students' experiences with digital tools, particularly in their learning during the transition from undergraduate study to postgraduate study. The findings reveal their prevailing digital practices. These insights will shed some light on the first research question – ‘What are digital practices among Chinese international students during the transition from undergraduate studies to postgraduate studies?’

5.2. Trend and nature of using digital technologies among Chinese international postgraduate students

Questionnaire item 1 asked participants to report their ownership of different digital devices for different levels of study (i.e., undergraduate and postgraduate study). The trend in ownership and uses of digital technologies is shown as in Table 7 below:

Table 7: Ownership of devices for undergraduate study and postgraduate study (n=409, questionnaire item 1).

Digital device	Number and percentage of respondents who owned it for undergraduate study	Number and percentage of respondents who owned it for postgraduate study
Desktop	221 (54%)	137 (33.5%)
Laptop	339 (82%)	350 (85.6%)
Digital camera	251 (61.4%)	131 (32%)
Phone with Internet	362 (88.5%)	358 (87.5%)
MP3 player/iPod	220 (53.8%)	135 (33.0%)
iPad/Tablet	313 (76.5%)	323 (79.0%)
Amazon Kindle/other e-reader	79 (19.3%)	166 (40.6%)
Gaming device	75 (18.3%)	73 (17.8%)

According to table 4, the percentage of participants who own a laptop, phone with Internet, iPad/Tablet, and gaming devices almost levelled off for undergraduate and postgraduate study. Three devices (i.e., laptop; phone with Internet; iPad/Tablet) have been the most popular tools among sample students since their undergraduate study. The ownership of an Amazon Kindle or other e-reader has increased from 19.3% to 40.6%, which indicates many of the participants began to use these during their postgraduate studies. The percentage of participants who owned a desktop or digital camera decreased from 54.0% to 33.5% and from 61.4% to 32.0% respectively. access to those devices to connect the Internet. For example, using a desktop provided by the library to access the Internet has been reported by interview respondents (e.g., P7).

5.3 Nature of using digital technologies and online services

Data for this section were investigated through in-depth interviews (n=30) and mind map activities (n=14). Themes for categorising the nature of using digital technologies and online services were identified based on activities conducted by participants when using these technologies and services. A description of the thematic analysis is provided in Appendix 10. The next section reports on the main rationale of digital practices among participants.

5.3.1 Rationale of digital practices

The rationale of using digital technologies comes down to six broad categories: (1) Information searching and management; (2) Communication and collaboration; (3) Participation; (4) Entertaining and online shopping; (5) Specific education/professional development and accomplishment of assignment; (6) Improving English.

Table 8: The nature of using digital technologies among research participants (n=30)

Rationale given for using digital tools/online services	Examples of Participants' descriptions	Examples of digital tools/online services
Information searching and management	<p>searching/finding information/academic journals;</p> <p>searching/finding for official data;</p> <p>searching/finding conceptual information;</p> <p>searching/finding learning resources;</p> <p>searching/finding reference;</p> <p>searching/finding course information and reading list. reading news</p>	<p>Sina Weibo (Sina Weibo is a Chinese microblogging website, which is akin to a hybrid of Twitter and Facebook. https://www.weibo.com);</p> <p>Google Scholar</p>
Communication and collaboration	<p>discussing and exchanging ideas;</p> <p>asking questions;</p> <p>sharing information;</p> <p>sharing links and news;</p> <p>sharing learning reflections;</p>	<p>Wechat;</p> <p>Facebook;</p> <p>WhatsApp;</p> <p>Dropbox</p>

	<p>making announcements;</p> <p>arranging face to face meetings;</p> <p>fostering a sense of community;</p> <p>exchanging files;</p> <p>uploading and sharing slides;</p> <p>commenting</p>	
Participation	<p>watching lectures/videos;</p> <p>learning subjects and gathering information;</p> <p>commenting;</p> <p>sharing resources;</p> <p>answering questions</p>	<p>YouTube;</p> <p>Coursera</p>
Entertaining and online shopping	<p>watching serials;</p> <p>listening to music;</p> <p>shopping online;</p> <p>buying books</p>	<p>Instagram;</p> <p>Amazon</p>
Specific educational purposes/completing assignments or tasks	<p>viewing seminars/making presentation slides;</p> <p>writing essays;</p> <p>making financial statements</p>	<p>Microsoft Package;</p> <p>Bloomberg</p> <p>Matlab</p>
Improving English	<p>translating;</p> <p>looking up vocabulary;</p> <p>searching for synonyms;</p> <p>searching for phrases;</p> <p>learning group on the WeChat;</p> <p>listening to Podcasts</p>	<p>Youdao dictionary;</p> <p>Podcast</p>

Table 8 describes main activities students are doing with Web technologies. It is worth noting that there are some overlapping aspects among different categories, due to the fact that the same digital tool can be used for different purposes. For example, YouTube has been used by participants for different purposes. P4 pointed out that:

I watch YouTube because I am interested in political topics so I watch political videos on YouTube. It is also related to my study. For example, when the tutor is talking something about management and if I do not understand those concepts very well, I then search them on the YouTube. I also found some lectures about them and watched them (P4, male, age 26, Management, line 346).

As shown in P4's case, YouTube is used to fulfil his personal and academic interests in politics. At the same time, he also regards YouTube as a useful tool to search for information and lectures related to his course. In another case, P3 specified using YouTube to improve English study. He reported that he seldom watched Chinese videos after he began to study a master's programme. He also said that he looks for online tutorials on YouTube if he does not know how to use a type of software (P3, male, age 24, Banking and Finance, line 348). Actually, improving English could be merged into the category of 'specific educational purposes'; however, it is listed as a separate category due to the importance participants placed on improving their English as this became an essential part of their postgraduate study and assessment.

5.4 Digital practices during the transition from undergraduate study to postgraduate study

This section concerns students' uses of technologies for information inquiry during the transition from undergraduate study to postgraduate study.

5.4.1. Experience with digital technologies for information inquiry



Figure 21: The transition of frequently used digital tools for information inquiry from undergraduate study to postgraduate study (n=30).

Figure 21 describes the major transition among participants in terms of using digital technologies for information searching and management. As it can be seen, for undergraduate study, the China National Knowledge Infrastructure ((CNKI, the primary national information construction project led by Tsinghua University) was reported as the dominant search engine for academic journals among participants.

In China, CNKI serves as the most important platform for storing China’s online intellectual output, including academic journals, conferences papers, dissertations and news, as a product of the Tongfang Knowledge Network in Beijing. During the interviews, the majority of the interviewees (n=25) reported using CNKI to search for resources when they had written assignments (e.g., essays), which was mainly driven by their undergraduate institutions. Because their undergraduate institutions had purchased

access to CNKI, students were allowed to download resources on CNKI for free by using their university account.

The Chinese search engine Baidu (n=25) was also reported as the most popular search engine used by sample students for undergraduate study. Apart from search engines, Baidu also provides community services such as Baidu Baike (a Chinese language collaborative online encyclopedia) and Baidu Knows (a Chinese language Web-based collective intelligence by question and answers).

Students also mentioned using other digital tools for the purposes of searching for information for undergraduate study, which included but was not limited to:

- (1) MBA lib (<http://www.mbalib.com/>, the most comprehensive Chinese online encyclopaedia on economics and business management, e.g., P4);
- (2) Wanfang database (<http://www.wanfangdata.com/>, a leading provider of electronic resources for China studies (e.g., P8, P17);
- (3) VIP information (<http://lib.cqvip.com/>, China's first Chinese journal literature database and China's largest self-built Chinese literature database); Wiser information (<http://www.wisers.com/en/>, the world's largest database of Chinese news and information, e.g., P24);
- (4) zhihu (<https://www.zhihu.com/>, a Chinese question-and-answer website in which questions are generated, answered, and edited by the community of its users, e.g., P22).

CNKI, Wangfang database, and VIP information were reported as being used primarily for the purposes of searching for academic journals (e.g., P20). While students' consultancy with other search engines (e.g., Baidu; Baidu Knows; Baidu Baike; Zhihu) tended to be more broad and diverse, including but not limited to searching for:

- (1) **Official data.** For example, P1 searched for data about Chinese tourism when writing his dissertation for undergraduate study in China (P1, male, age 23, Translation).

(2) **Background information, concepts and inspirations of new ideas for assignment.** P10 described that her undergraduate assignments included making cultural films, for example, she made a film about ‘Fenghuang’ (the name of an essay composed by the greatest modern Chinese writer-Shen Congwen; it is also a famous Chinese city, and former residence of Shen Congwen). P10 described that in order to make the film, she used Baidu to search for associated history resources (P10, female, age 23, Public Relations).

(3) **Practical solutions for certain questions.** This kind of practice is very obvious among students from a computer science background. For example, P5, who studied artificial intelligence for his undergraduate degree, reported people who study computer science like him are often described as ‘shut-in’ due to the fact that they seldom do anything apart from staying at home and surfing the Internet. He used to make computer programmes a lot and always kept his laptop switched on and looked for online solutions and codes for technical problems (P5, male, age 23, Management).

Compared with CNKI and Baidu, MBA lib and Wiser information gained less popularity among sample students, but these two platforms have different discipline focuses. For example, MBA lib was used more frequently among students from economics and business management backgrounds to search for subjective knowledge, news and research in the business domain (e.g., P4). While Wiser information is more well-known among students who are from a media background (e.g., P23).

About two thirds of the participants reported a lack of former experience with Google and Google Scholar before their postgraduate study, mainly due to the following reasons:

(1) **Lack of awareness.** About one third of the students did not know Google Scholar could be used to access scholarly literature during their undergraduate study (e.g., P1).

(2) Issue with access. Some students (n=6) reported they knew about Google and Google Scholar, however, it is difficult to use these websites in China due to political censorship. P3, P12 and P13 described that they could access Google and Google Scholar in China using VPN. However, VPN was not always stable: sometimes the web page required more time to load its content for material to pass through, while other times even the websites could not be opened (P12).

(3) Cultural aspect. Some participants (e.g., P16) pointed out CNKI and Baidu index more Chinese scholarly literature and news than Google and Google Scholar. Because he mainly searched for Chinese resources for undergraduate study in China he was dependent on Chinese language search engines.

Nevertheless, a small number of the sample students reported used Google (n=8) and Google scholar (n=6) for undergraduate study. There are several reasons accounting for this phenomenon:

(1) Different previous learning context. Wider learning context is one of the attributes leading to the differentiation in students' former experience. For example, P15 did his undergraduate study in the UK and he used Google a lot for his studying:

When encountering technical problems, Google is the most convenient tool. We often use laptop to make production. When I do not something, I use Google straightaway to search for solutions (P15, male, age 25, New Media).

In his case, P15 used Google as the main search engine because he did undergraduate study in the UK. In addition, he used Google Scholar to search for academic journals. He also had intensive experience with IEEE Xplore and Academic Search Premier (EBSCO), as provided on the university library website. In another instance, P24 (female, age 23, media and communication), who did an undergraduate degree in Macau University of Science and Technology, confessed that compared with people in Mainland China, people in Macau can use Western social media.

She could use western social media such as Facebook, Twitter, YouTube and Wikipedia, therefore she did not perceive much difficulty in adapting to Western social media. Moreover, P6 (female, age 23, Media and Communication) went to the United States for one semester in the exchange programme during her undergraduate study, and this experience helped her to adapt to the new online environment. It can be seen that students who had experience of studying in a context where there is more freedom with uses of websites and social media (e.g., on an overseas exchange programme) had used Google and Google Scholar.

(2) **Discipline and tutor influence.** Discipline and tutor influence were also discovered to have an effect. Students from hard science backgrounds tended to have more experience with Google.

This can be demonstrated by P12 (male, age 23, financial mathematics and computation, from telecommunication background) and P23 (male, age 23, computer science, from networking engineering background), who reported that they had to look up the open source websites in undergraduate study because Google contains more comprehensive open source data than the domestic site Baidu. It was easier for them to access open source data on Google and then modify the codes compared to Baidu.

Moreover, P23 stated that his tutors never used Baidu in teaching. Similarly, P5 (male, age 23, Management, from artificial intelligence background) also mentioned that he feels students who study computer science use Google more often than Baidu, and he stressed that Google is more suitable for students to search for codes. He reported that he used the default Hong Kong Google in China, and he used VPN to cross the firewall to search for computing resources, as he believed that Google provides better quality materials than Baidu.

Although the Virtual Learning Environment (VLE) such as Blackboard does not have the same search function as Google, students' adoption of Blackboard is evident, especially for the purpose of looking for course-related information. Blackboard serves as the main Virtual Learning Environment (VLE) in UK universities, however, only 5 out of 30

students reported that they used VLE for their undergraduate study in China. Some of these students mentioned uses of different VLEs in undergraduate study in China such as: Moodle (P5, male, age 23, Management), ‘Zhengfang’ Learning Management System (LMS) (P8, female, age 23, Translation). However, for P5 and P8, the uses of VLE during their undergraduate study in China was mainly restricted to selecting courses, submitting assignments and checking the outcome of their exams. Some students shared a critical perspective about the VLE used for undergraduate study, stating that sometimes the system crashed when they were trying to select the courses at the same time, and they found that the courses that interested them were no longer available soon after (e.g., P21, female, age 25, Media and Advertisement).

This highlighted the technical issue of the VLE used in Chinese universities that are often overwhelmed by the large student population. It can be seen that although a certain percentage of the participants have had former experience with VLE, most of this was very limited, and they did not have experience with the commonly used VLE in the UK (i.e., Blackboard). On the contrary, P26 (female, age 25, Media and Public relations), who did undergraduate study in Korea, had experience with Portal (“포털” - VLE used in her undergraduate study in Korea) in a similar way as she has for her postgraduate study (browsing course information and materials; submitting assignments; discussion).

P15 (male, age 25, New Media) also had experience with Blackboard previously because he did undergraduate study in the UK. Students described an apparent adoption of the blackboard for learning. Of the 30 students, 24 reported using Blackboard frequently for their postgraduate study. Most students held positive attitudes towards Blackboard, and some had downloaded the App of Blackboard onto their phone (e.g., P4, male, age 26, Management). However, some students also mentioned some issues when using Blackboard, such as:

- it lacks the interactive features of searching resources (e.g., P17, female, age 23, Media).
- the actual student lacks the motivation to use it (P16, male, age 27, Marketing).

Students' narratives confirmed an explicit transition of digital tools to search for information. For example, apart from those who already had experience with Google, most of the participants (n=24) started using Google to search for general information. Besides Google, Wikipedia has also been used widely among students (n=16), and was found useful to search for an explanation of certain concepts as well as references and links to useful literature (e.g., P6, female). In addition, 17 students reported starting to use Google Scholar during their postgraduate study, with a heavy reliance on Google Scholar for academic literature.

In addition to these, students also began to use tools that are provided by institutional and tutor factors. The University A-Z database received a wide recognition regarding its usefulness to search for academic resources, and some students are aware of the discipline-based databases, such as using Lexis to search for news (e.g., P10, female, age 23, Public Relations, line 265). Interestingly, there are cultural aspects attached to students' practices with digital tools for studying.

As observed, most of the participants did not stop using the Chinese search engines and CNKI as they adopted other digital tools. Some participants (n=6) reported that if they could not understand certain academic concepts or major events that were presented in English on the English search engines, they then try to search the key words in Chinese using Baidu or other search engines to get a better understanding. And some students still request resources from CNKI, as some of them are researching on China and are collecting Chinese cases for their essays.

5.4.2 Experience with digital technologies for communication and community participation during the transition

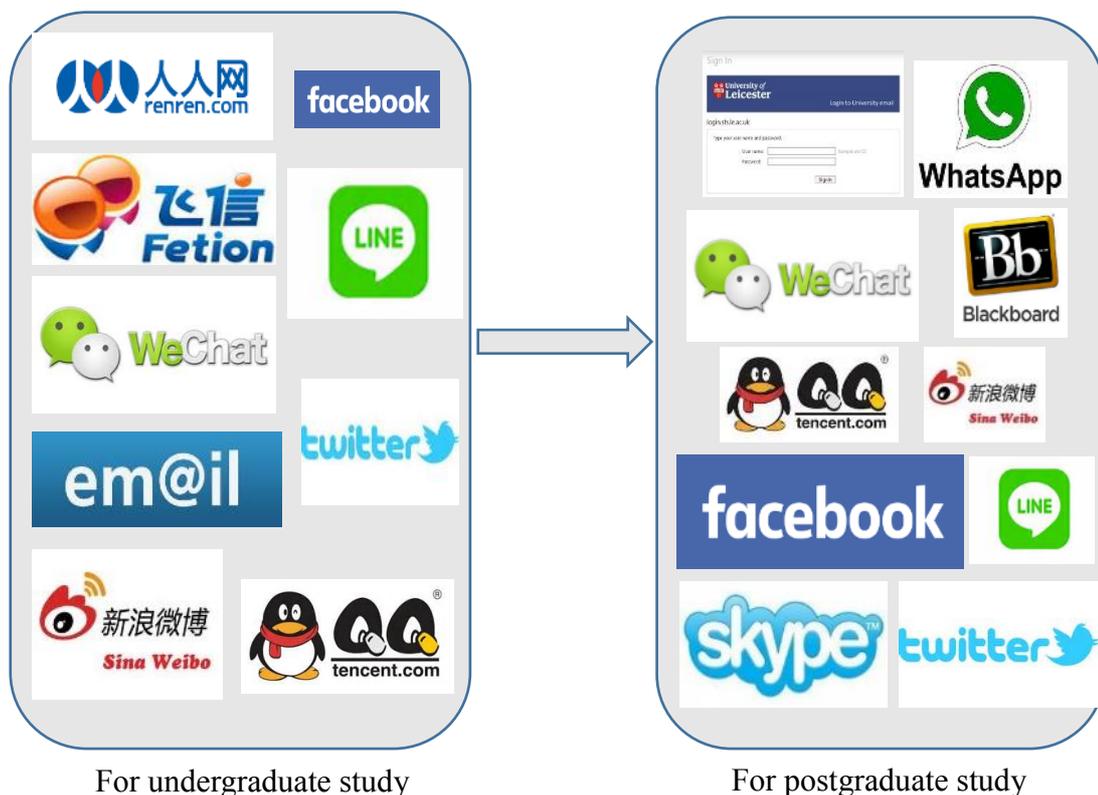


Figure 22: The transition of using digital tools for communication from undergraduate study to postgraduate study (n=30).

The study found evidence of transitions in using digital technologies for communication and community participation. Participation is an arguable term as people could participate in a variety of activities and social associations (Hague & Williamson, 2009), therefore defining participation is an issue of making value judgements. For the purpose of this research, the focus of participation is inspired by Hague and Williamson (2009), as placed on behaviours, knowledge, skills and understandings, represented by research students participating in the online environment socially, culturally, politically and economically in daily life. The main characteristics of community practices (the domain; the

community; and the practices) is used to help to distinguish whether students' practices belong to the category of participation.

5.4.3 Experiencing technologies for communication during the transition

The study found that for undergraduate study, students already demonstrated varying degrees of experience, skills and knowledge in relation to using digital technologies for communication and participation. However, in terms of the student-teacher interaction, most of the students reported that previously they did not use email to contact their tutor for undergraduate study in China. This was primarily because it was easier to access their tutor through face to face communication. Below are examples of statements from participants.

I usually went to the office to meet tutors. I feel undergraduate tutors did not have the habits of using email to communicate with students (P12, male, age 23, Financial Mathematics and Computation, line 63).

I communicated to my undergraduate tutors mainly through face to face (P7, female, age 23, Management Finance and Accounting, line 163).

Face to face, I think at that time, my Chinese tutors did not use email. Just face to face (P20, female, age 24, Data for business in technology, line 58).

Mainly face to face. I asked tutor questions when he/she was walking toward me. We hardly used email for communication. But only for the dissertation supervisor, I emailed him about my assignment (P8, female, age 23, Translation, line 92).

A small number of students had university email or the communal email during their undergraduate study in China. For example, P5 (male, age 23, management) stated that his undergraduate tutor shared slides through communal email and students used the same account to access slides. However, email was not often used to raise questions or to request feedback.

However, different from these students who described rarely having used email for communication with their tutor during undergraduate study, P2 often used email to communicate with her tutor during undergraduate study in China, because her tutor had overseas study experience, as described by P2:

Because I did not use Blackboard at that time, I sent my essays through email to my tutor. He shares slides through email. If he wanted to inform us about anything, he would have sent us an email. He did not use instant message to communicate with us but only email (P2, female, age 23, Translation, line 9-103).

During the interview with P2, it was discovered that her previous frequent use of email for communication was largely influenced by her tutor. Because her tutor had studied abroad before, he retained the habit of sending emails to his students. Likewise, tutor influence on the previous use of email during undergraduate study can also be found in the case of P24, who stated:

Most of the time, I asked questions face to face before or after the class time. Sometimes I also sent emails. My tutors [referring to the undergraduate tutors in Macau] liked sending emails and they also prefer students sending emails to them. They are very similar to UK tutors (P24, female, age 23, Media and Communication, line 81-85).

When asked about her undergraduate tutors, P24 stated that her undergraduate university often recruits tutors who have overseas qualifications or who graduated from Hong Kong. However, participants (n=19) noted that to email their tutors and course representatives to discuss studying issues or to arrange meetings is a more common practice in the UK (e.g., P28, female, age 22, TESOL). Two students reflected that email questions to tutors, rather than asking them face-to-face, helped them to overcome the problem of shyness, while some students (e.g., P10, female, age 23, Public Relations) also pointed out the issue that a quick response was expected by her but sometimes tutors are not able to provide prompt responses.

As mentioned before, due to the fact that most of the students did not use Blackboard for announcements during their undergraduate study, they used alternative digital technologies for announcements and participation. Two students (P4; P18) who had a few years of work experience, reported that they used to use Fetion (an instant messaging client developed by China Mobile) for announcements during undergraduate study. Most of the participants (n=22) mentioned using QQ (instant messaging software service developed by a Chinese company called Tencent Holdings Limited) for discussion, group sharing, publishing announcements and obtaining tutors' slides (e.g., P3; P6; P7; P9). For example, as P7 pointed out:

Because we did not have blackboard so the tutors upload their slides into the QQ group for sharing. We also had a communal email account, so the tutors either uploaded slides to the communal email or to the QQ group (P7, female, age 23, Management Finance and Accounting, line 186).

Likewise, P3 also mentioned that students sometimes used QQ for discussion after class and they had a QQ group where all classmates are in this group. They uploaded and shared some resources. Interestingly, when students were describing that previously they were using WeChat, QQ, Sina Weibo and Renren for communicating, exchanging ideas, sharing resources, some (e.g., P7) also used the word 'community' to describe their experience with these digital technologies, which indicates they had formed a sense of belonging on these social media through support from relationships with others. However, it cannot be ignored that face to face peer support is also important. Students sometimes use social networks for discussion to make up the physical distance, but they prefer to discuss face to face if there is no physical distance. For example, P9 stated:

I feel that we seldom discuss studying in the QQ group. If it is about studying, there were always several students discussing about the study privately and face to face. Because we were living on the campus, so everyone is close to each other. And for each accommodation room they might be a team leader. So, people could communication face to face easily and there is no necessity to discuss online. On QQ group, we have more communication when we have a distance from each

other. Because we could not meet face to face so we meet online (P9, female, age 23, Finance line 51).

P9 described the physical convenience for students of face to face discussion and communication during undergraduate study in China. In China, most undergraduate students live in dormitories on campus, usually sharing a room with four or six in bunk beds (Jin & Cortazzi, 2006). Students on the same course are also normally assigned to the same building or a building very nearby, therefore it is convenient for them to meet face to face. It seems that students who studied hard science in particular preferred face to face discussion, as pointed out by P5:

I used QQ. But more face to face. Very often we discussed in the accommodation. In addition, because we were studying hard science, so sometimes verbal explanation was not adequate and we may need to do demonstrations or deductions. For example, if I made a mistake when designing a programme and the programme did not work. I might need to get one classmate to help me with this problem by looking at these codes line by line (P5, male, age 23, Management, line 67).

Students (e.g., P5; P9) illustrated the reason for preferring face to face communication, and they also pointed out the Internet provides a means for communication over physical distance.

Experiencing technologies for participation during the transition

Additionally, in their words, students talked about their experience of being a community and of sharing a rich source of knowledge contributed by the community's members. Platforms such as Baidu Wenku, MBA lib, Zhihu and forums were frequently mentioned as spaces for community participation. For example, in China, Baidu library (Baidu Wenku) is a platform where Internet users are allowed to share content after being reviewed by Baidu, while Baidu itself does not edit or modify the content uploaded by Internet users. Some participants reported they read and download materials from Baidu Wenku, for example:

Sometimes I share my strategic plan or essays online, I do this most of the time for the purposes of getting credits in order to download more materials (P14, female, age 23, New Media, line 123).

Perhaps the purpose of contributing to Baidu Wenku is not totally imitative, but for the purpose of obtaining material, while to a certain degree P14's practices on Baidu Wenku can be regarded as a form of community participation. Similarly, Zhihu, a Chinese question-and-answer site in which questions are generated, answered and edited by the community of its users, was also mentioned by the interview participants. From P22's perspective, people can learn a lot of things on Zhihu, because users usually provided comprehensive, succinct answers, sometimes with examples, so that people from other disciplinary backgrounds could understand the answers. P28 also holds positive views about Zhihu:

I found there are many useful answers provided by competent people on Zhihu. On Zhihu, people ask questions and then there are other people who provide answers below the question. It is a real network of Q&A community. It enjoys a friendly and rational atmosphere. It connects elite people from all areas of life. They are sharing their expertise, experience and insights, and contributing to a high-quality platform (P28, female, age 22, TESOL, line 54).

It can be seen that for some students (e.g., P14; P28) the Chinese Zhihu act as a resource to access and export knowledge and insights into various topics. There are also examples where students subscribe to, or become members of, online forums or communities, which are frequently interest-driven, as a form of affiliation. For example, P23, from a networking engineering background, mentioned that the knowledge about computer science learnt during undergraduate study was not very in-depth, with most of the syllabus being basic knowledge. Therefore, he uses the forum a lot to learn codes because some computer experts publish some contents on the forum.

Cultural aspect of technology uses and social skills

The study also discovered some cultural aspects of using digital technologies for communication and participation. Compared with digital tools used for information

searches (such as Google and Google Scholar described in the above section) students' uptake of digital tools used mainly for communication (such as Facebook, Twitter and WhatsApp) are slower. Four students (P6; P15; P17; P24) had previously used Facebook. Sixteen students (e.g., P2; P6; P8) reported having registered Facebook accounts. Among them, five students (e.g., P19; P21; P22; P23) admitted not using it often after registering the account. Two students (P15; P24) mentioned having used Twitter before their master's programme. Eleven students reported having adopted Twitter during their master's study, and three students mentioned seldom using Twitter afterwards (P21; P22; P23).

The adoption of Google, Google Scholar, and library database and so on is mainly determined by the assessment and most of the students perceived the usefulness of these websites for their studies. However, less students regarded western dominant social networking sites as useful for study or reported frequent use of these tools. P15 who previously did his undergraduate study in the UK, reported frequent use of Facebook:

I have Facebook and other many accounts. But I often use certain social networks such as WeChat and Facebook. We often use them for groupwork. You can set up a group on Facebook and use it for discussion (P15, male, age 25, New media, line 63).

Because P15 did undergraduate study in the UK, he is more adapted to Facebook for discussion. There are also examples of students who did not have previous experience with certain Western social networking sites before postgraduate study but hold positive attitudes towards its uses, for example, P10 pointed out:

Facebook. It has some educational uses. For example, because it is an international environment, like we have Japanese, Hungarian students and students from other countries in the group. And they might not use Wechat, so we use Facebook and Messenger to discuss about the group assignment and arrange time for group meetings (P10, female, age 23, Public Relation, line 296).

In this case, P10 pointed out the educational value of Facebook in terms of discussing group work with her peers who use some different communicative tools. Additionally, in one photographic journaling activity, P12 (male, age 23, Financial Mathematics and Computation) replied that ‘it is nearly 1am, sorry for the late reply. I was finishing assignment alone in the accommodation. I had my laptop, phone and notebooks. My classmate messaged me to discuss questions. He is very hardworking and he motivated me.’ During the interview, P12 was invited to talk about how he discusses questions with his classmates. He reported that sometimes he shares photos about specific questions with one of his classmates; they distribute work and also make phone calls when necessary. Examples are shown below:

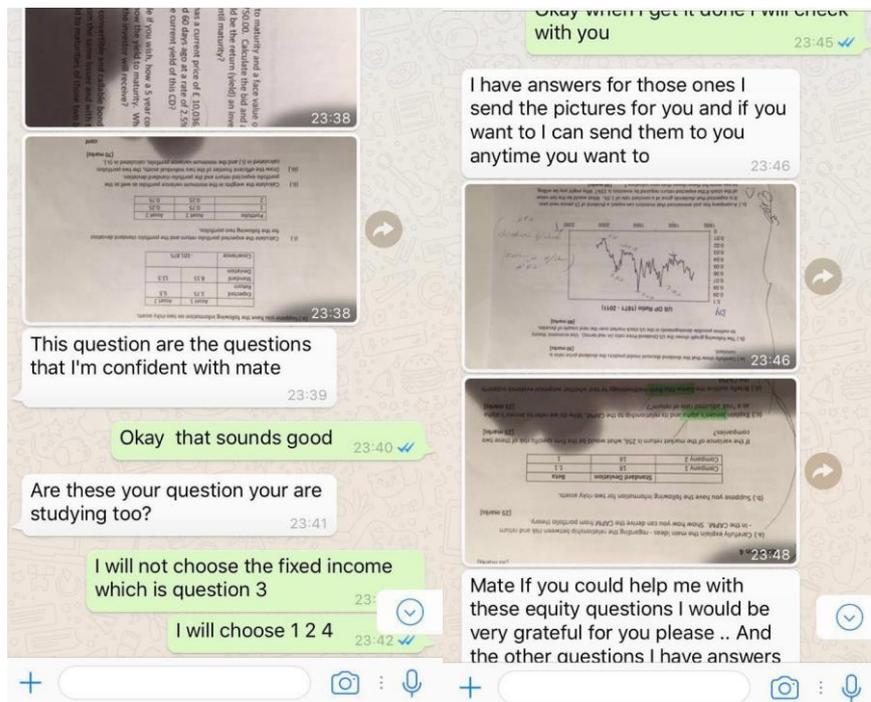


Figure 23: the example of using social network (e.g., WhatsApp) for discussion (P12)

From P12’s description, he did one group work with this peer and they added each other on WhatsApp to discuss group work. However, P12 seemed to have good social skills for interacting with other people, and he also showed a willingness to connect and respond to the discussion. Although P12 said that he was not in the same group for the following assignment with this classmate, they were still discussing course-related things on

WhatsApp. However, the majority of students are not able to foster or maintain intercultural communication with other overseas students, for example:

Sometimes we have interactions during the classroom. Most of time only Western students are answering questions. Chinese students keep quiet (P20, female, age 24, Data for Business in Technology, line 151).

P20 was asked why Chinese international students keep quiet. She said that she cannot fully understand what the teacher is saying, and therefore she lacks the ability to internalise the concept and participate the class. Normally she reads subject resources on her own after the class. There is also ‘problem class’ (tutorials organised by teaching assistants and PhD students) for students to ask questions. Because she is concerned with her ‘poor’ English and she is afraid of making simple mistakes, she normally asks the Chinese assistant questions. When asking her if she used Facebook for discussion with peers from other cultural background, she replied:

In terms of Facebook, we do not have many students enrolled in my course. I am not familiar with Western students; therefore, I seldom use it (P20, female, age 24, Data for Business in Technology, line 182).

A similar response was also heard from P16 (male, age 27, Marketing), who expressed that it took a few months to become used to the teaching being in English, and he did not manage to make friends with Western students due to anxiety about the assignment.

Meanwhile, students lack of use of tools such as Facebook and Twitter because they were accustomed to using Chinese equivalents. For example, P16 prefers to use WeChat because he is used to the functions it provides as it offers almost all the functions of different Apps under one roof, such as instant messaging, sharing photos, sending Red Packet and subscribing to official accounts. WeChat seems to offer more privacy than other social media as it only allows people in a user’s friendship group to view their ‘likes’, ‘comments’ and ‘moments’.

During the interview, it found most of interviewees do not manage to establish online opportunities to communicate with their peers from other cultural background. A large percentage of the students were still dependent on Chinese social media such as WeChat and QQ for their UK master's studies, due to the fact that these are commonly used tools in Chinese culture and these students contact their Chinese classmates more often than other overseas classmates. Some students had accounts for Facebook or WhatsApp, but did not use them frequently (e.g., P16; P24).

Such a lack use of Facebook and Twitter is also related to their social skills and their need for connection with other people. Some students (e.g., P19; P22; P23) reported that as they had not made many friends on Facebook and Twitter during the short period of their master's study, they rarely used these but remained active on Chinese equivalents such as WeChat and QQ.

P8 had another master's degree before her current postgraduate programme, and she described that she used to use Facebook a lot because she was connected to many foreign friends a year ago, but she seldom uses it this year because she does not have many friends on it. There are also students who mentioned cultural differences, and a lack of effort to socialise with classmates from other cultural backgrounds, for example, as pointed out by P14:

I attended a workshop about career seeking and the workshop tutor introduced some social media such as Linked in. I followed some people who are in the same field as me and I feel this tool is very professional and helpful. I think it is not easy to find a media job here in the UK due to the language deficiency and language is very important for media studies. For example, sometimes we were watching some video in the classroom. We saw the home students were laughing then we realize we missed a joke. Sometimes I did not understand the jokes but I just laugh when I see foreign students are laughing. There is something, cultural difference, which requires long time to get to know. I build my profile on the Linked in, but the companies that I keep an eye on are mostly Chinese company because I am going back to China to look for a job after finishing my degree. For the Facebook, we have a group. Because I did a course 'academic media' at the ELTU. There were 14 people in the group. The tutor named it as 'new media',

and we used it for discussion. I do not use it very often. There are too many Chinese students now in the university. So, I still use Wechat for communication as a dominant tool. And even some foreign students have been influenced by us to start using Wechat (P14, female, age 24, Media, line 172).

P14 described that cultural differences and language barriers are factors that challenged her to build intercultural understanding and communicate with peers from different backgrounds. Assigning Chinese students with students from other cultural backgrounds into the same study group may help with their communication, for example:

I think the intercultural understanding and communication skills with foreign students...just increase a little. Because they are so many Chinese students. But it is increasing...at least we have some foreign friends on Facebook. Also, we have groupwork, and we have foreign students in our group. We added all contacts on WhatsApp. We discuss things on it like distribute tasks...it kind of helped (P17, female, age 23, Media, line 118).

P17's statement indicates that to mix Chinese international students with other overseas students may help to accelerate the process of communication among students from different cultural backgrounds. In addition, some students held negative attitudes about the social networking sites, for example, P21 pointed out:

I did not register for any accounts such as Facebook and Twitter. Because I do not think they are useful for my study and they take up your time. I prefer to communicate face to face (P21, female, age 25, Media and Advertisement, line 222).

Therefore, it can be seen that students' uptake of communication tools is less common compared with those required by assignment. Participants' perception of the usefulness of social network sites, their social skills and willingness to connect with people can influence their online communication practice. Generally speaking, students felt their intercultural understanding had been slightly improved. Assigning Chinese students and other overseas students into a team may help with their mutual communication.

5.4.4 Experience with technologies for specific learning purposes/tasks during the transition

Questionnaire item 2.5 investigates the participants' uses of digital technologies for specific learning purposes/tasks for undergraduate study and postgraduate study. Responses to Likert-style belief statements were measured on a scale of 1-5 (1=never; 2=nearly; 3=sometimes; 4=nearly always; 5=always).

The alpha coefficient for the 11 items in this question is 0.735, suggesting the internal consistency of the 11 items is acceptable. Items for constructs around participants' frequency of using digital tools for a specific learning purpose for undergraduate study and for postgraduate study are shown below. Figure 24 and figure 25 are diverging stacked bar charts that consist of eleven 100% stacked charts. A central position is placed in the middle of the proportion that represents the percentage for 'sometimes'. The total percentages for 'nearly always' and 'always' are placed to the right of 'sometimes'. The total percentages for 'rarely' and 'never' are placed to the left of 'sometimes'.

Figure 24 describes the frequency of using digital tools for a specific learning purpose among Chinese international students during their undergraduate study. And figure 25 describes the frequency of using digital tools for specific learning purpose among Chinese international students during their postgraduate study.

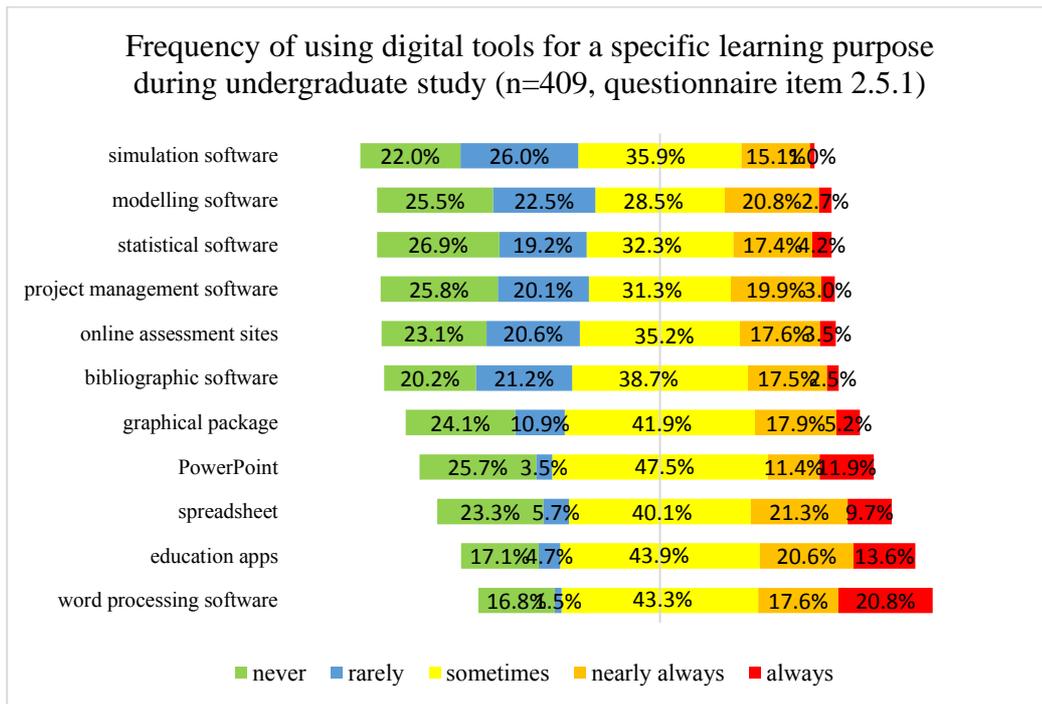


Figure 24: Frequency of using digital tools for a specific learning purpose during undergraduate study (n=409, questionnaire item 2.5.1, Cronbach alpha=0.735).

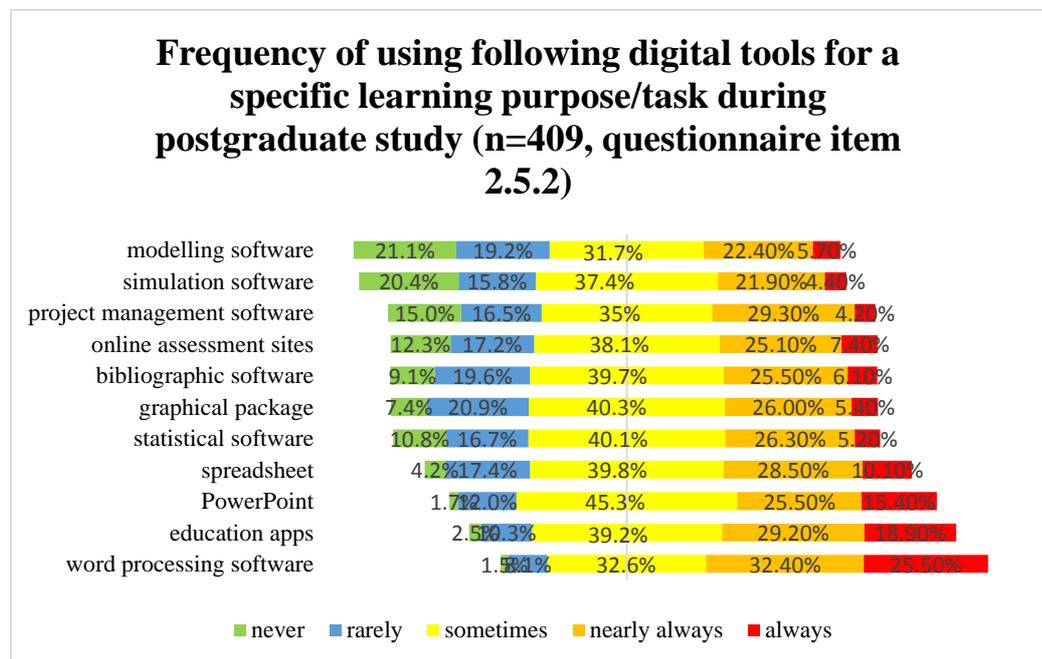


Figure 25: Frequency of using digital tools for a specific learning purpose during postgraduate study (n=409, questionnaire item 2.5.2).

From figure 24, it can be seen that a majority of students have used some software for specific learning tasks to a certain degree. For example, a number of students often used word processing for undergraduate study (17.6% nearly always and 20.8% always). There are also an unneglectable percentage of students (16.8%) who reported never having used word processing for undergraduate study. More students reported using word processing for postgraduate study (25.5% always and 32.4% nearly always). Educational apps also tended to be popular for students for postgraduate study (18.9% always and 29.2% nearly always).

The qualitative data found that most of the students had had experience with generic tools such as word processing, PowerPoint and Excel (e.g., P1; P2; P3) to do assignments since their undergraduate study. Most students are confident about their skills, but there are also specific examples in which participants encountered technical issues (reported in Chapter 6).

In addition, it was discovered that there are discipline differences in terms of using information and communication technologies for learning, for teaching and for accomplishing assignments. Based on the interviews, the figures below provide some examples about different experiences with digital tools based on different disciplines among participants. Figure 26 depicts software commonly used by students from media background for media production:

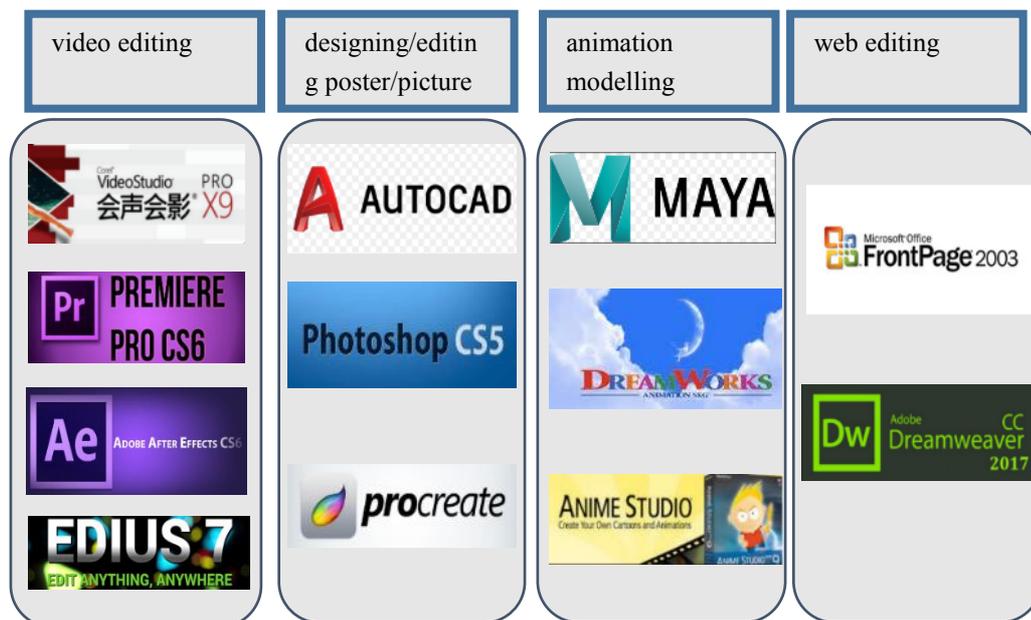


Figure 26: Digital technologies frequently used by students from media and communication study background (n=30).

Interview data revealed some specific digital practices among students who were from a media and communication study background. For example, P14 said that she had courses on web design, animation design, film making and broadcasting during the third year of her undergraduate study, and the assessments on these courses involved making media productions. She has made use of digital technologies such as Adobe Dreamweaver and Adobe Premiere to accomplish tasks. Likewise, others, from the same discipline also had experience of:

- editing photos/pictures and posters using Photoshop (e.g. P13, P17, P18);
- making, editing and remixing videos using tools such as Adobe Premiere (e.g. P15, P17, P18, P21), Adobe After Effects (e.g. P14, P15, P21), and Edius (e.g. P21);
- producing animations using ‘Dreamworks’ (<http://www.dreamworksanimation.com/>) and Maya 3D max (e.g. P14, P21);

- making electronic magazines using iebook (Chinese electronic journal platform, <http://www.iebook.cn/>) (e.g. P14);
- designing graphics using Adobe Illustrator (e.g., P18);
- using Procreate to draw digital paintings (e.g., P16).

It means that media students are more involved with activities for creation of production. There is also a range of Chinese tools used by students. These include the video making tool Ulead Video Studio ('Hui Sheng Hui Ying', the Chinese video editing tool, <http://www.huishenghuiying.com.cn/>, e.g., P11, P18), and 'Fangzheng Feiteng' (<http://www.cncrk.com/downinfo/53923.html>) for formatting electronic newspapers (e.g., P13). Some students from a media background also had a specific website to gain domain knowledge, a typical example is Mtime (<http://www.mtime.com/>). Mtime is similar to Internet Movie Database (IMDb), on which resources regarding movies are published. A few students (e.g., P4; P14; P21) reported referring to Mtime to see movie reviews written by well-known people and learn how to outline a movie. Some students (P16; P17; P18) also mentioned that during their undergraduate study, they had to collect certain templates and materials to construct their own libraries from certain sites such as Nipic (<http://www.nipic.com/index.html>) for future assignments. It indicates that Web 2.0 provides them with potentials for sharing resources.

The above section provides a picture of the technologies commonly used among students from a media background (e.g., P11; P15; P18). Interview found some students from a media background have used a range of technologies to design and produce media productions. For example, P15 made animation and shared it on the YouTube. While students from a 'hard' science background (e.g., computer science; telecommunication engineering) are proficient with different ranges of educational tools as demonstrated in the figure below:



Figure 27: Digital technologies frequently used by students from computer science and telecommunication backgrounds (n=30).

According to Figure 27, students from computer science and telecommunication backgrounds had more digital experience with computer programming and coding, and those students (e.g., P5, P14, P20) who were from a science background mentioned making programmes as a form of previous assessment during their undergraduate study. For example, P23 described that he used the Linux operating system and C language to do some assignments and also ‘C++’ and ‘Microsoft Visual Studio’ to create programmes. P23 described that sometimes after he finished the programme making, he archived the assignment and sent it to the undergraduate tutor, and then the tutor could run it on the server.

Some students were also required to submit products to be assessed, for example, P11 from a telecommunication background, had to design and make single chip microcomputers (SCMs). Additionally, P20 described how she used different software for doing a specific assignment,

I used MATLAB. It can be used for calculation or simulation. But for the purpose of the undergraduate study [she did telecommunication for undergraduate study], I mainly used it as a filter to eliminate noise. And there is a software called Proteus, I used it to draw and simulate circuits before welding them (P20, female, age 24, Data for Business in Technology, line 17).

Students from a business background reported more experience with education simulations. For example, three interviewees (P3; P7; P25) reported prior experience with simulation software for learning:

Simulation. I have participated in the simulated stock competition before in the Chinese university. It was a society activity. People who won could get an award. There was a simulated software.... different people registered software and constructed their accounts and edited their profile... We had virtual money like 5 million yuan... Then after two months, they checked the account and see who has got the most money (P3, male, age 24, Banking and Finance, line 352).

I had experience with ERP (Enterprise resource planning) software. It is like a simulation, and it is very similar to the Monopoly. You have the factory houses and so on. It was quite useful and helpful (P7, female, age 23, Management Finance and Accounting, line 201).

P3 had experience with simulation because he took part in a competition event held by a society during his undergraduate study. P7 and P25 also used simulation as part of their coursework activity. For example, P7 had experience with ERP (Enterprise resource planning) software during undergraduate study. From his viewpoint, ERP software is very playful and useful. P5 did not use simulation for undergraduate study but he has encountered it during postgraduate study:

We used a simulation...that is the assignment for marketing. The tutor divide the class into different groups...each group would be formed by around three people and they run a company virtually together. We need to consider...for example...we decided to sell backpack bags...we need to consider how many

bags to produce and whom would be the targeted consumers. It is like a competition. We compare to see who sell the most of the products then that group would win. Each group has an account for the company. We discuss about the strategy together and operate the company together. We discussed questions like: what to produce? what to sell? How to design the products? how to advertise? and so on. We would be warned by tips of the game. On every class for every week, the tutor would report all the situation of different companies during the class like the rankings of different companies. And the tutor would use some companies as good examples to explain what are the strategies that they have used, and also provide some feedback for other companies which are not in good situations (P5, male, age 23, Management, line 164).

From the qualitative data, it can be seen that simulation usage seems to be more common in business and marketing courses. These three students (P3; P5 and P7) all hold positive attitudes towards simulation games in terms of providing users with experience in developing strategies, team building and decision-making skills as well as its playfulness. Additionally, P7, from a linguistic background had experience with a computer software package named 'Praat' to analyze speech in phonetics and research dialects and to type the international phonetic system.

In addition, some students also reported previous uses of statistical software for assignments, such as Excel (e.g., P3; P4; P7; P11; P22; P25; P27) and E-views (e.g., P3; P4). Most of these students are from a finance and business background. As it can be seen, there are discipline-based practices among participants. As shown in Appendix 7, most of the participants carried on to study the same or similar subjects, and a small number selected a different major for postgraduate study. For example, P5 did 'Artificial Intelligence' for undergraduate study but selected 'Management' for postgraduate study. P6 did 'Teaching Chinese as a foreign language' for undergraduate study and 'Media and Communication' for postgraduate study.

On one hand, students build on their previous knowledge towards certain technologies and carry on the same practices. On the other hand, students' transitions of digital practices in relation to a specific learning task is largely defined by assignments and

assessments. Generally speaking, some students (e.g., P6; P13; P14; P15) doing postgraduate study in Media and Communication reached a consensus that undergraduate study tended to be more practical, which required them to create certain media products, while postgraduate study involves more research.

Therefore, most of them (e.g., P6; P13; P15) engaged more frequently with those technologies they used to accomplish an assignment (such as using word processing to write a piece of an essay, or using PowerPoint/Prezi to make slides) during postgraduate study, while their practice of making videos or other media production became more interest-driven.

5.4.5 Experience with digital technologies for improving English during the transition

This chapter regards the uses of technologies to improve English as a separate theme because English studying was reported as an integral part of participants' postgraduate study and many of them made efforts to overcome the language barrier. The interviews found that students had previously used a lot of methods to learn English before the master's programme, such as:

- Listening to Podcast (e.g., global news; BBC news; CNN). For example, P6 downloaded a Chinese app called 'Lan Ren Ting Shu' onto the phone and used it to listen to audios of English novels and essays.
- Participating in online forums. For example, P11 mentioned the Pute (<http://forum.putclub.com/>) website for downloading learning materials and doing online quizzes.
- Reading newspapers, magazines and watching movies (e.g., P1; P28).
- Watching open online courses or online lectures (e.g., P1; P2).
- Using blogs (e.g., P25).
- Using mobile Apps (e.g., P22).

There are examples of students using digital tools to enhance productivity of English learning, as pointed out by P11, for example:

I also used a website called White House. It is an official website that issues news. It has a weekly press ever since Obama's inauguration. It broadcasts presidents' announcement about economic and political issues and appeals for vote from the citizens. So, we listen to that website every week. And digital tools in relation to translation. When I was preparing for the interpretation test in Shanghai. I also read many resources. I downloaded a special software especially for interpretation. We used something called 'Booth'. The software had a 'repeat' button which allows you to listen to the same content again and again, and you do not have to replay the material manually, so it saves time (P21, female, age 25, Media and Advertisement, line 106).

P11 provides an example about how Chinese international students dedicated to trying to improve their English. Moreover, a number of students (n=5) reported taking notes and remembering vocabulary using fragmented time. The majority the students prefer to learn oral English through engagement in multimedia resources in a more enjoyable way, such as through listening to TED talks (n=15) and through watching serials or movies (e.g., P1). For example,

I wanted to improve my English because it was my major [referring to undergraduate major]. There are many websites like Hujiang Website [an interactive language learning website, <http://www.hujiang.com/>]. Many famous English training institutions all have their own websites to let you study English or test your vocabulary and so on. But I did not use all of them very often. I feel the best way to study English is through newspaper, magazine and movies. I feel it depends on individual English level. For me, I have reasonably good English. I like newspapers and movies because the vocabulary and topics is board, which involves many different fields and many aspects of life (P1, male, age 23, Translation, line 63).

I use a recorder to record myself to improve English. I listen to TED talks. I do not like use websites. I prefer to listen to some contents or watch movies (P16, male, age 27, Marketing, line 26).

P1 prefers studying English through newspapers and movies because he thinks they involve ‘many different aspects of life’. This indicates that he prefers to use resources that provide real-life situational experiences for him to study English. P2 described Ted Talks as creative and attractive. Some students showed an awareness of the importance of culture in the way we learn and use English (e.g., P17). Some students reported using more time to watch documentaries on BBC iPlayer for learning culture and English language after starting their postgraduate study (P17; P28). As for postgraduate study, most students (n=10) were concerned about whether their writing could meet the standard required by the UK university. The majority of the students (n=21) stated that the requirement for undergraduate study is less demanding compared with postgraduate study. Participants mentioned challenges such as difficulty in understanding their tutor’s feedback, and concerns in relation to proper referencing style and the issues of plagiarism. These issues will be discussed in Chapter 7. Some students (P16; P21; P22; P23; P26; P28), who did pre-sessional English course described the additional help provided by the English Language Unit (ELTU):

The ELTU tutor recommended some websites. Some we can use them to look up English synonyms. There are ones can be used to check grammar mistakes. She also gave us some web links to practise paraphrasing (P21, female, age 25, Media and Advertisement, line 216).

The ELTU tutor recommended a dictionary. You can also use it on the phone. I changed Chinese-English dictionary to English-English dictionary (P22, female, age 23, New Media, line 131).

Cite this for me (<https://www.citethisforme.com>). You can use it to create citation. I think it is very convenient and it is free (P19, female, age 23, Marketing, line 94).

They recommended Academic phrasebank (an essential writing resources for academics, see <http://www.phrasebank.manchester.ac.uk>). And also, many websites for paraphrasing (P28, female, age 22, TESOL, line 110).

It was found that additional support from ELTU is helpful for international students to improve their academic writing. P21 and P22 pointed out that they appreciated the value of the Virtual Self Access Centre (VSAC) within Blackboard. For example, as illustrated by P22:

I think VSAC is a very good platform, it is within the Blackboard. You can view some study methods there, you can improve your speaking, listening, writing and reading English skills. And also, the interactive activities. As for the Blackboard, whether to use it or not, I think it depends on students' autonomy. I think it is a good platform, even though maybe only half or even less of the students are using it. After all there is such a platform to satisfy your needs (comparing with former experience without Blackboard for undergraduate study). It is a big difference.

P22 expressed her appreciation of the postgraduate university for providing Blackboard which contains a collection of useful materials for the students. As an international student, she also pointed out the usefulness of Blackboard for offering extra resources and activities to assist them to improve their English and academic studying methods.

5.5 Chapter summary

This chapter attempts to answer the research question 'what are the digital practices among Chinese international students during the transition from undergraduate study to postgraduate study?'. The chapter describes how Chinese international students experience technology during the transition in relation to:

- (1) Information searching and management;
- (2) Communication and collaboration;
- (3) Participation;
- (4) Specific education/professional development and accomplishment of assignment;
- (5) Improving English.

Firstly, it was found that participants had previously engaged in a range of digital technologies for learning however, the political censorship in China and control over

certain websites lead to a lack of recognition of certain websites (e.g., YouTube; Facebook) among some students.

Secondly, most of the students across different disciplines had much experience in using generic digital technologies such as word processing. It is also important to note that they had discipline-specific digital practice, and they had developed a different set of digital skills.

There are some common patterns in terms of using technologies for information searches during the transition. Most of the students began to use certain sites (e.g., Google Scholar; Blackboard; University database) more frequently for postgraduate learning. One prominent underlying reason for this is because such digital practice is defined by the coursework requirement to be informed about course information and to accomplish assignments.

Some students still use Chinese websites when there is an information need, such as looking for Chinese cases, and this reflects that students are making use of the digital technologies and appropriate resources from what is available around them. In terms of how students' experience with digital technologies used for a specific learning purpose, it shows a discipline-specific digital practices among students. On one hand, there is a continuity in digital practices, as some students continued to do what they were good at (e.g., P29 continues to make videos), and this continuity is interest-driven, mainly based on their previous experience and interests. On the other hand, there is also a shift of digital practices among some student, and this is largely task-driven which is defined by coursework.

Thirdly, as for students' experience with communication technology, it found a shift from face to face tutor-student communication to tutor-student communication through email. It found that students' uptake of Western social networking tools for communication is less apparent compared with those used for learning purposes during postgraduate study. It discovered a cultural aspect of technology uses. Because postgraduate study is a short period and there are many Chinese students on the campus, Chinese social media is still

dominant among most of the students. The wider context is found to be influential and as such students' decisions are contextually mediated. For example, students turn to Facebook when they perceive the need/usefulness (e.g., group discussion). It is also related to their social skills. It is interesting to note that some students are better at expanding their networks with peers from different cultural backgrounds than others. For participation, most of the students tended to be pragmatic internet users: they observed online content and only shared resources for the purposes of gaining credits or to download other resources.

Finally, there is also a changing pattern of using digital technologies for learning English. Students are more concerned with their English writing and paraphrasing skills during their postgraduate study. In short, this Chapter depicts a general picture of digital practices among Chinese international postgraduate students during the transition from undergraduate study to postgraduate study. The next chapter focuses more on their digital skills and digital skills issues encountered by them during their postgraduate study.

Chapter 6 - The development of Chinese international students' digital skills during the transition from undergraduate study to postgraduate study

6.1 Introduction

This chapter concerns digital skills represented by Chinese international students. The content under each main subtitle describes Chinese international students' development of their digital skills according to the following sequence:

- (1) What are the digital skills demonstrated by Chinese international postgraduate students?
- (2) What are the digital issues reported by Chinese international students during postgraduate study?
- (3) What digital skills do Chinese international postgraduate students develop during their masters' programmes?

These insights will put a spotlight on the second research question: What is the development of digital skills among Chinese international postgraduate students during the transition from undergraduate study to master's study?

6.2 Operational skills and formal skills

This section reports on Chinese international postgraduate students' digital skills and issues in relation to their technological skills (i.e., having knowledge of the affordances of popular hardware and software, being able to manipulate today's computer applications flexibly). It also provides an insight into the development of participants' technological skills during their postgraduate study.

6.2.1 Technological knowledge, operational skills and formal skills

The research (questionnaire item 7) investigated Chinese international postgraduate students' perception about their digital skills. Responses to Likert-style belief statements were measured on a scale of 1-5 (1=extremely weak; 2=weak; 3=generally ok; 4=well; 5=extremely well). The alpha coefficient for the 22 items in this question is 0.941, suggesting that the items have relatively high internal consistency. Items for constructs around participants' self-perception about their digital skills is shown in Figure 28, presented using one hundred percent bar chart.

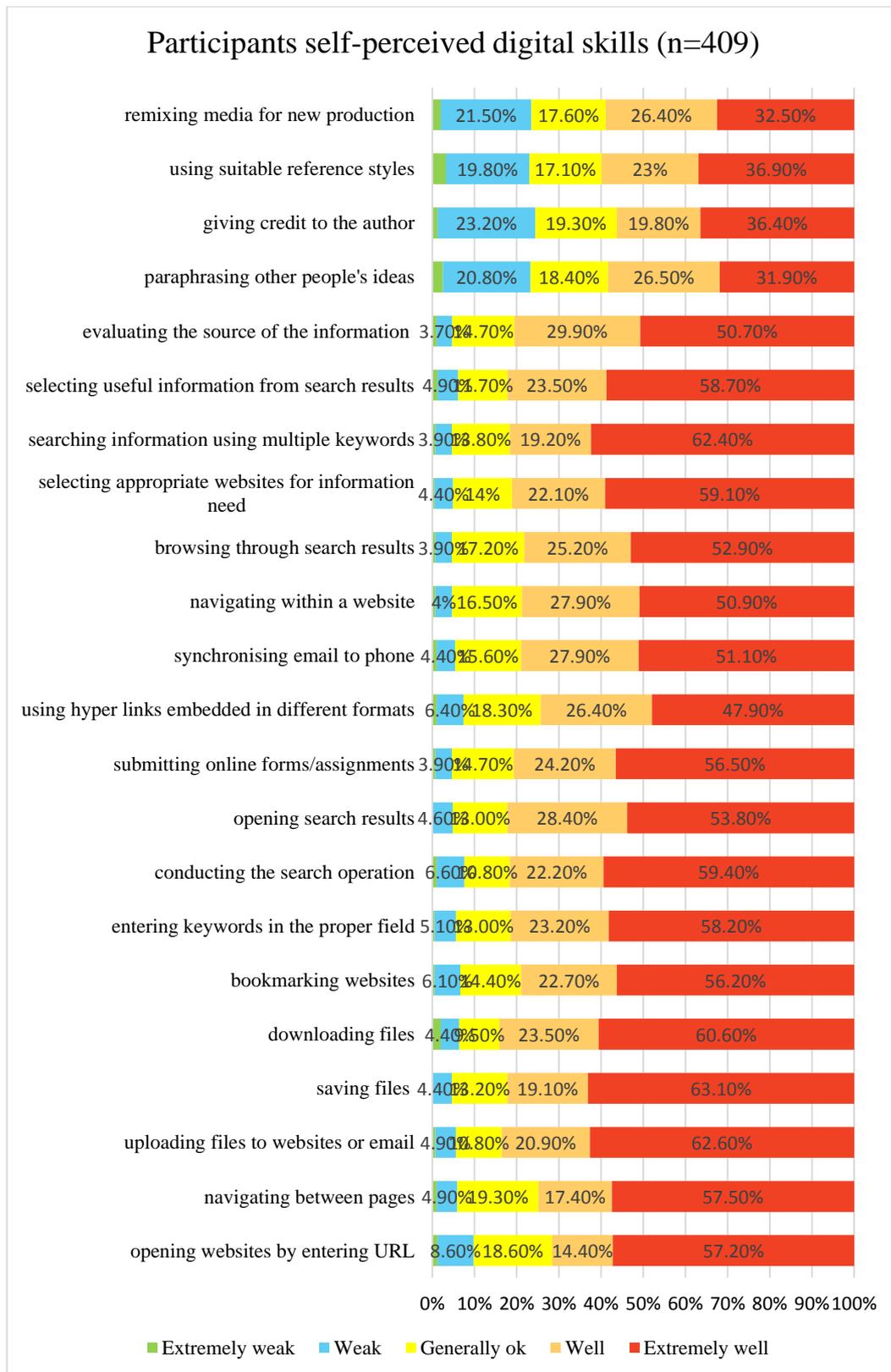


Figure 28: Perception on digital skills (n=409, questionnaire item 7, Cronbach alpha=0.941).

According to figure 28, the majority of the items are associated with technological aspects of digital skills (e.g., saving files; navigating within a website). It can be seen that the majority of the students are confident about their basic knowledge of technology and about their technical skills. Most of the students have a good mastery of the skills needed to conduct a search operation (59.4% reported 'extremely well' and 22.2% reported 'well'). More than half of the participants reported their skills as 'extremely well' for the following options: opening website by entering URL; navigating between pages; uploading files to websites or emails; bookmarking websites and so on. There are slightly less students who are confident about their skills to use hyperlinks embedded in different formats (47.9% reported 'extremely well' and 26.4% reported 'well'). There is an obvious decrease in the degree of participants' confidence levels about their ability to remix media for new production (58.9% reported 'extremely well' or 'well'). However, in terms of the formal skills such as navigating within a website, the majority of students reported their confidence (27.9% nearly always and 50.9% always). Interviews revealed that some participants had difficulty in navigating within a website, primarily due to their lack of language proficiency and the layout of some English websites is not user-friendly (e.g., P4, male, age 24, Banking and Finance). Additionally, there is also a decrease of confidence levels in terms of:

- (1) using other people's ideas or images and giving credit to the author;
- (2) remixing media for new production;
- (3) paraphrasing other people's ideas.

These three items are related to the ethical aspect of digital skills and will be discussed in the next section.

6.2.2 Participants' skills and issues with operational and formal aspects

Most of the participants (n=26) identified exams as the main assessment for undergraduate study, accounting for around 60% - 70% of their total marks. Other assessed assignments such as essays, reports, presentations, attendance and so forth accounted for around 30% of their total marks. Those students (e.g., P5, P14, P20) who were from a science background also mentioned making programmes as a form of assessment. And some students were required to submit products to be assessed, for example P11, from a telecommunication background, had to design and make a single chip microcomputer (SCMs) and P15 (from a media production background) was

engaged in making media products such as 3D animation and films. In addition, sample students (e.g., P7) from a business background mentioned financial simulations as part of their assignments.

As for the postgraduate study, the majority of the participants (n=21) reported having essays as the main form of assessment for postgraduate study, and the rest of the students (n=9) reported their postgraduate study involves writing reports/essays and exams. This section discusses digital skills as well as issues in technological aspects identified during the interview. It provides cases about situations where students face challenges of digital practices and how they overcome such challenges. Because students' digital practices are highly associated with assessment, this section started with Chinese international postgraduate students' digital skills and issues with generic tools (e.g., word processing as most of students have essays as assessment during postgraduate study). It then reports participants' skills and issues with discipline-specific software with particular examples.

(1) Word processing skills and technical issues

All participants (n=30) reported they used word processor software for their undergraduate study. The majority of students (n=26) are confident about their word processing skills. There are cases where students describe that they mastered word processing skills before their postgraduate study. Work experience, tutor influence and institutional practice were main attributes for this. For example:

But only for that tutor (referring to her undergraduate tutor who is like head teacher) is an exception. He is very proficient at using new technologies. He taught me how to 'view' and 'track changes' on word processing. Some tutors were not good at technology at all. But some tutors who are teaching translations. They were so good at using view and track changes on word (P2, female, age 23, Translation, line 121).

I think through the dissertation project of the undergraduate degree, I have mastered the basic skills. Things like inserting bullet points and different titles. I did not use many functions of Microsoft word like insert the table of content. I used it when I was working. I worked as the chairman assistant in an investment company. At that time, I had to create books and leaflets for my boss. I had to

create slides based on the discussion with my boss. I had to write some presentation notes for him (P4, male, age 26, Management, line 319).

I feel I already knew the basic word processing skills during undergraduate study. But I acquired more skills during the undergraduate internship (P21, female, age 25, Media and Advertisement, line 171).

I have good word processing skills. We had computer grade test in Zhejiang Province during the first year of undergraduate study. We must pass this examination in order to graduate. Because we had exams, I practised a lot and became proficient at Microsoft word (P28, female, age 22, TESOL, line 56).

From the description of P2, it can be seen that there is a variation of digital skills among her undergraduate tutors, and her word processing skills regarding to making and viewing tracked changes on a document is largely influenced by her tutor(s) who are good at it.

P4 had three years' work experience as the assistant of the chairman in an investment company and P21 had a two-month internship in a newspaper agency during her undergraduate study. On one hand, these two students reached a consensus that their work experience is crucial for the development of their digital skills. On the other hand, it indicates the clear importance of digital skills for graduate students in terms of their employability, with many jobs requiring ICT skills (Meurant, 2009). P28 points out the institutional factor, as she had to pass a computer grade test in order to graduate.

However, there were also cases where students had difficulty in using word processing for particular assignments. Four participants provided examples of experiencing difficulty in using word processing:

I sometimes use the library desktop. Sometimes I feel I am not familiar with version of the word on library desktops. The version of the word in library is different with what I have on my laptop. The layout is different. I cannot find the right options that I wanted to use. I have to Google or Baidu to see where is the option (P3, male, age 24, Banking and Finance, line 311).

At beginning of the course, when I came across something useful for my essay, I found the electronic version of the article. I copied that bit and pasted it into my essay, and changed some keywords. When I print out the essay, that bit looks different with other content because I did not change the format. I was lazy sometimes, if not, I would have typed the contents again (P4, male, age 26, Management, line 318).

I did not know how to insert a table of contents. I tried to create one by typing the titles and dots manually, but I failed to do so because it does not look very neat. I was annoyed by dots because it is so difficult to align them. In the end, I asked my friend to help me to do it (P6, female, age 23, Media and Communication, line 126).

I still do not know how to insert table of contents. Because I did not have to do it often before. For undergraduate study, I only had to insert a table of contents for the dissertation. Actually, many of us in the class did not know how to insert a table of content. We went to the print shop. We paid some money to the staff in the print shop and asked their help to insert a table of contents for us. Now I am experimenting with it and if I do not know any functions I ask my peers (P10, female, age 23, Public Relations, line 156).

The above statements demonstrate specific situations where students had challenges when using word processing. P3 described that the version of word processing provided by the library desktop is different with the one on his laptop, but he can search the internet to solve certain issues. P4 described that he used to copy and paste content from the Internet. It indicates that previously he did not have a good recognition of the ethical aspect of digital practices, and he was not aware of word processing skills such as clicking ‘merging formatting’ to remove web formatting.

P6 and P10 described a lack of skill to insert a table of content. P10 revealed a sociocultural view of digital practices - she was only required to insert a table of contents for her undergraduate dissertation, and it was easy to obtain help to do this from the staff in the print shop in China. Peer support became more important for her to develop digital skills during her postgraduate study.

In another case, during the observation, P3 demonstrated that he had difficulty in writing financial models in a piece of an essay. For the purpose of demonstrating the problem, he took some contents from his essay. The first example is ‘Cost of liquidation (normal market) = $\sum S_i a_i / 2 = 1.438 * 3343.25 * 0.0004487 / 2 = 1.0785$ ’. While showing this example, P3 described that he did not know how to insert an ‘ α (alpha)’ or ‘ β (beta)’. Sometimes, he typed an ‘a’ in the word document then put an Italic so that it became an ‘*a*’, which looks like an ‘ α (alpha)’.

More often, he took a screenshot of certain letters (note: as shown in the example above, ‘ α ’ is from a screenshot) or certain equations, and pasted them into his report. Also, he said that he could only type, for example a ‘ $\sqrt{10}$ ’ in the word document, which does not look quite right. He was not aware that when inserting an equation ‘ $\sqrt{}$ ’, it can be formatted through choosing the ‘professional’ icon to make it into a ‘ $\sqrt{10}$ ’.

According to P3, lacking the skills to write equations lead to an inconvenience when he wanted to modify a model, because he could only copy and paste an existing model. P3 provided some examples, which might be a common concern for students from a finance background. P12’s perspective also parallels this point. He had experienced the same issue, and he mentioned that one of his friends who is studying the same subject recommended he write and format his report using other software - ‘Scientific Word’ (a word processor specifically for scientific documents, <http://www.sciword.co.uk/>) and ‘LaTeX’ (a typesetting system that includes many features designed for producing technical and scientific documentation, see <http://www.latex-project.org/>). P3 and P12’s perspective provides a contextualised understanding of the digital skills issue that may be commonly confronted by Chinese international students from a finance background.

(2) Statistical software and technical issues

The interview also investigated students’ experience with statistical software. It found a discipline difference among participants. Firstly, students (n=16) from a social science background reported the use of SPSS. Five students reported that they had learnt SPSS during undergraduate study, for example:

I am familiar with SPSS. We had a course about quantitative research methods in mass media [referring to undergraduate study]. The course required us to use SPSS. We collected data using questionnaire and then input data into SPSS. My tutor [referring to undergraduate tutor] taught us step by step in the computer room (P13, female, age 24, Media, line 102).

My tutor introduced [referring to undergraduate tutor] the software during the class and asked us to experiment with it on our own. I learned it on my own. I watched some online tutorials (P14, female, age 23, New Media, line 117).

I used SPSS (meaning during undergraduate study). The tutor gave us some data and taught us how to do certain analysis based on those data. But I did not know how to do analysis if the data type was changed. Because the class time was limited and the tutor did not teach it in details. The tutor was processing different data analysis in the class. I just learned some terms by the end of the session but did not practice it (P17, female, age 23, Media, line 29).

Because my undergraduate dissertation topic was about foreign president and the images of foreign countries. I used SPSS to analyse data collected from many newspaper and new media (P24, female, age 23, Media and Communication, line 65).

These five students learnt SPSS during undergraduate study as required by the course. P13 is more confident about her skills of using SPSS because she used SPSS to analyse and report data for her undergraduate dissertation. Two students (P17 and P25) reported that they did not learn the software in depth. P17 pointed out a lack of practice. During postgraduate study, students (n=11) gained new knowledge about SPSS, mainly through their tutor, for example:

My tutor introduced SPSS. I used it but seldom. I learned it for some time. I used it only for my dissertation. It is very professional and I had some technical issues to use it (P19, female, age 23, Marketing, line 100-103).

My tutor [referring to postgraduate tutor] put the tutorials about SPSS onto the blackboard. I watched it first and then there is an assignment for us to finish. I logged in blackboard with library account and finished assignments on SPSS.

After that I had another three sessions and assignments. And then we had one exam on using SPSS (P6, female, age 23, Media and Communication, line 330). I attended workshops in the computer rooms in the library. And there was a tutor to help us when we had problems or questions (P7, female, age 23, management, Finance and Accounting, line 331).

Most students (n=11) described that their postgraduate tutor introduced SPSS during the class, while they learnt it in their own time. When they were learning SPSS, they usually used the following methods:

- follow the instruction manual (e.g., P6);
- peer support (e.g., P6);
- online tutorials (e.g., P13).

It is interesting that P7 was the only student among all participants who was aware of the workshop on SPSS provided by library. However, most of the students who have used SPSS reported a lack of technical skills, as illustrated in the following examples:

For SPSS. I had difficulty to download it. I tried to download it onto my laptop but I failed to do so and many of my friends also failed to download it. Therefore, I am using it on university library desktops. The library desktops have installed SPSS (P6, female, age 23, Media and Communication, line 394).

My tutor taught us SPSS in English. And I pick up information about computer science very slowly. It is even harder for me that I learned it in English. I did not understand tutor's session on that. He said SPSS is very convenient for data analysis. But I still do not know how to use it and I am inputting and analyse data manually. I just feel maybe using technologies is not my strong point. I think boys are better at this than girls. Even I am using smart phone (iPhone), I am just use it to do basic things such as make phone calls and send instant messages (P7, female, age 23, Management, Finance and Accounting, line 399).

I feel that are really annoying. I hate using software. I do not think they are useful. I hate using Nvivo and SPSS, so I would normally try to avoid using software (P10, female, age 23, Public Relations, line 247).

As can be seen from the above statements, these students reported encountering challenges when using the statistical software SPSS, and their challenges can be understood in the following ways:

- Technical issues (e.g., P6; P29). Some of the technical issues can be very specific and unpredictable, for example, P6 attended the SPSS course, did the assignment and passed the exam on SPSS. She should have developed a certain degree of skill in using SPSS however, she had issues with downloading the software. Although she used the desktop provided by the library, she was not aware of the technical help she could request from the IT services.
- Lack of skills and knowledge. Some students reported not being proficient at using the software and not knowing the methods to analyse data (e.g., P18; P19).
- Language barrier. P7 pointed out that learning a software in a second language is more challenging.
- Personal belief and preference. Some students did not perceive the usefulness of SPSS and preferred not to use this technology (e.g., P10).

It is worth noting that students' lack of skills to use the SPSS statistical software is associated with their knowledge about data analysis methods. As stated above, P17 mentioned that her undergraduate tutor gave a session on SPSS, but she did not know how to select the appropriate method to analyse data when the data set was changed. In another instance, P10 mentioned having difficulty in understanding using 'social network analysis' for qualitative data. In addition, some students (n=4) reported difficulty in visualising data, for example, P30 described that she does not know how to create graphs and figures using Excel.

Secondly, students from a finance and mathematics background have different practices with statistical software (see Chapter 5), which is largely dependent on the assessment. P20, from a mathematics (Data for Business in Technology) discipline, reported her assessment was composed of three assignments (reports), one exam and one presentation. She mentioned that she still used a lot of software that she used before, such as MATLAB. She described that her reports involved coding, reporting data using figures and writing results. When asked about whether she had any issues with using software for her

studying, P20 pointed out that the learning materials for her major do not involve much difficult English vocabulary, and the main issue lay in the technical skill to use the software to accomplish the assignments.

6.3 Information skills

This section reports participants' methods to locate, use and synthesise online information. It is also concerned with the extent to which they are aware that a media message is not neutral. The following section reports methods, strategies and skills participants use to locate, evaluate and manage information. It also reports challenges encountered for information handling and critical thinking skills, and how students think their critical thinking skills have improved after postgraduate study.

6.3.1 Methods to locate information among Chinese international postgraduate students

Questionnaire item 3.2 is a Likert scale question that asks participants how often they use(d) the different methods to search for current information when working on an assignment (e.g., writing an essay) during postgraduate study. Responses to this question were measured on a scale of 1-5 (1=never; 2=rarely; 3=sometimes; 4=nearly always; 5=always). The alpha coefficient for the 11 items in this question is 0.729, indicating that the internal consistency is acceptable. Data that describe how often Chinese international postgraduates use different methods to search for current information is presented using diverging one hundred stacked charts. A central position is placed in the middle of the parentage bar that represents 'sometimes':

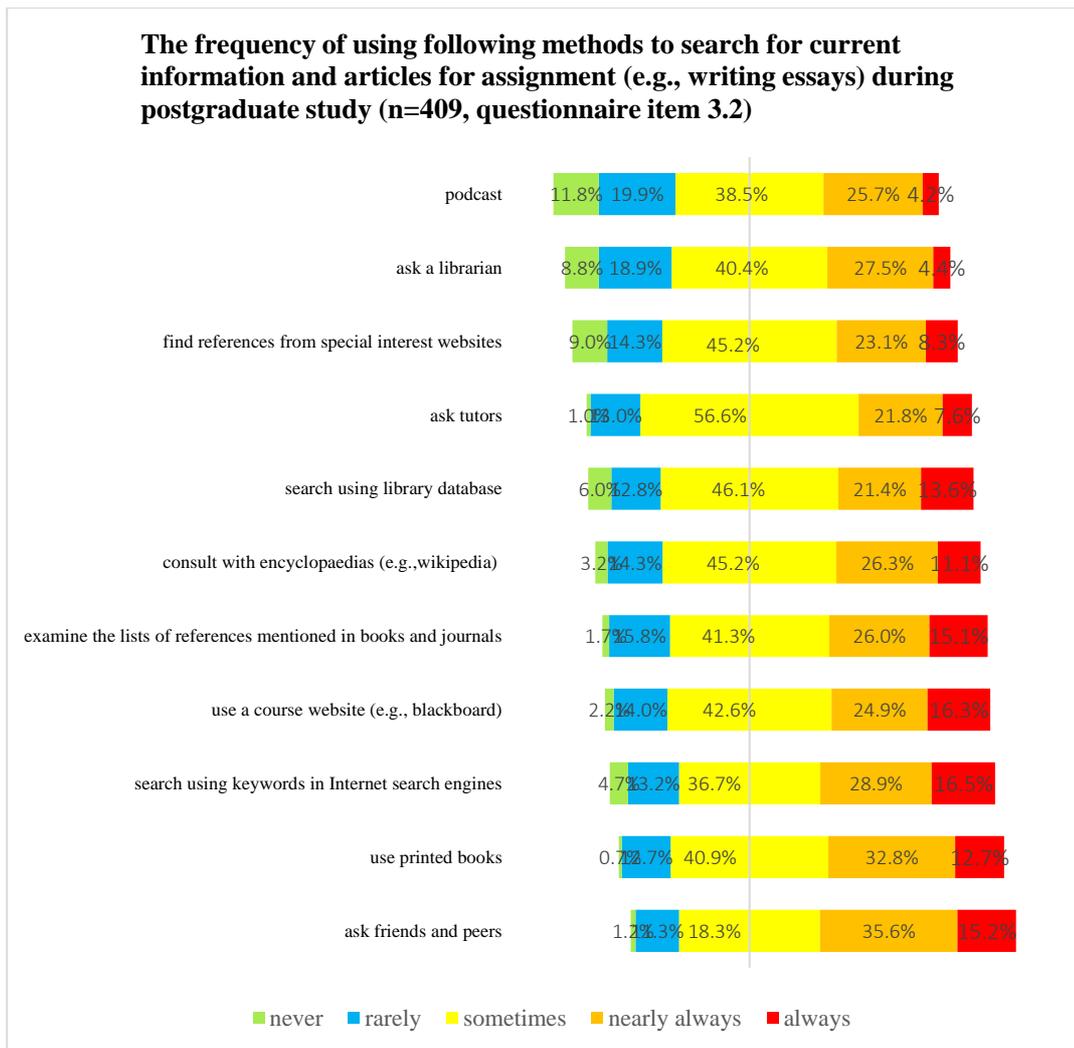


Figure 29: Frequency of using different methods for information needs during postgraduate study (n=409, questionnaire item 3.2, Cronbach alpha=0.729).

As it can be seen from figure 29, even online resources are abundant and a significant number of students reported using printed books frequently for postgraduate study (32.8% nearly always and 12.7% always). Peer support in consulting about information related to the assignment is also common for postgraduate study (35.6% nearly always and 15.2% always). In both contexts, participants are more likely to seek advice from peers/friends than their tutors and librarians. Searching for information and resources using keywords on Internet search engines is also often practised: 16.5% of the participants reported always searching for keywords on search engines and 28.9% reported nearly always doing this for postgraduate study.

During the interview, participants were asked about methods that were commonly used to locate studying-related information. It was found that participants' study information needs are often driven by coursework requirements or personal interests, and their methods of locating online information can be broadly categorised into the following categories:

Using key words to search for resources on search engines, websites or the library database.

As mentioned in Chapter 5, students use search engines, websites and databases in both of the two contexts (i.e., undergraduate study and working in China; postgraduate study in the UK). Using key words to search for information seems to be a common practice, and participants use keywords that are frequently used in their disciplines to search for online information (n=22). For example:

I normally write my essays in this way. I like to use Google Scholar using key words. You have a question about my skills of searching literature using key words. And my skills in this aspect have been trained very well. I normally use a few key words and then I would use similar words as the replacements. (P2, female, age 23, Translation, line 135).

Sometimes, in order to find more resources, I try to use other words that are similar to the key words as replacements (P5, male, age 23, Management, line 174).

Some students (e.g., P2; P5) are confident about their skills in relation to the use of key words to search for online information, and they described that they are able to pick synonyms as a replacement of keywords in order to enlarge the search results (e.g., P2; P5). In terms of using key words to search for information, a small number of students reported that their skills in this aspect have been developed during postgraduate study.

I had some sessions at the English Language Teaching Unit (ELTU), the tutor taught us how to deconstruct the keywords for a topic for literature search. How to filter the resources and so on. The tutor taught us in details. In China, we only had supervisor and students; and the supervisor only told us what you should

write and what should you not write. They did not offer much practical help. It is useful to know how to conduct literature search. For example, like the topic ‘the influence of financial opening upon the national economy in Vietnam’, the tutor taught us how to deconstruct the sentence and use the key works for searching. We search from big scope to small scope. For Vietnam, I searched Southeast Asian first... financial opening is related to the government control and financial freedom. These are alternative keywords. Maybe not only deconstruct the sentence but also use some interconnected words as the replacements and you may get some useful articles (P4, male, age 26, Management, line 206).

P4 provide an example about how his information search skills using key words has been developed during postgraduate study. In his narrative, after studying for a few sessions provided by the ELTU, he has strengthened his key-words searching strategy through deconstructing a sentence and using alternative keywords. However, there are also students who reported experiencing difficulty in searching online resources during postgraduate study. P24 expressed that she often encountered some journals which seemed to be relevant but turned out not to be:

It is hard to search for literature. Most of the cases, I found the literature [referring to English literature] I searched are not relevant to my research topic. For literature about the theoretical concepts. I only search for Chinese resources. I can understand better if they are in Chinese. I often search for Chinese articles and then translate the main idea into English when writing essays (P24, female, age 23, Media and Communication, line 133).

As in the above case, P24 said sometimes she had challenges when trying to identify English journals that contain the information she expected. She also always tries to understand theoretical concepts by searching such concepts in Chinese.

Having knowledge about specific sites/databases and apps

As described in Chapter 5, there is a discipline-specific digital practice among students. Accordingly, most of the students are able to provide examples of the specific sites for looking up discipline-related information, for example:

My undergraduate tutor recommended a website called ‘Ju Chao Zi Xun (a Chinese website designated by the China Securities Regulatory Commission that

disclose information about all listed Chinese companies, <http://www.cninfo.com.cn/cninfo-new/index>)' to download financial statement. It has all the financial statements of all the listed companies (P7, female, age 23, Management, Finance and Accounting, line 59).

The above examples show that some participants are informed of specific sites to search for discipline-related information. Students from a finance and business background show their familiarity towards certain websites, such as:

- 'Zhongguo Kuaiji Wang' (a Chinese website specialised in accounting, <http://www.canet.com.cn/>, P7);
- 'Jingguan Zhijia' (the biggest Chinese online community among economic and management discipline, <http://bbs.pinggu.org/>, e.g., P4; P7; P25; P27);
- Yahoo Finance (a media platform that provides financial news, data and commentary, <https://uk.finance.yahoo.com/>, e.g., P4; P27);
- Financial Times (an English-language international daily newspaper with particular focus on business and economic views, <https://www.ft.com/>, e.g., P3);
- Wall Street Journal (an American business-emphasised international daily newspaper, <https://www.wsj.com/europe>, e.g., P25).

According to P25, the Wall Street Journal seems to be blocked in China. Although there is a Chinese edition of the Wall Street Journal (<http://cn.wsj.com/gb/index.asp>), the focus in the Chinese edition is different from other editions. P25 used VPN or read the English edition of the Wall Street Journal shared by Internet users in certain forums. But he was unhappy about receiving delayed information. It is another example that Internet censorship in China leads to a gap in students' prior experience of accessing information. Similarly, P4's undergraduate university subscribed to the Wall Street Journal and he read the printed versions, and now he is using an APP to download newspapers to read. It was found that there was a continuity in developing knowledge toward discipline-specific sites/applications, as participants expand such knowledge during postgraduate study, for example:

Because I had to take an economic test. I downloaded an APP called 'CFA programme study' App. It contains official books for the preparation of exams into this APP. It can keep a record of how much I have read a book and how much

I have learnt. And it can help you to track your work plan. If you create your plan in this APP, it would tell you whether you have finished the task and the percentage of the process (P4, male, age 26, Management, line 322).

I knew about Bloomberg (a website that delivers business and markets news, data and analysis, <https://www.bloomberg.com>) during postgraduate study. For undergraduate study, we mainly used Chinese database. Now sometimes I need to find information using Bloomberg when doing project (P12, male, age 23, Financial Mathematics and Computation, line 232).

Above are two examples in which Chinese international students reflect on their current situation and expand their knowledge about specific sites/applications in order to satisfy their current information needs. As mentioned during the previous chapter, some students from a media background used a website called 'Mtime' (<http://www.mtime.com/>) to access movie reviews, and used templates websites to obtain templates (e.g., P16; P17) during their undergraduate study. It was found that tutor influence and peer influence are very crucial for developing participants' knowledge about discipline-specific websites. After being introduced by their tutor, some Media students (n=6) started to use Lexis library (a legal online research service that provides a collection of annotated legislation, cases, forms and commentary, see <http://www.lexisnexis.com/uk/legal/>) to search for news. These are some examples which indicate that developing knowledge about discipline-specific resources is a continuing practice. It shows that students develop their digital skills through acquiring new skills at the same time as modifying their existing knowledge and skills to meet their current studying needs.

Apply digital technologies to keep up-to-date information

Interviews discovered that some students (n=6) are able to apply social networks to keep up-to-date information. For example:

I was using the Samsung smartphone in the college. I downloaded some electronic books on to the phone and read them. I did not use We-chat at that time but now I subscribed to some public accounts on the We-chat that are related to the finance and business, and I also have some similar things on the Sina Weibo account (P3, male, age 24, Banking and Finance, line 98).

Similar to the above case, some students are also able to identify influential people or organisations through following them on social network sites. For example, P4 followed blogs of influential people in the field of finance, and P29 followed Li Tao (a famous Chinese tutor who teaches media skills) on Sina Weibo and checked his online lectures. However, during the interviews, students mainly recalled and described their experience on Chinese language dominant social media. They hardly mentioned the use of Western social networks such as Twitter for keeping up-to-date with information in their fields, or following English influential academics on social media.

6.3.2 Methods to evaluate online information among Chinese international postgraduate students

The research investigated how often Chinese international postgraduate students use(d) different methods to evaluate online information when they were doing an assignment (e.g., writing an essay) both for undergraduate study (questionnaire item 4.1) and for postgraduate study (questionnaire item 4.2). Responses to Likert-style belief statements were measured on a scale of 1-5 (1=never; 2=rarely; 3=sometimes; 4=nearly always; 5=always). The alpha coefficient for the seven items included in questionnaire item 4.1 (undergraduate study) is 0.764, and 0.780 for that of questionnaire item 4.1 (postgraduate study). Both are in excess of 0.7, suggesting that the internal consistency is acceptable. Data is presented using diverging one hundred stacked charts as in the figures below:

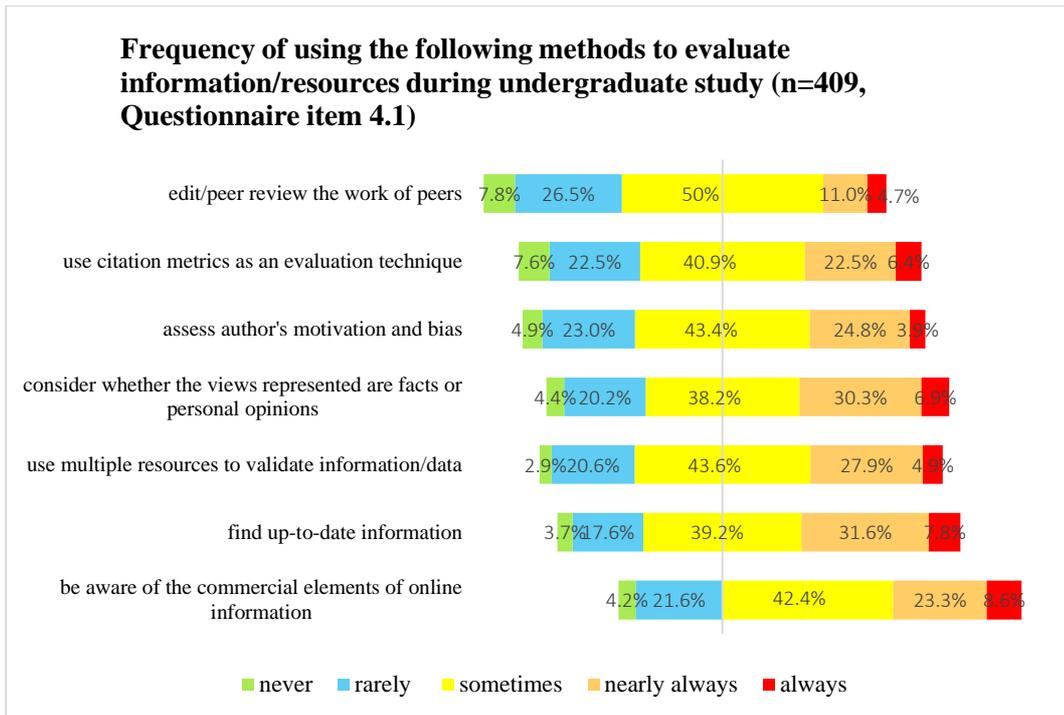


Figure 30: Frequency of using different methods to evaluate information during undergraduate study (n=409, questionnaire item 4.2, Cronbach alpha=0.764).

Figure 30 provides an overview of participants' self-perceived perspective in terms of how often they used the different methods listed to evaluate online information. Over one third of the participants reported that, more often than sometimes, they are able to notice commercial elements contained in online information (23.3% nearly always and 8.6% always), and find up-to-date information (31.6% nearly always and 7.8% always). Students use other methods less frequently to evaluate online information. For example, 15.7% of participants reported editing or reviewing a peer's work (11% nearly always and 4.7% always) more often than sometimes. Half of the participants reported editing or reviewing a peer's work sometimes, and 34.3% of participants reported this option less frequently than sometimes (7.8% never and 26.5% nearly never).

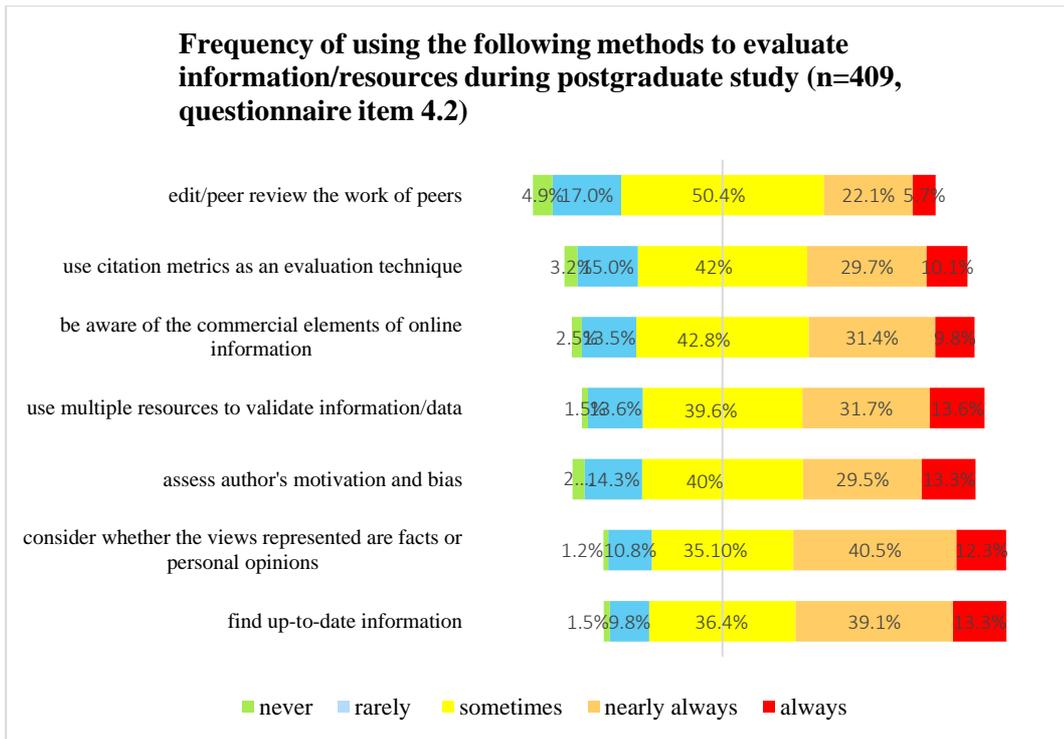


Figure 31: Frequency of using different methods to evaluate information during postgraduate study (n=409, questionnaire item 3.2, Cronbach alpha=0.780).

According to Figure 31, more than half of the participants reported that they had tried to find up-to-date information during their postgraduate study (13.3% always and 39.1% nearly always). Only a small percentage of students reported that they did not often find up-to-date information (9.8% rarely and 1.5% never). Similarly, around half of the participants considered whether views represented were facts or personal opinions (12.3% always and 40.5% nearly always). There is a slightly smaller percentage of participants who used other methods to evaluate online information. For example, 39.8% often used citation metrics to evaluate information (10.1% always and 29.7% nearly always), while 17.2% reported not often using such methods (15.0% rarely and 3.2% never). Just over a quarter of the participants (27.8%) reported often editing/reviewing the work of their peers (5.7% always and 22.1% nearly always), while 21.9% of participants did not often use this method (17% rarely and 4.9% never) to evaluate information.

During interviews, participants were asked how they judge the relevance and quality of their sources, and how they decide whether they are going to use an online resource.

Based on participants' narratives, they mainly considered the following aspects when judging the relevance of online resources:

Using citation index and citation rate.

Some students (n=9) reported that citation index and citation rate is one of the factors they consider when they decide whether to use a resource or not. For example:

I think papers which are published on journals in Science Citation Index (SCI) and Social Sciences Citation Index (SSCI) are believed to have good quality and reputation. But for me, normally I look at the quantity of the citation. Personally, I feel the more citation rate the better. I feel paper which has been cited many times is better than paper which has only been cited for one time or twice (P2, female, age 23, Translation, line 161).

The citation means the article has been cited because either people agree with the articles or people show contrasting arguments. Either agree or against. If a journal is not paid attention to by other people, then it might not be a good journal. I prefer to look at the citation rate and read the content to judge if the journal is good or not (P8, female, age 23, Translation, line 30).

P2 and P18 pointed out that they consider the citation index. For example, they think journals covered by the Science Citation Index (SCI) and Social Sciences Citation Index (SSCI) generally have a good reputation. However, some participants (n=8) described that rather than looking at the impact factor of a journal, they tended to look at the citation numbers, for example, those shown on Google Scholar (n=7) or Scopus (n=2). This is likely to be because the academic and scientific resources are currently disseminated online. As a result, students tend to conduct online literature searches using key words on particular topics from a wide variety of journals rather than reading entire journals. Moreover, a paper can be read and cited on the basis of its own merits if it is available online, with little regard to the impact factor of the journal (Lozano et al., 2012).

Verifying data by checking the official website or using multiple resources

Some students (n=4) mentioned using official data or using multiple websites to verify online information (e.g., journals, e-books). For example:

I was writing the essay outline about tourism translation [during postgraduate study]. I needed the data about tourists who travelling from aboard to China. I search it on Baidu and I found some official websites to look for and validate data (P1, male, age 23, Translation, line 151).

For information, such as data I normally look for more than one sources to make sure it is right. And for important event and argument I would search for different sources to get a more comprehensive understanding (P30, male, age 23, Media, line 65).

The above cases show that some students (n=4) try to use more than one source to verify online information. As illustrated in these cases, some students (n=4) are confident about their ability to verify data using multiple resources. However, there are also interviewees who talked about their concerns about this. For instance, P13 shared her difficulties in finding data about Zara (a fashion retailer) and judging the credibility of sources from different stakeholders:

Because now I am reading the English literature so my reading speed is not fast. In addition, my major involves many data and I do not know where to find this kind of data. For example, now I am doing a course on ‘Principle and practices of marketing’, and I would like to do a research on Zara. I need to refer to certain criteria and judge whether Zara has done a good job or not. But the company does not offer some internal data. And I did not know whether such information provided by other websites are trustworthy. I also do not know whether the Zara company itself has made its annual financial report looks better than what actually is. It may be different with what did the financial expert say and I did not know whom to believe (P13, female, age 24, Media, line 133).

The above example illustrates that sometimes students have had difficulties identifying sites to access desired information and judging the credibility of the online sources.

Being critical with the context.

From the perspective of two participants (P2 and P8), the context of the resources was important when deciding whether to draw on these resources for their assignments.

During the interview P2 (female, age 23, Translation, line 171) used one of her assignments (i.e., a part of an essay) to describe the importance of the context. According to P2, she wrote part of an essay focusing on the translation between English and Japanese. She mentioned that firstly she tried to find recent resources. In her view, if the journal was written many years ago, then the data or the situation described in that journal would not be the same as the present situation.

Moreover, she pointed out that one must look at the context of the paper. In her narratives, she described that she came across one article written about translation between English and Costa Rica's language. P2 reported that although the theoretical ideas seemed to be relevant, she could not understand the examples provided in that article after reading it. P2 and P8 reported that one can use advanced search options to refine the search results through limiting the research results to a specific time frame, or by being more specific with the context such as the nationality and level of education. It can be seen that these two students are more critical with the context in online resources and are able to refine search results accordingly using advanced search options.

Being able to skim through a large amount of information.

Some interviewees (n=6) are confident about their ability to scan and skim through a large amount of content and decide key relevant information quickly. For example, P2 described that she often spends one to two hours reading journal articles before writing essays:

I would read 10 to 20 relevant journals. Then within around 1 to 2 hours, I will decide what I am going to write. I can take some useful ingredients from other journals. For example, feel this journal views a phenomenon from a good angle. That journal has a good content. I have a notebook to note these things down and outlining the essay. But the ideas that I am going to write are still my ideas but I am just building the foundation on previous studies. I normally just refer to journals. I rarely read a book and I seldom use a book as a reference (P2, female, age 23, Translation, line 136).

The above example demonstrates that P2 is able to process a large amount of information with the purpose of identifying the relevant points. It also indicates that her uses of online information for assignments, specifically journals rather than books, tends to be

pragmatic. In another case, P8 (female, age 23, Translation) illustrated that she often applied what she called the ‘carpet method’ to search for literature, meaning that she usually requests a large amount of resources initially. For example, if she searched for ‘educating farmers’ children’ using the Internet, she would read around 50 journals first in order to obtain a general picture of how this topic has been discussed by other people. During the process of reading, she does not read all the contents, instead, she reads the abstract, introduction and conclusion to make a judgement about whether these resources are useful.

She will then read the journals she thinks are useful in depth. Through this process, she cuts down the number of journals she is going to use from, say, 50 to 20 and identifies the outline for the essay. In addition, another three students (e.g., P10, female, age 23, Public Relations) talked about their strategy to filter large amount of research results: when they receive the research results on the websites or search engines, they first scan through the headings and the highlighted keywords in the contents, which shows the most relevant information to select. They then read the abstract, introduction and conclusion to pick up a quick impression about the content.

However, during the interview, a small number of students’ narratives indicated that they read online resources at a surface level. This can be illustrated with P5 (male, age 23, Management), who admitted that he always searched for keywords in the search area on a PDF document, and only read a few sentences which contained the keywords. In this case, P5’s use of information is pragmatic but he may not understand the content in depth because he is only reading some fragmented parts of the online resource. When checking this behaviour with other participants, two interviewees (P6 and P7) reported that they always read the whole content of the PDF document. Surprisingly, the reason is not because they were rigorous with what they read but because they did not know that they could search for key words on a PDF document. Such lack of digital skills may have a negative influence on their productivity when it comes to dealing with a large amount of resources.

6.3.3 The development of information skills during postgraduate study

This section reports on how Chinese international postgraduate students refine their digital skills in terms of searching for online resources and evaluating information in order to adapt to their postgraduate study. This also reports on how their digital skills have been developed during their postgraduate study. The interview data reveals that there are several circumstances in which students reflect on their learning experience, cognitively thinking about the differences with regard to information searches and evaluation, then refining their skills for a better learning experience. Some examples are:

Draw available cultural tools and combine Western sites with Chinese sites

Combining Western sites with Chinese sites to search for information can be argued as the most practised ‘surviving strategy’ for Chinese international postgraduate students. From all mind maps collected before the interview (n=14), it can be seen that students do not just migrate from the Chinese media landscape to the English landscape, but they also started to combine Western sites with Chinese sites for their learning and living. This can be seen from the mind maps constructed by participants. Below are two examples from the mind map.



Figure 32: Example of frequently used digital sites and application for learning (P13, female, age 24, media, data collected from mind map activities).

picture, P7 listed the Chinese search engine Baidu and a Chinese site she uses (e.g., CNKI) separately from the Western search engine Google and Western site Science Direct (a website that provide access to a large database of scientific and medical research, <http://www.sciencedirect.com/>) that she uses to search for articles.

Interview data also confirmed this point. The difficulty that many students' (n=16) experienced in searching or evaluating online resources in their postgraduate study was largely associated with a lack of language proficiency and their unfamiliarity with the Western sites, as well as context. A typical example is provided by P14, who expressed her concern about unfamiliarity with Western digital media when she was writing part of an assignment:

Speaking of the difficulties in assignments. I had a class called 'the politics of digital media.' It is related to politics. Because I have seldom experienced Western media when I was in China but we must use case studies for that class. But I feel I know nothing about the Western politics so I could not come up with any cases. I could only use Chinese cases. Fortunately, one of my tutors is doing Asian related studies and he encourages me to use cases in my own country as he thinks I know better about the domestic cases. But again, the problem is that many political cases have not been reported by the Western media so I had to translate many content from the Chinese media (P14, female, age 23, New Media, line 137).

P14 talked about her concern in relation to her lack of knowledge about Western politics at the beginning of the course. The tutor's help was an important factor in terms of lessening her concern and she used a lot of Chinese resources for this particular essay. Similarly, most of the students reported that they combined Western sites with Chinese sites to search for information. For example:

Once I decided the topic for my essay, I search for the literature using different approaches. Google Scholar I use it definitely, and I still like Chinese database CNKI because it is the biggest and the most comprehensive Chinese database. Together with the University library database. And we also had specific database for translation studies. I normally use these approaches to look for literature (P1, male, age 23, Translation, line 133).

I use both Chinese and Western resources. But I will turn to Chinese resources if I read something in English and I feel I do not understand. Because Chinese literature is in Chinese normally (P2, female, age 23, Translation, line 166).

If I don't understand a key word, I use my mobile to check it. And sometimes if I do not understand anything well in English, I then check the Chinese explanation of the topics. We have many terms in my field (P3, male, age 24, Banking and Finance, line 366).

As illustrated above, it can be seen that there is a cultural aspect of using digital technologies to search for information. Sometimes students carry on using Chinese sites when searching for Chinese cases and data, or when seeking a Chinese explanation of concepts when they feel they cannot understand the English well. On one hand, it shows that students bring their previous habits regarding the use of technologies for information searching and on the other hand, they try to make informed choices about different search engines and databases in response to situational needs.

Adjust the strategy to skim through journal article.

One participant talked about how she perceived the difference between the structure of English academic articles and Chinese academic articles, and adjusted her reading strategy:

I found it is not very useful to read the conclusion first for the English journals, but it is the best to read the abstract in the first place. Before in China, I think the conclusion contains more useful arguments and summary, so it is useful to read the conclusion first. But for English journals, the abstract summaries what did the researchers found out but the conclusion is very short. The abstract use the very simple words to display the key points of the articles, including its methodology and the major findings. (P9, female, age 23, TESOL, line 94).

In the view of P9, it is useful to read the conclusion in Chinese journals. While when it comes to the English journal, she thinks the abstract provides more useful and contextual information than the conclusion. In addition to this, some participants talked about having noticed the qualitative difference between undergraduate study and postgraduate study and reported that they became more critical with online resources. One example is that

some students built up their awareness towards the commercial influence of online resources.

Be more critical with content and the commercial elements of the online resources.

The interview data shows that some students paid more attention to the author's qualifications when they were searching for articles during undergraduate study, and they tended to regard viewpoints from authoritative people as trustworthy without much critical thinking (e.g., P21). While P21 pointed out that she started to notice the qualitative difference between undergraduate study and postgraduate study, and started to think about whether important argumentation is based on empirical evidence. As stated by P3:

I look at the whole content and also the theoretical frameworks. Also, I consider if the important viewpoints are based on empirical evidence. Then I knew roughly the quality of the resources (P21, female, age 25, Media and Advertisement, line 192).

As it can be seen that P21 became more critical with information and evaluating whether important viewpoints are based on evidence. Moreover, some students have more awareness of the commercial influence of online resources. For example:

I think one problem of the Chinese academic research is that the quality of certain journals is not very good. People can pay those publishers to publish journals, even I have published journal before and it has been indexed by CNKI. Because there are too many commercial influences which lead to some journals are not academic. (P13, female, age 24, Media, line 145).

P13 expressed her concerns regarding the commercial elements of certain publishers. Likewise, some students acknowledged that research results were impartial due to commercial influence (e.g., sponsorship). However, when asking whether interviewees assess an author's goal and motivation, it turn out that the majority of students (n=28) reported not exercising this practice.

Most of the students (n=16), especially those from social science, reported critical thinking as an essential skill needed for postgraduate study. More than half of the students (n=19) said that critical thinking was rarely stressed as a requirement for undergraduate

study. For example, P1, who did English for undergraduate study, described that grammar was the primary focus of his undergraduate assignments; others (n=5) reported that the word count of undergraduate study was much shorter (about 4000 words) and the requirement was very basic thus critical thinking was not emphasised. Some students talked about the challenges of practising critical thinking skills during postgraduate study:

When I first studied in the UK, I did not know what does critical thinking exactly means. In China, I could express my personal ideas even without the support of other references or even I did not do the research. But here [referring to postgraduate study], your statements must be supported by evidence either by research or the literature review. I have done reflective thinking about critical thinking after writing several essays. Firstly, you must find some support to support your opinion. Secondly, you may see some people support one argument in some literature, but they may get the evidence under certain contexts. But other group of people may get other results in different contexts. You need to consider this. For example, if you are researching an educational phenomenon in the UK, then it might be not very appropriate to reliant on many American resources. It is also about comparing for and against, commonalities and differences (P9, female, age 23, TESOL, line 106).

From above, it can be seen that P9 experienced difficulty in understanding critical thinking at the start of the course. Similarly, P2 described that when she saw the comments from her tutor about her essay, which said ‘no critical thinking here’, she did not understand the meaning of it or how to improve. Although critical thinking has been regarded as a major challenge among a large number of participants, some of them reported that they had developed these skills. Take the example of P9 and P28:

I feel it [critical thinking skills] has been improved significantly. I did not even have the awareness before when I was doing undergraduate study but now I would stress it from time to time. Now when I am writing essays, I would pay attention to the research context, sample and how the researcher generate findings. Because for some research, it might only work with certain sample and the sample size may not be big enough. I have to doubt when I need to cite this kind of information. I did not do this before when I was doing undergraduate study, I would use some information if I feel I can use such information to my advantage. Because I would still go to the CNKI to read around 3 journals written

by Chinese scholars. One obvious thing I found some journals on CNKI, the authors did not mark the reference and the year within the content but they just list out all the references at the end of the article. It is incredible because people believe CNKI has the authority. When we read such journals, how could we know where does the statement come from. I do not know why these journals could be published (P9, female, age 23, TESOL, line 110).

Before [referring to undergraduate study in China], I thought what I read is right and I just used the ideas. Now when I am reading I read with question. And consider different people's viewpoints (P28, female, age 22, TESOL, line 120).

As it can be seen from above, critical thinking is a major challenge for many participants at the beginning of their course, but some students reflect actively based on their assignment and learning experience, as in the case of P9, and gradually improve their critical thinking skills.

6.4 Content creation and strategic skills

6.4.1 Students' activities related to content creation

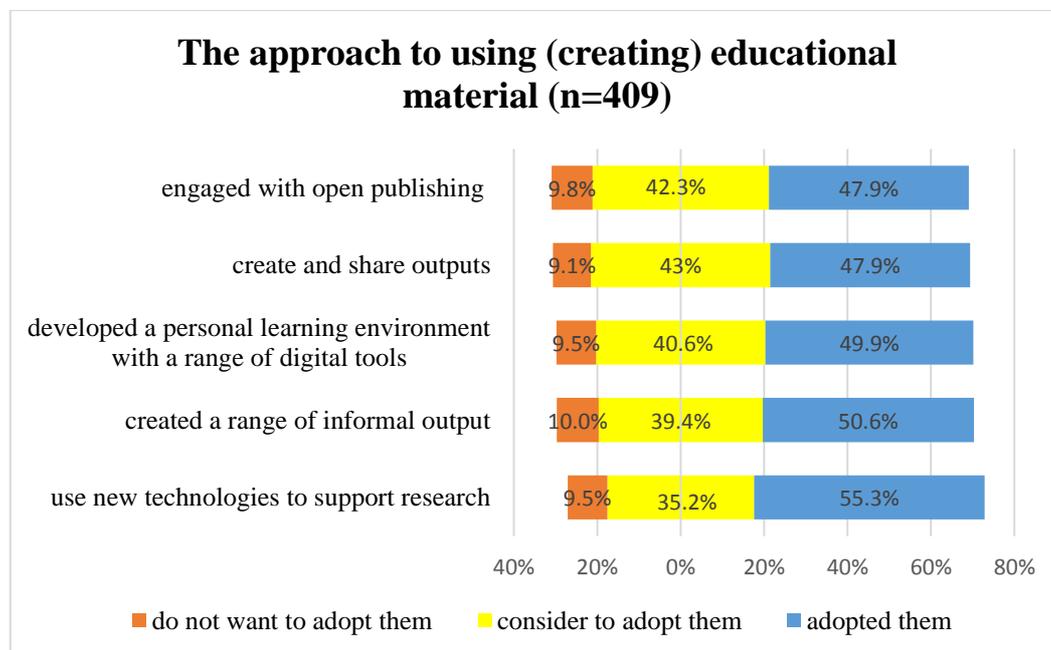


Figure 34: Participants' approach to using (creating) educational material (n=409)

Questionnaire item 5 asked about participants' approach to use and create educational resources. Based on the survey data, around half of the participants reported that they have used the following approaches to using (creating) educational material: engaged with open publishing (47.9%); created and shared outputs (47.9%); developed a personal learning environment with a range of digital tools (49.9%); created a range of informal output (50.6%); used new technologies to support research (55.3%). However, there is also a small percentage of participants who do not want to engage with open publishing (9.8%) or create a range of informal output (10.0%).

The photographic journaling gathered some moments when students are studying or involved in appropriation. A typical example is a below:



Figure 35: Data from the photographic journaling (P5).

Figure 35 is a photo collected from P5 when he was studying in the library. It was exam period and the library was busy. He wanted to go to the café and created this content to convey the meaning that he will be back to other people while he is absent. Other examples also show students involved content production and communication, shown in box 1.

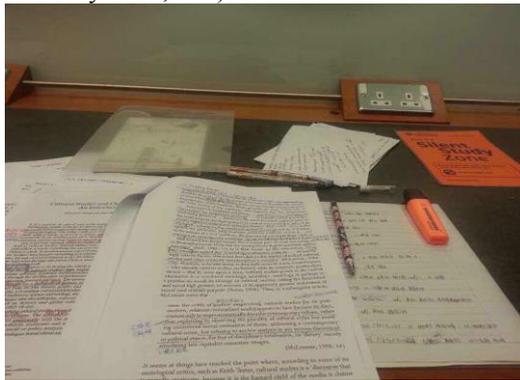
Box 1: Examples of the photographic journaling (n=4)

‘Two bottles of water, two calculators, I am not fighting alone. Working hard for exams! - to cheer each other up’ (9.51pm, 21 May 2014, P4).

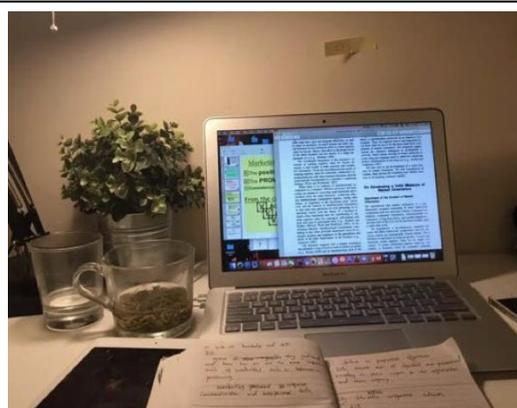


‘Working on an assignment with my classmate in the café. We discuss things together but it is a little bit difficult to concentrate on writing’ (3.15pm, 15 March, 2015, P18)

‘I am in the library reading journals. I feel my brain has not been accustomed to the fact that I am already a postgraduate student. It is so much efforts to read academic journals’ (11.35pm, 20 February 2015, P18).

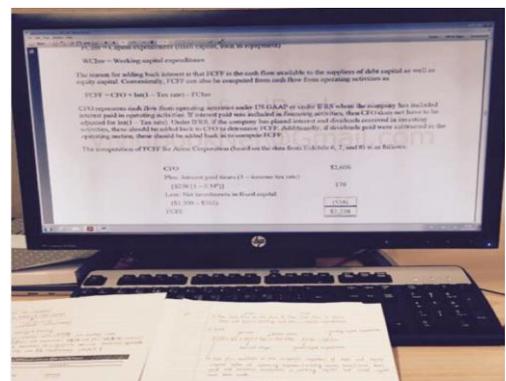


‘Reading papers for my dissertation at home alone, with a phone at hand to look up terms’ (10.32pm, 10 May 2014, P4)



‘I was writing my essay to meet the deadline. It is so late now, I feel tired and hungry’ (2am, 5 February, 2015, P12)

‘Prepared the test on financial reporting at the library. Using the big screen help me to concentrate on details’ (9.12pm, 19 July, 2014, P5)



Data from photographic journaling captured some moments when participants were conducting studying related activities. Similar to mind maps, it found that learning is a complex activity involving fast-moving social networks, materials and spatial aspects of practices. For instance, students' learning involves both digital and non-digital elements. Although digital practices exist, students writing on papers and textual practices are still overwhelming (P5, P18, P12). Students describe digital resources on the laptop to generate upstanding (e.g., P18), while they also distinguish the differences in different spaces, such as the library is quiet and has the big screen that helps the concentration (e.g., P5). Another example can be seen from the below figure:

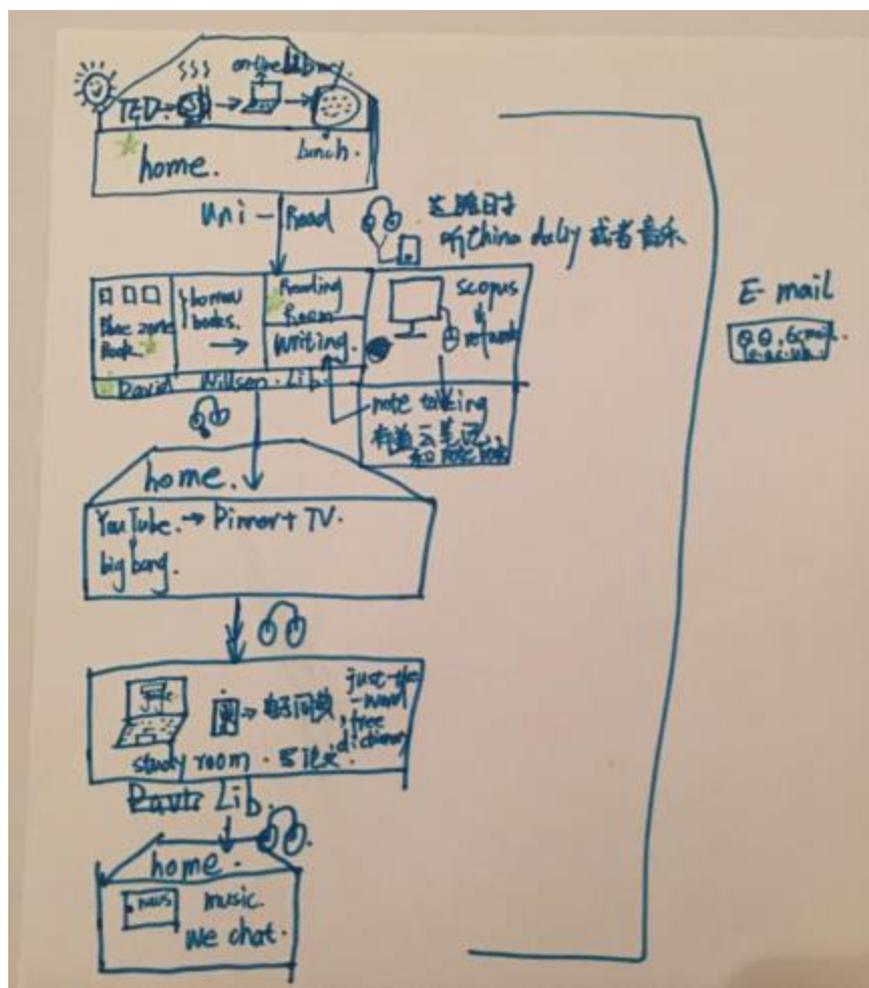


Figure 36: Participant's uses of technology within a typical day (P1, male, age 23, Translation).

Figure 36 describes a typical day based on P1's experience. As shown in the figure, P1 usually starts a day by having breakfast and coffee while watching TED talks or checking the online libraries. After having lunch, he then walks to the university library and he has the habit of putting on headphones whilst he is walking to immerse himself in his world

listening to podcasts or music. There are a lot of activities he normally does at the library in different spaces such as borrowing physical books from the blue zone, searching for electronic resources using Scopus (<https://www.scopus.com/>), reading and writing and managing references with the aid of Refworks (<https://www.refworks.com/>). He then goes back to the dormitory to have dinner and watch TV during any breaks. In the night, he walks to the study room and mainly concentrates on writing essays using his laptop and dictionary. After finishing studying, he would walk back home with headphones on again and would relax by listening to music or watching the news. He also describes that he uses communication tools such as email and QQ throughout the day. P1 described that digital technologies have become essential tools of communication while he sometime tries to shy away from the communication tools to concentrate on studying. It indicates that he has developed a strategic attitude towards uses of digital tools.

Student reported more content creation activities with regard to writing essays and they expressed concerns with producing content in an ethical manner. The ethical aspect of digital skills means interacting through ICTs in a responsible way (Calvani et al., 2008). It emphasises the ability to use technology and information legally and ethically, and to be aware of copyright issues, intellectual property and plagiarism. In light of the interview data, a lot of participants were concerned about the issue of plagiarism, especially at the beginning of their postgraduate study. Some participants talked about how their undergraduate study did not emphasise the issue of plagiarism:

I feel the tutor's requirement at that time is that you cannot copy and paste other people's essays. He did not make it clear that you cannot plagiarize, and I plagiarized many times for my undergraduate essays. But there were no requirements for critical thinking skills but only formatting requirements (P7, female, age 23, Management, Finance and Accounting, line 86).

For the dissertation in China, the requirement for paraphrasing is very low. Sometimes they do not check your plagiarism rate. Sometimes you could get what you want by searching Baidu. For some contents on Baidu, they do not have the copyright. And you do not know the original sources because they might just be personal thoughts. But some thoughts are meaningful which can be used. I compared different points and then rewrite them (P9, female, TESOL, line 98).

Based on the regulation, we did have to paraphrase. But I think the undergraduate did not have a strict requirement and we did not detect the plagiarism rate. I did not spend much effort on paraphrasing during undergraduate study and now I paraphrase every sentence of the source (P20, female, age 24, Data for Business in Technology, line 245).

We had rule about plagiarism in undergraduate university. I think the study here [referring to the UK study] emphasise much more about plagiarism than it was in Chinese university. I think Western countries pay more attention to the copyright than China (P21, female, age 25, Media and Advertisement, line 58).

The above examples illustrate that some students were concerned about plagiarism because this had not been emphasised as a major issue during their undergraduate study. Some students had also been allowed to write their personal opinions during undergraduate study in China, even without existing literature to support them (e.g., P9). This has led to difficulties in comprehending the concept of plagiarism. A typical example is P2, who demonstrated a misunderstanding of referencing:

My tutor says that there is something wrong with my reference. For translation, sometimes there are original text. I only provide reference for original text, which I quoted directly. But the university has a system called ‘Turnitin’ to check the repetition of the content of your work, so I don’t want to use too much direct quotation as it will increase the repetition rate. I seldom use direct quotation; therefore, I think I don’t need to put references (P2, female, age 23, Translation, line 137).

From P2’s viewpoint, she does not look at the original content and her paraphrasing is very different from the original content. She does not reference all her content because she feels that if she uses references throughout her essay, then it means that she does not have original ideas. In her case, P2 perceives that ‘providing references wherever possible equals ‘no originality of the work’. However, she is not aware that passing off ideas from other’s work without crediting the source can disguise the seriousness of plagiarism.

In addition, one participant pointed out the underlying issue of plagiarism which, from Pennycook's (1996) perspective, is culturally related to the epistemological beliefs about the relationship between text, knowledge and learning:

I feel some Chinese academics do not have a strong sense of avoiding paraphrasing even they are professors. I selected international trade as my pathway for undergraduate degree. I read many definitions about E-commerce and commercial podium. Almost all different authors have the same definition. I even feel they have copied and pasted the definitions, because even every single word is the same. I read paper written by four people and they all used the same definitions (P13, female, age 24, Media, line 147).

As it can be seen from this student, she became more critical with as her understanding. Her awareness of the issue of plagiarism increased during postgraduate study, thus she was critiquing that it is common to see identical definitions of certain concepts in Chinese academic journal papers. The underlying issue of this might be because that, in Chinese culture, it is said that 'verbal debate and argumentation are not meaningful tools for understanding truth and reality (Ji, Peng & Nisbett, 1999, p. 747)'. Yet, imitating and mastering authoritative knowledge transmitted through well-acknowledged text is often deemed as a major practice in Chinese education (Stone, 2008).

During the interview, participants also reported their online practices with regard to e-safety. Such practices especially those developed at work often has an ethical component. For example, P27 developed e-safety practices regarding career in accounting, as he demonstrates:

I think the working experience can help you to develop your critical thinking ability. For those things, you have learnt from text books in school, sometimes you may think they are right but they might not be that important in the practice. For example, career ethics are very important to accounting jobs, such as you cannot forge accounts. And the network security. When I was working, we were required that our personal computers must be encrypted and even your colleagues cannot access to the data. Each of us is working independently and we can only report it to the superior. I think because of this working experience, so I have developed a strong sense of security on the network. Particularly those related to banking. I must log off your account than close the window. Because if you close the window straight away without log off your account, the next people who open

the browser may lead to the same interface. It is a simple but often overlooked example. Another example is always log off the computer then switch it off (P27, male, age 23, Accounting, line 106).

Shown as above, P27 demonstrated that working experience helped him to strengthen the e-safety awareness. However, students also reported the potential e-safety risks due to their unfamiliarity with the new digital environments. P2 described how she experienced with financial loss because she filled in sensitive information (i.e., bank card details), as P2 illustrates,

Normally I fill real information and real name on the website, but I lost some money because of this, I subscribed to a website. The first three months are very cheap, only 18 pounds per month. After three month I wanted to cancel the subscription but I did not pay attention to the timing. Because I had provided the information of my bankcard, so they charged me for another three months before the following month. I subscribed quarterly. But the subscription for the next quarter was very expensive. So, I feel you had better not to provide the information of your bankcard online. Although I knew that they would not charge me carelessly, but I did not expect that they would charge me much earlier before the expiry date. So, I suffered from losses. Now I can only cancel from August (P2, female, age 23, Translation line 208).

P2 described the financial loss due to unfamiliarity with certain websites and not reading the terms of subscriptions. Likewise, one student also expressed the e-safety issues regarding spam emails. P18 described her experience as below:

Sometimes they are strange emails come to my university mail. I have received email that asked me to join business service and emails that tells me that I can redeem an Argos gift card which worth 100 pounds. And once an email informed me that I am the Google winner. I ignored these emails because it was very obvious that they are spam emails. Only one time, I was nearly cheated. I received an email that pretend to be sent by University of Leicester, and the email says that they noticed a spam attack on my data and asked me to protect email through following certain instructions. I nearly click on the link provided because they were a lot of spam emails before. However, just before I open the link I

noticed that the email address is a bit wired. It does end up with something like edu which seems like coming from the education sector but I was not sure if it is from our university. I brought my laptop to the IT services showed it to the IT staff. The lady said that if anything pretends to be sent by university but does not show the university email address, they are spam emails and I can add them to the block lists (P18, female, age 23, Translation line 297).

P18 revealed the potential e-safety risks among international students. Because students come into new studying environments, they might be a vulnerable group which are often be targeted by spam emails.

6.6 Chapter Summary

This chapter attempts to answer the research question ‘what is the development of Chinese international students’ digital skills during the transition from undergraduate study to postgraduate study?’. This chapter discussed Chinese international students’ digital skills and issues in relation to technological aspect, informational handling and critical thinking, and ethical aspect.

In terms of the technological aspect, firstly, most of the participants were confident about using generic tools such as word processing because they had previous experience with it, but a small number of participants experienced technical difficulty such as formatting issues and writing functions. Secondly, there was a discipline-specific difference in using statistical software.

A large number of students from social science reported their experience with SPSS. It found that during postgraduate study, their learning with statistical software had been largely on their own. Therefore, the development of technological aspects in this area is highly associated with their perception of the usefulness of the software and their motivation. Only one student expressed confidence in mastering SPSS, and it was found that she had had more experience with SPSS during her undergraduate study: she learnt it in the computer room step-by-step and used it for her dissertation. Other students reported different technical issues or a lack of knowledge regarding the data analysis method.

As for information handling skills and critical thinking skills, it was found that students develop their own methods to search for information such as using key words search. They also used different methods to judge information such as citation numbers. It was found that language inadequacy was a challenge for students, as some could not effectively obtain the desired English articles or understand English concepts.

In order to adapt to this challenge, some of them combined Western and Chinese sites to look for resources, or to check the Chinese explanation of certain theoretical concepts. Critical thinking has been reported as a primary challenge for the majority of the students because this skill was not emphasised or practised during their undergraduate study. However, some students tried to be reflective and modify their skills as they went along.

Ethical aspect also cannot be neglected, particularly the issue of plagiarism. Some students experienced difficulty in comprehending plagiarism, partly because it was not emphasised or detected during their undergraduate study. However, some students increased their awareness of the ethical uses of online information and respected copyright. This chapter is about important digital skills, and the issues revealed by participants. The next chapter focuses on how to support Chinese international students to enhance their learning experience with digital technology in order to develop their digital skills.

Chapter 7 - Data analysis-RQ3: How can Chinese international students be supported in enhancing their digital practise to adapt their learning in a UK university

7.1 Introduction

This chapter reports factors that emerged from the study that influenced students' digital practices. During the data analysis of the qualitative interview, it was repeatedly found that Chinese international students' digital practices and the development of their digital skills during the transition from undergraduate study to postgraduate study were associated with other factors such as: changing assessment; students' beliefs and motivations. This Chapter discusses the factors that account for students' digital practices. Based on these insights, implications regarding how to develop students' digital skills will be proposed in Chapter 8. The focus of Chapter 7 is answering the third research question- How can Chinese international students be supported in enhancing their digital practise to adapt their learning in a UK university?

7.2 General barriers of using Web technologies

The research (questionnaire item 8.2) investigated Chinese international postgraduate students' perception about the barriers of using Web technologies. Responses to Likert-style belief statements were measured on a scale of 1-5 (1=strongly disagree; 2=disagree; 3=not sure; 4=agree; 5=strongly agree). The alpha coefficient for the eight items in this question is 0.810, suggesting that the items have relatively high internal consistency. Items for constructs around participants' self-perception about barriers for digital practices is shown in the below table:

Table 9: Mean and standard deviations of responses to statements about participants' personal barriers of using social networking sites for learning (n=409, questionnaire item 8.2, Cronbach alpha=0.810).

Statement	Mean	Standard deviation
I lack previous experience of using Western social networking sites due to some sites were not accessible before.	3.20	0.949
I feel I lack the motivation to adopt new Social networking site.	3.18	1.009
Social networking sites is not very useful for my coursework learning.	3.14	1.168
I feel it is difficult to understand online English terms due to language inadequacy.	3.31	1.006
I find it is difficult to find, identify and view relevant documents.	3.18	0.992
I lack good grasp of technologies.	3.17	0.994
I feel it is difficult to synthesis online information.	3.25	1.057
I feel it is difficult to evaluate and analyse online information.	3.36	0.980

In analysing the mean values of the items, means of less than 3 are regarded as negative and means with a value of more than 3 are regarded as positive to the statement. There seems to be more students who report that it is difficult for them to evaluate and analyse online information (mean=3.36). Participants generally agree that it is difficult for them to understand online information due to language inadequacy (mean=3.31) and to synthesize online information (Mean=3.25). There is also general agreement on the difficulty in relation to: lack previous experience (mean=3.20); lack the motivation to adopt new technologies (mean=3.18); not perceive the usefulness (mean=3.14) and lack

of technical skills (mean=3.17). The next section discusses the factors and barriers, which emerged from interview data, that influence students' digital practices.

7.3 Factors that influence Chinese international students' uses of digital practices and the development of digital skills.

7.3.1 Wider context: virtual digital divide

Sharpe and Beetham (2010) argued that 'function access' (ownership of digital devices, access to resource and time) is the fundamental step for students to use technology effectively. Research data shed some light that there is not a big difference in terms of their ownership of digital devices from undergraduate study to postgraduate study. However, the study confirms that access to network and information is an important mediating factor that influenced participants' digital practices. As noted in the introduction chapter, there is a virtual digital divide, the artificially prohibited access to information in China due to the political censorship. The present study confirms that the virtual digital divide is one of the factors that mediates students' uses of digital technologies.

Interview data reveals that not all students have equal access to information during their undergraduate study. Those participants who did undergraduate study in the UK (15) and Macau (P24) described that they did not have problems using Western social media or accessing English sites. However, this is not the case for the rest of participants. During the interview, many participants noted the negative influence of censorship in China. Some had already noticed this critical social issue during their undergraduate study in China P5, for example, described how this unequal access to resources had a negative impact on his undergraduate study:

We often cross the fire to access Western sites in order to look at open source of software. Because I am not familiar with the logic of certain algorithms, and the quality of the open source codes in China is not that advanced. But many western websites are blocked, so I had to cross the firewall to see these resources. The available resources are like examples, part of the entire codes. They are open. I could share and modify them for my own uses. (P5, male, age 23, Management, line 77).

As pointed out by P5, crossing the firewall to access source codes seems to be a common practice among peers in his discipline. P12 and P23 provided supportive evidence by stating ‘open source data in domestic sites does not work well’, and ‘it is easy to obtain good quality open source data from Western sites’. As described by P5, this practice is highly likely a bottom up approach, contacted by students in China’s universities. Having finished an undergraduate degree in Posts and Telecommunications at Beijing University, P5 viewed censorship as a complex issue and he expressed that he ‘does not know’ why certain English websites are blocked. He mentioned that his principle was ‘Fang Bing Xing’, who is well-known for a substantial contribution to China’s internet censorship infrastructure. He quickly bypassed this topic but pointed out that many peers in his discipline are oppressed by the fact that it is difficult for them to access information that is important for their study. As he observed during his internship at an Internet company, he learnt that many staff in Internet companies in China cross the firewall to access needed information:

You see many videos on www.youku.com are downloaded from YouTube. The companies provide tips about how to download materials by crossing the firewall at the fastest speed. For Baidu, I was in contact with a person who views the content on Baidu. His job is to search and filter sensitive contents. He defines the sensitive words by crossing the great firewall. Because he has been working with the Central Propaganda Department for long time, so he has the experience to decide what are the sensitive contents and sensitive website (P5, male, age 23, management, line 87).

P5 might be one of the participants who had already developed an understanding of the unequal access to information and how this could prevent his professional development. Other students also revealed they had ‘crossed the firewall to watch BBC news’ under the influence of her roommate who was studying translation (P22, female, age 23, New Media and Society); ‘crossed the firewall to login Facebook’ due to curiosity during undergraduate study (P16, male, age 27, Marketing).

However, not all participants had an awareness that there was an absence of learning opportunities due to the issue of the virtual digital divide. Some students reported ‘not knowing about Google scholar’ during undergraduate study (e.g., P1; P22). Students generally reported a historical virtual digital divide based on their previous studying

experience. P13 (female, age 24, Media), who wanted to find English resources during undergraduate study, reported that there was a lack of English academic resources based on her experience during her undergraduate study in China. Sometimes she could find some English resources, but then she experienced the problems of opening the site. P13 showed her appreciation that her UK University subscribes to numerous online databases and resources, providing her with sufficient resources.

This historical virtual digital divide may lead to the issue of a ‘participation gap’ but it is also a difficult concept to pin down. As noted in Chapter 7, when working on one assignment about the ‘politics of digital media’, P13 was confronted with difficulties in obtaining case studies from Western politics as she seldom experienced Western social media. A conflict can also be seen between the tutor’s view on Chinese censorship and some Chinese international students’ opinions:

At the beginning of the course of ‘the politics of digital media’, many Chinese students often felt unpleasant when the tutor was critiquing about China. This offended Chinese students as they are feeling great about China. For instance, when the tutor was talking about the Fa Lung Gong [often understood as a spiritual practice in the Western context], he thinks the Chinese government is controlling the freedom of a normal organization. But some students argued that Fa Lung organization is an evil threat because some members did many destructive things. I think it is because we have different mind-set. For them, they may think people have the free rights to do things to court others’ attention. But for us Chinese people, we think social order should not be disturbed. But because that course, I read many Western comments about the Chinese politics which make me feel it is difficult to say which one is real and I started to be critical about the Chinese politics. The Chinese media always say something in a different way compared to the Western media. I think maybe media is propaganda which serves the purposes of a government (P14, female, age 23, New Media, line 137).

P13 reported a tension at the beginning of the course due to contrasting views about political information in relation to Fa Lung Gong. This is corroborated by Guo’s (2010) finding that displeasure and resistance from Chinese international overseas students was witnessed regarding Western media coverage of Chinese human rights issues. This may

indicate a need for culturally sensitive pedagogy to engage Chinese international students when teaching political issues of social media.

P14 perceived this tension as attributed to ‘mindset’, indicating that there is a perceived difference in ideologies constructed in different sociocultural contexts. What is interesting to note is her growing criticism of the digital media as a result of her continuing and increasing engagement with the digital media, and as a result of evaluating media reports from different angles. This is associated with Buckingham’s (2007) notion of media literacy as discussed in Chapter 3, which points out it is important to recognise that reality in media coverage is interpreted in a selective manner and it is neither politically neutral or socially neutral. P14 further expressed how the postgraduate course changed her cognitive thinking about critical social issues:

The censorship in China is very strict. I cannot watch sensitive contents [in China]. Thinking about this problem, I do not want to go back to China because I can access to information here [referring to the UK] which is blocked in China (P14, female, age 23, New Media, line 139).

While her statement may be extreme, it demonstrates how postgraduate study is significant in developing her mind to be critical about political information on social media. She then mentioned about this issue repeatedly during the interview:

I think China is taking serious control over the information. I think the information in the UK environment is free and abundant. Many of my friends who are currently doing their master degrees in China, they often send me a list of the English literature and ask to help to download these resources. Or sometimes they give me some key words and ask me to help them to search and download some articles. I think because China is controlling the free flow of the information, and it jeopardizes the development of Chinese academic research process (P14, female, age 23, New Media, line 143).

Although in P14’s account, her friends can use the Internet as a solution to connect with her to seeking help obtaining resources, other students in Mainland China may be oppressed by this fact or even not be aware of this issue.

For example, Chao et al. (2017) recounted experience of an international librarian exchange programme that brought together the City University of New York (CUNY), Shanghai University and Shanghai Normal University spanning from 2010 to 2011. From the exchange programme, there was a recommendation that Chinese university libraries ought to fulfil their responsibilities to challenge the censorship and to provide fair access to information and enlightenment through technological fixes (i.e., VPN and proxy software). However, such practice of challenging censorship in public seems to be not feasible. Moreover, self-censorship is not uncommon. At one class, one participant intentionally bypassed the topic that Chinese academic libraries and the U.S. both subscribe to EBSCO databases to avoid possible questions about, for instance, omitted citations based on sensitive content (Chao et al., 2017).

In line with this, P14 described how she feels about Chinese people behave on social media:

I think Chinese people behave different on Chinese social media as they seldom write anything sensitive. For one course of the postgraduate, I was writing an essay about sensitive words. I found Chinese people, normally if they write sensitive words online, such content would be blocked very soon or deleted. For example, on Sina Weibo, the Sina secretary can delete your post if there is sensitive content (P14, female, age 23, New Media, line 163).

As above, P14 is aware of self-censorship behaviour among Chinese social media users, and such awareness is potentially developed through doing the course assignment. As it can be seen from the above examples, due to the virtual digital divide and the fact that China provides its citizen with many alternative Web technologies, some of the students are not familiar with Western social media. This cultural and social issue is one of the reasons of a lack of use of Western social media among participants. For example, P8 used Facebook for a short time during her first master's degree to discuss group work with peers, in the meantime she was inactive on Facebook but active on WeChat, and for her second master's degree she seldom used Facebook because there was not much need for discussion with Western peers.

P14's remarks are interesting to note; however, it is difficult to pin down the fundamental meaning. One of the interpretations can be that digital skills is linked with cultural and social issues. Sociocultural theorists (Buckingham, 2005) argue that the relationship between Internet users and social media is linked to social and cultural contexts, thus literacy is regarded as inextricably linked to cultural and political power. It is therefore important to note how students' decisions on using Web technologies are shaped in different contexts and influenced by social and cultural issues.

7.3.2 University technological conditions

Interview data revealed that students' digital practices are contextually shaped, which is associated with the changing technological conditions from undergraduate study in China to postgraduate study in the UK. The next section focus on reporting how technological conditions shape students' uses of digital technologies for learning:

Wi-Fi

Interview data show that the technological infrastructure in Chinese universities has been improved in terms of providing Wi-Fi services compared to my personal experience. A lot of students reported that their undergraduate university provided Wi-Fi that either covered the whole campus, or covered important study areas such as library or teaching buildings. Some students reported that they accessed the internet through broadband arranged by themselves in the dormitories or for use on their mobile phones. It seems that the digital divide as in the physical ownership and access to the Internet is not the major factor that influenced their digital practices and skills, however, it cannot be ignored that there are still students who complain about the Internet services provided for their undergraduate study. For example:

I feel my Chinese University is a little bit mean. You need to buy a card called 'Xing Xing' card that cost 10 RMB. With that card, you can use the Internet in library for 10 times. The internet speed is very slow in the library (P9, female, age 23, TESOL, line 126).

As shown above, P9 shared her unpleasant feelings about the Internet services during her undergraduate study because the Internet was not free and was very slow. This indicates that a small number of students may still previously have been deprived of free and

reliable Wi-Fi services during their undergraduate study. However, the majority of students did not report this issue.

Virtual learning environment (VLE)

As briefed in Chapter 5 there was a clear absence of using Virtual Learning Environment (VLE) among the majority of students during their undergraduate study. Those who had had previous experience with VLE, expressed a negative attitude towards the uses of VLE in their previous Chinese universities. For example, P21 pointed out that there is a need to select a suitable VLE that can accommodate the overwhelming student numbers. Another issue is associated with pedagogy. In her account, P8 said that her Chinese tutors used VLE to upload learning materials and organise group discussions. However, she experienced a feeling of being ‘forced’ to use Blackboard during undergraduate study:

Interviewer: How about its’ functions? Is it the same with the Blackboard here in the UK?

P8: Very similar. The tutor uploaded course materials and we had group discussion. The tutor raised a question and then let us to discuss about it.

Interviewer: Did the tutor often organize the discussion activity?

P8: Yes, around two tutors have done it one time or twice. But they forced everyone to write something for the discussion. Everyone has an account and once they publish the information it shows who has published the information. But I do not feel it is nice and useful. If they force students to join the discussion, then the students would lose their interests. And for the discussion I feel it is formality that matters more than the content. But they did not provide us adequate feedback or comments. They mentioned very briefly about it during the classroom. I think even the tutor is also not very serious. It is like the practice required by the university. Because the university has paid money for the VLE and the University was promoting it. Then the tutor feel obliged to use it. But I feel I am more interested in the topics here in the UK, and tutors they sometimes give you resources like the preliminary reading. And the students email. We also have university students’ email accounts in the university in China but nobody was using it (P8, female, age 23, Translation, line 64-72).

Based on P8's experience, she felt her uses of VLE during undergraduate study was 'forced' by her tutor. She regarded the discussion on VLE during undergraduate study as a 'formality' - something that has to be done because it is required by the undergraduate University. However, she did not perceive the importance or the usefulness of this practice attached to her study. This is probably because she had less interest in the course materials shared by that tutor during undergraduate study. As she recalled, she was more interested in the materials uploaded by the postgraduate tutors in the UK. In addition to this, there seemed to be a lack of tutor engagement for the discussions on VLE during her undergraduate study, for the tutor did not provide adequate feedback on students' discussions at VLE. This gave P8 the impression that the tutor was not 'serious' about the discussion in the group, and this in turn led to a lack of general interest among the student group.

Another student commented that his undergraduate tutor was reluctant to use VLE, partly because they were used to more traditional teaching methods, as was heard in P12's story:

My University had VLE but normally we just used it for the English classes. The undergraduate tutors were not used to it, and they preferred to use the traditional way for teaching and for the submission of the assignments. But for the English classes, Blackboard was used a lot for doing assignment such as doing the choice questions. We logged into it, did the choice questions and then submitted it online. Then we could view our scores on the system. Once we finished answering all questions, the system informed us of our scores. We did not have explanations for the right options but we could ask tutor in person. Because all questions were like testing the vocabularies and grammars (P12, male, age 23 Financial Mathematics and Computation, line 76).

The above remark shows that on the basis of P12's experience in his undergraduate University the implementation of VLE was not practised widely and only the English course tutor used it for an online quiz. In his view, an English quiz can be easily applied to VLE therefore the English tutor was using VLE. However, this practice was not generally used by other tutors. In addition, there was an absence of feedback from the online activity; P12 explained that there were no explanations provided for each quiz, but students could ask the tutor if they wanted to.

However, when asked about VLE for postgraduate study, P8 and P12 reported it was useful for their study. Generally, students reported not having difficulty in using VLE, and they held positive attitudes towards VLE. Many students reported using VLE as a place to view and download learning materials:

I think it is very useful. It contains many teaching and learning resources, and also announcements. I could watch these resources on my phone. It is very convenient (P10, female, age 23, Public Relation, line 294).

Some students commented that ‘Chinese university should learn to use VLE’. In addition, P22 expressed that:

I think the construction of VLE or websites of Chinese universities, at least the ones I have seen, are far behind of those of the Western universities. Especially the online systems for self-directed learning. My undergraduate university did not have VLE, but we could download all resource in CNKI using university accounts. The websites of undergraduate study contain mainly administrative information but seldom have learning materials. It would not improve you study. Only very famous teacher shared their slides. You can download them but it is updated very slowly. (P22, female, age 23, New Media and Society, line 63).

From P22’s viewpoint, the website of her undergraduate university mainly contained administrative information, therefore she did not use it a lot for her study. She also points out that there is a lack of online learning resources shared by undergraduate tutors. Towards the uses of Blackboard, participants generally described their interest in its learning materials shared by tutors and the uses of VASC (a platform that can be used to improve English listening, speaking, reading and writing). VASC was mentioned by students who did a pre-session course (e.g., P26; P28; P29). Others also mentioned the mailing list on Blackboard, for example:

The Blackboard has many functions. I could even use it to send group emails. I can use it to email my tutor. When login to your Blackboard, you can see different mailing list. You could also select different categories and to send emails them. Because I am the course representative, so I need to collect feedback from the students. At first, I did not know I could use mailing list. I send emails one by

one to all students and I was exhausted. Later I found this function and it became so easy. (P9, female, age 23, TESOL, line 122).

As described by P9, she did not know about the mailing list before. As the course representative, she used to send emails one by one. Later on, after she discovered the mailing list function on Blackboard, she used the mailing list to email peers. Although a few students pointed out Blackboard's lack of 'interactive features' that allow students to search the content. Although one student (i.e., P20) reported not often using VLE due to 'laziness', the majority of students held positive attitudes about VLE used in their postgraduate study.

Library

Another important change in technological conditions discovered in interviews is associated with services provided by libraries. Most of the students who did their undergraduate study in China, described the library services in China as not as good as the library services during their postgraduate study in the UK:

Our [undergraduate] tutors did not read Journal quite often by themselves. They might recommend some books to us, but they did not teach us quite often about how to use the online resources and the library. I went to the library mainly because there are air conditioners in the library and I was mainly reading novels. Not many people were reading the specialized books for our majors. Maybe because the books are limited and we only subscribed to few journals (P8, female, age 23, Translation, line 104).

The facilities in the [undergraduate University's] library was not good. We did not have a website for the university library and databases. (P16, male, age 27, Marketing, line 14).

The resources on the library [undergraduate study] was very limited. If you want to read books, you have to go to the physical library (P17, female, age 23, Media, line 7).

P16 and P17 described having access to limited resources during their undergraduate study. They mentioned that in their undergraduate university, physical books are normally displayed on shelves, and there are desks arranged line by line next to them. In addition, the above students pointed out that there were limited online resources provided by their

undergraduate university. More often, they went directly to CNKI to seek journal articles. This may give an explanation to the question of why some students (e.g., P12; P16; P27) reported that they did not know they could search academic resources using the library websites at the very beginning of their postgraduate studies.

It is worth noting that there is a difference in terms of the Wi-Fi services and the provision of VLE and library services between participant's undergraduate university in China and their postgraduate university in the UK. The above examples shed some light on understanding how technological conditions can be a mediating factor that influences participants' use or lack of use of digital technologies for learning. However, these differences do not seem to be the main barrier to using the library database and VLE. Many students build up their skills during their study, such as through experience and experimenting (such as P9's example of using a mailing list above).

7.3.3 Tutor and the focus of learning

Interview data reveals that the tutor's role and teaching strategies are important factors that influence students' experience with technology and their digital skills. Interviews discovered that the focus of the participant's higher education in China at undergraduate level is highly associated with the declarative knowledge and practical skills in relation to the subject studied. This is in parallel with Allinson's (1989) viewpoint that the focus of Chinese education is placed on the acquisition of declarative knowledge (factual information) and procedural knowledge (knowing how to perform particular tasks). In addition, it found that participants' undergraduate teachers' teaching strategies were highly associated with the above focus.

Undergraduate teaching and learning

The most common scenario during undergraduate study described by participants was tutors giving lectures delivered by textbook and PowerPoint:

Most of the time, they [Chinese tutor] used PowerPoint. They also used printed books. (P25, male, age 22, Management, Finance and Accounting, line 73).

They [Chinese tutor] used PowerPoint for teaching, especially for small classroom. We also rely on their slides a lot when preparing for exams, because most of content are on their slides (P27, male, age 23, Accounting, line 79).

Most of students reported that their undergraduate tutor used PowerPoint and textbooks when teaching declarative knowledge. There were also situations in which tutors used chalk to write on the traditional Blackboard because they had to deduct or demonstrate an algorithm step by step (e.g., P12).

In addition to this, the interview revealed that not only did students have different a set of digital skills, their tutor's skills also varied. Students' comments about their undergraduate tutor's digital skills ranged from 'too old to be able to make PowerPoint slides (P1)' to 'be advanced at using technology (P2)'. For example:

I think it also depends on tutor's age. For some of our [undergraduate] tutors who are elder, they only used textbooks for teaching. They thought PPT is not good within teaching but some younger tutors used PPT for teaching (P1, male, age 23, Translation, line 112).

Some [undergraduate] tutors just used textbooks to teach you. Some [undergraduate] tutors, for instance, those who were teaching management of the cultural management, they showed some videos to us. I feel different subjects have different delivery designs (P9, female, age 23, TESOL, line 25).

As it can be seen, participants' undergraduate tutor's skills varied and their uses of technologies in the classroom sometimes catered to their subjects. This challenged the digital native/digital immigrant dichotomy (Prensky, 2001). There were a few distinctive examples mentioned by participants where they felt their tutor engaged with technology for teaching pedagogically during undergraduate study:

We had a module on human chemistry [undergraduate study]. At the beginning of the session, the tutor plays a section of the animation *Detective Conan* selected by himself. He then picked up chemistry knowledge that is linked to the animation and delivery his session. This module was renamed as *Detective Conan and Chemistry* ('名侦探柯南与化学'). This module is very engaging. It was reported by news and social media (P25, male, age 22, Management Finance and Accounting, line 78).

P25 talked about how his Chinese tutor was able to spot chemistry knowledge in certain situations inside the animation *Detective Conan* and used animation to engage his

students. To satisfy my curiosity, a search on the Internet revealed a report about this course on YouTube (<https://www.youtube.com/watch?v=YPA2XFtOoyI>). It was found that this tutor's teaching method was highly inspired by his overseas studying experience, and interactions are incorporated into the design of the module (http://news.ifeng.com/society/2/detail_2012_06/07/15102854_0.shtml). This provides evidence that the Chinese teaching method (normally referred to as 'chalk and talk' or 'force-feeding the duck') has been gradually replaced by more student-centred teaching methods (Tan, 2013). It is highly likely that Chinese universities are benefiting from the cohort of returnees in terms of transferring skills invested by 'foreign capital' (Zweig et al., 2004).

The above example, however, was one exception found in the interview, as most of students still regard undergraduate teaching as 'teacher-led' with little room for group discussion:

We listened to tutor's talk [undergraduate study]. We noticed he has used the same PowerPoint for a few years. He used it for teaching last year. He did not change anything for teaching this year. You asked me about whether he makes open educational resources. He did not share any teaching session online. And he refused us when we wanted to record his session (P22, female, age 23, New Media and Society, line 71).

The interview discovered that most of interviewee still think 'listening to their tutor' was the most often practised approach during their undergraduate study. Secondly, it discovered that in their previous study experience, when it came to the sessions about practical skills, some students reported having more experience with digital technologies during these sessions:

Normally the [undergraduate] teacher used PPT for most of the courses. For example, if we have 10 classes for one course. The tutor would teach you theories during the first 5 classes using PowerPoint. And then it comes to the practical things for the next 5 classes and all people are divided into groups to film things. After we made the films, we turned up at the next session to show our products to the tutor. The tutor provided us some feedback during the class. Then we had exams at the end of the term to test theories and we have also submitted the

movies. Both are counted for the final score. (P10, female, age 23, Public Relations line 92).

P10 described that she also had sessions which required students to take digital devices (e.g., camera; radio recording) and make media products. Similarly, other students (e.g., P5; P23) described that some of their sessions either required them to bring their own laptops or they were taught in the computer room.

It was discovered, however, that apart a small number of students who said that their undergraduate tutors had strict requirements for slides (e.g., P2; P21; P23), they mostly found that their undergraduate tutor had less awareness of copyright issues compared with their postgraduate tutor. Another issue was the use of pirated software. As described by P21, during her undergraduate study in China, her tutors provided students with a pirated version of the software to finish their assignment. A similar case was found with P15, who was more tech-savvy and had travelled across many forums to obtain information shared by fandom about cracking a software for free, as some of the software he wanted to learn from was not affordable. Such issues were not investigated in depth, but it indicates that there is a conflict between the ethical behaviour of accessing software and obtaining the educational benefits at affordable costs among some students.

Postgraduate teaching and learning

When asked about how learning in the UK differs with that in China some students from a media background (P15; P10; P16) reported postgraduate study as more academic focused with less practical sessions. A small number of students reported that they had classes in the computer room (P20). The details vary across different disciplines. A few students (e.g., P5) mentioned that tutors used an interactive voting system to engage students: students are given a shared link to a website where they are able to see a multiple-choice question. Students are requested to vote for an answer in about 30 seconds, and the polling result is shown in real time on the big screen.

For classroom learning, rather than the condition of technology used in the formal classroom, most of the students reported that they had more space for independent thinking and group discussion during postgraduate study:

Because I was studying science [during undergraduate study], so I did not have to take many notes. Most of the contents taught by tutors during the classroom are covered by textbooks. I also did not take much notes of the slides because they introduced and explained how to infer a code. when it was a simple programme which did not take much time to make it, the tutor made it for us to watch as a demonstration (P5, male, age 23, Management, line 45).

I still feel [UK] tutors are using PowerPoint. Maybe it because we have too many students in the lecture. But for small seminar which includes around twenty students, I feel the teaching is much better than undergraduate study. Sometimes students can discuss in the seminar. (P17, female, age 23, Media, line 110).

For undergraduate study, I mainly listen to the tutor and read textbooks. Seldom had I had to research many things online. But now I am researching more online (P19, female, age 23, Marketing, line 142).

The UK tutors use more teaching methods. Sometimes there are group discussions. Sometime students are required to do presentations. We also had experience of doing group research (P19, female, age 23, Marketing, line 125).

It is clear that for most of the students, their teaching and learning during undergraduate study in China was more of a ‘teacher-centred’ approach where declarative knowledge was transmitted by their tutor and students relied on textbooks with little need for searching on their own. On the other hand, postgraduate study uses more of a ‘student-centred’ approach in which students are encouraged to discuss with peers. Moreover, as reported by some students, they feel the teaching and learning at undergraduate level is much easier compared with postgraduate study:

I think what I learnt during undergraduate study is very straightforward and shallow. Most of them are outlined before. They are base knowledge. (P23, male, age 23, Computer Science, line 53).

A lot of students reported that undergraduate study involves the acquisition of declarative knowledge or practical skills to master certain technologies. This can also be seen in the format of the assessment (described below). Generally, when some participants searched

for things on the Internet (e.g., P5; P10; P12; P20) during undergraduate study, they tended to search factual information or practical solutions, which did not require them to do much critical analysis work.

This may shed some light on why some students expressed that they ‘do not understand what is critical thinking’ (see Chapter 6) and ‘did not understand the learning requirement (P6; P26)’ at the beginning of their postgraduate study. However, we also need to be critical about this, because the interview reveals that students from different disciplines attach different importance to critical thinking. For example, P20, from the Department of Mathematics, said that her assignment did not involve much critical evaluation of online information but involved more subjective knowledge.

7.3.4 Requirement of assessment

The present study discovered that the requirement of assessment is also an important factor in determining students’ literacy practice. As mentioned in Chapter 6, although the assessment for undergraduate study tends to be diversified, it is still examination dominant (accounting for around 70% of the total marks):

We had exams and essays during undergraduate study. For the exam during the first year, I would say 80% involves memorisation. Then they increased the difficulty for the following years, then maybe 40% of it involves memorisation. But it is very unlikely for students to fail the exams. For some courses, we have essays at the end of the term (P28, TESOL, line 4).

The dominant assessment is the exam. It involves some theories related to economics mathematics. For example, it asks you about some definitions of the terms. Then it has some simulation questions such as it tells you that someone has invested some money and something has happened about his company. Then it asks you to do some calculations. The exams tend to be mathematics test (P12, male, age 23, Financial Mathematics and Computation, line 205).

Examinations were reported as the dominant assessment, and some students (e.g., P5; P28) reported that they did not generally need to use Web technologies a lot when preparing for exams, as most of the contents were covered in textbooks or tutor’s slides. Most of the students reported that they had fewer essays (the most important one being the undergraduate dissertation) as assessments during undergraduate study compared to

postgraduate study. Apart from those from an English background, most of the students wrote their dissertation in Chinese, and they pointed out that the standard for their undergraduate dissertation was much lower than for their postgraduate essays/dissertation:

For undergraduate study, the English teaching is about Basic English Education. It focused on the language itself and teaching English. We began to write essays after the third year. Like language and rhetoric. Mainly it means that we use English as a tool. The requirement of the critical thinking is not as demanding as the master assignments. Evidences were not that important as long as you had your own thoughts and insights. They wanted to see your initial ideas and that is it. We had not very good critical thinking skills. For most of the students, they might be not able to achieve the goal to have their own initial thoughts, and they just accumulated the arguments from the literature. Chinese tutors only required them to have their own thoughts, let alone to have the supportive evidence (P1, male, 23, Translation, line 24).

I feel the [undergraduate] tutor's requirement at that time is that you cannot copy and paste other people's essays. He did not make it clear that you cannot plagiarize, and I plagiarized many times for my undergraduate essays. There were no requirements for critical thinking skills (P7, female, age 23, Management Finance and Accounting, line 86).

I feel for some [undergraduate] courses, what I wrote is not like essays but like report. The tutor encouraged us to write about our own insights. Such as 'what do you think will be the development of certain events'. The tutor gave us a theme and then we think about how to plan and promote the event. Sometimes we did not use any references. Because it needs creativity and inspirations. And then for my undergraduate dissertation, it detected the plagiarism rate but it does not have much requirement for the referencing system (P14, female, age 23, New Media, line 48).

The undergraduate dissertation was written in Chinese. The dissertation was a review of the literature divided by subtitles. We did not have to do research and collect data. I think the detection of plagiarism is not as serious as it is in the UK. Maybe because the intellectual property protection in China is not strong (P16, male, age 27, Marketing, line 55).

For undergraduate essay, I just tried to reach the word account by putting some content together. Sometime I find Chinese literature and translate it into English. We do not have to refer to other literature a lot. But the tutor asks you to have your own idea (P28, female, age 22, TESOL, line 10).

P1 and P2 who studied English for their undergraduate degree, suggested that the focus of their undergraduate dissertation was placed on ‘using language as a tool’ and ‘grammar’, while not critical evaluating resources or critically writing towards a topic. As it can be seen, many students mentioned that the standard for undergraduate essays was less strict compared to those of postgraduate study in terms of paraphrasing skills, appropriate referencing to evidence, and in-depth thinking on a topic. P7 and P8 admitted during the interview that they had conducted plagiarism in the past. A lot of students emphasised that undergraduate tutors asked them to have their own ideas, but such ideas could be written freely without the support of empirical evidence. It is highly likely that previous study experience is linked to a difficulty in understanding the concept of ‘plagiarism’ and ‘critical thinking’ for those students who expressed such difficulty, for example:

For undergraduate study. We did not have many requirements for quality and critical thinking. We had two essays which ask us to talk about the innovation products and make a prediction of the future trend. For example, we had one about ‘Could you please write your understanding about the Cloud Computing’. Then I wrote it freely. I could write my ideas even without the support from other literature. But after this year of study. I became more rigorous. But I still feel a bit strange with this requirement. I feel that if you have a new or novel idea, then you rarely find any reference to support your idea. I feel sometimes I have some ideas that I want to write then down and discuss with audience, but I could not write about them because I don’t have the reference support. One of the courses I am doing this year is accounting. And I was asked to explain something using accounting. I found one theory which I think is relevant to accounting but my [postgraduate] tutor said they are not relevant. When I explain the relationship to the tutor, I could say my own reasoning but I could not find reference. Because nobody has ever linked that theory with accounting. Maybe it is my problem because I did not find the references. My tutor said ‘I mentioned before. It is about the method to deal with a problem’. I think this method means to provide reference and supports (P5, male, age 23, Management, line 187).

P5's story shows that his previous writing had an impact on his difficulty in understanding the academic requirement of writing essays. A similar situation is experienced by P2 (see Chapter 6), who was inclined to think that 'referencing everywhere possible' is equivalent to a 'lack of originality'. During the interview, some students told me to have their 'own ideas' is seen as an important way to gain high marks for undergraduate essays, but the issue of critical evaluation of information and writing based on evidence was not stressed. It may shed some light on why students had difficulty in understanding the concept of critical thinking or the importance of acknowledging the source.

7.4 Learner's Agency

The above section described that institutional factors such as technological conditions, tutors and teaching strategies had an influence on Chinese international students' digital practices and the development of digital skills. This section reports factors that mediate students' uses of technology from the learners' own perspective.

7.4.1 Attitude and belief

The present study reveals that apart from uses of Web technologies that are determined by institutions, participants have more personalised uses of Web technologies beyond the classroom. Their attitude and motivation have a significant influence on their digital practices and the development of their digital skills. Firstly, students' attitudes towards the usefulness of social software was discovered in the questionnaire using Likert-style question. Statements were measured in questionnaire item 8.1 on a scale of 1-5 (1=strongly disagree; 2=disagree; 3=not sure; 4=agree; 5=strongly agree). The alpha coefficient for the 9 items in this question is 0.778, suggesting the internal consistency is acceptable.

Table 10: Mean and standard deviations of responses to statements about participants' personal attitudes towards the usefulness of social networking sites (n=409, questionnaire item 8.1, Cronbach alpha=0.778)

Statement	Mean	Standard deviation
Social networking tools (e.g., Facebook/Renren) provide me with richer and complex communicative tools.	3.34	0.92
Social networking sites (e.g., discussion forum) help me to foster a sense of community in learning	3.41	0.80
Social networking applied to education (e.g., Cloudworks) helps me to change the way of exchanging information, with the potential to lead to proactive sharing and reuse of educational resources.	3.49	0.98
Social networking tools (e.g., Slideshare) enable me to have access to scholarly and open learning materials easily.	3.40	0.99
Social networking tools (e.g. Second Life) provide me with authentic real-time modelling environment to fulfil exploratory and problem-based learning.	3.37	0.97
Social networking tools (e.g., Youtube) encourage me to enhance my analytical skills though investigating the credibility of the content.	3.43	0.92
Social networking applications (e.g., Itunes U) help me to make educational choices.	3.43	0.92
Social networking tools (e.g., Second Life) help me to transfer good practice from research into practice in an effective way.	3.43	0.92
Social networking tools (e.g., Wikinomics) give me the opportunity to observe and emulate scholars at work.	3.55	0.96

In analysing the mean values of the items, means of less than 3 are regarded as negative and means with a value of more than 3 are regarded as positive. As shown in the above table, there was a general agreement that Social Networking Sites (SNSs) provided them with richer communicative tools (Mean=3.34). Generally, participants also acknowledged the usefulness of SNSs in terms of establishing a sense of community of learning (Mean=3.41) and reuses of educational resources (Mean=3.49). Overall, participants held positive attitudes towards the usefulness of SNSs in relation to:

- accessing scholarly materials easily (Mean=3.4);
- exploratory learning (Mean=3.37);
- enhancing analytical skills (Mean=3.43);
- making educational choices (Mean=3.43);
- transferring skills from research to practice (Mean=3.43);
- observing scholars at work (Mean=3.55).

However, it worth noting that when looking at the percentage of students' responses for each scale in the above 9 items it was found that a large number of the students were not sure about certain learning opportunities afforded by SNSs, for instance 35.5% of the participants reported that they were not sure that SNSs can provide them with an authentic real-time modelling environment to fulfil exploratory and problem-based learning. Also, 44.7% of the students selected that they were not sure whether SNSs could help them to foster a sense of community in learning. This implies that there is a lack of awareness of the educational usefulness of SNSs for community learning and for providing an authentic learning environment.

During the interview, a few participants held extreme positive beliefs about the usefulness of Web technologies. For example:

Definitely positive. First it makes things more convenient for people. You can learn wherever you like and you do not need to carry many materials as things are getting portable. There are so much resources online, so you do not have to spend a lot of time to search the information using printed materials. All you have to do is searching by using the key words. I feel most of the time now [postgraduate study] I am learning by myself using web resources. (P3, male, age 24, Banking and Finance, line 375).

From the argument above, it can be seen that P3 totally believes that Web technologies are positive things, while most of the participants viewed Web technologies and abundant online resources as both learning opportunities and challenges:

I think the development of the technologies and social media make it easier for people to gain knowledge. But one issue of the online information is there are too much information. It remains to be a question about how people judge the validity of the information and how to synthesis information. The massive information is a challenge for people's critical thinking skills. It depends on how much fundamental knowledge you have about certain topics then you will be able to think about all the information and to evaluate them. I also feel that we are learning the technologies more in informal time and we are influenced more by our peers than tutors. Like we use WeChat, Sina blog to share things (P4, male, age 26, Management, line 377).

As it can be seen from the remarks above, these participants are more critical about the uses of web technologies. P4 pointed out that abundant online resources make it easier to learn at their own pace, and he observed that a lot of learning and sharing resources happen without the tutors' presence. This echoes Ala-Mutka (2009) that learning can happen without teaching, and such informal learning is also important for lifelong learning. One participant (i.e., P21) pointed out that she thinks postgraduate tutors provide students with more guidance and inspiration towards a particular direction. She regards Web technologies as a helpful supplement for a more general subjective interest during limited formal learning time. Presented in Chapter 5, students are prone to share a common use of a core set of Web technologies as determined by institutional practice and assessment but in their own time, students' uses of technologies tend to be diverse and more personalised.

There are two extreme examples of participants who expressed negative attitudes towards Web technologies. The first example is P10, who specialised in broadcast television direction during her undergraduate study. As she described, her undergraduate study involved group work making media productions (e.g., videos). Because she resented using technology, she was in charge of writing scripts and left the technical work (i.e., shooting, filming, pre-processing and post-production) to other team members. She went to CCTV for a six-month internship as a journalist during the third year of her

undergraduate study and discovered that she did not like the job of journalist or director because those jobs were really tough. She told me she chose to study Public Relations for postgraduate study because it is associated with media (her undergraduate subject) but is less challenging for her. She said that she used social media which were user-friendly such as Sina Weibo, but when it came to academic software, she told me:

I feel they are really annoying because I hate using software. I hate using SPSS or NVivo so I would normally try to avoid using software (P10, female, age 23, Public Relations, line 250).

In P10's case, she was willing to use user-friendly social media, but she was not willing to use more complex technology or software and always attempted to avoid using them. Another example is provided by P16, but his attitudes towards digital technology are different from P10's. He had made efforts to learn different software related to his undergraduate major:

I can use most of the media software. But I am far from being skilled at combining different software to accomplish a media product that is desired. I normally ask tutor and peers. Sometime I search the Internet or experiment with the software based on my experiences (P16, male, age 27, Marketing, line 11).

From P16's account, it can be seen he was self-critical about his digital skills in terms of mastering software to accomplish a satisfactory task. He also attempted to improve his skills in different ways. In this sense, he was willing to use Web technologies and software. However, when it came to Web technologies that were used for communication, he described himself as 'anti-social media':

I do not use Micro blogs or other things. If people want to find me, they can call me. I would not indulge myself into mobile. I dislike those things. I do not like when I am having meals with my friends, and they are browsing micro blogs. I think these are virtual. The feeling is different when you interact with real people. I do not want to be intruded by those things (P16, male, age 27, Marketing, line 37).

As it can be seen above, students show different attitudes towards different sets of digital technologies. Their attitudes influence their uptake and practice of certain digital

technologies. Apart from general attitudes, the interview revealed that participants' personal goals, interests and motivations also played an important role in mediating their digital practices. The next section reports some findings in relation to the influence of personal goals on the uses of technology for learning.

7.4.2 Personal interests and motivation and preference

The interviews acknowledged that students' personal goals, interests and motivations are an important determinant of their learning behaviour, which possibly reveals the underlying reasons for their uses of Web technologies for learning:

When I did my interview, I let participants to watch some video clips on the YouTube to let them know about the background information. I made the video myself. I used a software called BB flashback (Blueberry flashback). It can record your screen and it is designed for translators. It can track translator's cursor. I used this software to produce a 'Think A Lot Protocol'. There is one strategy for reading: you let the participants speak out what they are thinking when then read something. For example, you probably have lot of memos when you read an article, so I made this video because I hope the participants could do this experiment. I made the video and uploaded this on to the YouTube. I selected people who have the link can view the content. I sent the link to participants and they could view my video but other people cannot search my video on the YouTube. Other software is the same as what I used for undergraduate like Word and Excel. The survey is new and I used the Survey Monkey. It was recommended by tutor. He recommended Survey Monkey and the Questionnaire Pro. The RefWorks is also recommended by tutors. When tutor mention some software then I would learn to use it. Other friends may feel a bit reluctant to learn and then I would help them. It is not hard to learn to use it, just like playing with your phone. You can just learn it by experimenting with the software. (P8, female, age 23, Translation, line 254).

As shown above, P8 showed her interest in general Web technologies and how she was willing to experiment with new technologies, some of which were recommended by her tutor. However, not all students actively try to experiment with all Web technologies recommended by their tutor. During the interviews a lot of students described that their digital practices are associated with extrinsic motivation, such as qualifications and a

decent job after postgraduate study. Therefore, they selectively used a core set of basic Web technologies which were more directly useful for finishing their assignment (e.g., P14; P21).

Moreover, students tended to have personalised digital practices beyond the frame of institutional factors, and personal interest was found to be an important factor for students' choices of digital practices. For example, P2 used a lot podcasts, applications, open educational courses and other online resources to learn subjects that she was interested in, such as architecture, art and physics. Her motivation was more intrinsic, less aiming for the gaining of external rewards. She described that for open online courses, sometimes she finished all of the contents, and sometimes she picked the ones that interested her most. When asked whether it was hard to learn with Web technologies on her own, without interaction, she showed a lot of motivation:

I think it depends on students' purpose and motivation. If you need teachers' interaction to stimulate your learning, then I feel you don't have a strong motivation. For some students, if they really want to enrich their knowledge or skills in certain domains, without teachers' interactions is not a problem. They can learn by themselves (P2, female, age 23, Translation, line 80).

In addition, the interview showed that some students have the motivation to experiment with Web technologies and learning knowledge that is related to subject knowledge using their own methods, but they show less intrinsic motivation when it comes to learning activities imposed by assessment:

Because I am in favour of technical aspects of media. I use a lot of Web technologies and software. I explore many Web tools actively. I normally can experiment with different technologies and use them to satisfy different needs. Take the PDF reader for example, many people use Adobe Reader, but I prefer to use Foxit Reader. Because it is faster, when dealing with large amount of PDF, you can increase your productivity (P15, male, age 25, New Media, line 69).

P15 described that he was interested in experimenting with Web technologies but his motivation towards the assignment is slightly different:

My [UK undergraduate] tutor opened an account on WordPress and sent the link to every student. We used it to keep a reflective diary, for example, to summarise and reflect on what have been learnt. Sometimes I showed my blog to my classmate if I do not understand the requirement for the task or I found their blogs to see how they have written it. However, sometimes I felt reluctant to write something because I did not learn many things this week, but I had to because it is requested by the tutor (P15, male, age 25, New Media, line 23).

P15 was more motivated to learn the technical skills of social software, while he showed less motivation in writing a reflective diary on a blog. For some students, there seemed to be a tension between their general interest in using Web technologies and those recommended by their tutors. For example, P7 described that she liked to watch TED talks and lectures on YouTube, she also adopted Google Scholar and a discipline-specific database. However, she lacked the motivation to use more academic tools like RefWorks (reference management).

A similar example can be found in P5's story. It was found that P5 had a more basic knowledge about Internet censorship in China and more technical skills in relation to coding. He used some Web technologies for postgraduate study, such as Wikipedia, podcasts and search engines, but when asking if he used things like a PowerPoint sharing website (e.g. SlideShare), a research managing and sharing tool (e.g., Mendeley) or a reference management tool (RefWorks), he told me he was not using them because he did not think there were useful. When asked about whether he let peers or tutors view his assignment before the submission, P5 replied:

Their feedback can improve my marks, or offer some advice. But I feel the content and format of my essay is good. I feel confident, so I do not want to send the draft. And I don't want to make any corrections. I feel I have learnt the things I want to learn. My goal is to finish assignments. I do not have to waste my time on making corrections. I can use the time to do other things (P5, male, age 23, Management, line 44).

In P5's account, his goal was just to finish the assignment. It is highly likely that his goal resulted in a pragmatic approach to learning. For example, P5 used Wikipedia because

he used it as a starting point to learn a concept and find out references. He also searches online tutorials because:

I feel it is very more engaging and interesting. I search the videos using key words then I watch them if I feel they are interesting. It is fast and easy for me to take in information. I am thinking and questioning. When I am watching certain tutorials. I would think ‘oh. It is like this’/ ‘really?’ It has both visual effect and acoustic effect. I feel it is very helpful for people to understand the content and also, I can remember it faster (P5, male, age 23, Management, line 229).

From above, P5 described that he felt himself more engaged when watching online videos and felt that he could take in information more easily when watching videos. In order to conceptualise this, it is useful to draw on Dale (1946) who reveals that students can learn better when learning is sensory based (perceptual learning). More sensory channels interacting with resources can potentially lead to better retention. Evidence about the preference of learning with technologies that involves more sensory channels was also heard from other participants (P2; P8; P9; P12). A lot of students highlighted their interests and preferences in terms of using Web technologies during the interview.

7.5 Recommendations and Supports

Questionnaire Item 9 is an open-text question that asks participants to provide recommendations to cope with barriers of using technologies for learning. It collected valid text responses from 62 participants out of 409 who filled the questionnaire. Answers were analysed using thematic analysis. These open text answers were entered into Wordsalad (an app) and ‘word clouds’ were generated as shown in figure 37.

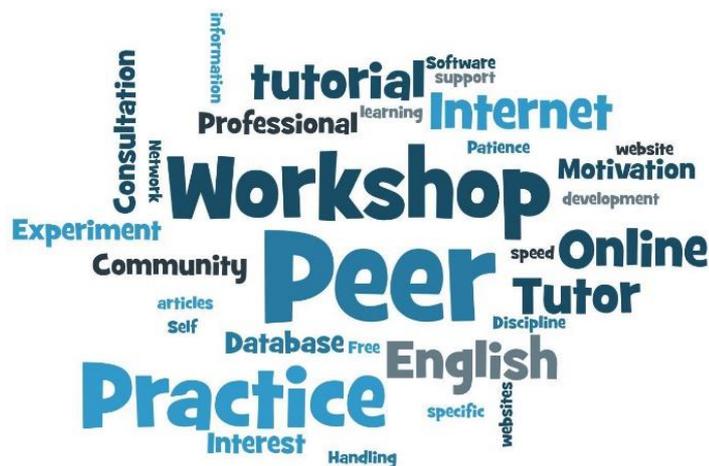


Figure 37: Recommendations to cope with barriers of using technologies for learning (n=62, questionnaire item 9)

Figure 37 shows themes from the open-text question. The size of the text is related to the number of times it has been mentioned. The next section is organised based on themes from the open-text data and interview data.

7.5.1 Peer support

Out of 62 responses, 10 respondents suggested using peer support to overcome barriers of using technology for learning. Examples of open-text answers are ‘Peer help is very important’; ‘My roommate taught me how to analyse data using software’ and ‘Students can learn from their friends’. Some interviewees also reported peer support as a major source of help to overcome difficulties in using technologies for learning:

Normally I do not like to ask tutor. I would ask my friends. Or search the Internet. Also, I would probably search the ‘help’ option of the software (P20, female, age 24, Data for Business in Technology, line 55).

I think it is time-consuming to learn technical things by watching online tutorials. I lack the patience when I learn things by using online resource on my own. And sometimes when I search on the Internet about how to use a software, then are different answers online in accordance to the different versions of the software. Then I had to read all this information and have a few trials to see which one is relevant. I normally turn to peers who are more skilled (P11, female, age 23, International Education, line 120).

Peer support is one of the important sources from which students acquire help to develop their digital skills. Apart from peer support, some students regard tutor and university workshops as important to develop their digital skills.

7.5.2 University workshops and tutor's help

Out of 62 responses, 7 respondents suggested using peer support to overcome barriers of using technologies for learning, such as 'to attend workshops to improve skills of using technology'; 'tutor can give some lectures on what kind of technologies can be used for study', and 'it is useful if the university can provide workshops and tutor can introduce some background information of Web technologies'. There are also recommendations that students prepare themselves through 'having class about using technologies for learning from undergraduate' or 'providing training at school level'. Out of 62 responses, 4 students pointed out the importance of the tutor's role, such as 'tutor do not use technology very often in the class, students who are not familiar with certain technology may be at loss when comes to doing research via using technologies.' Some interviewees also advocated the importance of the tutor's help and university workshops in developing digital skills:

I think Web technologies are good things in general. However, I think even you produce them, if you do not promote them or teach people how to use it. It is still not useful. Because people do not know how to use it. I think if certain technologies are useful for learning, then we must make it known by students and let tutors teach them how to use these technologies. The university can offer workshops. That would be very helpful (P6, female, age 23, Media and Communication, line 397).

As it can be seen, some students think that university workshops that allow students to see how they can benefit from using specific technologies for learning is important. Moreover, tutors can introduce some background information about Web technologies and selectively recommend several of the most useful educational technologies.

7.5.3 Interest, motivation and practice

Out of 62 responses, 19 respondents suggested the importance of 'self-learning', 'experiment' and 'practice'. Four respondents also pointed out the importance of interest

and motivation. Examples include ‘started from something that you are interested’, ‘try to form your interest’, ‘search the internet and online tutorial’, ‘have more patience and learn it’ and ‘try to use it, and it is the best way to learn skills step by step’. During the interview, students also pointed out the importance of interest and self-learning:

I think in terms of using Web technologies for learning, 70% is learnt by self-learning. I mainly learnt them through online videos and forums. When having difficulty, I search the internet first, and if I did not solve it I then ask peers and tutors. In terms of manipulating software, I think people learn faster when they see another people demonstrating it. Online videos can be another method for demonstration (P15, male age 25, New Media, line 50).

Some students pointed out the importance of forming their interest and a willingness to experiment with new technologies, as well as self-learning.

7.5.4 Language

Six of the 62 respondents suggested that they needed to improve their English. For example, students wrote ‘I need to improve my English’. Some interviewees also mentioned language as a barrier to using some Web technologies:

I think for Chinese international students, most of us have the language barriers. For the Web technologies or online resources, if they are English, then it is less likely to be adopted by me. I think it needs to be promoted. And as a student, I also need to improve my English (P19, female, age 23, Marketing, line 158).

Apart from language, survey respondents provided recommendations such as consultation with professional staff (e.g., librarian) and more databases.

7.6 Chapter summary

The focus of this chapter has been shifted from investigating students’ practice, skills and issues of using Web technologies for learning, to the underlying factors that explain the development of students’ digital skills. It was found that sometimes students’ uses of Web technologies is a context shaped decision. The development of digital skills among Chinese international students is associated with their previous experience. Firstly, it

provides insights into the changing situation of access to the information which is associated with the virtual digital divide, and such views may help UK tutors to understand Chinese international students' lack of use of certain Western social media and why some students tend to have a dominant view on political events presented on social media. Tutors can design culturally sensitive pedagogy in teaching politics in social media. Secondly, it describes the changing situation of the institution (i.e., technological condition; teaching and learning; requirement of assessment), and such views shed light on why Chinese international students have certain difficulties with the use of technology for learning (e.g., using database; plagiarism). Finally, it was found that, except for digital practices that are determined by institutional factors, students have personalised practices - their belief, motivation and interests are important in developing their digital skills. In terms of the recommendations for developing digital skills, students reported peer support as a key source of help. They also expressed the value of university workshops and tutors' scaffolding. In addition, students mentioned the importance of establishing interests and of self-learning.

Chapter 8 - Discussion and Conclusions

8.1 Introduction

The research reported in this thesis concerns Chinese international students' digital practices during the transition from undergraduate to postgraduate study, and how to support them in enhancing their digital practices to adapt to learning in a UK university. Firstly, it identified participants' digital practices during the transition from undergraduate study to postgraduate study, as reported in Chapter 5. Chapter 6 then discussed specific digital skills, and issues confronted by Chinese international students in their development of digital skills. Chapter 7 explored the factors that influence students' use of technologies and their development of digital skills. This Chapter discusses important findings that emerged from the data analysis.

8.2 Summary of the findings

The study investigated the transition of digital practices and development of digital skills among Chinese international students at a UK university, the next section provides a summary of the research findings in relation to research questions.

8.2.1 Chinese international students' digital practices during the transition from undergraduate to postgraduate study

The study found that most Chinese international students were reliant on Chinese online resources and websites during their undergraduate study. Although some students were previously unfamiliar with Western websites, they showed rapid adoption of Web technologies (e.g., Blackboard; Google Scholar) during postgraduate study that are driven by the assessment, under the influence of their tutor and peers. Having access to information and social support is important for this transition. Warschauer (2002, cited in Deursen & Van Dijk, 2011) argues that digital practices involve social practices in which it is essential to have access to physical artefacts, content, skills and social support.

Burnapp et al.'s (2012) study of Chinese students who were doing an online training course, found that the students did not abandon their previously-used digital technologies, but combined Western technologies with Chinese technologies. The present study of

Chinese students engaged in postgraduate study at a UK university found similar behaviour.

By combining Western and Chinese technologies for learning, students can bring their previous ‘cultural scripts’ into their postgraduate study. The important part of this change is their capacity of reflection, and making informed decisions on technology use in the light of their needs and situation. For example, some students use Chinese websites to check a difficult concept when they cannot understand it in English.

Apart from using a core set of generic technologies (e.g., MS word, Excel) to complete assignments (e.g., essays), students have a discipline-focused digital practices, which affect their set of digital skills developed. It worth noting that students from different disciplines have different information needs. For example, students from hard sciences tend to search for more practical and factual information, they have a different understanding of the critical thinking required for their studies. Therefore, there may be different pedagogical methods best-suited for engaging students with digital technologies according to their discipline. For example, some students who are from business and finance background acknowledge the usefulness of simulations.

In parallel to O’Reilly’s (2007) idea that Web 2.0 encourages collaborative contributions to knowledge building and empowers students to ‘harness collective intelligence’, there is evidence for students recognising the educational benefits of harnessing ‘collective intelligence’ in becoming members of online communities. However, students have different degrees of participation – some are willing to share and some tend to be observers and only share resources when it is required in order to obtain resources.

The research found participatory characteristics of some participants for different online activities, both formally and informally; for example, students’ contributions to, or membership of, online forums and communities are frequently interest-driven, as a form of affiliation. Many participants also use social media to circulate information and support their research, such as through blogging or sharing links on social networking sites. There are exceptions where participants have engaged in making new creative forms, such as making podcasts or digital sampling through remixing existing work and soundtracks for

artistic expression. However, the ‘participation gap’ is also obvious among the sample students due to varying degrees of experience, skill and knowledge.

However, compared to the uptake of basic academic tools (e.g., Google Scholar; library database) used for studying, students showed a low uptake of communicative tools that are often used in Western context (although a small number of students managed to develop their communication skills with other overseas students and establish connections on social media). For many students, there was a lack of awareness of the potential educational benefits they could obtain through connecting with influential people on Twitter or connecting with their peers on Facebook. Students have different explanations for this: some perceived a lack of language ability and intercultural understanding; some connected actively with Chinese students and viewed ‘Facebook’ as ‘Western’; some perceived Facebook and Twitter as not relevant to their study, or distracting.

Participants were also found to use information technology for production. This ranged from the more prosaic, such as writing an essay using word processing or producing a PowerPoint presentation, to those that tend to be more creative, such as making videos, films and animations.

8.2.2 Chinese international students’ development of digital skills during postgraduate study

The study discovered that most of the students showed confidence about their basic Internet skills. Most of the students also had knowledge of using generic software such as a word processor. It identified several cases in which students had challenges to their technical skills. These challenges were specific; for example, most students reported difficulty in mastering statistical tools such as SPSS.

Search engines, library databases and recommended reading lists were heavily used by the students to access sources for assignments, and some students were able to identify discipline-specific databases to search for information. However, although online resources are abundant, students still relied on printed books. They were also more likely to ask for advice from their peers than from tutors and librarians. This partly echoes the findings from the project *Students’ Use of Research Content in Teaching and Learning*

(Hampton-Reeve et al., 2009), which found that students show a heavy reliance on library catalogues and databases, as well as faculty advice, and some students have a better experience of locating research content by using discipline-specific databases. Moreover, some students expanded their capacity to refine their information searching skills over the duration of the study with alternative help (e.g., ELTU) and reflection. This study found a lot of students are aware of discipline-specific sources, which differs from Hughes' (2013) finding that international students overlook discipline-specific sources.

This study showed that students' challenges are not limited to uses of technologies. Academic writing, critical thinking and providing proper referencing, as well as avoiding plagiarism, were reported by participants as one of the major concerns for postgraduate study. This is in accordance with the review of the literature, that Chinese international students may have difficulty in developing critical thinking skills and acknowledging authorship as well as giving references (Jin & Cortazzi, 2006). The present study shows that students' reflective thinking and practice helped them to modify their skills to adapt to the UK learning requirement. Chapter 7 shed some light on how Chinese international students refine their reading strategy to adapt to the UK learning requirement.

Data analysis (Chapter 5 and Chapter 7) showed that students' digital practices are contextually shaped and mediated. The figure below helps to describe the development of participants' digital skills:

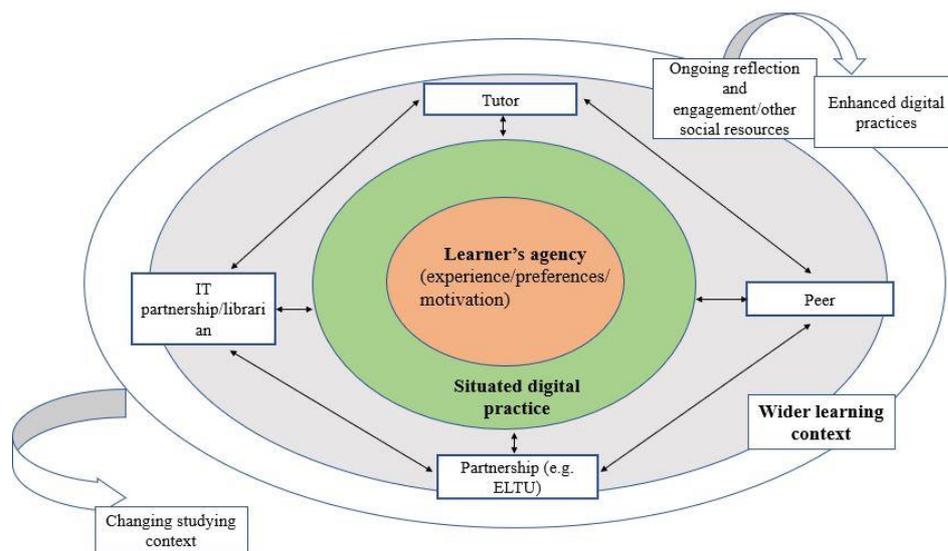


Figure 38: Development of digital skills among Chinese international students in a UK university (Adapted from Pachler, Bachmair & Cook, 2010, Gill, 2007)

Based on the data analysis chapters, there are several cases in the data analysis chapter which show that students have been reflective about their digital practices – they modified their skills to adapt to postgraduate learning. In addition, there are some cases where students made informed choices of technologies in the light of their needs. Therefore, experience, reflective practice and help from social networks (e.g., peers; tutors) are important factors that contribute their digital skills development. This resonates with the work of the Society of College, National and University Libraries (SCONUL, 2011). Shuell (1986, p. 412) stated that the focus of learning concern was placed on “the way in which people acquire new knowledge and skills and the way in which existing knowledge and skills are modified”. The development of digital literacy also requires one to reflect on prior experience and to modify existing skills. Similarly, Beetham et al. (2009, p. 11) drew on previous studies (e.g., Goodyear & Ellis, 2008) and summarised the implication for developing digital literacy:

How learners interpret their experience is highly influenced by prior experiences of learning, and the interpretations that have arising from those. Digital literacies cannot be bolted onto existing practices and prior conceptions: these must be recognized, incorporated and (if necessary) reconceptualised.

The above quote indicates that developing digital skills involves a reflective approach, and students can take the opportunity to develop appropriate strategies (Hague & Payton, 2010). From the data analysis, it can also be seen that learners’ digital practices are contextually mediated. The problem of a skills-based model of digital skills is that it cannot explain the complexity of real-world situation in which Chinese international students engage themselves. According to sociocultural theorists (e.g., Gee, 1996), the understanding of literacies signifies that literacy practices ought to be understood in the contexts of the social, political, economic, cultural and historical practices of which they are a part. This viewpoint is the central theme of ‘new’ literacy studies referred to by Gee (1996) and socioliteracy studies (Lankshear & Knobel, 2003). Hartley (2002, p. 136, quoted in Livingstone, 2004) put forward:

Literacy is not and never has been a personal attribute or ideologically inert ‘skills’ simply to be ‘acquired’ by individual persons ... It is ideologically and

politically charged – it can be used as a means of social control or regulation, but also as a progressive weapon in the struggle for emancipation.

This implies that students' digital practices can be better understood with its relations within the wider context. For example, some students previously did not have access to certain Web technologies due to contextual constraints (political censorship), while other students who had overseas experience were able to conduct these digital practices. However, after students who were previously not familiar with Western websites moved on to postgraduate study, they were able to make informed choices to use a different set of Web technologies.

Students' agency also influences their digital skills development. The study found that students have different beliefs and preferences towards technology use. Students' ongoing interactions with tutor and peers were helpful in developing their digital skills. Gill (2007), drew on Kolb's experiential learning and, along with the finding from her study on Chinese international students' adaption to the UK universities, proposed a cyclic process of intercultural learning. The model views international students as achieving personal growth through making sense of experience, through ongoing reflexive practice and comparison, and by engaging in learning. The study also found evidence of students reflecting on their experience and refining their skills to adapt to the digital practices in the UK learning environment. The study also found that social support is very important to support students' digital practices in adapting to UK learning.

Revisiting the conceptual framework in the Chapter 3, the issue with the framework is that it lacks functionality in explaining the development of digital skills in the field of internationalisation within higher education. In spite of international contributions from different fields towards a conceptual understanding of digital literacy, it remains difficult to provide a detailed description of how digital skills emerge and which digital skills are more important, because this varies from context to context. The development of digital skills takes place within specific social contexts, which needs to be added into the conceptual model. Arguably, there is a need to link macro, meso, and micro levels within international students' development of digital skills in addition to considering individual attributes. Therefore, Figure 39 adds elements that frame Chinese international students'

development of digital skills within the context of their digital practices at micro, meso and macro levels:

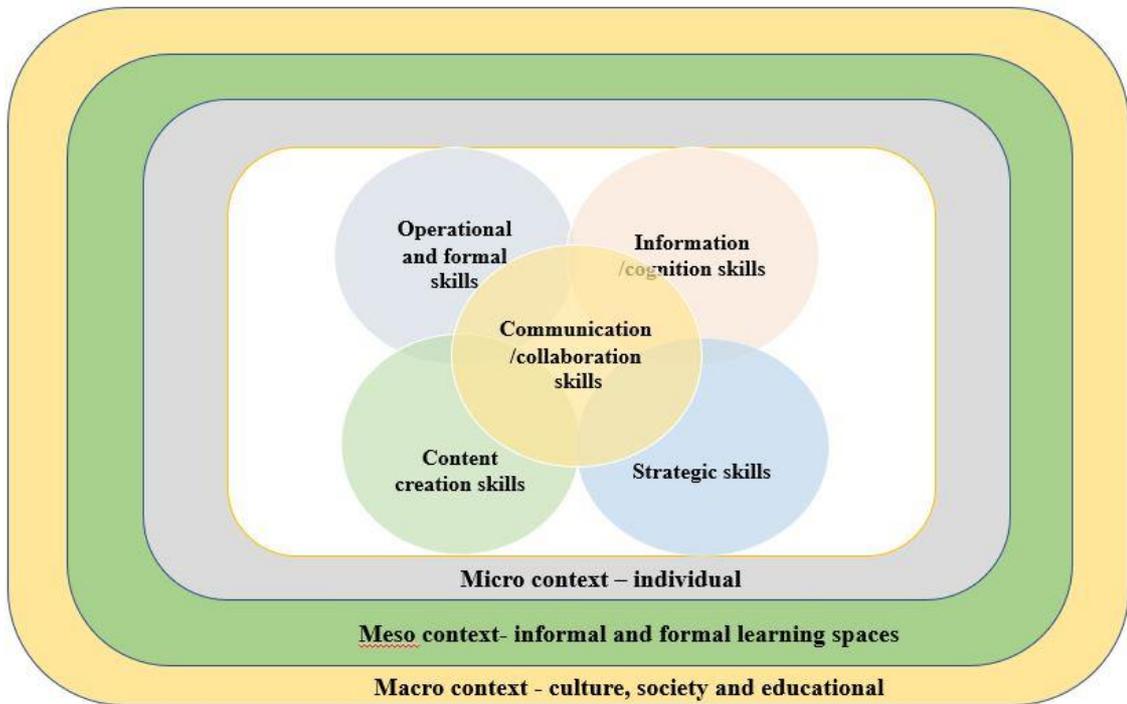


Figure 39: The development of Chinese international students’ digital skills (Adapted from Pachler et al., 2010)

Pachler et al. (2010) proposed a social ecological approach called ‘mobile complex’ in which educational uses of technology are viewed as part of sociocultural practices, shown in the below figure:

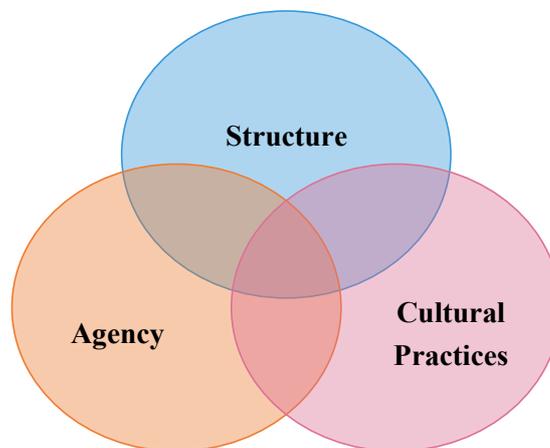


Figure 40: Mobile Complex (Pachler et al., 2010)

The model of ‘mobile complex’ is made of three interrelated aspects: ‘structure’, ‘agency’ and ‘cultural practices’. Briefly, ‘structure’ stands for ‘the sociocultural and technological structure’ in which the *appropriation* of mobile technology happens (Pachler et al., 2010, p. 14). As Pachler et al. (2010) argue, the fundamental construct of the ‘mobile complex’ is the idea of appropriation. Appropriation, in their view, is defined as “the processes attendant to the development of personal practices with mobile devices” and these processes are considered largely to be interaction, assimilation, accommodation and change (Pachler et al., 2010). ‘Agency’ concerns students’ personal choice and capacity to take action on the world through the use of mobile technology. ‘Cultural practices’ views learning as culturally situated meaning-making of everyday life, which includes both inside and outside of educational institutions. Here, ‘structure’ is seen as the learning context in which students engage themselves, and ‘agency’ is seen as students’ capacity to make learning choices.

Pachler et al. theorise the interwoven relationships among the uses of technology as modes of cultural practice, students’ agency and the impact of the wider learning context (Pachler, Bachmair & Cook, 2010; Pachler, Cook & Bachmair, 2012). At the explanatory level, the wider context is made up of the macro-context, including the societal discourse of learning and political as well as economic status, and the meso-context, including both formal and informal learning spaces. Analysis at the micro, meso and macro provide us with a better understanding of the mechanism underpinning the uses of digital technologies (Selwyn, 2011). The convergence of media is having more impacts upon education at the micro, meso and macro levels, and change influencing these levels also affects an individual learner, and vice versa (de Freitas & Griffith, 2008).

Firstly, at the micro level, is the individual student. He or she has their experience, interests and digital skills that shape their digital practices. For example, students have discipline-informed digital practices. Secondly, at the meso level, there are influences from both informal and formal spaces. Within formal learning settings, students’ digital practices are framed tightly by institutional culture, assessments and available resources. Educational institutions can be powerful actors in shaping students’ digital practices, especially if those institutions have policies that affect instructor’s intentions and design of the course in relation to digital practices. In informal spaces, such as cafés, on the

commute, and ‘online affinity spaces’ (Gee, 2004), students can develop digital skills through interaction with peers.

Locating the development of digital skills at the micro and meso levels considers learning as both situated and social (Lave & Wenger, 1991). It is to do with how students learn and master digital technologies – how students interpret and communicate their representation of information and create new knowledge, both as individuals and as members of a community. Learning and development of digital skills often takes place in authentic contexts where mutual engagement occurs. Such engagement involves negotiation between tutors and students with regard to expectations so as to provide appropriate scaffolding to move students’ learning forward in the zone of proximal development.

At the macro level, there are influences from society, culture, politics and economic status. For example, students’ transitions in digital practice are influenced by national conditions of technological infrastructure, and higher institutions’ practices are informed by national educational policy. While Figure 38 goes some way towards explaining the development of digital skills as context-dependent practices, a critique of ecological models exists because they seem to present a static model of a complex process. With regard to this, Carrington (2013) argues that the emphasis of ecological models is placed on balance. However, uses of technology are more eclectic and she proposes the term ‘assemblages’. If the concept of ‘assemblage’ is applied to research on digital practices and digital skills, digital literacy can then be viewed from a social material approach where messiness and complexity can be recognised (Gourlay & Oliver, 2013).

Nevertheless, Sefton-Green et al. (2016) argue that implies digital practices and the development of digital skills at the micro, meso and macro levels suggests a broad framework for conceptualising diverse context-based digital practices and provides a research foundation to move beyond analysis based on ‘basic skills’. With regard to this, Ryberg and Marianne (2010) suggest that the macro policy perspective also entails problems, such as that it can ‘potentially alienate teachers and result in inflexible, prescriptive curricular “literacy chunk” that overlook the complexity of these literacies’, and they further propose that it ‘might be fruitful to think of pedagogical approaches’ to

digital skills as ‘meso-level pedagogies or strategies which can act as “boundary objects” between macro-level policy descriptions and micro-level classroom practice.’

8.2.3 How can Chinese international students be supported in enhancing their digital practices to adapt to learning in a UK university?

The study found although there are some pedagogical changes in China, the teaching model is still teacher-centred. The focus of teaching is on transmission of declarative knowledge or mastering practical skills. Together with different requirements for assessment, students have difficulty to understand the learning methods and requirements when they first begin studying. It is important to give them an induction course to stress the postgraduate learning requirements, such as academic writing, and ethical use of sources. The study showed that social support is very important for students’ digital practices. Students reported on how they develop their digital skills with the help of their peers and tutors. However, some Chinese international students were not aware of the various types of support services available to them, and there is a need to increase their awareness.

Because postgraduate study is very short, students’ use of Western social media tends to be explanatory and students reported they have other issues such as academic stress. It is important for tutors to selectively introduce the most important Web technologies that are useful for their studies. It is also important for tutors to motivate students to use certain digital technologies through making the educational benefits clear to them, and a reflective approach is needed (e.g., such as through the bottom-up approach of sharing the experience and difficulties) to promote students’ participation.

It was found that some students’ low uptake of certain social networking sites was partly due to their English inadequacy and their challenges of intercultural understanding and communication skills. Jenkins et al. (2006) proposed the notion of a ‘participatory culture’ in the context of young people’s engagement in digital environments. They argue that ‘participatory cultures’ transformed the core of literacy from “one of individual expression to community involvement”. Therefore, they propose a set of new skills for the purpose of developing “cultural competencies and social skills needed for full involvement” (Jenkins et al., 2006, p. 8). One of the skills – ‘negotiation’ – indicates the

importance of being able to grasp alternative norms. Therefore, it is important to enhance students' intercultural understanding and communication to enhance their participation.

8.4 Contribution of this thesis

One of the contributions of this thesis is its investigation of the Chinese international postgraduate student experience surrounding digital practices at a deep level. It uses a research-balanced account to describe the main challenges that concern Chinese students in their digital practices and how they develop their digital skills. It can also contribute to bridging the gap between UK tutors' assumptions around Chinese international students' digital practices and what is actually happening. As Conole et al. (2008) suggest, there is a mismatch between institutions' perception of students' use of educational technologies and their actual use.

The number of Chinese students is likely to increase over the next few years. As Chinese students bring considerable financial benefits, these empirical findings are valuable for institutions to understand the main issues concerning Chinese international students in this area, so as to find ways to engage international students accordingly. The dissemination of this research can also help e-learning instructors in China to help students engaged in distance education with UK universities to overcome their difficulties in learning and develop their digital skills. For example, I was recently in contact with the human resources manager of the Laureate international universities, and she described how some students who are doing online courses distantly with Liverpool University in the UK have difficulty in progressing their studies.

Another contribution of this thesis is that it offers insight into the diversity and complexity of digital practices among international students (Chapter 5 to Chapter 7). It responds to the call to move beyond the rhetoric of 'digital natives' to understand the complex experience surrounding digital practices. The empirical findings yielded valuable insights into Chinese international students' lack of previous experience with the digital practices that is considered normal in UK universities. These findings call for a need to shift attention from 'affordances' of technologies to the study of students' lived experience.

8.5 Implications for practice

Firstly, institutions ought to be open-minded about educational possibilities in terms of Chinese international students using Web technologies in their own hands, and provide scaffolding pedagogies accordingly. The study found that, apart from formal education, students also use a variety of digital technologies in their own time. For example, students listen to podcasts, watch online tutorials, and follow influential people on micro blogs. Sometimes students' participation with Web technologies tends to be interest-driven, but this can lead to incidental learning gains which also assists their formal learning. However, sometimes students' use of Web technologies tends to be explanatory and fragmented. Cigognini, Pettenati and Edirisingha (2011) reported that novice learners need guidance and scaffolding as well as pedagogical interventions to make the best of the potential of social media to support learning. According to McLoughlin and Lee (2010), the social aspect of Web 2.0 technologies is useful to support informal learning and reflexive dialogue through promoting learner agency.

Secondly, institutions ought to strengthen Chinese international students' social resources and enhance their intercultural communication skills. The study found that social resources are important for supporting Chinese international students' digital practices. Postgraduate study takes place over a very short period of time and sometimes students are dealing with other issues such as academic stress, and they may overlook the educational benefits of collaborative learning with their peers through the use of Web 2.0 technologies. Social integration of international students is important for enhancing their digital practices to adapt to the UK learning environment. Wilcox et al. (2005) found that social support (i.e. social networks of students) can exert a positive influence on academic performance. For example, UK institutions can help Chinese international students to establish a connection with the university by providing social media that are familiar within their own culture (e.g., WeChat; Sina Weibo). Academic faculty can provide more information about the course requirements by highlighting discipline-specific knowledge and skills.

Thirdly, research on developing students' digital skills ought to incorporate academic literacies and link with pedagogical strategies about how digital skills can be taught in practice. The well-established definitions of digital skills and research on

digital skills often focus on the uses of digital tools to create meaning, including the ability to understand and use visual representations, to navigate within a non-linear digital structure, to evaluate and synthesise digital information and to communicate effectively (e.g., Eshet-Alkalai, 2004; Ng, 2012). However, debates have emerged alongside the concern that such discussions might reflect a narrow research area agenda, to date focusing on which digital skills are important, while lacking the understanding of how these skills develop and how they impact on working with both digital and non-digital texts (Neumann, Finger & Neumann, 2017).

Ryberg and Georgsen (2010) argue that the prescriptive list of ‘digital skills’ can be problematic when confronted with the complexity of issues in practice. Therefore, it is important to explore how digital skills can be taught in practice, and to link digital skills with pedagogical strategies in a meso-context, mediating between the macro-context and situated practice. Moreover, the present study found that producing content not only requires knowledge of technologies but also domain knowledge. Students’ learning involves both digital and non-digital artefacts. In particular, textual practices are overwhelmingly affected by institutional practices, and participants raised a lot of concerns about their academic writing skills.

Jenkins et al. (2009) suggests that digital literacy includes both traditional literacy that evolved with print culture (the capability to read and understand knowledge, to write coherently and to think critically about the written content) and newer forms of literacy associated with mass and digital media. Beetham, McGill and Littlejohn (2009) argue that the development of academic literacies that support scholarship in society is essential for students, in order to prepare them for the challenges of digital literacy in a ‘participatory culture’ (a culture in which an individual is not only a consumer but also a contributor through the Internet). In the UK, a report of the National Committee regards academic writing as one of the key ‘communication skills’ that include oral and written, as well as uses of information and communication technologies (National Committee of Inquiry into Higher Education, 1997).

Lea and Jones (2011) suggest that, although technologies permeate students’ lives, students are prone to be reliant on authority when it comes to the assessment (e.g., writing

essays). They indicate that students may be relied upon to the point where any disruption of digital technology is a problem, such as it may impair students' ability to write academically. Moreover, Digital technology makes plagiarism easier, as students can copy and paste content on the Internet. Computerised digital reproduction has given rise to possibilities for reproducing and distributing information, but it also presents students with new challenges of academic literacy (Eshet-Alkalai, 2004). The implication is that research on digital practices and skills and digital literacy ought to incorporate academic literacies so as to understand this phenomenon as situated in social practices in a range of educational contexts (Lea & Street, 2006).

8.6 Limitations of the study and implications for future study

Although the findings of the study are encouraging, there are several limitations of the present study which be taken into consideration for future research:

(1) Sampling.

One limitation of the study is its non-probability sampling. The university students studied were not randomly selected. Although I attempted to use probability sampling for the survey, a large number of the participants became involved as a result of convenience sampling. Therefore, the findings of the study may not speak for the wider population. It is critical for the future study to develop more strategic sampling to collect data from wider geographical scope so as to generalise findings.

(2) Impact of academic culture and students' travelling overseas

The participants of the study presented in this thesis consist of international students who come from a distinct culture (i.e., Chinese culture). Although the literature describes recent developments in Chinese education, differences are still expected in the wider environment and institutional cultures, as well as in the ways academics teach and students learn in different cultures at higher education institutions. Apart from that, participants' increasing use of particular digital devices (e.g., e-readers) and of communication services (e.g., WeChat, QQ, Skype) are likely to be related to the fact that they are travelling overseas. This is partly due to the need to access learning materials while they do not have access to certain physical copies (e.g., Chinese books) and to stay in touch with their relatives and friends while they are overseas. This means that

researchers need to pay attention to relevant cultural differences and the impact of travelling overseas when applying findings from this study to other studies.

(3) Impact of discipline

Participants were enrolled from different disciplines (e.g., Media, Translation, Finance, Education, Computer Science) with an initial attempt to compare and contrast results. As described in the findings, the discipline impacts on students' digital practices. The study participants were recruited as volunteers, resulting in more participants from social science disciplines than science disciplines (e.g., physics, chemistry, biology and mathematics). Therefore, some findings cannot be transferred directly to other disciplines. In addition, although the study tried to compare students' digital practices based on different disciplines, it was unable to explore the effect of students' abilities to transfer their discipline-based digital skills into other areas of study.

For the future, it is important to conduct research to explore the essential aspects of different disciplines through recognition of the need for discipline-based capabilities and knowledge. Moreover, a few of the participants indicated that they thought some digital skills are better learnt in the working environment. It is critical to collaborate with professionals and potential stakeholders to explore what it means to be 'digitally literate' as a graduate in different disciplines. There is a need to study digital skills in situation so as to generate explicit implications for educators for pedagogical and curricular development (Williamson, 2010).

(4) Duration of the research time

Although the study used a range of quantitative and qualitative data, it only provided a snapshot of students' digital skills development. One issue is that the technological field is changing very rapidly. For example, a few participants said they were disappointed that they could only download 60 pages of an eBook from the university library website, whereas at the time of analysing the data this was no longer the case. In addition, the literature and research on digital skills is also inconsistent and changes fast, which also affects the present study. However, this study is more than a narrative of Chinese international students' adaptation to the UK learning environment and their development of digital skills, it also looks at why students have challenges with their digital practices for postgraduate study. Moreover, although the researcher conducted follow up interviews

with nine participants, about one third of the participants participated in one interview, and the survey was administrated at a single point of time, making it hard to generate findings regarding students' digital practices and development of digital skills over time. Reflecting on this limitation, a more in-depth longitudinal case study should be put on the agenda. For example, researchers could collaborate with educational agencies to track a group of Chinese students from when they are still in China to the end of their postgraduate study. Data could be collected from the same cohort of students at different stages. In this way, researchers could be clearly informed about participants' perceptions, and their degree of adaptation during different stages of the study.

8.7 Concluding remarks

This thesis presents a mixed methods student experience study on digital practices and the development of digital skills among Chinese international postgraduate students. It found that students have a discipline-based digital practice and they have discipline-specific skills. Some cases of students' practice, to refine their digital skills in adapting to the UK learning environment is important to note. Their digital skills in terms of writing academically, using references and thinking critically have been improved during the postgraduate study. However, there seems to be a disconnect between students' use of digital technologies in their own time and those determined by the institutions. With students bringing their own cultural scripts (e.g., their existing patterns of using technologies) to postgraduate study and appropriating digital technologies for their own use, it seems that the social aspects of the Web 2.0 do not fit well into their sociocultural context. As can be seen from students' narratives, their digital practice tends to be constrained by the context in which each student is situated. At a deep level, students' digital skills and issues ought to be better understood within a context. It is hoped that, through this thesis, more research attention can be directed towards 'bottom up' research, to hear the student voice and to study students' digital practices in day-to-day situations.

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Appendix 1: Questionnaire (English version)

A Study into Development of Digital Skills among Chinese Postgraduate Students in Leicester University

Questionnaire (2014)

My name is Mengjie Jiang. I am a PhD student at the University of Leicester doing research in digital skills. As part of my study is to investigate digital skills among Chinese international postgraduate students and the development of their digital skills during their higher education studies, I would be very grateful if you could spare your time to participate in this study. The information collected in this questionnaire will be used only for the purpose of research and kept confidential to the research team. Thank you very much for your cooperation. Your reflections and suggestions are very welcome and will help to improve the quality of this study. If you have any feedback, please contact me at: mjj16@le.ac.uk.

1. About your ownership of digital devices and access to Internet (Please tick all that apply).

Statement	I had this for my undergraduate studies	I used this to access Internet for my undergraduate studies	I have this for my postgraduate studies in the UK	I use this to access Internet for my postgraduate studies in the UK
A desktop computer				
A laptop / netbook computer				
A digital camera (other than a phone)				
A phone with Internet capability (e.g., iPhone) (specify)				
An MP3 player/iPod				
An iPad or other tablet computer (specify)				
An Amazon Kindle or other e-reader (specify)				
A gaming device (please specify if this is Internet capable).....				
Other (specify)				

2. About your uses of software/applications for university studies.

2.1 How often you use **these digital tools** for ‘**Publication and information dissemination**’ for your **undergraduate (UG) study and postgraduate (PG) study? For example, using Facebook to disseminate the link of research questionnaire.**

Please tick the appropriate number into the box to and specify which kind(s) of tools that applied to you when necessary.

[1=never; 2=rarely; 3=sometimes; 4=nearly always; 5=always]

Statement Digital tools	1=never		2=rarely		3=sometimes		4=nearly always		5=always	
	UG	PG	UG	PG	UG	PG	UG	PG	UG	PG
Digital Video (e.g., YouTube).										
Podcast (e.g., tudou podcast)										
Blogs (e.g., Sina blog)										
Digital photographs (e.g., Flickr)										
Discussion forum (e.g., http://bbs.isolearn.com)										
Wikis (e.g., Wikipedia)										
Other (Please specify)										

2.2 How often you use **these digital tools** for ‘Communication’ for your undergraduate (UG) study and postgraduate (PG) study? For example, using Skype for online tutorials or use WeChat to arrange interviews.

Please tick the appropriate number into the box to and specify which kind(s) of tools that applied to you when necessary.

[1=never; 2=rarely; 3=sometimes; 4=nearly always; 5=always]

Statement	1=never		2=rarely		3=sometimes		4=nearly always		5=always	
	UG	PG	UG	PG	UG	PG	UG	PG	UG	PG
Digital tools										
Blogs (e.g., Sina blog)										
Discussion forum (e.g., http://bbs.isolearn.com)										
Email										
Instant message (e.g., QQ/WeChat/Facebook)										
Voice over IP (e.g., Skype)										
Other (please specify)										
.....										

2.3 How often you use **these digital tools** for ‘**Information and resource handling**’ for your undergraduate (UG) study and postgraduate (PG) study? For example, using Google Scholar to search for journal articles.

Please tick the appropriate number into the box to and specify which kind(s) of tools that applied to you when necessary.

[1=never; 2=rarely; 3=sometimes; 4=nearly always; 5=always]

Statement	1=never		2=rarely		3=sometimes		4=nearly always		5=always	
	UG	PG	UG	PG	UG	PG	UG	PG	UG	PG
Digital tools										
Digital video (e.g., YouTube)										
Podcast (e.g., Tudou)										
Blackboard (e.g., https://blackboard.le.ac.uk)										
Digital photographs (e.g., Flickr)										
Social bookmarking (e.g., Delicious)										
Discussion forum (e.g., http://bbs.isolearn.com)										
Wikis (e.g., Wikipedia/Baidu baike)										
Electronic library (e.g., Mendeley)										
Bibliographic software (e.g., Refworks)										
Other (please specify)										

2.4 How often you use **these digital tools** for ‘**Collaboration**’ for your **undergraduate (UG) study and postgraduate (PG) study? For example, using Google Docs for collaborative writing**

Please tick the appropriate number into the box to and specify which kind(s) of tools that applied to you when necessary.

[1=never; 2=rarely; 3=sometimes; 4=nearly always; 5=always]

Statement	1=never		2=rarely		3=sometimes		4=nearly always		5=always	
	UG	PG	UG	PG	UG	PG	UG	PG	UG	PG
Digital tools										
Wikis (e.g., Wikipedia)										
Electronic library (e.g., Mendeley)										
Google Document (e.g., Google Docs)										
RSS feeds (e.g., Google reader)										
Discussion forum (e.g., http://bbs.isolearn.com)										
File sharing (e.g., Dropbox)										
Other (please specify)										

2.5 How often you use **these digital tools** for ‘a specific learning purpose’ for your undergraduate (UG) study and postgraduate (PG) study? For example, using PowerPoint to deliver a presentation

Please tick the appropriate number into the box to and specify which kind(s) of tools that applied to you when necessary.

[1=never; 2=rarely; 3=sometimes; 4=nearly always; 5=always]

Statement Digital tools	1=never		2=rarely		3=sometimes		4=nearly always		5=always	
	UG	PG	UG	PG	UG	PG	UG	PG	UG	PG
PointPoint										
Word Processing (e.g., WPS/Microsoft Word)										
Project management software (e.g., Project Server 2013)										
Modelling software (e.g., 3D Studio Max)										
Graphical package (e.g., photoshop)										
Spreadsheet (e.g., Excel)										
Statistical software (e.g., SPSS)										
Online assessment sites (e.g., grammarly. com)										
Bibliographic software (e.g., Refworks)										
Simulation software (e.g., Simlab)										
Education Apps (e.g., Youdao)										
Other (please specify)										

3. About your uses of conventional and new learning methods.

How often do you use the following **methods to search for current information and articles** for your assignment (e.g., writing essays)?

Please put the appropriate number into the box to indicate how often you use each method.

[1=never; 2=rarely; 3=sometimes 4=nearly always; 5=always]

Statement	I did this for my undergraduate studies	I do this for my postgraduate studies in the UK
Ask your tutors (lecturers)		
Ask a librarian		
Ask friends and peers		
Use printed books		
Podcast		
Examine the lists of references mentioned in books, book chapters, journal papers, etc.		
Search using library database		
Search using keywords in Internet search engines (e.g. Google) (please specify)		
Find references from special interest websites (please specify)		
Use a course website (e.g., Blackboard)		
Consult with Encyclopaedias (e.g., Wikipedia)		
Other (please specify).....		

4. About your evaluation of the information.

How often do you conduct the following activities to **evaluate online information** in university?

Please put the appropriate number into the box to indicate how often you use each method.

[1=never; 2=rarely; 3=sometimes 4=nearly always; 5=always]

Statement	Grading	
	For undergraduate studies	For postgraduate studies in the UK
I edit/peer review the work of colleagues and / or my peers.		
I try to find up-to-date information that I need		
I consider whether the views represented are facts (accurate) or personal opinions.		
I use multiple resources to validate the information/data.		
I assess authors' motivation/objectives for posting information and bias.		
I aware the influence of commercial elements upon online information (e.g., advertising/promotion/sponsorship).		
I use citation metrics as an evaluation technique (e.g., citation counting, journal impact factor).		
Other (please specify)		

5. About your approach to using (and creating) educational material.

Please put the appropriate number (1, 2 or 3) into box to indicate how likely you use(d) **each** method.

[1 = do not want to adopt them; 2 = consider to adopt them; 3 =adopted them]

Statement	Grading
I have a developed personal learning environment from a range of tools (i.e., I developed a suite of preferred tools such as YouTube, Wikipedia and so forth for my learning based on my personal trial and error).	
I have engaged with open publishing (i.e., I seek for the open publishing route like blogging to disseminate my work).	
I have created a range of informal output (i.e., I explore different forms of informal output such as video, podcast, slide cast and so on).	
I use new technologies to support research (i.e., I adopt new technologies not only for personal basis but also to support professional practices, such as using Facebook to disseminate my online questionnaire).	
I create and share outputs (i.e., I share my presentations, ideas, suggestions or publication; such as using Slideshare to share my slides created).	

6. About your online identity.

Note: An online identity is a social identity that an Internet user establishes in online communities and websites. It can be considered as an actively constructed presentation of oneself: some people prefer to use their real names online while others prefer to be anonymous, however, these online identities can reveal partial personally identifiable information.

Please put the appropriate number (1, 2 or 3) into box to indicate how likely you use(d) **each** method.

[1 = do not want to adopt them; 2 = consider to adopt them; 3 = adopted them]

Statement	Grading
I have online identities (i.e., I use different tools to creating discrete online presence, for example, I use Facebook to portray a part of my identities).	
I have a central place for my online identity (i.e., although my identity is distributed, there usually exists a central hub for distributed identities such as blog or aggregation service).	
I have cultivated an online network of peers (i.e., I usually engaged in a preferred social networks such as blog and I regularly contribute to this network).	

7. About your perception of your Internet Skills.

The purpose of the following set of statements is to gain an understanding of to how well you can you conduct the following activities.

So, please put the appropriate number (1, 2, 3, 4) into box to indicate how well you can conduct the following activities.

[1=extremely weak; 2=weak; 3=generally ok; 4=well; 5=extremely well].

Statement	Grading
Opening Websites by entering the URL in the browser's location bar	
Navigating forward and backward between pages using the browser buttons	
Uploading files to websites or email	
Saving files on the memory stick	
Downloading music and files	
Bookmarking websites	
Entering keywords in the proper field	
Conducting the search operation	
Opening search results in the search result lists	
Submitting online forms/assignments	
Using hyper links embedded in different formats such as text and images.	
Synchronising email to your phone	
Not becoming disoriented when navigating within a website	
Not becoming disoriented when opening and browsing through search results	
Selecting the appropriate website or search engine to seek information	

Searching for information using multiple keywords	
Selecting useful information on websites or from research results	
Evaluating the source of the information found	
Paraphrasing other people's ideas	
Using other people's ideas/images with giving credit to the author	
Citing resources using suitable referencing styles	
Remixing media content to produce a piece of work (e.g., making a slide/poster.)	

8. About your attitudes and challenges of using digital tools/applications for learning.

8.1 About the usefulness of Social software in your coursework studying. *Please tick the appropriate number into the box to indicate how likely you agree with each statement.* [1=strongly disagree; 2=Disagree; 3=Not sure; 4=Agree; 5=Strong agree]

Statement	Grading				
	1	2	3	4	5
Social networking tools (e.g., Facebook/Renren) provide me with richer and complex communicative tools.					
Social networking sites (e.g., discussion forum) help me to foster a sense of community in learning					
Social networking applied to education (e.g., Cloudworks) helps me to change the way of exchanging information, with the potential to lead to proactive sharing and reuse of educational resources.					
Social networking tools (e.g., Slideshare) enable me to have access to scholarly and open learning materials easily.					
Social networking tools (e.g. Second Life) provide me with authentic real-time modelling environment to fulfil exploratory and problem-based learning.					
Social networking tools (e.g., Youtube) encourage me to enhance my analytical skills though investigating the credibility of the content.					
Social networking applications (e.g., Itunes U) help me to make educational choices.					
Social networking tools (e.g., Second Life) help me to transfer good practice from research into practice in an effective way.					
Social networking tools (e.g., Wikinomics) give me the opportunity to observe and emulate scholars at work.					

8.2 About your barriers to using digital technologies for postgraduate studies. *Please tick the box representing the appropriate number to indicate how likely you agree with each statement.*
[1=Strongly disagree; 2=disagree; 3=Not sure; 4=Agree; 5=Strong agree]

Statement	Grading				
	1	2	3	4	5
I feel I lacked experience in the use of Internet during my undergraduate study due to some websites were not accessible.					
I feel I am not motivated to adopt new Web technologies because I am used to the previous studying habit and organizational culture.					
I feel Social networking tools are not very useful for my coursework learning as I do not use them for academic purposes often.					
I find it is difficult to understand the online English terms due to my language proficiency.					
I feel it is difficult to find, identify, retrieving and to view relevant documents.					
I find it is difficult to evaluate and analyse online information.					
I find it is difficult to organize online information.					
I feel social networking tools are difficult to use since I do not have a good grasp of technologies.					
Other (Specify).....					

9. What recommendations do you have to cope with the barriers of using technologies for learning?

Please list your recommendations in the following box.

10. About you.

Age:

Gender:

Major of your undergraduate study:.....

Major of your postgraduate study:.....

Are you self-sponsored or government funded? Self-sponsored () government funded ()

Did you have any working experience before your postgraduate study in the UK? Yes (please specify your job type, and the length of month)...../ No

Did you have other overseas experience before your postgraduate study in the UK? Yes (please specify what did you do, and the length of moth)...../ No

Please specify your stage of postgraduate study:

Pre-session English Course (enrolled in 2014)

Master study(enrolled in 2014), please specify how many month.....

Dissertation stage (enrolled in 2013)

Dissertation stage (enrolled in 2014)

Appendix 2: Questionnaire (Chinese version)

对中国国际硕士生的数字素养及发展的研究

我的名字是姜梦洁。我是莱斯特大学的教育学博士。我的研究是关于中国的国际研究生的数字素养，希望您能抽出您宝贵的时间来填写这份问卷，如果您有任何改善研究质量的意见，请与我联系：mjj16@le.ac.uk。

研究中国国际硕士学生的数字素养及发展

1.关于您所拥有的数码设备，以及您是否用这些设备来上网（请打勾）。

	我本科的时候有这个设备	我本科的时候用这个设备上网	我硕士有这个设备	我硕士期间用这个设备上网
台式计算机	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
笔记本/上网本	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
数码相机（不包括手机）	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
智能手机（如 iPhone）（请注明） <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MP3 播放器/ iPod	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iPad 或其他平板电脑（请注明） <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
亚马逊的 Kindle 或其他电子阅读器（请注明） <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
游戏设备（请注明） <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
其他（请注明） <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2.关于应用软件和网站的使用频率(请注意下面的问题有比较本科期间的电子学习和硕士期间的电子学习)。

2.1.1 请回忆你在本科学习过程中，你使用如下的选项来辅助于“信息的传播/出版”的频率是怎样的？（例如:使用 Facebook 或者微信来传播调查问卷）

请在适当的数字下面打勾

[1 =从未; 2 =很少; 3 =有时; 4 =几乎总是; 5 =总是]

	1	2	3	4	5
数字视频	<input type="radio"/>				
播客（如土豆网）	<input type="radio"/>				
博客（如新浪博客）	<input type="radio"/>				
摄影图片网站（如 Flickr）	<input type="radio"/>				
讨论论坛（如 http://bbs.isolearn.com ）	<input type="radio"/>				
维基（如维基百科/百度百科）	<input type="radio"/>				
其他（请注明） <input style="width: 80px; height: 20px;" type="text"/>	<input type="radio"/>				

2.1.2 请回忆你在英国硕士学习过程中，你使用如下的选项来辅助于“信息的传播/出版”的频率是怎样的？（例如：使用 Facebook 或者微信来传播调查问卷）

请在适当的数字下面打勾

[1 =从未; 2 =很少; 3 =有时; 4 =几乎总是; 5 =总是]

	1	2	3	4	5
数字视频	<input type="radio"/>				
播客（如土豆网）	<input type="radio"/>				
博客（如新浪博客）	<input type="radio"/>				
摄影图片网站（如 Flickr）	<input type="radio"/>				
讨论论坛（如 http://bbs.isolearn.com ）	<input type="radio"/>				
维基（例如，维基百科/百度百科）	<input type="radio"/>				
其他（请注明） <input style="width: 80px; height: 20px;" type="text"/>	<input type="radio"/>				

2. 关于应用软件和网站的使用频率(请注意下面的问题有比较本科期间的电子学习和硕士期间的电子学习)。

2.2.1 请回忆你在本科学习过程中，你使用如下的选项来辅助于“交流 communication”的频率是怎样的？（例如：使用 Skype 进行在线指导或使用微信预约采访）请在适当的数字下面打勾 [1 =从未; 2 =很少; 3 =有时; 4 =几乎总是; 5 =总是]

	1	2	3	4	5
博客（如新浪博客）	<input type="radio"/>				
讨论论坛（如 http://bbs.isolearn.com ）	<input type="radio"/>				
电子邮件	<input type="radio"/>				
即时消息（如 QQ/微信）	<input type="radio"/>				
IP 语音（如 Skype）	<input type="radio"/>				
其他（请注明） <input type="text"/>	<input type="radio"/>				

2.2.2 请回忆你在英国硕士学习过程中, 你使用如下的选项来辅助于“交流 communication” 的频率是怎样的? (例如: 使用 Skype 进行在线指导或使用微信预约采访) *请在适当的数字下面打勾* [1 =从未; 2 =很少; 3 =有时; 4 =几乎总是; 5 =总是]

	1	2	3	4	5
博客（如新浪博客）	<input type="radio"/>				
讨论论坛（如 http://bbs.isolearn.com ）	<input type="radio"/>				
电子邮件	<input type="radio"/>				
即时消息（如 QQ/微信）	<input type="radio"/>				
IP 语音（如 Skype）	<input type="radio"/>				
其他（请注明） <input type="text"/>	<input type="radio"/>				

2.关于应用软件和网站的使用频率(请注意下面的问题有比较本科期间的电子学习和硕士期间的电子学习)。

2.3.1 请回忆你在本科学习过程中，你使用如下的选项来“搜索信息和资源”的频率是怎样的？（例如：使用谷歌学术搜索期刊文章）

请在适当的数字下面打勾

[1 =从未; 2 =很少; 3 =有时; 4 =几乎总是; 5 =总是]

	1	2	3	4	5
数字视频	<input type="radio"/>				
播客（如土豆网）	<input type="radio"/>				
黑板 blackboard（如 https://blackboard.le.ac.uk ）	<input type="radio"/>				
摄影图片网站（如 Flickr）	<input type="radio"/>				
社会化书签（如 Delicious / 豆瓣）	<input type="radio"/>				
讨论论坛（如 http://bbs.isolearn.com ）	<input type="radio"/>				
维基（如维基百科/百度百科）	<input type="radio"/>				
电子图书馆（如 Mendeley）	<input type="radio"/>				
文献管理工具（如 RefWorks）	<input type="radio"/>				
其他（请注明） <input style="width: 100px; height: 20px;" type="text"/>	<input type="radio"/>				

2.3.2 请回忆你在英国硕士学习过程中，你使用如下的选项来辅助于“搜索信息和资源”的频率是怎样的？（例如：使用谷歌学术搜索期刊文章）

请在适当的数字下面打勾

[1 =从未; 2 =很少; 3 =有时; 4 =几乎总是; 5 =总是]

	1	2	3	4	5
数字视频（如 YouTube）	<input type="radio"/>				
播客（如土豆网）	<input type="radio"/>				
黑板 blackboard（如 https://blackboard.le.ac.uk ）	<input type="radio"/>				
摄影图片网站（如 Flickr）	<input type="radio"/>				
社会化书签（如 Delicious / 豆瓣）	<input type="radio"/>				
讨论论坛（如 http://bbs.isolearn.com ）	<input type="radio"/>				
维基（如维基百科/百度百科）	<input type="radio"/>				
电子图书馆（如 Mendeley）	<input type="radio"/>				
文献管理工具（如 RefWorks）	<input type="radio"/>				
其他（请注明） <input style="width: 100px; height: 20px;" type="text"/>	<input type="radio"/>				

2.关于应用软件和网站的使用频率(请注意下面的问题有比较本科期间的电子学习和硕士期间的电子学习)。

2.4.1 请回忆你在本科学习过程中，你使用如下的选项来辅助于“合作 collaboration” 的频率是怎样的？（例如: 使用谷歌文档 Google Docs 和他人一起编辑文档）

请在适当的数字下面打勾

[1 =从未; 2 =很少; 3 =有时; 4 =几乎总是; 5 =总是]

	1	2	3	4	5
维基（如维基百科）	<input type="radio"/>				
电子图书馆（如 Mendeley）	<input type="radio"/>				
Google Document（如 Google Docs）	<input type="radio"/>				
RSS 订阅源（如谷歌阅读器）	<input type="radio"/>				
讨论论坛（如 www.mop.com）	<input type="radio"/>				
文件共享工具（如 Dropbox）	<input type="radio"/>				
其他（请注明） <input style="width: 100px; height: 20px;" type="text"/>	<input type="radio"/>				

2.4.2 请回忆你在英国硕士学习过程中，你使用如下的选项来辅助于“合作 collaboration”的频率是怎样的？（例如：使用谷歌文档 Google Docs 和他人一起编辑文档）

请在适当的数字下面打勾

[1 =从未; 2 =很少; 3 =有时; 4 =几乎总是; 5 =总是]

	1	2	3	4	5
维基（如维基百科/百度百科）	<input type="radio"/>				
电子图书馆（如 Mendeley）	<input type="radio"/>				
Google Document（如 Google Docs）	<input type="radio"/>				
RSS 订阅源（如谷歌阅读器）	<input type="radio"/>				
论坛（如 www. mop.com）	<input type="radio"/>				
文件共享工具（如 Dropbox）	<input type="radio"/>				
其他（请注明） <input style="width: 100px; height: 20px;" type="text"/>	<input type="radio"/>				

2.关于应用软件和网站的使用频率(请注意下面的问题有比较本科期间的电子学习和硕士期间的电子学习)。

2.5.1 请回忆你在本科学习过程中，你使用如下的选项来完成“一项特定的学习任务”的频率是怎样的？（例如：使用 PowerPoint 编辑演讲文稿）

请在适当的数字下面打勾

[1 =从未; 2 =很少; 3 =有时; 4 =几乎总是; 5 =总是]

	1	2	3	4	5
幻灯片	<input type="radio"/>				
文字处理工具（如 WPS / Word）	<input type="radio"/>				
项目管理软件（如 Project Server2013）	<input type="radio"/>				
建模软件（如 3D Studio Max）	<input type="radio"/>				
图像处理软件（如 Photoshop）	<input type="radio"/>				
电子制表软件（如 Excel）	<input type="radio"/>				
数据统计软件（如 SPSS）	<input type="radio"/>				
在线评估网站（如 grammarly. com）	<input type="radio"/>				
文献管理工具（如 RefWorks）	<input type="radio"/>				
仿真建模软件（如 SIMLAB）	<input type="radio"/>				
教育应用程序（如有道辞典）	<input type="radio"/>				
其他（请注明） <input type="text"/>	<input type="radio"/>				

2.5.2 请回忆你在英国硕士学习过程中，你使用如下的选项来完成“一项特定的学习任务”的频率是怎样的？（例如：使用 PowerPoint 编辑演讲文稿）

请在适当的数字下面打勾

[1 =从未; 2 =很少; 3 =有时; 4 =几乎总是; 5 =总是]

	1	2	3	4	5
幻灯片	<input type="radio"/>				
文字处理工具（如 WPS / Word）	<input type="radio"/>				
项目管理软件（如 Project Server2013）	<input type="radio"/>				
建模软件（如 3D Studio Max 的）	<input type="radio"/>				

图像处理软件（如 Photoshop）	<input type="radio"/>				
电子制表软件（如 Excel）	<input type="radio"/>				
数据统计软件（如 SPSS）	<input type="radio"/>				
在线评估网站（如 grammarly. com）	<input type="radio"/>				
文献管理工具（如 RefWorks）	<input type="radio"/>				
仿真建模软件（如 SIMLAB）	<input type="radio"/>				
教育应用程序（如有道辞典）	<input type="radio"/>				
其他（请注明） <input type="text"/>	<input type="radio"/>				

3.关于传统学习方法和电子学习方法的应用。

3.1 请回忆你本科学习的经验，当你要完成一项作业时(比如写论文), 你经常使用下面的方法来搜索信息和资源么？

请在适当的数字下面打勾 [1 =从未; 2 =很少; 3 =有时 4 =几乎总是; 5 =总是]

	1	2	3	4	5
咨询你的导师（讲师）	<input type="radio"/>				
咨询图书馆工作人员	<input type="radio"/>				
咨询朋友或同学	<input type="radio"/>				
使用印刷书籍	<input type="radio"/>				
使用播客	<input type="radio"/>				
使用搜索引擎（如谷歌）搜索（请注明） <input type="text"/>	<input type="radio"/>				
查看书籍，书籍章节和期刊中提到的参考文献 <input type="text"/>	<input type="radio"/>				

使用图书馆数据库检索工具	<input type="radio"/>				
使用特殊网站（请注明） <input type="text"/>	<input type="radio"/>				
使用课程网站（如 blackboard）	<input type="radio"/>				
与百科全书咨询（如维基百科）	<input type="radio"/>				
其他（请注明） <input type="text"/>	<input type="radio"/>				

3.2 请回忆你在英国硕士学习的经验，当你要完成一项作业时(比如写论文), 你经常使用下面的方法来搜索信息和资源么？请在适当的数字下面打勾 [1 =从未; 2 =很少; 3 =有时 4 =几乎总是; 5 =总是]

	1	2	3	4	5
	<input type="checkbox"/>				
咨询你的导师（讲师）	<input type="checkbox"/>				
咨询图书馆工作人员	<input type="checkbox"/>				
咨询朋友或同学	<input type="checkbox"/>				
使用印刷书籍	<input type="checkbox"/>				
使用播客	<input type="checkbox"/>				
使用搜索引擎（如谷歌）搜索（请注明） <input type="text"/>	<input type="checkbox"/>				
查看书籍，书籍章节和期刊中提到的参考文献 <input type="text"/>	<input type="checkbox"/>				
使用其他文献检索工具（请注明） <input type="text"/>	<input type="checkbox"/>				
使用特殊网站（请注明） <input type="text"/>	<input type="checkbox"/>				
使用课程网站（如 blackboard）	<input type="checkbox"/>				
与百科全书咨询（如维基百科）	<input type="checkbox"/>				
其他（请注明） <input type="text"/>	<input type="checkbox"/>				

4.关于信息评估技能。

4.1 你在读本科的时候，用以下方式来 评估信息资源 的频率是怎么样？

请在适当的数字下面打勾

[1 =从不; 2 =很少; 3 =有时 4 =几乎总是; 5 =总是]

	1	2	3	4	5
我曾编辑/审查的同事或同行的作业。	<input type="radio"/>				
我曾试图找到我需要的最新的信息。	<input type="radio"/>				
我曾审核文章中的观点否是基于事实依据还是个人的观点。	<input type="radio"/>				
我曾使用多种信息源来验证信息/数据的准确性。	<input type="radio"/>				
我曾评估作者的偏见。	<input type="radio"/>				
我意识到网上的信息（如广告/促销/赞助）有商业因素的影响。	<input type="radio"/>				
我曾用引文指标作为评估文献的技巧（如查看引用计数，期刊影响因子）。	<input type="radio"/>				
其他（请注明） <input type="text"/>	<input type="radio"/>				

4.2 你在英国读硕士的时候，用以下方式来 评估信息资源 的频率是怎么样？

请在适当的数字下面打勾

[1 =从不; 2 =很少; 3 =有时 4 =几乎总是; 5 =总是]

	1	2	3	4	5
我会编辑/审查的同事或同行的作业。	<input type="radio"/>				
我会试图找到我需要的最新的信息。	<input type="radio"/>				
我会审核文章中的观点否是基于事实依据还是个人的观点。	<input type="radio"/>				
我会使用多种信息源来验证信息/数据的准确性。	<input type="radio"/>				
我会评估作者的偏见。	<input type="radio"/>				
我意识到网上的信息（如广告/促销/赞助）有商业因素的影响。	<input type="radio"/>				
我会用引文指标作为评估文献的技巧（如查看引用计数，期刊影响因子）。	<input type="radio"/>				
其他（请注明） <input type="text"/>	<input type="radio"/>				

5.关于使用和创造教育材料的方式 (请注意下面的所有问题是针对目前的情况)

请选择相应的数字 (1 , 2 或 3)

[1 =不希望采取他们。 2 =考虑采纳; 3 =采纳了这些]

	1	2	3
我有采用一系列的电子工具或应用软件来组建自己的个人学习环境（比如有一套首选工具像 YouTube， 维基百科， 谷歌学术来辅助学习）。	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
我从事过开放出版（比如用博客来传播作品）。	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
我有一系列非学术作品输出（如视频，播客，幻灯片等）。	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
我使用新技术来支持研究（如用 Facebook 的传播我的网上问卷调查）。	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
我共享我的作品输出（如使用 Slideshare 分享幻灯片）。	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6.关于您的网上身份

备注：在线身份是互联网用户在网站上建立的身份。它可以被看作是用户积极构建的关于自己的展现：比如有些人喜欢用自己的真实姓名上网，而另一些人喜欢用昵称，但是，这些在线身份可以揭示部分个人信息。

请选择适当数字 (1,2 或 3)

[1 =不希望采取他们。 2 =考虑采纳; 3 =采纳了这些]

	1	2	3
我有网上身份（如我有创建网上存在感，如我使用 Facebook 来描绘身份的一部分）。	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
我有一个核心网络工具来展现我的身份（即我的身份虽然是分布在各个社交网站，但是有一个核心网站，例如博客或聚合服务）。	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
我已经建立适用于同行的网上关系网	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7.关于技能的评估。

请你对自己的 Internet skills 做一个评估，并选择相应的数字（1，2，3，4，5）。

[1 =极其微弱; 2 =弱; 3 =一般; 4 =好; 5 =非常好]

	1	2	3	4	5
在浏览器的地址栏中输入网址打开网站	<input type="radio"/>				
使用浏览器导航按钮	<input type="radio"/>				
上传文件到网站或电子邮箱中	<input type="radio"/>				
在硬盘存储文件	<input type="radio"/>				
下载音乐和文件	<input type="radio"/>				
将网站标记上书签	<input type="radio"/>				
在适当的地方输入关键字	<input type="radio"/>				
进行搜索操作	<input type="radio"/>				
打开搜索列表中打开搜索结果	<input type="radio"/>				
在线提交表格/作业	<input type="radio"/>				
嵌入不同的格式的超链接如文本和图像	<input type="radio"/>				
同步电子邮件到您的手机	<input type="radio"/>				
在网站内浏览信息不会迷失	<input type="radio"/>				
浏览搜索结果时不会迷	<input type="radio"/>				
选择合适的网站或搜索引擎搜索信息	<input type="radio"/>				
使用多个关键字来搜索信息	<input type="radio"/>				
从网站或从搜索结果中选择有用的信息	<input type="radio"/>				
评估的相关资料的来源	<input type="radio"/>				
复述别人的观点(Paraphrasing)	<input type="radio"/>				
使用其他人的观点或图像时会标注出处。	<input type="radio"/>				
使用合适的引用样式引用资源	<input type="radio"/>				
混合媒体来制作新的媒体产品（如制作幻灯片/海报）。	<input type="radio"/>				

8.你对网络工具的态度以及使用网络工具来辅助学习的困难。

8.1 关于软件工具的你学习中的用处。

请选择适当的数字来表明：在哪种程度上，你同意下面的陈述。

[1 =强烈反对; 2 =不同意; 3 =不知道; 4 =同意; 5 =非常同意]

	1	2	3	4	5
社交网络工具（例如，Facebook/qq）为我提供更加丰富的交际工具。	<input type="radio"/>				
社交网站（如论坛）帮我培养社区学习意识	<input type="radio"/>				
社交网络在教育中的应用（如 Cloudworks）帮助我和其他人交换信息，并且有推动共享或者再次利用教育资源的潜力。	<input type="radio"/>				
社交网络工具（如 Slideshare）使我更加容易地去获得学术资源和开放式教育资源。	<input type="radio"/>				
社交网络工具（如 Second Life）给我提供模拟现实的环境来满足研究性学习。	<input type="radio"/>				
社交网络工具（如 YouTube）使我能够通过内容可信读的审查来提升我的信息分析能力。	<input type="radio"/>				
社交网络应用程序（如 iTunes U）能够帮我做和教育相关的选择。	<input type="radio"/>				
社交网络工具（如 Second Life）能帮我将研究学习中的有效途径付诸于实践。	<input type="radio"/>				
社交网络工具（如维基经济学）给我机会去了解其他学者的成品。	<input type="radio"/>				

8.2 关于你在研究生期间使用网络工具辅助学习的困难。

请选择适当的数字来表明：在哪种程度上，你同意下面的陈述。

[1 =强烈不同意; 2 =不同意; 3 =不知道; 4 =同意; 5 =强烈认同]

	1	2	3	4	5
我觉得由于国内存在互联网的政治审核制度，我在国内读本科的时候无法访问一些网站，导致我缺乏使用一些网站的经验。	<input type="radio"/>				
我觉得我习惯传统的学习方式，因此我不主动采用新的网络技术来辅助学习。	<input type="radio"/>				
我觉得我不经常使用网络工具来辅助我的学习，因此我觉得新媒体和网络有学术价值。	<input type="radio"/>				
我觉得由于我的英语水平有限，我很难理解网上的一些英语术语。	<input type="radio"/>				
我觉得搜索，识别和获取紧密相关的网上资源很困难。	<input type="radio"/>				
我发现评估和分析网上信息。	<input type="radio"/>				
我发现组织整合网上资源很困难。	<input type="radio"/>				
我觉得因为我没有掌握很好操作技术，因此我觉得使用网络工具和学习软件很困难。	<input type="radio"/>				
其他（请注明） <input type="text"/>	<input type="radio"/>				

9.你对解决电子学习种的困难有什么建设性的意见？

请在下框中填写您的建议。

10.关于你的基本信息。

年龄

性别

你的本科专业

你的研究生专业

你的研究生学习是自己出资还是政府资助的？

- 自己出资
- 政府资助

在研究生学习之前，你有工作经验么？

- 是（请注明您的作业类型，以及时间长短）
- 没有

在研究生学习之前，你有其他海外经验么？

- 是（请注明类型）
- 没有

请注明您的研究生学习阶段

语言课程（2015 入学）

硕士研究（2014 入学）目前开学多少个月

你的邮箱是：

Appendix 3: Interview schedule

Part 1 背景信息 (Background information):

1. 可以请你介绍一下自己么? 你的家乡在哪? 年龄多大? Could you please give a short introduction of yourself? Where are you from? How old are you?
2. 本科就读的院校和专业? 方便提供下雅思成绩么? 然后你现在的硕士是什么专业? What was your undergraduate university and what was your undergraduate discipline? What do you study now?

Part 2 Undergraduate study and digital practices

1. 请你回忆一下本科时主要的作业和考核形式是什么? Can you please recall what was the main form of assignment and assessment for undergraduate study?
2. 本科时, 当你写论文或者是其他形式的作业时, 你是怎么搜索文献或者信息? 你主要从哪里获得资源? During the undergraduate study, how and where did you carry out resources or information searching?
3. 本科时, 你对网络资源和电子期刊的使用率高么? 如果是的, 可以举例说一些你当时经常使用的搜索引擎, 期刊和网站么? 如果你不经常使用, 可以简单的说下原因么? During the undergraduate study, did you often use online resources and electronic journals? If so, can you specify search engines, online journal sites and websites that were frequently used? If not, can you please explain why?
4. 本科时, 你会怎么判断这些信息的有用性和质量? During undergraduate, how did you judge the usefulness and quality of the online information?
5. 本科时会经常用什么网站, 应用软件来辅助专业学习或者完成作业么? 如果有, 是哪些? 主要用来做什么? During undergraduate, did you often use any website, application or software to help with your subject study or to accomplish assignment? If so, what were they and what did you use them for?
6. 必要的时候访谈者是如何开始使用这些网站, 应用和软件的? Where necessary, ask participants how did they begin to use these websites, applications and software.
7. 你在使用这些技术展开学习的时候有遇到过什么困难么? 如果有, 可以举例子么? 你最后有解决困难么? 如果有是怎么样解决的? Did you have any difficulties in using these technologies for learning? If so, can you provide (an) example(s)? Did you managed to cope with the difficulty? If yes, how?
8. 本科时, 老师主要采取什么样的教学方式? 学校的电子设施基本是怎么样的? During undergraduate, what were the main teaching methods used by teacher to deliver a lesson? What were the e-learning facilities provided by the University?
9. 本科时, 你还有经常用过其它的网络工具来开展学习相关活动么? 比如互动或是接收反馈么? Was there any other particular Web tools or software that you used frequently during the

undergraduate study to carry out studying-related activities such as interaction or receiving feedback?

Part 3 Undergraduate study and digital practices

1. 你为什么选择出国留学? 你期望通过硕士学习获得什么? Why did you choose to study aboard and what do you expect to gain from the postgraduate study?
2. 硕士主要的作业和考核形式是什么? 和本科相比有没有变化? What was the main form of assignment and assessment for postgraduate study? Are there any changes compared with those of undergraduate study?
3. 硕士的班级有多少人? How many students are there in your class for postgraduate study?
4. 硕士的课程安排, 教学方式和本科有不同么? 怎么不同的? Are there any differences in terms of the class arrangement, tutor's teaching method compared with undergraduate study? How?
5. 参照画的思维导图, 请说下你经常使用哪些工具以及用来干什么? Please refer to the mind map that created by you, and talk about what tools do you frequently use and what do you do with them?
6. 思维导图上有哪些电子设备, 应用, 网站和软件是你在硕士阶段新使用的? 你是怎么知道并且使用它们的? Can you specify what digital devices, applications, websites and software are recently used during postgraduate study? How did you know and began to use them?
7. 这些工具哪些是主要用于学校学习, 哪些是用于自主学习的? Among these digital tools, what are mainly used in the classroom, and what are mainly used for self-regulated learning?
8. 你觉得在英国攻读硕士学位是一个挑战么? 你对你的学习有什么顾虑么? Do you think pursuing a Master degree in the UK is a challenge? Do you have any concerns about you study?
9. 你在硕士学习过程中, 尤其是在使用这些电子工具学习和完成作业中有遇到困难么? 举例说明是什么? 困难有得到解决么? 是如何解决的? During your postgraduate study, particularly in terms of experiencing digital tools for learning and accomplishing assignments, have you encountered any difficulties? Any examples? Were these difficulties solved and how?

Part 3 Challenge and implications about digital practices

1. 你对网络资源和电子工具的态度是怎样的? 它们对你学习很有帮助么? 为什么? 有其他的评价么? What is your attitude toward online resources and digital tools? Are they helpful to your studies? Why? Do you have any other comments?
2. 除了这些网站和工具之外, 你还采用了其它的对你学习有所帮助的网站和工具么? 你可以具体说说他们是如何帮助你的学习的? Except for above websites and social software tool, have you adopted other tools that you think are useful for your study? Any examples about how they help your studies?
3. 你有曾经停止使用过一些网址和软件之类的工具么? 请举例说明为什么? Have you ever stopped to use any Websites or Web tools? Why? Any examples?

4. 你认为老师的支持和同学的支持对你使用电子工具来学习重要么? 为什么? Do you think tutor support and peer support are important to your uses of digital tools for learning?
5. 你对提高使用电子工具来学习的技能有其他的建议么? Do you have any recommendations to improve skills to make use of digital tools for learning?

Appendix 4: An example of preparation of the codebook

Questionnaire Item	Variable	SPSS Variable name	Variable type	Coding Instruction
	Identification number	ID	Numerical	Number assigned to each questionnaire
q.10.1	Age	Age		Age in years
q.10.2	Gender	Gender	Nominal/Categorical	1=Female; 2=Male
q.10.3	Major UG	Major_UG	Open-ended	Coding scheme
q.10.4	Major PG	Major_PG	Open-ended	Coding scheme
q.10.5	Funds	Funds	Nominal/Categorical	1=self-sponsored; 2=government-funded
q.10.6.1	Working experience	Working	Nominal/Categorical	1=yes; 2=no; 99=missing
q.10.7.1	Overseas experience	Oversea	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.1.1	Desktop ownership (UG)	Dsktopown_UG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.1.2	Desktop access (UG)	Dsktopaces_UG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.1.3	Desktop ownership (PG)	Dsktopown_PG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.1.4	Desktop access (PG)	Dsktopaces_PG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.2.1	Laptop ownership (UG)	Laptopown_UG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.2.2	Laptop access (UG)	Laptopaces_UG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.2.3	Laptop ownership (PG)	Laptopown_PG	Nominal/Categorical	1=yes; 2=no; 99=missing

q.1.2.4	Laptop access (PG)	Laptopaces_PG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.3.1	Digital camera ownership (UG)	Digitcamown_UG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.3.2	Digital camera access (UG)	Digitcamaces_UG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.3.3	Digital camera ownership (PG)	Digitcamown_PG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.3.4	Digital camera access (PG)	Digitcamaces_PG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.4.1	Phone with Internet ownership (UG)	PhoneIntown_UG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.4.2	Phone with Internet access (UG)	PhoneIntaces_UG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.4.3	Phone with Internet ownership (PG)	PhoneIntown_PG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.4.4	Phone with Internet access (PG)	PhoneIntaces_PG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.5.1	MP3 player/iPod ownership (UG)	MP3own_UG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.5.2	MP3 player/iPod access (UG)	MP3aces_UG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.5.3	MP3 player/iPod ownership (PG)	MP3own_PG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.5.4	MP3 player/iPod access (PG)	MP3aces_PG	Nominal/Categorical	1=yes; 2=no; 99=missing

q.1.6.1	iPad/Tablet ownership (UG)	iPadown_UG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.6.2	iPad/Tablet access (UG)	iPadaces_UG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.6.3	iPad/Tablet ownership (PG)	iPadown_PG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.6.4	iPad/Tablet access (PG)	IPadaces_PG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.7.1	Amazon Kindle/other e-reader ownership (UG)	Kindleown_UG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.7.2	Amazon Kindle/other e-reader access (UG)	Kindleaces_UG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.7.3	Amazon Kindle/other e-reader own (PG)	Kindleown_PG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.7.4	Amazon Kindle/other e-reader access (PG)	Kindleaces_PG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.8.1	Gaming device ownership (UG)	Gamiown_UG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.8.2	Gaming device access (UG)	Gamiaces_UG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.8.3	Gaming device ownership (PG)	Gamiown_PG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.8.4	Gaming device access (PG)	Gamiaces_PG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.9.1	Other ownership (UG)	Otherown_UG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.9.2	Other access (UG)	Otheraces_UG	Nominal/Categorical	1=yes; 2=no; 99=missing

q.1.9.3	Other ownership (PG)	Otherown_PG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.1.9.4	Other access (PG)	Otheraces_PG	Nominal/Categorical	1=yes; 2=no; 99=missing
q.2.1.1.1	Digital Video-Publication and dissemination (UG)	Digtvideo_Pbl_UG	Ordinal	1=Never;2=Rarely; 3=Sometimes;4=Nearly always; 5=Always; 99=missing
q.2.1.1.2	Podcast- Publication and dissemination (UG)	Pdcast_Pbl_UG	Ordinal	1=Never;2=Rarely; 3=Sometimes;4=Nearly always; 5=Always; 99=missing
q.2.1.1.3	Blogs- Publication and dissemination (UG)	Blog_Pbl_UG	Ordinal	1=Never;2=Rarely; 3=Sometimes;4=Nearly always; 5=Always; 99=missing
q.2.1.1.4	Digital Photographs- Publication and dissemination (UG)	Digt4to_pbl_UG	Ordinal	1=Never;2=Rarely; 3=Sometimes;4=Nearly always; 5=Always; 99=missing
q.2.1.1.5	Discussion Forum- Publication and dissemination (UG)	Dis4rum_pbl_UG	Ordinal	1=Never;2=Rarely; 3=Sometimes;4=Nearly always; 5=Always; 99=missing
q.2.1.1.6	Wikis-Publication and dissemination (UG)	Wiki_pbl_UG	Ordinal	1=Never;2=Rarely; 3=Sometimes;4=Nearly always; 5=Always; 99=missing

Appendix 5: An example of two-level coding of the demographic information

Level 1: Broad Category of discipline (single-digit codes)	Level 2: Narrow groups (three-digit-codes)
1 Media and Communication	1 Media and Communication 101 Mass Communication 102 Media and Publication Relations 103 Media and Advertising 104 Media, Culture and Society 105 New Media and Society 106 Global Media and Communication
2 Business and Economics	2 Business and Economics 201 Accounting and Finance MSc 202 Finance Msc 203 Financial Risk Management 204 Human Resources Management 205 Management, Finance and Accounting 206 Marketing Economics 207 Banking and Finance 208 Economics
3 MAIE	3 MAIE
4 TESOL	4 TESOL
5 Museum Studies	5 Museum Studies 501 Art Museum and Gallery Studies
6 Modern Languages	6 Modern Languages
7 Translation Studies	7 Translation Studies
8 Law	8 Law 801 International Business Law

9 Mathematics	9 Mathematics
10 Biosciences	10 Biosciences 1001 Cancer Cell and Molecular Biology MSc
11 Chemistry	11 Chemistry 1101 Green Chemistry 1102 Physical Chemistry
12 Engineering	12 Engineering 1201 Advanced Computer Science

Appendix 6: Activity log

	Interview 1	Interview 2	Interview 3	Photographic Journaling	Mind Map	Observation
P1	21/06/2014	✓	Phone interview	×	✓	×
P2	21/06/2014	✓	Phone interview	Declined and commented	✓ positive feedback	×
P3	06/07/2014	✓	Phone interview	×	✓	×
P4	06/07/2014	✓	Phone interview	✓	✓	×
P5	20/07/2014	×	×	✓	×	×
P6	26/07/2014	✓	Phone interview	×	✓	×
P7	26/07/2014	×	×	×	✓	×
P8	08/08/2014	×		×	×	×
P9	22/08/2014	×	×	×	✓	×
P10	13/09/2014	×	×	×	×	×
P11	05/02/2015	×	×	×	×	×
P12	15/02/2015	×	×	✓	✓	×
P13	20/02/2015	✓	×	×	✓	×
P14	25/02/2015	×	×	×	×	×
P15	03/03/2015	✓	Phone interview	×	✓	✓
P16	06/03/2015	×	×	×	×	×
P17	15/03/2015	×	×	×	✓	×
P18	20/03/2015	✓	Phone interview	✓	✓	×
P19	18/07/2015	✓	×	×	×	×
P20	09/08/2015	×	×	×	×	×
P21	10/09/2015	×	×	×	✓	×

P22	18/09/2015	×	×	×	×	×
P23	18/09/2015	×	×	×	×	×
P24	18/09/2015	×	×	×	×	×
P25	19/09/2015	×	×	×	×	✓
P26	19/09/2015	×	×	×	×	✓
P27	19/09/2015	×	×	×	×	✓
P28	19/09/2015	×	×	×	✓	×
P29	03/01/2015	×	×	×	×	×
P30	07/01/2015	×	×	×	×	×

Appendix 7: The profile of the Interview Participants

Participants	Gender	Age	Geographic area in China	UG University	UG subject	Working experience	Other overseas experience	IELTS	PG subject
P1	M	23	Chongqing	He Hai University	English	No	No	7	Translation
P2	F	23	Shanghai	Anhui University	English	No Teaching assistant in New Oriental English company (3 months)	No	8	Translation
P3	M	24	Xiamen	Hefei University of Technology	International trade and economics	Asset management corporation (6 months)	No	6.5	Banking and Finance
P4	M	26	Shanghai	Fudan University	Economics	Assistant of chairman in an investment company (three years)	No	6.5	Management
P5	M	23	Xiamen	Beijing University of Posts and Telecommunications	Artificial Intelligence	No	No	6.5	Management

P6	F	23	JiuJiang	Jiujiang University	Teaching Chinese as a foreign language	No	Americian UG exchange (one semester)	6.5	Media and Communication
P7	F	23	Xi'an	Chang'an University	Accounting	No	No	6	Management, Finance and Accounting
P8	F	23	Guangzhou	Guangzhou University of Business Studies	Teaching Chinese as a foreign language	English tutor (one year)	Another master in education studies	7.5 (2012); 8(2013)	Translation
P9	F	23	Xi'an	Xi'an University of Finance and Economics	Public career management	Beginner English tutor at the English First institution (two months)	No	6.5	TESOL
P10	F	23	Changsha	Hunan University	Broadcast director	Internships as a journalist at the Chinese CCTV	No	6.5	Public Relation
P11	F	23	Guiyang	Guizhou University	Business English	No	Americian UG exchange (one semester)	6.5	International Education
P12	M	23	Hangzhou	Zhe Jiang University	Telecommunication	No	No	6.5	Financial Mathematics and Computation

P13	F	24	Weifang (Shandong)	Southwest Jiaotong University	Mass Communication	No	No	6.5	Media
P14	F	23	Yichang (Hubei)	Jiangxi Normal University	International communication studies	No	No	6.5	New media
P15	M	25	Maoming (Guangdong)	De Montfort University	Media Production	No	UG study	6.5	New media
P16	M	27	Luoyang	Sichuan University of Media and Communications	Environmental Art and Design	sales	No	5.5	Marketing
P17	F	23	Hangzhou	Zhengjiang College of Communication	Media and Communication	No	No	6	Media
P18	F	26	Nanjing	Southwest Forestry University	Advertisement	5 years working experience for advertisement company	No	6	Media

P19	F	23	Xi'an	Xi'an University of Posts & Telecommunications	Telecommunication	Part-time working experience in travelling agency company	No	6	Marketing
P20	F	24	Lanzhou	ChongQing JiaoTong University	Telecommunication	No	No	6.5	Math (Data for business in technology)
P21	F	25	Xi'an	Xi'an normal University	Television director	No	No	5 (courseC)	Media and Advertisement
P22	F	23	Yingchuan	Nanjing University of Information Science & Technology	Teaching Chinese as a foreign language	No	No	5.5 (course D)	New media and society
P23	M	23	Hengshui (Hebei)	Beijing Forestry University	Network Engineering	No	No	5.5	Computer Science
P24	F	23	Nanchang	Macau University of Science and Technology	Media and Communication	Internship for 3 months	No	6	Media and Communication
P25	M	22	Tangshan (Hebei)	Central South University	International	No	No	6	Management, Finance and Accounting

					Economics and Trade				
P26	F	25	Zhangjiakou	Chonnam National University	Korean Language and Literature	No	UG study in Korea	5 (Course C)	Media and Public Relations
P27	M	23	Hengyang	Zhongnan University of Economics and Law	Accounting	No	No	6	Accounting
P28	F	22	Wenzhou	Ningbo Dahongying University	English	No	No	5.5 (Course C)	TESOL
P29	M	25	Shan dong Wei fang	Tianjing University	Television broadcast and news	Two years working experience in a media company	No	6 Course D	Mass communication
P30	M	23	Hunan	Qingdao University	English	No	No	6.5	Media and Communication

Appendix 8: Research Participants Information sheet

Project title

Digital skills and its development among Chinese international postgraduate students in UK universities

Invitation Paragraph

You are being invited to take part in a research study. Before you decide, it is important for you to understand why the study is being carried out and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask questions if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Why is this study being carried out and what is the purpose of the study?

My name is Mengjie, Jiang, and I am a PhD candidate based at School of Education, University of Leicester. My PhD project is about digital skills and its development among Chinese international postgraduate students in UK universities. The research aims at investigating Chinese international postgraduate students' digital skills in order to examine how their prior study experience might influence their digital skills and how they could be prepared and supported to develop their digital skills for postgraduate study in the UK.

Why have I been chosen?

To start this study, the ethical approval has been given by the University of Leicester and the reference for this study is mjj16-2cea. I have been approached you as one of my research participants because you are Chinese and currently studying a master degree in a UK university, which meet sample criteria for this research.

Do I have to take part?

Your participation is voluntary. You can decide whether or not you want to take part. We would like you to consent to participate in this study, as we believe that you can make an important contribution to the research. If you decide to take part, you will be given this information sheet to keep and you will be asked to sign a consent form. If you do decide to take part, you are still free to withdraw at any time and without giving a reason. A decision to withdraw at any time, or a decision not to take part, will not affect your rights.

What will happen if I take part?

If you decide to take part in this research, Mengjie Jiang, PhD candidate in the Institute of Learning Innovation at University of Leicester will arrange photographic journaling, questionnaire and focus group interviews to collect data from you. First, you will carry out a photographic journaling activity, that is, to take photos of your different learning scenarios and technological use within a typical week. These photographs will only include physical locations and arrangement of the study area (without people), the digital devices that they use for learning (e.g., smart phones, tablet computers) and where applicable computer screens displaying learning activities. Photographs will not include display screens that show people's faces, names or any signs or text that can identify people, for example Facebook webpages). Then after the collection of photos through Dropbox, the focus group interview will be arranged. The photos will be brought into the interview to provoke your thinking and discussion. During the interview, you will draw a mind map about their daily use and academic use based on digital devices shown in the photos and map out the networks you use to construct your own learning environment. Then these will be followed by questions and discussions. The interview will be recorded with agreement from you. And during the interval between each single focus group interview, the data will be analyzed to improve the interview schedule. Questionnaires would be administered during the same time.

How long will it take?

The time period for the photographic is one week. Questionnaire can be completed in 20 minutes approximately. And the focus group interview would take up around 1 hour.

What will happen to the information that I give?

All information collected from you will be kept confidential and anonymously during the research on researcher's laptop protected by password. Only researcher would have access to it and it will not be disclosed to anyone else. And all the questionnaires and transcripts will be kept anonymously. Under no circumstances will identifiable responses be provided to any other third party, and information emanating from the evaluation will only be made public in a completely unattributable format or at the aggregate level in order to ensure that no participant will be identified.

Will I benefit directly from this research study?

Although you might not benefit directly, we hope that this evaluation will help you to reflect on your learning experience and reconceptualise your digital practices for academic purpose so as to improve your digital skills. Whilst this cannot be guaranteed, but the information we get from this study may help with the development of digital skills among Chinese overseas postgraduate students in the future.

What to do now

If you would like more information before you decide about taking part, please contact Mengjie Jiang at mjj16@le.ac.uk. If you would like to take part, a consent form is enclosed.

Thank you for taking time to read this information sheet.

Appendix 9: Participant Consent Form

Mengjie Jiang

mjj16@le.ac.uk, +44(0) 7427624965

The Institute of Learning Innovation

University of Leicester

103-105 Princess Road East

Participant Consent Form

Dear Participant,

I am a PhD candidate at the University of Leicester doing degree in educational research. As my study is investigating digital skills and its development among Chinese overseas postgraduate students in UK universities, I would be very grateful if you could spare your time to participate in this study. The data collected will be used only for the purpose of research. Thank you very much for your cooperation. I would like you to read the following statements and confirm your agreement to take part in this study by signing your name.

- I confirm that I have read and understood the information and the Participant Consent form.
- All the questions that I have about the research have been satisfactorily answered.
- I understand that my participation is voluntary and that I am free to withdraw from the study at any time, without giving reason.

Please sign your name if you agree to take part in: -----

Date: -----

Appendix 10: An example of the thematic analysis

The nature of using digital technologies among researched participants (N=30)

Nature of using the digital tool	Description	Digital tools
Information searching and management	Search for information/ academic journals; Search for official data; searching for conceptual information; Find learning resources; searching for reference; Find course information and reading list. Reading news	Sina Weibo; Twitter; CNKI; Baidu; Baidu Baike; Baidu Wenku; Google; Google Scholar; Wikipedia; Blackboard; University website; Financial Times; Renren; Wall street Journal; VIP information (“维普信息”); nopic.com (“昵图网”); Wan fang database (“万方数据库”); Wiser information portal (“慧科”); MBA lib (“MBA 智库”); Zhihu (“知乎”); Douban (“豆瓣”); SAGE; JSTOR; Science Direct; Ebook.qq.com; iReader (“爱读掌阅”); Whitehouse; BBC news; iCloud; Baidu Cloud; 115 disk, Z disk; Mendeley; Naver; Scopus
Communication and collaboration	Discussion and exchanging ideas; Asking questions; Sharing information; Sharing links and news; Sharing learning reflections; Making announcement Arrange face to face meetings; Fostering a sense of community; Exchange files; Uploading and sharing slides; Commenting;	Wechat; Fetion; QQ; Sina Weibo; Facebook; What’s App; line; Dropbox; Renren; Skype;
Participation	Watching lectures/videos; Learning subjects and gather information	YouTube; Youku; Ted Talks; MOOC (netease open educational courses; Coursera; YY edu; iFeng.com (“凤凰教育公开课”); Harvard open educational class; Khan Academy); YouTube; Sina weibo; Twitter; Douban; Mtime.com (“时光网”);

Entertaining and online shopping		Instagram; YouTube; Youku; Ebay; Amazon; Taobao;
Specific educational purposes/completing assignments or tasks	View seminar/ making presentation slides; writing essays; making financial statement	Microsoft Package; Bloomberg; CFA programme; SAS; R; BB flashback; SPSS; Blog (Word Press; Sina Blog; Online survey (survey monkey; Questionnaire Pro); Prezi; Refworks; Front page; Foxit Reader; Adobe Dreamweaver; Adobe Audition; Adobe After effects; Adobe Premiere; Adobe Photoshop; Adobe illustrator; Adobe Reader; Fangzheng Feiteng (“方正飞腾”); Dream works; Fieldwork; Maya 3D; Flash; Huisheng Huiying (“绘声绘影”); Pro Tools; Clip converter; College Manysy; Turnitin; Blackboard; IEEE Xplore/ Academic Search Premier (EBSCO); Auto CAD; C++; Visual C++; Java; Proteus; Matlab; Edius; Xi Ma La Ya (“喜马拉雅”); E-views; Simulation (e.g., Enterprise resource planning); Jingdie (“金蝶”); Yongyou (“用友”); Interactive whiteboard; Juchao Zixun (“巨潮资讯”); PRAAT; Cool edit pro; Audacity
Improving English	Translation; Look up vocabulary; Search for synonyms; search for phrases; Preparing for translation exams;	Youdao dictionary; Podcast (global news; qingting.fm-“蜻蜓 fm”; Put.club.com (“普特论坛”); word reference. com; The free dictionary; just-the-word.com; Booth; Hujiang.com (“沪江英语”); bbs.taisha.org (“太傻英语”); Cite this for me; Duolingo; CNN; VOA; Jinshan Ciba (“金山词霸”)