Are Chinese student incompetent in information literacy skills and what are the barriers behind?

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Abstract

Academic libraries are served as important information centre in higher education institutions and in academia. Information literacy acompetency are vital for academic and scholar success in higher education. Chinese students, as one of the most populated ethnic groups of international students admitted by UK higher education institutions, are experiencing multiple challenges in academic environment. It is worth assessing their information literacy competency in order to reveal potential barriers presented and discrepancies of our library services.

This study intend:
- To design and present an individualized and non-standard method to assess information literacy competency of Chinese international students.
- To conclude a result of how Chinese international students performed in the assessment of information literacy skills, and to validate whether Chinese international students' self-perceived information literacy skills have potential correlation with variability in language skills, and cultural assimilation, educational backgrounds.
- To investigate whether there are barriers that prevent Chinese students from performing better in the assessment, in order to provide suggestions and guidance for institutions and library to assistant them well.

A survey in the form of online questionnaire using self-efficacy scale was used to collect data. Corresponding scores to each participant were calculated afterwards for analysis. The findings of this study suggested Chinese students did equipped with adequate competency in information literacy. Most of the existing challenges in previous studies regarding to language deficiency and cultural differences were not observed. However, there was some minor barriers presented, in advanced writing and comprehending skills. There were a positive relationships between Chinse international student's information literacy competency with time spent in English-speaking academic environment, and years of learning English as a second language. In the last section, summary and suggestions were made to help international students perform better.

Declaration

I have read and understood the College and Departmental statements and guideline concerning plagiarism. I declare that:

- This submission is entirely my own original work.
- Wherever published, unpublished, printed, electronic or other information sources have been used as contribution or component of this work, these are explicitly, clearly and individually acknowledged by appropriate use of quotation marks, citation, references and statements in the text. It is 10819 words in length.

List of tables:

List of abbreviations:
- ACRL: Association of College & Research Libraries
- CILIP: the library and information association
- ELL: English-language learner
- ESL: English as a Second Language
- HE: Higher Education
- HESA: Higher Education Statistics Agency
- IELTS: International English Language Test System
- IL: Information Literacy
- TOFEL: Test of English as a Foreign Language
- UNESCO: United Nation Educationnel, Scientific and Cultural Organization

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1. Introduction

The development of transportation and technology strive the various way of information delivery and exchange globally. These developments have shaken the traditional way of people learning and interacting with information. The everchanging political situation, dynamic flow of information and economy stimulated the migration and presence of diversity in societies.

Knowledge and education, as one major part of our information world, also respond to globalization with greater and opener access, more inclusive and diverse scholar community, and sociocultural awareness. Techniques to reframe and decentralize knowledge traditions, such as study abroad, service learning, and foreign language instruction, help student aware of their own and others' culture.

Interactions between globalization and higher education became an inevitable result of these development. Since the 2020 global pandemic, global education became even more vital, and expand in new contexts. It interacted with technology making distant study overseas possible; it interacted with inclusion advocacy holding multi-language orientation for first-year entrants creating sense of belonging; it interacted with collaborative exchange programs providing perfect opportunities for scholar communications; it interacted with open access to advocate open education providing scholars from non-western countries with greater academic platform and opener access to information; and it interacts with authoritative institutions (UNESCO, United Nations, etc.) to raise awareness in global citizenship, social responsibility, decolonization, and

environmental issues.

The most direct evidence of global education must be higher education institutions started to welcome increasing number of international students in the past decade.

According to Higher Education Statistics Agency (HESA), the majority of non-EU students in the UK come from China with a total population of 143,820 during the 2020/21 academic year ('Non-UK domiciled HE students by HE provider, country of domicile, level of study, mode of study and academic year', 2022). Despite the fact of rapidly increasing statistic, institutions were planned to attract even larger population of outstanding scholars. The international education strategy launched by UK Department of Education and Department of International Trade in 2021 was quite ambitious. According to the strategic plan, UK higher education institutions expected to increase the value of their education exports to 35 billion pound per year, and increase the number of international higher education students to 600,000 per year by 2030 (Hinds and Fox, 2021). Therefore, Chinese as one major ethnic groups of international students, the attention to their academic experiences should be given to improve UK's competency as host country.

Though the first-year entrants from China fell for the first time in 2020/21 since 2007 due to the pandemic, the enrollment of Chinese international students in UK HE institutions still remain at top ranking among all other non-EU countries. The preference of Chinese students pursuing higher education in English-speaking countries can be traced from the popularity of English as a second language learned in China. English, as the only mandatory foreign language course in China, has been embedded in learning from a very early stage of education. Most of the Chinese

generation Z first started to learn English from the age of kindergartens. Therefore, English-speaking HE institutions (including UK, Australia, US, Canada, and partial EU countries) are top choices for Chinese students who want to pursue their qualifications.

Though studying in a completely different cultural environment is thrilling, the preparation and assimilation into new countries and new academic institutions can be frustrating and challenging for students.

To be admitted into Western academic institutions, international students have to go through complex application process. Personal statement, application materials, test scores, online/face-to-face interviews are all required and viewed international applicants equally as domestic applicants. Other than regular applying procedure, international applicants need to pass IELTS/TOFEL standardized English test. In order to enter the foreign countries successfully, international students also need to go through complicated visa application. Before true settling down in the dorm rooms, there is no guarantee that students can entering the country without extra barriers. Applicants are experiencing enormously high level of anxiety of being rejected and losing huge amount of application fee or being repatriated at borders.

Beyond the challenging preparation before arriving the host country, the enormous amount of unfamiliar dazzling new information in foreign language upon arrival will create extra difficulties and anxiety for oversea students. Therefore, to settling in a new environment, international students are required competitive, transformative, flexible information skills to help them assimilate and resolve difficulties faced in day-to-day life and in academia. Hence, there comes the inevitable questions: as academic library, what can we do to help?

Information literacy can act as one of the core competencies for higher education students. They bear the responsibility and expectation to create knowledge. Academic libraries bear the duty to assist and help scholars construct their information knowledge system. However, standardised skill can be replaced and outdated easily by the fast-changing information world. Therefore, information literacy competency should not be limited at a set of standardized skills but expanded to greater context and be more transformative.

Though there were a lot attention made on strategic policy and plan of information literacy by universities and academic libraries, the interaction between international students and information literacy was rather scarce and old. Information literacy can be interdisciplinary and situated in different contexts. Therefore, it is hard to define, assess and assign with a constant scale.

Today's academic information literacy is neither representing certain set of standardised skills nor limiting itself to simple knowledge who can learn from one or two tutorials. The ever-developing information world has re-conceptualize the definition of information literacy from "a focus on identifying universal standards for finding information, to outlining dynamic skills, subjectivities, and creation processes that develop this information" (Freeburg, 2017:974). This transformation can also be seen in the framework by the Association of College and Research Libraries (ACRL), which has emphasized the 'contextual nature of information', 'seeking multiple perspectives', 'demonstrating intellectual humility', and 'recognizing scholarship conversation take place in various venues' (ACRL, 2015).

This work aims answer the following questions:

1). Are Chinese student competent in information literacy?

2). and if not, what are the affects and barriers existed?

To address the questions above, a quantitative method will be used. A self-assessment will be conducted and delivered through a survey questionnaire designed based on threshold concepts in ACRL framework. Demographic information data will be collected and used as variables to investigate potential correlation existed. A score will be calculated regarding to participants level of self-efficacy which referring to the information literacy competency of Chinese international students. Detailed answer reports will provide evidence and explanations to their overall performance in the assessment. The findings of this paper can assist librarians and faculty to better understand Chinese international students' information literacy level, and potential challenges and barriers which keep them from performing better.

The rest of the paper is structed as follows: next section provides a thorough literature review on academic information literacy, its assessment method, and common barriers and challenges international student may face. Next, methodology section will introduce participants information, data collection and analysis, questionnaire design and validation, and scoring method. Further, findings and discussion on analytical results and answer reports will be provide. Then, conclusion and suggestions will be made to finalize the study.

2. Literature Review

2.1. Information literacy and academic information literacy

Early standards defined IL as a set of abilities and emphasized abilities of recognizing information need, constructing searching strategies, using tools to attain access, and evaluating and selecting information found. Though the definitions for information literacy have been expanded into a broad description, the fundamental skillset still presented in documents. CILIP stated that information literacy do incorporates with some particular skills which enable everyone to under-take information related task (*CILIP*, 2018). ACRL framework also listed *knowledge practices* and *dispositions* to illustrate desirable learning goals to be information literate (ACRL, 2015). However, after continuous evolving, information literacy nowadays is so much beyond just a set of skills.

CILIP (2018) defines information literacy as "the ability to think critically and make balanced judgements about any information we find and use"(2018: 3). ACRL (2015) viewed information literacy as a continuous presence in scholar's academic careers, which defines as following:

> Information literacy is the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning (2015: 8).

Information literacy is never "a stand-alone concept and is aligned with other areas of knowledge and understanding" and is "associated and overlaps with other literacies" (*CILIP*,

2018:3). In the context of this study, information literacy can be one of the key elements contributing to academic success. In higher education, students and scholars bear "more responsibility to create new knowledge, understand the contours and changing dynamics of the world of information, and use information, data and scholarship ethically" (ACRL, 2015:7). Therefore, as one growing and expanding body, one of the outstanding features of academic IL is its complexity of role. Academic IL does not only serve as contributors to "academic competencies, research methodologies and understanding of plagiarism" (*CILIP,* 2018:5), but also encompasses socio-cultural feature of developing contextual knowledge (Freeburg, 2017). In academic information literacy, scholars gradually become information producers in addition to consumers by continually learning and transferring prior knowledge into new contexts (Freeburg, 2017). The idea of internalisation of knowledge and constructivism learning is consistent with the "threshold concepts" from ACRL framework (ACRL, 2015).

From definitions stated by CILIP and ACRL, it is obvious to notice that, beyond as a user of information, academic IL requires more from its learner. Other than "think critically" and "make balanced judgement" (*CILIP,* 2018:3), in academic information literacy definition, it emphasizes the ability of "discovery", "creating", and "participating ethically" (ACRL, 2015:8). In the context of academia, students and scholars are not only the user of information, but also the creator and participants of the information communities. It requires users' action more proactive and engaging than in general information literacy definitions.

2.2. Information literacy is culturally situated

Information literacy is not an independent set of skills that gained by sole instruction or course. It is gained through continuously accumulation from prior and current experiences. In the 21st century, one of the major milestones in the history of information literacy is the production of the information literacy competency standards for higher education published by ACRL in 2000. The document outlined concrete standards to measure information literacy outcomes in higher education study. It soon been criticized for too generic and skilled-focused (Rath, 2022). The criticism towards the old standards of IL generated the initial shape of critical information literacy.

Simmons (2005), as one librarian who proactively advocated social practice approach, stated that critical information literacy that would "help students to examine and question the social, economic, and political context for the production and consumption of information" (2005:299).

Therefore, the push to promote a more critical approach towards IL, generate the major subfield of critical information literacy. The rejection of banking model in education stimulated the new era of education, where learning started to be view as an accumulation process. (Rath, 2022). Through the lens of New Literacy studies, Alison explored the 'non-natural', "standard" and 'social and cultural situated' characteristics of information literacy (Hicks, 2018).

Information literacy, as social enacted practice (Rath, 2022), is dependent, contextual and can be influenced by various factors. As in Chinese international students' case, they were from

non-western cultural backgrounds, with various educational experiences and language abilities. Therefore, while they shared similar school lives with local students, their prior knowledge and experiences would differentiate them on information seeking behaviour and attitudes towards information service.

Avery and Feist (2019) stated that institutions also had a habitus as individual did. Information services provided by western higher education institution was built originally to serve local students. However, the information needs became diverse and more complex as the strive of international student population. "Entitlements and sense of belonging" (2019:20) can arise as the issue which lead by discrepancies in education experiences between dominant cultural groups and minority ethnic students in higher education institutions. Therefore, acknowledgment of various demand from diversified information users became vital for academic libraries.

2.3. Assessment method

Quantitative method for IL assessment is widely used and easy to analysis statistically. Self-efficacy test is one of the most popular assessment scales for information literacy competency measurement. The rationale behind self-efficacy test to assess one's ability is that people tend to perform well in tasks that they feel competent and capable and avoid those exceeding their abilities.

The belief in one's capability to successfully perform, or to organize and execute actions in order to complete a task or attain a goal, is referred as self-efficacy. "Self-efficacy

determines how people feel, think, motivates themselves, and behave"(Pinto and Pascual, 2016:703). Further, it provides the foundation of one's motivation and stimulate incentive to produce desired outcomes. It is important for Individuals to develop confidence in the skills that they are learning. Therefore, attainment of high sense of self-efficacy beliefs is important as possessing information literacy skills (Serap Kurbanoglu, Akkoyunlu and Umay, 2006:731). Individuals with strong sense of self-efficacy are more likely to be persistent when facing challenges. There is a positively proportional relationships between one's level of self-efficacy and degree of efforts, persistence, and resilience (Serap Kurbanoglu, Akkoyunlu and Umay, 2006:731). As trending emphasis on inquiry, problem-solving learning in both higher education and information study, self-efficacy perception becomes vital to obtain competitive information literacy skills and accomplish life-long learning.

Self-efficacy, as a way for participants to self-assess their information literacy competency, is well suited based on the unique self and inquiry learning characteristics of information skills. However, existing information literacy measuring scales rather focused on standardized skills set, including defining, planning, locating, assessing, interpreting, communicating, and evaluating information.

Serap Kurbanoglu, Akkoyunlu and Umay (2006) developed an information literacy self-efficacy scale (ILSES) with 28-item version. A further refinement version with 17 items loaded well on three components, labelling as (basic, intermediate and advance), to provide a guide for information literacy instructor.

Sommer 's study (2021) validated the assessment instruments ILSES constructed in

2006. Data from a total of 254 participants were gathered and subjected to descriptive analysis. After conducting the factor analysis, the study found out the assessment scale could not assess the factors it intended to measure comprehensively. An alternative 4-factor model with 12-corresponding item has been proposed at the end of the study to provide a better fit and consistency with regard to data collected.

Pinto and Pascual (2016) started a self-assessment study using IL-HUMASS as tool to understand students' appreciation of IL and explore weaknesses in information literacy competency where allow further improvement.

Though there were a number of studies using self-efficacy scale to assess information literacy competency, most of them has adopted a standard-based conception of IL (Flierl, Maybee and Bonem, 2021). Clearly, the skill-based assessment method is outdated and not sufficient for measuring IL identified as part of process of learning. There is an absence of assessment instruments designed to align with the concepts from framework of ACRL. According to Flierl, Maybee and Bonem (2021), instruments based on ACRL framework should attempt to measuring IL from an "informed learning", and a "context-dependent theoretical" lens (2021: 1007). Therefore, this study intend to design and present an assessment instrument using self-efficacy scale, while also consistent with those elements mentioned above.

2.4. Information seeking behaviour, challenges, and barriers

Chinese as one of the largest minority ethnic groups in most of the western universities,

their information seeking behaviour and habitus were worth investigated, and have been studied by many researchers. Duan (2016) investigated Chinese students information seeking behaviour and attitudes towards library facilities, resources, and services. She divided Chinese students' information needs and seeking behaviour into three major categories: needed information, searching strategies and major barriers and problems during searching process. In terms of needed information, Chinese students mainly use library for academic purposes (Duan, 2016). The study pointed out that academic programs, daily local information, and American cultures and customs are top reasons for Asian students to use library resources. While online databases, interlibrary loan, support services and leisure resources were the least four reasons for them using library resources. Similar description was also stated by Alwan, Doan and Garcia (2019) that "unfortunately many of service academic libraries provide, such as reference, interlibrary loan and online-library web page, may be unfamiliar to international students" (2019:4).

Moreover, the format of information was rather scarce. Most of them seldom use branch libraries, special libraries, or other library sections including locations of media materials, maps, newspapers, reserved materials, government materials, etc. (Duan, 2016)

In terms of searching strategies, several studies on Chinese international students indicated their preference of internet sources and electronic formats (Liao, Finn and Lu, 2007; Duan, 2016; Crist and Popa, 2020). The process of information searching could be break into three major categories: initiating search, finding appropriate methods and sources, and locating information (Liao, Finn and Lu, 2007). According to Liao, Finn and Lu's (2007) study, Chinese students had obvious tendency using internet rather than e-resources databases, and were more dependent on

'less-professional' search tools and methods for its simplicity of plain language use for searching. Library website are not Chinese students first choice when they started to search for resources (Crist and Popa, 2020). Moreover, there was also a favor of English search tools, such as Google, over Chinese search tools, as its benefit of "efficiency, convenience, and containing more comprehensive and popular content (Duan, 2016:163).

One of the major challenges for Chinese students is to be fully understand library service in a western academic context and be aware of plagiarism and citing other's intellectual properties correctly. According to Duan's (2016) study, Chinese student did not have a comprehensive understanding of library service and resources. The insufficient usage of the library services could be due to unawareness, which may further result the lack of a strong understanding of ethical information use. Crist and Popa (2020) also pointed out, despite of some general literacy challenges in information literacy skills which share by all students, such as locating full text when searching, synthesizing information, creates outlines, and writing persuasively. However, international students may face some unique challenges, such as knowledge of basic library service and resources, as well as reading, writing, evaluating, and citing information.

Further, Chinese students may also face challenge of evaluating information sources and content. Student may often neglect to reflect on their own biases, judgements and preconceived attitudes towards information (Crist and Popa, 2020). And relied heavily on their intuition or past experiences when making judgements about what sources to consult. And rarely mention evaluating the content of the information itself.

Varga-Atkins and Ashcroft's study (2004) designed an instrument intended to compare

international business students' self-perceived IL skills and their actual test-assessed IL skills. The results suggested that there were wide discrepancies between their perceptive and actual IL skills. Most of the students overestimated their abilities in all six ILA-topics (information literacy assessment) areas, including "develop a topic", "locate information", "assess information", "evaluate information", "write" and "cite" (2004:46).

Particularly, many studies found that Chinese student's critical competency has been doubted. Though students were able to recognize the specific information need's influence on the information type, access, and use. And able to match sources depending on varying situations. However, students applied these elements much less critically in practice, by oversimplified ideas such as certain types of information never containing bias. And some students indicated that certain informal type of sources having absolutely no use in certain circumstances (Crist and Popa, 2020).

2.5. Language Deficiency

According to multiple studies, the major causation of those challenges were language deficiency and cultural differences (Cho and Lee, 2016; Crist and Popa, 2020; Han, 2012; Varga-Atkins and Ashcroft, 2004).

As English language learners, Chinese international students were lack of experience in an English-speaking environment, and study proved that there is a positive relationship between retrieval success and the length of time in a western country. Understanding assignments, guideline, marking rubrics are vital for success in academic writing. Lower English proficiency

will prevent Chinese students from comprehending instructor's expectations.

Library jargon may already be unfamiliar to native speakers, and even more challengeable for Chinese international students. Therefore, barriers could present as lack of vocabulary including library jargons and terminology, which may further result in difficulties of forming searching terms and limited choice of research tools. Difficulties can present when students try to create search strategies, keyword selection, plural forms, synonym, correct spelling, and terminology. Huge differences in language create extra difficulties, as in Chinese, there were no plural and connecting words. Unfamiliar with Boolean strategy, vocabulary limitations create difficulties for finding synonyms.

Moreover, low language proficiency can result in loss of confidence, fear of academic failure and embarrassment feeling which may prevent them from seeking help (Crist and Popa, 2020).

A comparison study (Zhao and Mawhinney, 2015) between native Chinese-speaking and native English-speaking engineering students was conducted to identify challenges Chinese international student may face in researching and writing academic papers. Methods, including a preliminary interview, an online survey and an in-depth interview, were conducted to gather data and information for further analysis. The study found out Chinese international students had lower English proficiency in writing skills, as well as abilities of synthesizing information. Chinese international students have showed a lack of knowledge in basic library resources and services comparing to domestic students.

Han's (2012) study explored the IL development of international higher degree research

students from China. The project aimed to explore their advanced IL skills within a research context. A biographical approach was used to collect the data, with intention that allowed interviewees freedom to express without interruption and prejudice. The results found out that international students did experience difficulties in developing their IL skills. Further, the difference in language and culture imposed additional barriers to their information use.

The results Han's study (2012) revealed and been consistent with other studies that Chinese students were heavily relied on searching engines, such as Google when conducting research, and lacking ability to evaluate the quality of information content. Moreover, as they've been situated in an advanced educational level (PhD), their tutors and supervisors may assume they were already familiar with those necessary information skills, and competent enough without instruction. Without acknowledgment of students' previous educational background could result in fail to consider discrepancies in their prior experiences and knowledge. As a results, participants indicated that "she always had, based on her previous experiences in her home country" (2012:12). Even those experiences might be outdated already.

Language difficulties also presented when ELL (English language learners) tried to paraphrase and cite the resources. A general difficulty has been concluded in the study as heavily relying on descriptive content, and hard to be analytic and cohesive. Participants have self-reported inability to paraphrase the idea and sentence better than the original text. As a result, ELLs generally tended to directly quote a large volume of original content rather than internalize and transcribed the texts. Despite of deficiencies in advanced writing skills, differences in citation format seemed a minor effect, but still could be frustrating for Chinese international

students (Han, 2012).

2.6. Cultural Differences

Despite of language differences, most of the Chinese international students were born and raised, and have spent most of their school life in China. The huge cultural differences between Eastern and Western countries may result in different thinking logic, values, educational style, relationships with authority. Cho and Lee (2016) concluded the impacts of students' background as "although international students share similar experiences in terms of personal, social, and school lives, their experiences tend to be bounded by their backgrounds. In particular, students are of significantly different cultures from host culture, they may be more likely to feel difficulty in terms of cultural adjustment" (2016:592).

Cho and Lee's study (2016) gathered participants from a large public university in North California. Among 131 international students participated, 28.3% were from China. The study found out Chinese students have shown preference of monitoring, and inquiring information from instructor. As a result, it could prevent them from seeking for help when they encounter with information problems. The learning style is rather more passive, comparing with the proactive and engaging way advocated in Western educational custom. The passive learning style may not directly relate to deficiency in English speaking and listening abilities. It could result from differences in power distance. Power distance indicates the "extent to which individuals accept unbalanced power relationships"(2016:598). Therefore, the study suggested that students from educational background with high power distance may expected a distant

communicative relationship with instructor. The low social distance and active communicative in western learning custom might result differences in expectations. Such differentials in expectations could impose barriers for international student to assimilate new academic environment. Due to cultural difference, Chinese student tend to keep problems to themselves, seldom seeking for assistance.

Formal educational experiences and previous library experiences would have significant impact on current practices. Open learning environment and the creative learning styles in the Western HE system, which are completely different from the traditional education methods in China (Duan, 2016). However, differences within Chinese international student groups could also present, as most of student's population of postgrad and PhD were born in the 90s, when educational environment was not as open learning as nowadays. Therefore, if a longitudinal study conducted, some potential attitude differences may exist between different generations.

Duan (2016) highlighted in study of some known challenges, such as the lack of systematic knowledge of online catalogue, classification systems like abstracts, subject headings, indexes and controlled vocabularies of Chinese international students. The shortages presented in systematic knowledge could result from different library services and absence of information literacy instructions.

Moreover, the differences in library service may be difficult for Chinese international students realize the complexity of librarian's role (Avery and Feist, 2019). The theory of distant power can also adapt here as Chinese students may view library as "a sanctuary" where requiring "maintaining quiet" (2019:21), and view librarian as "bookkeepers".

The conservative political environment and power relationship between citizens and authority can also influence on how Chinese evaluating information, which is based on different logic than western students. Chinese students assessed authority of information based on an institution's reputation and rankings rather than content and quality. The unique censorship in China will inevitably impact on information delivery and how citizens acknowledge about information. Therefore, it is hard for Chinese students to evaluate information critically, and may have the tendency to seek positive commonality, and fear of negativity in academic research and study. Crist and Popa (2020) have concluded the challenge as "the cultural difference may profoundly affect the way Chinese students grapple with western understanding of authority and its construction within information literacy" (2020:648).

The different educational custom between Chinese and western countries can result in different understanding, attitudes, and academic customs towards textual ownerships. Students may plagiarize unintentionally without proper guidance from librarians or instructors.

Despite of the objective barriers in culture and language differences, discriminative attitudes towards foreigners and minority groups can impose negative influence mentally for international students. The anxiety, stress, fear in academic failure and embarrassment can negatively influence students' academic and information competency. Chinese students were often criticized for unimaginative and uncreative. Stereotypes, stigma and negative perceptions from faculty members and librarians of international student can "truly undermine their success" (Alwan, Doan and Garcia, 2019: 6). The accumulation of exhausting and bad experiences will stimulate their silence in the classroom, self-segregation with other Chinese students.

2.7. Conclusion

Overall, by acknowledging how academic information is defined, the discrepancies can be observed between traditional test-assessed method and core concepts of contextuality and transformative nature of information literacy. Therefore, this study intends to design an appropriate assessment method using self-efficacy scale, based on its automotive and self-directed feature.

There were many studies highlighted the barriers and challenges as causation of incompetency of Chinese international student's information skills. The huge language and culture differences can impose difficulties, but it may also be their unique advantages. This study intends to validate the true effect of those difference.

3. Methods

3.1. Research Objectives

- To design and present an individualized and non-standard method to assess information literacy competency of Chinese international students.

- To conclude a result of how Chinese international students performed in the assessment of information literacy skills, and to validate whether Chinese international students' self-perceived information literacy skills have potential correlation with variability in language skills, and cultural assimilation, educational backgrounds.

- To investigate whether there are barriers that prevent Chinese students from performing better in the assessment, in order to provide suggestions and guidance for institutions and library to assistant them well.

3.2. Participants

Participants are eligible if they were 1) adults who aged over 18 years old (consent form was given prior to enter the survey); 2) Chinese international students; 3) currently study in an English-speaking academic environment. Our survey contains a branching question in the beginning to ensure all the participants are Chinese international students. If participants select NO for the first question, they will be redirect to a 'thank your participating' page and exit the survey. The raw data file exported from Opinio automatically omitted the non-finished answers with only completed survey data left. There were 79 completed answers out of 118 answers

stored, at a participation rate of 66.9%. However, after detailed inspection over the responds,

only 65 pieces left with fully effective answers (participation rate at 55.1%) for further analysis.

There were 14 ineffective answers were omitted, either by 1) first question with answer 'NO' or

2) remain one or more questions blank.

The survey contained 5 questions to collect some demographic data, including country

where educational institution located, gender, student status, time spent in Western academic

environment, and years spent learning English as a second language.

All the respondents were studied in typical Western countries. Most of them were studying

in countries with at least one of the official languages is English, including UK, US, Canada, and

Australia. Some of participants were pursuing degree in European countries, however, in

institutions with official teaching language of English. Among these 65 respondents, 24 were

from Canada (36.9%), 7 were from Australia (10.8%), 15 were from US (23.1%), and 4 were

from UK (6.2%), 15 from other countries (23%) (14-Germany, 1-Netherlands).

Among all the effective answers, female participants were seemed more supportive. 55 out

of the 65 participants were female (84.6%), 10 of them were male (15.4%), and 1 of them prefer

not to disclose.

From the results showed, our participants were from various educational backgrounds with

educational status varied from bachelor to doctoral degree. More of our participants were

currently in master's degree study, as the median and mode both fell in the category of master's

degree student. 24 out of 65 participants were bachelor's degree students (36.9%); 38 of them

were master's degree students (58.5%); 2 of them were doctoral degree students (3.1%); 1 of

them were in gap year between bachelor and master's degree study.

The length of study abroad using English was ranged from less than one year to more than 8 years. There were 5 options: 1) 'under 1 year' representing most of freshmen in undergraduate and students who distantly studied due to the pandemic; 2) '1-2 years' representing most of the master's degree students; 3) '2-5 years' representing most of the bachelor's and doctoral degree graduates; 4)&5) '5-8' years and 'over 8 years' representing students who started their abroad education in their early ages, or students who proceeded their education in Western countries as domestic students. According to results, 43.1% (28) of the participants have studied in English-speaking environment for 2-5 years, following by 27.7% (18) for 5-8 years and 15.4% (10) for over 8 years. There were only 6 (9.2%) of the students who studied abroad for 1-2 years, and most of them were master's degree students as previously assumed. While only 3 out of 65 participants who spent a very short time (under 1 year) in a new academic environment.

Unsurprisingly, the results for the 'years of learning English as a second language' were turned out to be very similar and generally long for Chinese international students. The abilities of English reading, speaking and writing are significantly valued by Chinese educational system. The years since our participants first studied English are generally over 5 years. More than 80 per cent (83.1%) of the participants chose the option of 'over 10 years' with the exact number of 54 out of 65. Among the rest 11 participants, 9 of them have learned English for 5-10 years. Chinese in general started to learn English in their early stage of education since the generation of 80s. English, as the only compulsory second language, was taught in Chinese elementary, junior, high school and universities. Standardised English test even presented in Gao Kao,

graduation requirement for bachelor's degree attainment, and entry examination for postgraduate study.

3.3. Data collection and analysis

The survey was presented in the form of online questionnaire anonymously. Content of questionnaire was reviewed by dissertation instructor, with approved ethic forms by UCL department of information studies. Questionnaire was created in UCL Opinio portal and were distributed directly via link generated automatically once the survey published. Links to questionnaires were sent to several Wechat group chats (as one vital part of Chinese international students' online community) including both formal (CSSA) and informal (house-renting, job-hunting) channels.

The questionnaire was self-administrated through online form via Opinio. Participants were allowed to complete the survey totally on their own and were free to exit the survey anytime.

The structure of questionnaire was designed based on Framework for Information Literacy for Higher Education by Association of College Research and Libraries (ACRL,2016). There are six threshold concepts contained in the framework, which defined as follow:

- Authority is constructed and contextual.

- Information Creation as a process.

- Information has value.

- Research as inquiry.

- Scholarship as conversation.

- Searching as strategic exploration.

Rather than define a set of standardised skills, the ACRL framework in 2016 emphasized and valued the dynamic, transformative, and contextual nature of information literacy. Therefore, the survey intended to assess students' confidence in their information skills through a self-efficacy test by presenting a set of statements which derived from the framework concepts. These statements are categorized and subjected into six threshold concepts mentioned above and tried to state a scenario that can reflect participants' understanding regarded to each concept.

The questionnaire contained 8 sections with 37 questions. First section was introduction, participants consent form, and one branching question to rule out ineligible participants. Second section had 5 questions regarding to demographic data collection as mentioned before, and one question about training or instruction participants received from library.

For the rest of 6 sections, each one of the sections is corresponded to one threshold concept in ACRL framework. All the questions derived from framework concepts used a 5-point Likert scale for participants to self-assess their information literacy competency. Likert-scale provides participants with sufficient variance to respond with 5 rating levels (strongly disagree, disagree, neither agree nor disagree, agree and strongly agree). The following section will detailed explain how questions were stated and validated, scoring method for this assessment, as well as how the final scores and data will be analysed and interpreted.

3.4. Questionnaire design and validation

As mentioned in last section, ACRL framework 2016 contains 6 threshold concepts.

However, the 6 frames are rather generic and abstract. In order to adapt those concepts into our survey and explain in an understandable way, questions are designed intended to state a scenario, as well as corresponding information literacy skills or awareness should equipped with when facing the situation.

Other than the identity and demographic related questions within the first two sections, Question 6 stated as 'I have attended at least one library induction at the beginning of the semester' with 'Yes or No' choice intended to collect information of participants' experience on library trainings. Out of 65 effective respondents, there were 22 of them never participating in library training session of information literacy.

Starting from question 8, there were 30 questions were structured in a 5-point Likert scale (See Appendix 1). For the six threshold concepts from ACRL framework, each one of them was corresponded to one section from the survey (section 3-8). There were 4 questions per section for the first five threshold concepts, and 10 questions in the last threshold concepts.

According to the framework, each of the threshold concept section contained an explanatory paragraph articulating central concepts to information literacy, paired with two added elements illustrating a set of core learning goals and outcomes: knowledge practices and disposition. These three parts provided our survey with excellent sources for constructing the statements. For example, the central concept in the first frame "Authority is constructed and contextual" stated that "information resources reflect …, and are evaluated based on information need and the context in which the information will be used" (ACRL, 2015:12). One of the dispositions described "learner who are developing their information literate abilities question traditional

notions of granting authority and recognize the value of diverse ideas and worldviews" (ACRL, 2015:12). By combining the ideas from above, Question 11 – 'When facing daunting new idea with conflicts against traditional value, I am able to keep an open mind and acknowledge certain value/idea is only 'true' within specific context and can be affected by politics/religion/etc.' were developed. Similar strategy was used for constructing all other questions in the survey.

The last section with 10 questions has adapted some of international student specific scenario where some cultural and language affects might exist. For example, Question 35 ('I feel it was difficult to paraphrase the idea and sentence better than the original text. I rather cite direct quotations.') was developed based on potential language and writing skill deficiency Chinese international student might encountered with. In addition, Question 37 ('I used to consult my course tutor for information help rather than librarian/information expert') was developed based on cultural differences between Chinese and Western academic library services and student-teacher relationships.

The tone and description of questions and statements were reviewed by peer student fellows to ensure that there was no offensive and discriminated language used in the questionnaire. All the questions have been revised by instructor from UCL information studies department to ensure content validity. And questions were present with plain language for easier understanding. Further, ethic forms were prior approved by UCL departments to ensure there was no ethic and data privacy issues.

Internal consistency of the questionnaire was estimated using Cronbach's alpha (0.77), which indicating that items are adequately interrelated with one another.

3.5. Scoring Method

Question 8-37 using the self-efficacy scale were used for scoring the test. All of the six frames are equally important, therefore, each one of the section and questions within were assigned with the same weight and considered equally significant.

Questions 8-37 with 30 in total are categorized into three: 1) questions which expected positive respond on efficacy scale; 2) questions which expected negative respond on efficacy scale; 3) questions with neutral tones which shall be excluded from scoring. Questions that expected positive respond was referred as 'positive' for abbreviation and was assigned with scale ranged from -1 to 3 points (-1-strongly disagree, 0 – disagree, 1 – neither agree nor disagree, 2 – agree, 3 – strongly agree). Questions that expected negative respond was referred as 'negative' and was scaled from -3 to 1 points (-3 – strongly agree, -2 – agree, -1 – neither agree nor disagree, 0 – disagree, 1 – strongly disagree).

Therefore, 22 questions were picked out and summed into positive group which expected participants answer with higher score the better (3-strongly agree), 6 questions were fell into negative groups with expected score higher the better as well but in different point scale (1-strongly disagree), and 2 questions were excluded.

We intend to calculate a score for each respondent by taking average of their ratings. The higher the score indicating the higher sense of self-efficacy, hence, higher information literacy. However, since our questions were subjected into 6 threshold concepts from ACRL framework. The average rating calculation can be a little more complicated than simply sum all the ratings

then divided by number of items. The scoring method followed the steps of 1) calculate average score separately for the six sections; 2) sum up the six average scores of each section; 3) calculate a final average score by dividing the total sum score by 6; 4) optimize the final average score data by multiple each average to 10 to obtain a final score for the test with a maximum of 26 and lowest of -13.

To interpret the score, there are three components with low (scored between -13 to 0), intermediate (scored between 0 to 13), and high (scored between 13 to 26) self-efficacy.

3.6. Statistically Analysis

To investigate the correlation between participants self-assessed score on their information literacy competency and variables related to data on their demographic information, it was necessary to analysis those by running a regression. The method this study used for statistical analysis was to perform a linear regression with null hypothesis assumed that the variables (demographic data) had no correlation with our independent variable – the final score of the assessment. Therefore, if the results turned out to reject our null hypothesis, it means that there was correlation between demographic variables and final score of information literacy.

There were three variables considered, years of learning ESL, years of time spent in English-speaking academic environment, and student status. In order to perform statistical analysis, all the ordinal variables should be recoded to assign each with a numeric value. For student status, variables were recoded as followed: bachelor's degree students = 4, master's degree student = 6, doctoral degree student = 6, other (gap year between bachelor and master) =

5. The reason why they assigned with value of 4,5,6 was based on the years of studied for each of the degree cumulatively.

For years of studied in English-speaking environment, variables were recoded as followed: under 1 year = 0.5; 1-2years = 1.5; 2-5 years = 3.5, 5-8 years = 6.5; over 8 years = 10. The reason behind those numeric value was the average calculated out of the upper and lower interval, for example, 1.5 years was the average between 1 and 2, 10 years was the average between 8 and 12 (Note: 12 was the length of an international student spent abroad from high school to doctoral degree study).

For years of ESL learning, variables were recoded as: under 1 year = 0.5; 1-5 years = 3; 5-10 years = 7.5; over 10 years = 10. The methodology of recoded value was similar as last variable.

After finishing recoding the variables, use the excel data analysis tool to run the regression. The independent variable y would be final scores obtained by each of the respondents, while dependent variables x_1 would be student status, x_2 would be year of spent in English-speaking environment, x_3 would be years of learning English as a second language. The formula of our assumption was $y = a + b_1x_1 + b_2x_2 + b_3x_3$. The liner regression model will be able to predict potential relationships between independent variable y and dependent variable x. A specific coefficient for each variable can be derived from regression to help predict the value of Y.

4. Findings

23 of the respondents (34.8%) never attended any instruction about information literacy from library, and 43 respondents (65.2%) have participated in at least one IL session hosted by library.

None of the participants scored lower than 0, 34 out of 65 scored at intermediate level which was a slightly over half of the participants population, and 31 scored at high level sense of self-efficacy. (Note: score less than 13.5 was rounded to 13, and classify as moderate, and score larger than or equal to 13.5 was classified as high/advanced.)

Among the moderate level of scores, there were 6 out of 34 who scored lower than 10. Among the high level of scores, there was only one scored over 20.

The descriptive statistic of final score: mean = 13.57 which classified as high, median = 13.12 which classified as moderate, mode = 14.59 which classified as high as well, s.d. = 3.332, minimum = 5.63, maximum = 22.08, with range = 16.46.

The results of scores participants obtained indicated an average of moderate to high sense of self-efficacy, which means that Chinese international students were equipped with acceptable level of information literacy skills. However, there was more than half of the participants consider themselves at intermediate/moderate. Both of the median and mode were concentrated around the score of the 13, which was the upper bond of moderate level, and the lower bond of advanced level. Further, according to the data, there was only one participant scored over 20, which indicating that Chinese students were rather conservative when conducting the

self-assessment. There was a general trend for each of the participants to avoid extreme ratings

both in the direction of positive and negative.

By running the regression, we've got the regression table below.

	Coefficients	Standard Error	t Stat	P-value
Intercept	7.195340966	2.49190396	2.88748727	0.00536591
X Variable 1	-0.232547442	0.32511699	-0.7152731	0.47716916
X Variable 2	0.345169894	0.15162138	2.27652514	0.02633619
X Variable 3	0.626054008	0.2446122	2.55937365	0.01298138

Regression table

By filling the assumption formula before, we can get $Y = 7.19+0.34*X_2+0.62*X_3$. The X_1

variable has been omitted, because its p-value is 0.477 which was larger than 0.05, indicating it

was statistically insignificant. Therefore, the change in variable X_1 cannot help predicting Y.

therefore, student status has very little correlation with scores obtained by participants in this

study.

Meanwhile, the p-value for X_2 and X_3 variable were 0.026 and 0.01 which were less than

0.05, indicating that they were statistically significant. The variation in years of spent in western

countries and years of learning English as second language can help predicting their information

literacy competency. The positive value of the coefficient suggested a positive relationship

between X and Y. In other words, the longer years spent in western countries and learning

English, the higher the score might obtain.

ANOVA

table

	df		SS	MS	F	F	Significance
Regression	3		141.953854	47.3179513	5.07482591		0.00334342
Residual	61		568.7673	9.3240541			
Total	64		710.721154				

According to the ANOVA table, the significance F = 0.0033 which means the p-value was less than 0.05, then the model is statistically significant (the null hypothesis has been rejected), there was at least one variable X can help predict Y.

When giving a closer examination to each of the threshold concepts and corresponding sub-sectional scores. There were 33 scored over 2 point with a maximum of 3 point for frame 1; 39 scored over 1.25 point with a maximum of 2 point for frame 2; 45 scored over 1.25 point with a maximum of 2 point for frame 3; 46 scored over 2 point with a maximum of 3 point for frame 4; 26 scored over 1.25 point with a maximum of 2 point for frame 5; and only 14 scored over 1 point of a maximum of 1.5 for frame 6.

To conclude, participants felt relatively more confident in their skills and ability on frame 2,3,4 which are 'Information Creation as a process', 'information has value', and 'Research as inquiry' respectively. For all of these three threshold concepts, over half of the participants

scored themselves with higher level of agreement. While for frame 5 and 6, which are

'scholarship as conversation' and 'searching as a strategic exploration', participants rated

themselves with lower efficacy. Far from half of the participants rated higher level of agreement.

5. Discussion

5.1. Self-assessment

This study has presented a feasible assessment method of information literacy. The generic feature of statements/questions in the survey focused on intuition-wide study rather than discipline-specific. The self-efficacy method used in this study presented an individualized assessment method. Skills were not the target and result this method intend to assess, but awareness, understanding and responsibility towards foundational ideas about information as a dynamic ecosystem. This assessment method wants to reveal core concepts that are more align with the ideas ACRL advocates and believe about information literacy.

Participants had fully autonomy during the process and evaluate themselves based on self-perceived knowledge and ability. The questions were straightforward, simple, and easy for understanding, without creating extra anxiety for participating. The traditional exam-style method with a set of standardised skill-test questions could stress respondents and cause them underperforming from reflecting their true achievement.

In addition, the questions were designed specifically for Chinses international students as some of the questions contained some common cultural and language barriers students may face during their academic experiences. The benefits of including those elements are: 1) can resonance with participants, hence create a sense of belongs and weaken the embarrassing and feeling of deficient; 2) to better understand participants' barriers when seeking and using information; 3) can used as one indicator of how they assimilate in a foreign academic

environment.

Finally, the general issue of over-rated issues of self-scored test did not present in final results of this study. There was no extreme high score presented in the assessment results, and participants were rather humble and conservative when rating themselves. Moreover, there was no obvious indicator of correlations existed between genders and self-assessed scores.

5.2.Information literacy competency of Chinese international students

For this study, information literacy competency was measured by participants self-perceived ability and understanding towards a set of core concepts of threshold concepts in ACRL framework. A self-efficacy scale was used, with assigned numeric value to each of the rating option. The final score was calculated by calculating average then multiple by 10.

Self-efficacy as one measurement for one's belief in their ability to completing certain task, the higher the level of self-efficacy the greater possibility for someone to overcome difficulties and the higher incentive to study and complete tasks. Hence, the higher sense of self-efficacy, the more advanced in information literacy one would be. Therefore, according to the test results, Chinese international student did have adequate information literacy competency, with moderate to high sense of self-efficacy presented. The level the self-efficacy was positively proportional to two variables - 'years of time spent in western academic environment' and 'years of learning English as second language'. The 'years of learning ESL' represented one's language skills, and 'years of time spent in western institutions' indicated one's extent to whom assimilate into a new culture environment. Between the two variables, 'years of learning ESL' has greater impact on

information literacy skills, as its coefficient is slightly higher. However, it was quite surprising

that the variable of 'student status' was statistically insignificant to the model, indicating that

student status could not help predicting one's information literacy levels. The negative

coefficient suggested that between student status and information literacy competency might

exist negative correlation.

Unlike conclusion from many of studies, Chinese international students did not have

apparent language deficiency in English, especially in communicative skills. In question 28 ('I

feel confident about my communitive skills and am not afraid of asking for assistant in library'),

80% (52 out of 65) of the respondents have rated either 'agree' or 'strongly agree', which thrown

against the stereotypes of their language deficiency. According to the results from demographic

data collected regarding to 'years of learning English as a second language', majority of the

participants had learned English more than 10 years. As nearly every international student must

pass standardised English language test (IELTS, TOFEL, etc.) to be admitted by universities, it is

beyond reasonable to believe their English language skills are quite advanced.

In addition, despite of communicative skills, library jargons seemed also familiar to Chinese

international student. Question 32 and 33 were paired questions designed to test whether

respondents understanding of searching strategy could corresponded with relative library jargon.

Question 32 stated as 'I am aware of how to use Boolean logic in my searching process', while

question 33 stated as 'In my searching terms/phrases, I use 'AND' if I want a combination of

phrases/terms; use 'OR' if I want at least one term/phrase; use 'NOT' if I don't want phrase/term

included'. The statistic turned out to be consistent for those two questions, indicating participants

knew exactly the jargon 'Boolean logic' and what it stands for.

Cultural effects can present. However, they did not influence much on their self-efficacy. For question 37 ('I used to consult my instructor for information help rather than librarian'), more than half (56.9%) of the participants have rated either 'agree' or 'strongly agree', indicating a clear preference for Chinese international student seeking help from course tutors over librarians. The results of their preference were consistent as early mentioned in LR section. It can be due to the closer and intimate teacher-student relationships which rooted in Chinese traditional culture. There was an old Chinese slam of "day as a teacher, life for a father". The special mentorship role, which Chinese students viewed their teacher as, can result their habits of seeking help from their tutors. Moreover, the library services are rather marginalized in most of the Chinese elementary, junior and high schools. Therefore, comparing with course instructor, library services can be unfamiliar to Chinese students, and they may not be aware of the library service comprehensively.

Moreover, several culture barriers that may existed for Chinese international students mentioned in earlier literatures, could not be observed in this study. First, Chinese international students were not lack of systematic knowledge regarding to library system and scholar information use as mentioned in Duan (2016). There were a lot of questions in the survey that could reflecting participants attitudes and understanding towards how to select, use and evaluate information. Question 12, 19 and 23 contained academic and information vocabularies, including 'publication status', 'reviewing process', 'information gap', 'public domain', 'open access', and 'fair use'. Question 13, 17, 22, 34 and 36 mentioned concepts regarding to seek, read, select, and

evaluate scholar papers. The results for above questions turned out to be quite positive, and most of the participants did not experienced difficulties understanding those statements. Participants showed in-depth understanding of ideas, such as appropriate format chosen, evaluation strategy like reviewing abstract and determining relevancy, ethic usage of academic resources.

Second, Chinese students did not assess authority differently than what expected in Western higher education system. According to the assessment results, they did view authoritative information critically, and presented adequate understanding of information's contextual nature. Question 8, 9, 10, 26, 27 all exanimated participants attitude towards information privilege by authoritative sources, and awareness towards bias, stereotypes, diversity, and inclusivity. There was no evidence suggesting Chinese students evaluating ranks and authoritative status more importantly over contents of information. As Chinese international students progressed in degree and scholar journey, they seemed paired with outstanding transformative skills, and willingness to be open-minded to embrace different cultures and way of learning. Therefore, the results from this study did not consistent with Crist and Popa have suggested in their study, regarding to Chinese students' difficulties on 'grappling with Western understating of authority'.

This generation of Chinese international students were born and raised in a fast developing globalized world, and were endowed with ability of symbiosis with the complexity of information world.

There were some questions regarding to understanding towards the complexity of information nature. According to the report from question 15 and 16, participants were able to recognize the debatable credibility of social media and digital publications. Additionally,

respondents also have realized economic value of information, and its potential possibility to be misused to serve capital gains.

Fourth, understanding of importance of scholar communication, and core nature of academic research is also a vital indicator of one's academic information literacy. Positive feedback on reports from question 20, 21, and 24 have reflected participants' thoughts about scholar research rather as an on-going, communitive, social act.

Overall, no matter evaluating from final scores achieved or from a closer analysis on answer reports, Chinese international students were qualified with adequate academic information literacy competency. They either did not have obvious deficiency of using English as second language, nor experienced huge cultural shock when assimilating into a new environment. Instead, their identity, courage and independency were the unique advancement.

5.3.Barriers and challenges

Though Chinese international students performed fairly well in the assessment, it did not mean that there was no room for improvement and barriers that preventing them from performance better. There were still some barriers presented that were consistent with earlier literatures stated.

First, Chinese student did show apparent preference to broad databases and search engines which similarly would generate much more results than subject-specific databases. Question 29 ('I used to start my searching process with Google/Google Scholar, and I found it was easier and straightforward') and 31 ('I rather use a broad database that would direct more results, than

subject-specific database') both had more answers on agreement than disagreement. Though the

level of agreement towards using broad databases did not necessarily mean poor information

skill. It was still debatable to use Google for academic research. Google search had apparent

benefits of simple and straightforward. However, without adequate strategies and skills on

information evaluation, the results directed from search engine can be misleading. Generally,

Google will present studies and scholar papers most cited at the top of the page. Sometimes, even

though the top result seems plausible to use, it can be out-dated. Number of a study been cited

can only be one of the indicators of its true value for reference. Therefore, by agreeing to

prioritize broad databases and search engine, respondents' information skills on evaluating and

selecting sources should be concerned.

Second, though most of the Chinese students did not experiencing difficulties on daily

communicative skills and study, their language skill on in-depth comprehension, expression and

conversation can still be deficient. The deficiency and lack of confidence in advanced language

skills may eventually marginalize them from participating different types of scholar

communication. As ESL learners, sometimes learners may feel hard to fully express their views

and thoughts orally by a second language. It may be due to the lack of advanced vocabularies

and reading accumulation. The similar issues presented in the survey results as well.

For question 25 ('I feel language can sometimes be the barrier that keep me from

participating scholar conversation more often. I used to observe scholar/academic conversation,

rather participate in it'), there was considerable number of participants choosing 'agree'. This

might suggest that if scholar and academic opportunity presented in a way that Chinese

international student did not feel familiar and comfortable with, they may be marginalized unintentionally. The proactive and rigorous way of conversation commonly happened (conferences, seminar, etc.) in Western culture can be difficult to include Chinese students who speak with accent or speak not as fluent as domestic participants.

Despite of communitive skills, advanced writing and reading comprehension can also be difficult for ESL learners. In question 35 ('I feel it was difficult to paraphrase and sentence better than the original text. I rather cite direct quotations'), there were many participants selected 'agree'. Preference over large volume direct quotations was due to lack of skills on finding synonyms, internalising knowledge, and comprehending contents. The lack of advanced writing and reading skills may also create barrier in academic performance and information skills competency, such as formulating searching terms and comprehending abstract concepts.

Third, though Chinese students were aware of ethical usage of other's intellectual properties, the understanding of information and relative ethic issues was not comprehensive enough. There was still some ambiguity and confusion presented. In question 18 ('when conducting survey, it is fine to collect irrelevant personal information, as long as I follow the data privacy regulations'), there were quite a few of participants chose to agree. The understanding of ethical use should not be limited to correctly referencing others' work, but also be fully aware of data privacy and protection.

By horizontally comparing the areas Chinese students' weakness presented in particular question reports with average scores participants obtained for each sub-section, the results were consistent with one another. As concluded in the findings, participants showed less confidence

about their abilities in 'Scholar as conversation' and 'searching as strategic exploration'. The low sense of self-efficacy in those two frames could be due to the lack of advanced skills in evaluating and synthesizing information, in-depth language communitive and writing skills, and comprehensive awareness on ethical use of information and data.

5.4. Limitations of this study

The assessment method design for this study intended to investigate only information literacy competency of Chinese international students. Hence, it did not transformative to other targeted groups. Likewise, the performance and test results could only represent the participants within this research context, and could not represent international students as a whole.

Though the sample has been randomly selected, the size of sample population remained relatively small. If funding and networking has created better condition, ideally a much larger population should be studied for more accurate results and patterns.

The survey can be more comprehensive if conclude more questions. However, participation rate may significantly drop if the survey contains more questions. Therefore, a trade-off between participation rate and well-included question set has been made for this study. In addition, the validation of this questionnaire can be improved by test-retest and content validation, however, a larger sample size and longer study periods will be necessary for performing those validation methods.

6. Summary and suggestion

This paper explored and investigated Chinese international students' information literacy competency. A non-standard individualized self-assessed method has been designed to align with the core concepts from ACRL framework. The self-efficacy test was conducted with 5-point Likert scale. The educational concepts of constructivism, inquiry-learning and inclusivity has shined through the intention of this study, to building a bridge which can bond between library, faulty and Chinese international student. Without stereotypes regarding to deficiency, library is able to better serve this growing student group by understanding their barriers and challenges.

This study has revealed Chinese international students were capable of many fundamental information literacy skills and did have awareness towards some complexity and ethical issues regarding to information world. However, scholar communitive and advanced searching strategic skills were found to be relatively challenging. The barriers may exist due to weakness in advanced language ability and some cultural differences. Moreover, the absence of library services in their academic study should bear the major responsibility. Library should advocate induction more proactively and reach out to Chinese international students networking for more pedagogical opportunities. Nearly half of the students in this study never participated in at least one induction hosted by library. This can be seen as the 'red flag' of our library service. If no immediate intervention and actions taken, it will be the same as marginalized particular student group from our information service spectrum. Therefore, based on the findings of this study following recommendation and suggestion are proposed:

- Induction sessions should be provided with various participating options (in-person, online tutorials, informal gathering session, seminars, etc.), and in different languages (Cantonese, Mandarin). To create a sense of belongings and attract more participants, a diversity in ethnicity of information instructors should be ensured. Asian librarians might encourage Chinese international students seeking help without feeling embarrassment and afraid.

- Workshops on formulating searching strategic and advanced language skills should be hosted by library. Tutorials on library jargons, introduction on databases, writing help and more skill-focused program should be proactively promoted.

- Writing centre within the library should proactively promote its services. Specialized tutorials should be designed for international students, such as collaborating with ESL learning. The content of tutorials should focus on challenging areas of Chinese international students mentioned in this study (paraphrasing, comprehending, synthesizing academic text).

- Library should collaborate with faculty to provide more opportunities for international students involved in scholar communication. Moreover, promoting strategies to encourage and advocate students participating in conferences, seminars, informal chats, and other communitive events should be planned out and pushed forward.

- Peer interactions are also very important for Chinese international students to assimilate in. Library should actively seek opportunities to collaborate with Chinese students networking and association.

- Information literacy should embed in various courses and subjects. Course instructors should be aware of potential barriers and challenges for international students in information

skills. Therefore, instructors can make adjustments, scaffold learning experiences.

- Subject librarian should actively promote databases by making corresponding workshops, marketing strategies, tweeting on social medias, etc.

To conclude, without collaborations between academic libraries and faculties, those barriers and challenges are hard to removed. It is library's responsibility to create an inclusive academic environment which does not marginalize any user groups. The adequate information literacy competency Chinese student performed in this study has overthrown some stereotypes of them being deficient. They equipped with well information knowledge and awareness of contextuality and ethical use of scholar information. Though there were some minor disadvantages caused by differentials in culture, language, and learning customs, they were not far lagged behind domestic student. Inversely, they were fast learning and open-minded about diversified cultures. It is no doubt that with targeted help from library on well-instructed information literacy, they will become outstanding scholars who can contributes to our information ecosystem. For further study and research, it is worth investigating using similar methodology on larger population in a diversified ethnicity, and with more variables.

7. Bibliography

ACRL (2015) *Framework for Information literacy for Higher Education*, pp. 1–36. Available at: http://www.ala.org/acrl/standards/ilframework (Accessed: 27 March 2022).

Alwan, A., Doan, J.M. and Garcia, E.P. (2019) 'International Students in Higher Education', p. 16.

Avery, S. and Feist, K. (2019) 'Adapting Information Literacy Instruction for International Students', p. 10.

Cho, J. and Lee, S. (2016) 'International Research International Students' Proactive Behaviors in the United States: Effects of Information-Seeking Behaviors on School Life', *Journal of College Student Development*, 57(5), pp. 590–603. Available at: https://doi.org/10.1353/csd.2016.0063.

CILIP Definition of Information Literacy 2018 (2018). The Library and Information Association, pp. 1–8.

Crist, E. and Popa, D. (2020) 'Information Literacy and Cultural Context: Chinese English Language Learners' Understandings of Information Authority', *College & Research Libraries*, 81(4), p. 646. Available at: https://doi.org/10.5860/crl.81.4.646.

Duan, X. (2016) 'How They Search, How They Feel, and How to Serve Them? Information Needs and Seeking Behaviors of Chinese Students Using Academic Libraries', *International Information & Library Review*, 48(3), pp. 157–168. Available at: https://doi.org/10.1080/10572317.2016.1204179.

Flierl, M., Maybee, C. and Bonem, E. (2021) 'Developing the Informed Learning Scale: Measuring Information Literacy in Higher Education', *College & Research Libraries*, 82(7). Available at: https://doi.org/10.5860/crl.82.7.1004.

Freeburg, D. (2017) 'A Knowledge Lens for information literacy: conceptual framework and case study', *Journal of Documentation*, 73(5), pp. 974–991. Available at: https://doi.org/10.1108/JD-04-2017-0058.

Han, J. (2012) 'Information literacy challenges for Chinese PhD students in Australia: A biographical study', *Journal of Information Literacy*, 6(1), p. 3. Available at: https://doi.org/10.11645/6.1.1603.

Hicks, A. (2018) 'Reframing librarian approaches to international student information literacy through the lens of New Literacy Studies', p. 14.

Hinds, D. and Fox, L. (2021) 'International Education Strategy: global potential, global growth'. GOV.UK. Available at: https://www.gov.uk/government/publications/international-education-strategy-global-potential-global-growth/international-education-strategy-global-potential-global-growth (Accessed: 29 September 2022).

Liao, Y., Finn, M. and Lu, J. (2007) 'Information-Seeking Behavior of International Graduate Students vs. American Graduate Students: A User Study at Virginia Tech 2005', *College & Research Libraries*, 68(1), pp. 5–25. Available at: https://doi.org/10.5860/crl.68.1.5.

'Non-UK domiciled HE students by HE provider, country of domicile, level of study, mode of study and academic year' (2022). HESA. Available at: https://www.hesa.ac.uk/data-and-analysis/students/table-28-051.csv (Accessed: 29 September 2022).

Pinto, M. and Pascual, R.F. (2016) 'Exploring LIS Students Beliefs in Importance and Self-Efficacy of Core Information Literacy Competencies', *College & Research Libraries*, 77(6), pp. 703–726. Available at: https://doi.org/10.5860/crl.77.6.703.

Rath, L.T. (2022) 'Refinement of a Threshold Concept for Academic Instruction Librarians', p. 169.

Serap Kurbanoglu, S., Akkoyunlu, B. and Umay, A. (2006) 'Developing the information literacy self-efficacy scale', *Journal of Documentation*, 62(6), pp. 730–743. Available at: https://doi.org/10.1108/00220410610714949.

Simmons, M.H. (2005) 'Librarians as Disciplinary Discourse Mediators: Using Genre Theory to Move Toward Critical Information Literacy', *portal: Libraries and the Academy*, 5(3), pp. 297–311. Available at: https://doi.org/10.1353/pla.2005.0041.

Sommer, M. *et al.* (2021) 'Investigation of the Validity Evidence of the Information Literacy Self-Efficacy Scale (ILSES) Among Undergraduate Students', *Communications in Information Literacy*, 15(1). Available at: https://doi.org/10.15760/comminfolit.2021.15.1.1.

Varga-Atkins, T. and Ashcroft, L. (2004) 'Information skills of undergraduate business students – a comparison of UK and international students', *Library Management*, 25(1/2), pp. 39–55. Available at: https://doi.org/10.1108/01435120410510247.

Zhao, J.C. and Mawhinney, T. (2015) 'Comparison of Native Chinese-speaking and Native English-speaking Engineering Students' Information Literacy Challenges', *The Journal of Academic Librarianship*, p. 13.

8. Appendix

8.1. Appendix 1: the questionnaire

Question		Choices					
1.	**Are you an Chinese international student who study in an English-speaking academic institution?**	Yes			NO		
2.	**Which country in the following do you currently study in?**	UK	US	Canada	Australia	Other (please specify)	
3.	**What is your student status?**	Bachelor's degree student		Master's degree student	Doctoral degree student	Other (please note status)	
4.	**How much time have you studied in an English-speaking academic environment?**	Under 1 year	1-2 years	2-5 years	5-8 years	Over 8 years	
5.	**What is your gender?**	Female		Male		Prefer not to disclose	
6.	**I have attended at least one library induction at the beginning of a semester.**	Yes			No		
7.	**How many years have you started to learn English as a second language?**	Under 1 year		1-5 years	5-10 years	Over 10 years	

variables		items	Agreement scale				
			SD	D	N	A	SD
			1	2	3	4	5
Authority is constructed and contextual (ACC)	**ACC1 (q8)**	**When encountering conflicting perspectives regarding to one research topic, I am able to critically reflect on both points of view.**					
	ACC2 (q9)	**When selecting sources, I am able to evaluate their authority comprehensively. And will not evaluate its value only based on ranking and reputation of its institution.**					
	ACC3 (q10)	**I recognize my own bias presented, and will always evaluate information content skeptically, even it was from an**					

		authoritative source.					
	ACC4 (q11)	When facing a daunting new idea with conflicts against traditional value, I am able to keep an open mind and acknowledge certain value/idea is only "true" within specific context, and can be affected by politics/religion/etc.					
Information Creation as a process (ICCP)	ICCP1 (q12)	I realize elements, such as publication status and reviewing process, may be important indicators of information quality.					
	ICCP2 (q13)	I feel it is appropriate to refer information from a personal blog post in my academic paper.					
	ICCP3 (q14)	I will choose to write a blog post based on my own research to promote my study.					
	ICCP4 (q15)	I will always keep a skeptical attitude towards information from social media and digital publications.					
Information has value (IV)	IV1 (q16)	Despite of educational value, information can also serve as a commodity, or as a means to influence. Therefore, information can be abused to serve personal gains.					
	IV2 (q17)	I am able to respect original ideas of other, and always citing other's work properly.					
	IV3 (q18)	When conducting survey, it is fine to collect irrelevant personal information, as long as I follow the data privacy regulations.					
	IV4 (q19)	I know the purposes and different characteristics of copyright, fair use, open access and public domain.					
Research as inquiry (RI)	RI1 (q20)	I am able to consider research as an ongoing process with various information engaged, and without a definite conclusion.					
	RI2 (q21)	I realize sometimes an innovative research may started from a simple question. And I will be critical and open-minded towards any question, even to basic and simple ones.					
	RI3 (q22)	I realize the significance of vast reading,					

		and will evaluate multiple perspectives towards one question.					
	RI4 (q23)	When searching results were very scare and old, it may indicate that information gaps existed.					
Scholarship as conversation (SC)	SC1 (q24)	Scholar conversation can take place in various venues, both professional and casual.					
	SC2 (q25)	I feel language can sometimes be the barrier that keep my from participating scholar conversation more often. I used to observe scholar/academic conversation, rather than participate in it.					
	SC3 (q26)	Perspectives in textbooks and articles from reading list may not represent the major views on the issue.					
	SC4 (q27)	Voices and perspectives from famous scholars can be privileged due to their authoritative status.					
Searching as strategic exploration (SSE)	SSE1 (q28)	I feel confident about my communicative skills, and am not afraid of asking for assistant in library.					
	SSE2 (q29)	I used to start my searching process with Google/Google Scholar, and I found it was easier and straightforward.					
	SSE3 (q30)	I feel it is hard to form searching terms for my research questions, and will easily give up trying different terms for more searching results.					
	SSE4 (q31)	I rather use a broad database that would direct more results, than a subject-specified database.					
	SSE5 (q32)	I am aware of how to using Boolean logic in my searching process.					
	SSE6 (q33)	In my search terms/phrase, I use 'AND' if I want a combination of phrases /terms; use 'OR' if I want at least one terms/phrase; use 'NOT' if I don't want phrases/terms included.					
	SSE7 (q34)	I am able to evaluate a study's relevancy towards my research by reading its					

		abstract.					
	SSE8 (q35)	I feel it was difficult to paraphrase the idea and sentence better than the original text. I rather cite direct quotations.					
	SSE9 (q36)	I am aware of a rough number of references I need for a 3,0000-word assessment.					
	SSE10 (q37)	I used to consult my course tutor for information help rather than librarian/information expert.					