
Media and Information Literacy of University Students in China: Status Quo, Issues, and Improvement

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Abstract: In the Age of Information and Knowledge, the competence of media and information literacy of higher education students directly affect the quality and efficiency of their study, work and life. This paper's data originated from UNESCO's "International Media and Information Literacy Survey of the Research Habits and Practices of University Students" (IMILS), a project that aimed to understand the state of undergraduates' information literacy and media literacy, with an expectation to design and construct benchmarks of the two on the basis of the results. A survey by questionnaire was conducted in five regions of China, collecting 1,579 questionnaires in total, in which the university students' behaviors in finishing coursework assignments, in daily life information searching, and in using media, were displayed. Through quantitative analysis the status quo of Chinese university undergraduates' media and information literacy was reflected in terms of their media and information awareness, information needs, ability of information access and selection, ability of information evaluation, and ability to process and make use of information. Constructive opinions were also raised on the existing issues, including some up-to-date suggestions based on the authors' observations and discoveries of the changes in information needs, information usage and information evaluation within Chinese higher education students in the social media and mobile Internet environment. It is also noticed that some problems highlighted in the IMILS investigation are also gradually being alleviated.

Keywords: University Students, Information Literacy, Media Literacy, China

1. Introduction

The concept information literacy was first proposed in the 1970s by Paul Zurkowski, President of the Information Industry Association (IIA) of the USA [1], in his report to the National Commission on Libraries and Information Science.[2] The concept was developed on the basis of library literacy. Regarding understanding of the connotations and nature of the information literacy concept, there is a basic consistency in China, namely the concept mainly embodies the four aspects information awareness, information knowledge, information competence and information ethics. [3] Information competence constitutes the core contents of information literacy. It mainly includes such aspects as accessing, organizing, evaluating and using information.

It is commonly understood that the concept of media

literacy first appeared in Britain in 1930s. Gradually it received research in the West. The concept was introduced into China in late 1990s. There are multiple versions of the media literacy concept and till now there is no definition gaining the status of consensus. All in all media literacy refers to the public's ability to interpret and criticize various media information, as well as the ability to employ media information for personal life and social development. Concretely it would include the ability to select, understand, evaluate, question, create and criticize media information. [4]

Hence it can be seen that there is a substantial overlap of the connotations of information literacy and media literacy. Internationally the scholars McClure [5], Rebecca [6] and Gustavson [7], in mainland China Gui Lin [8] and Feng Yanqun [9] as well as Lee and So [10] in Hong Kong have expounded and analyzed the two concepts and their connotations. The scholars agreed in common that

information literacy and media literacy being not identical concepts, with significant differences in their starting points and areas of concern. However as there is explosive growth in information and social media becomes more heterogeneous, relations between information literacy and media literacy also become more and more intimate. Research of scholars abroad gradually moves towards combining the two.

A series of expert conferences were jointly organized by UNESCO, IFLA (International Federation of Library Associations and Institutions) and some regional associations, e.g. 2003 in Prague, 2005 in Alexandria, 2006 in Ljubljana and 2010 in Bangkok. Global experts in information and media literacy gathered in these conferences and exchanged their thoughts, strategic approaches and plans with each other. They also discussed key questions in information and media literacy education. Multiple countries and regions have implemented many information and media literacy projects with good developmental prospects. Indeed these have gradually evolved into "best practices".

In 2010, the USA took the lead and commenced Project Information Literacy (PIL) to investigate information literacy of university students in 25 American higher education institutions. In international conferences afterwards, experts analyzed and discussed the PIL data and results. They believed under suitable circumstances and the right time PIL could become a reference for conducting similar investigations of information and media literacy in various regions. The experts looked forward to these investigations to be under unified strategic approaches and time frames, jointly co-ordinated and mutually complementing. The countries expressed their wish for UNESCO to conduct the project as a worldwide information plan, so as to facilitate procuring more actually useful aids and guidance, thereby raising the quality of the study results and the benchmarks, thus augmenting their values.

It is exactly under this background that UNESCO initiated the project International Information and Media Literacy, Survey of the Research Habits and Practices of University Undergraduates (referred to as IMILS below). The project aims to understand the state of undergraduates' information literacy and media literacy, expecting to design and construct benchmarks of the two on the basis of the results. Thus professors and faculty can improve methods and tools of teaching to better accomplish curricular goals. Thereby

students can raise their ability in searching, organizing, analyzing, evaluating as well as using information and media, so that they can accomplish related tasks and handle needs more efficiently and with higher quality in coursework and daily life.

This investigation is planned to be carried out in six global regions. In mainland China it is undertaken by the School of Information Management (SIM) of Wuhan University. The authors planned, implemented and engaged in the study throughout. This paper is written on the basis of the course and results of the investigation.

2. Overview of the Study

2.1. Study Target, Study Method

University undergraduates in China (full-time, from unified admission exercise) are the targets of this study. Geographically the study covers all regions of China mainland. Regarding the study method, questionnaires are used. Through both paper and online questionnaires the targets were contacted to the largest extent, broadening study coverage in location, year and disciplines.

2.2. What Are Studied

This study is a module in IMILS. The questionnaire consists of 27 main questions which can be of single or multiple choices. There are four main sections: (1). basic information, namely gender, age, academic institution, etc.; (2). behaviors in finishing coursework assignments; (3). searching behaviors in daily life; (4). behaviors in using media. Within the four, sections (2) and (3) have many similar questions. Through comparing the two we attempt to better evaluate the state of information and media literacy in Chinese university students.

2.3. Descriptive Statistical Analysis of the Study Sample

In this study, totally 1,579 questionnaires are returned. After eliminating those with answers too similar, too many questions left out and the responses clearly against objective reality, final acceptable questionnaires number 1,434. They constitute 91% of the returned original and this reaches the required standard for statistical analysis. Descriptive statistics are conducted on the sample's demographic characteristics and results of this analysis are shown in Table 1.

Table 1. Statistical Table on Demographic Characteristics of the Study Sample.

Demographic Characteristics		Frequency %		Demographic Characteristics		Frequency %	
Gender	Male	702	49.0%	Major	Humanities	573	40.0%
	Female	732	51.0%		Science/Technology	720	50.2%
					Sports, Arts	109	7.6%
Year	I	331	23.1%		Others	32	2.2%
	II	348	24.3%		Eastern	223	15.6%
	III	363	25.3%	Southern	114	7.9%	
	IV	356	24.8%	University location	Northern	130	9.1%
	V	36	2.5%		Central	870	61.3%
				Western	88	6.1%	

As can be seen from the above table, the sample set for this investigation of information and media literacy has good distribution in gender, year and major, basically in line with the actual condition of Chinese undergraduates. Since the responsible body for China mainland of the IMILS project, School of Information Management of Wuhan University is in Central China, as well as higher education institutions are more concentrated there, regarding distribution of university location over half of the samples are from Central China, namely 61.3%.

3. Analysis of the Results

3.1. Information and Media Awareness

Information awareness is the basis for the formation of information literacy. The awareness is based on an individual's response to information. Its strength will affect the individual showing his/her initiative and will further influence the individual's information behavior. In studying undergraduates' information and media awareness, we intentionally quoted the famous saying "the medium is the message" of renowned communications scholar Herbert Marshall McLuhan. In the

study we found that students who agreed with it to a certain extent or very much reached 72.5%, with 14.4% of the students staying neutral. Only 2.8% of the students did not understand this saying's meaning. 10.2% of the students did not agree with it to a certain degree or very much. The results indicate that most Chinese undergraduates have a certain understanding of the nature of media and information. From media's social influence and actual significance they will consider how the information is carried. They also possess quite clear understanding of the role of information and media currently in society.

3.2. Information Needs

Everyone will encounter various types of assignments to different extents in their study. Information needs are reflected in higher education students completing their programs or researches. Similarly, in order to solve problems in everyday life or satisfy everyday life needs, information needs will also be engendered. From our statistical data, no matter for coursework related tasks or research in everyday life, everyone in our investigation has chosen at least one item which they had information needs.

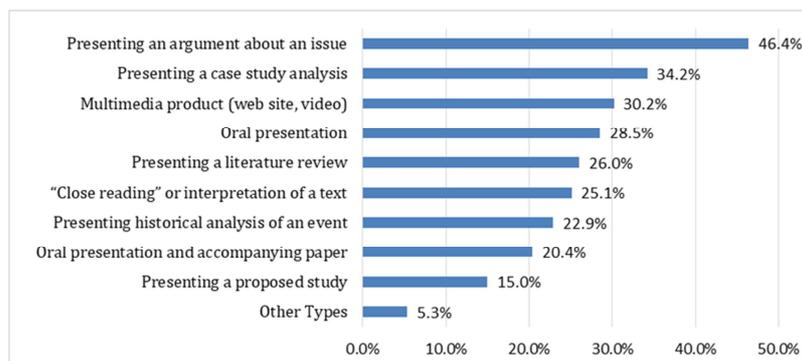


Figure 1. Types of assignments in undergraduates.

From Figure 1 above, we can see that the most frequent type of coursework related tasks is writing papers to present arguments on an issue (46.40%). This is the most common type of assignments for undergraduates. Following it are assignments to analyze a case (34.2%). In third place is producing multimedia products (30.2%). It illustrates that in the Information Age students are gradually unable to get away from media in their study. They have to resort to various media in large or small degrees when completing assignments.

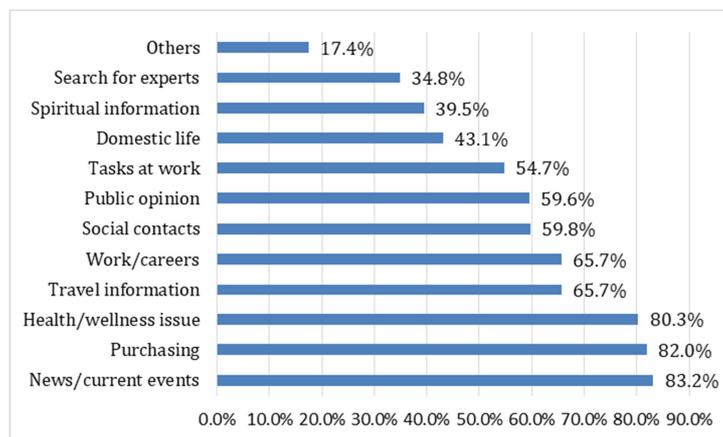


Figure 2. Everyday life topics which undergraduates made searches.

Details regarding searches for everyday life can be seen in Figure 2. Health, news, purchasing and travel are the aspects receiving the most attention from university students today. Considering the frequencies, university students have a greater eagerness to make searches for everyday life topics than in completing coursework tasks.

3.3. Ability of Information Access and Selection

As times change and the Internet becoming ubiquitous,

types of media now available for higher education students to choose from are ever increasing. Resources for looking up information are getting richer. Every type of media has its own strengths and specialness. In the study we also surveyed the state of undergraduates accessing information and selecting media. How to make use of various avenues and information tools to fluently access information through reading, viewing, discussion, visit, experiment and searching is the skill university students must possess.

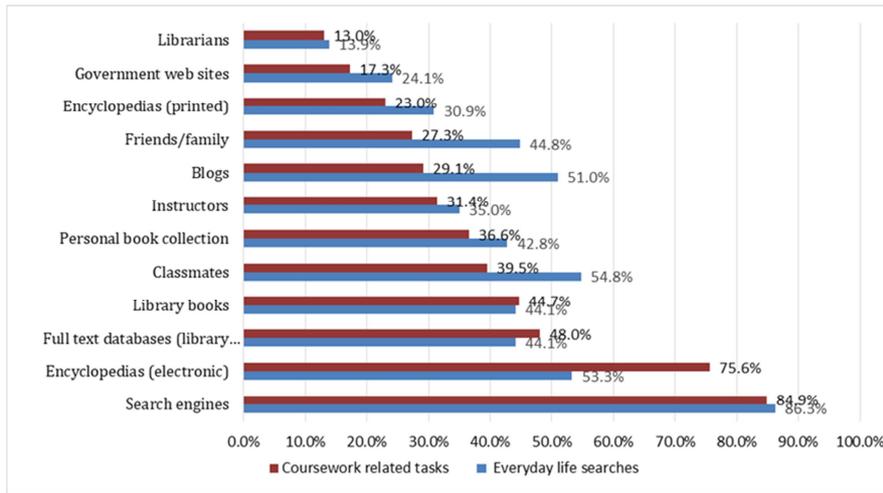


Figure 3. Tendencies of information search and media selection in undergraduates (only common choices for both scenarios shown).

From Figure 3 above, when undergraduates complete coursework tasks and make searches in everyday life, there are a few differences in their frequently selected means for obtaining information. Search engines are in the absolute leading position. When they complete course related tasks, the top five frequently chosen tools for the students are respectively search engines, encyclopaedias, course readings (68.5%), library full text databases, library books. In face of everyday life topics, the top five are respectively search engines, classmates, encyclopaedias, blogs and social media (50.2%). In completing coursework tasks, traditional course readings and library books are still widely used. In everyday life, emerging media such as blogs and social media are becoming more and more important.

The frequency of consulting librarians is the lowest, only

13% and 13.9% for coursework tasks and everyday life searches respectively. This illustrates that university libraries should consider how to better display the reference role of librarians to serve students in their study and their life. Government web sites are second from bottom for information sources the students used, only 17.3% and 24.1% for coursework tasks and everyday life searches respectively. This is related to the design principles of government web sites and their not solidly considering the two main themes "user-friendliness" and "service".

At the same time, the state of university students employing information tools and media tools to be more efficient in their own coursework tasks is also an important aspect of the study.

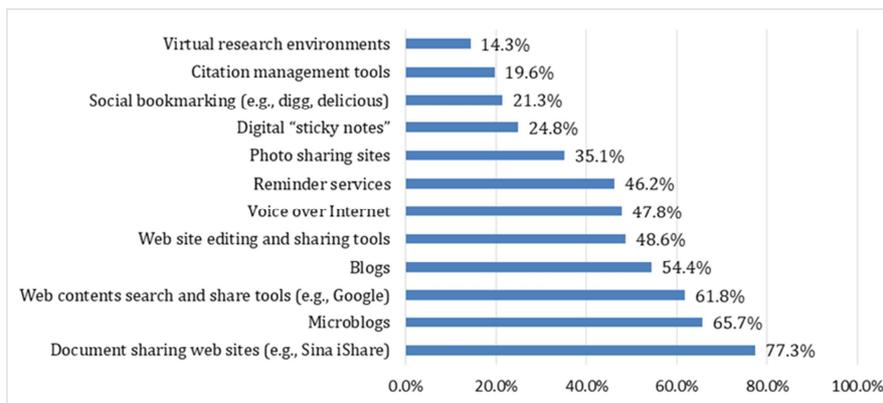


Figure 4. State of usage of productivity tools in university students.

Most students in higher education would make use of some tools to enhance their efficiency in coursework. Among the tools, document sharing programs (e.g., Sina iShare) are used by 77.3% of the students, 66.7% of them would choose microblogs. Conversely virtual research environments and citation management programs are used the least, with respectively only 14.3% and 19.6% having chosen them. In addition respectively 17.8% and 19.2% of the students indicated they even had not heard of the two. Virtual research environments and citation management tools are both very widely used productivity tools for university students overseas. However their usage rates in Chinese students are indeed quite low. This is related to the lack of suitable Chinese versions of them and also the style of research in China. Thus Chinese universities should put more efforts into introducing and popularizing these productivity tools, as well as help students to grasp them and use them.

For the question "when you send messages, will you select specific medium according to specific recipients or the messages' contents", 47.4% of the students responded they

would always do so, 46.5% indicated occasionally, only 6.1% of the students would never so consider. The result illustrates that undergraduates already have some understanding of the characteristics of various information medium and different sorts of media. Indeed they know quite clearly the influences which may arise from different mediums.

3.4. Ability of Information Evaluation

Information resources are growing explosively. In face of a universe of information online, people have to extract the elixir and eliminate the wastes from the search results, distilling out their most needed information. Thus from the factors considered by undergraduates in selecting information we can understand their information selection habits and henceforth comprehend their selection preferences. Based on these we can thereby improve the carrying mediums for media and information, enabling more relaxed and convenient information selection for university students.

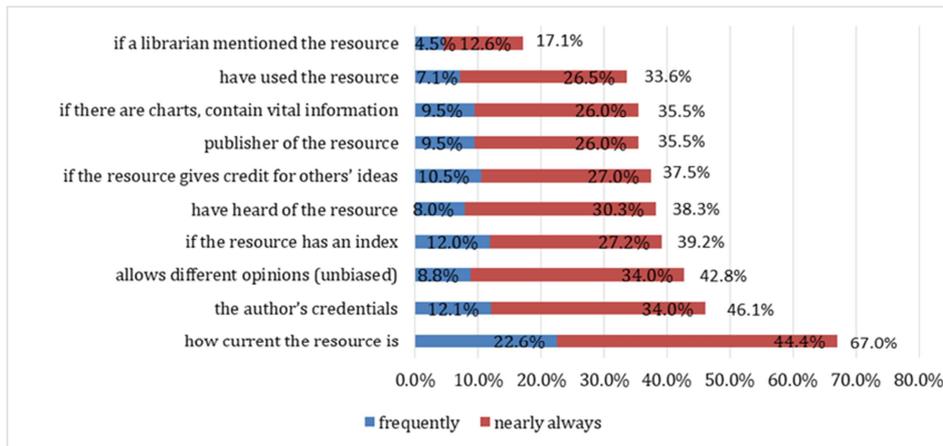


Figure 5. Factors considered by undergraduates in evaluating information (library or database resources in coursework tasks).

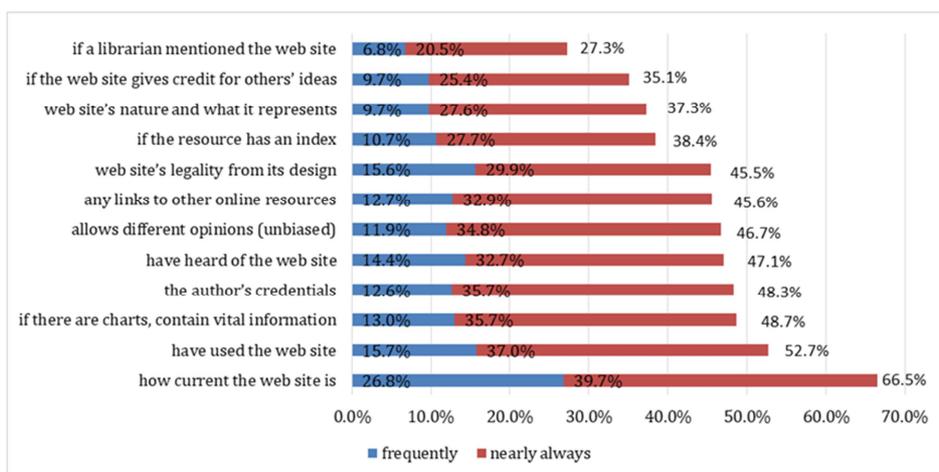


Figure 6. Factors considered by undergraduates in evaluating information (Internet resources in coursework tasks).

From Figures 5 and 6 above, no matter information is accessed via the library or the Internet, whether the resource is current is first considered by undergraduates. Respectively 67%

and 66.5% of the students frequently or always paid attention to this factor for library and Internet resources. Since information from libraries or databases would be more reliable,

in evaluating these resources fewer checked factors they had considered. Apart from how updated the resource is, there are some differences regarding other factors considered.

When evaluating library or database resources, other factors well considered by the subjects are in this order: the author's credentials (46.1%), whether the contents of the resource allow different opinions (unbiased) (42.8%), if there is an index in the resource (39.2%). Whether they have used the resource previously is second from bottom (33.6%). In evaluating Internet resources, apart from whether the resource is current, the factors well considered by the subjects are in such an order: whether they have used the web site before (52.7%), whether the charts in the web site contain important information, if there are any charts (48.7%), the web site author's credentials (48.3%). The web site has an index or not is only fourth from bottom (38.2%). Differences for the two

sorts of resources may be caused by students' research habits and course requirements. Students obtaining their information from university libraries or databases mostly have higher expectations on their performance for the coursework tasks. Hence they would consider overall factors like authors' credentials and whether the resource is biased. Conversely for students directly obtaining their information from the Internet their expectations are generally lower. Thus able to rapidly locate information one needs in accordance with previous experiences is what these students would consider more. We can also realize that whether the resource has been mentioned by librarians is the least considered, respectively only 17.1% and 27.3% for library/database and Internet resources.

Apart from evaluating the information itself, students would also seek assistance from people around to help evaluate the information resource.

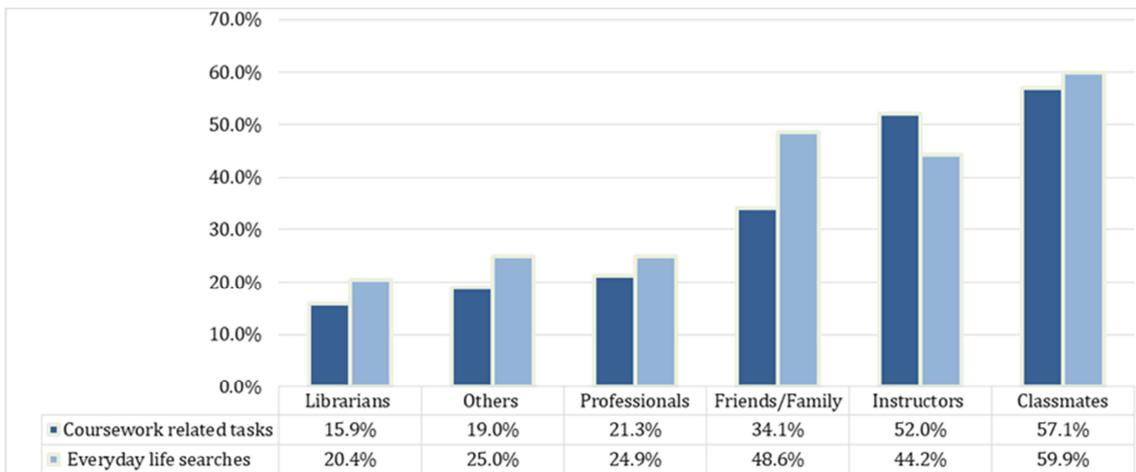


Figure 7. Sources consulted by university students in evaluating information.

From Figure 7 above, there is no significant difference of sources consulted for university students in completing coursework tasks and daily research. Classmates, being most frequently around in their life and their study, are the primary targets for seeking help when university students encounter information challenges. Apart from instructors in coursework related tasks, the students tend to consult others nearby more in everyday life. This illustrates that when knowledge having to do with personal competitive strength is involved, the degree of sharing is lower. Their circulation is less easy.

From Table 2 below, overall ability of evaluating information for university students still await increase. In completing coursework tasks and everyday life research, respectively 58.8% and 56.2% of the students admitted evaluating resources they have found to be difficult. Discerning if a web site or a source is credible, for these two scenarios of information needs respectively 52.3% and 54.6% of the students found that difficult. Percentages of students who could very seamlessly discern a web site's credibility and evaluate information resources they found were very low.

Table 2. Degrees of Difficulty in Evaluating Information for Undergraduates.

Difficulty (Coursework tasks)	Strongly Agree	Somewhat Agree	Total
Discerning if a web site is credible is difficult	16.60%	35.70%	52.30%
Evaluating resources I found is difficult	18.50%	40.30%	58.80%
Difficulty (Everyday life)	Strongly Agree	Somewhat Agree	Total
Discerning if a source is credible is difficult	16.70%	37.90%	54.60%
Evaluating resources I found is difficult	19.20%	37.00%	56.20%

3.5. Ability to Process and Make Use of Information

Ability to process and make use of information refers to being able to sort, classify, analyze, generalize and express succinctly on information one needs after finding them, as well as able to employ them for one's study and work tasks.

These are important aspects for exhibiting information and media literacy competencies. As displayed by Figure 8 below, the information processing ability of Chinese undergraduates is quite weak. 28.7% of the students strongly agreed that locating what they needed in a large set of search results to be difficult. This illustrated quite slim information organizing

ability and information excavation ability in the student body. 46.3% of undergraduates responded they could employ information they searched up into their assignments. This

would illustrate the information usage ability in these Chinese students to be stronger than other aspects. However the overall standard is still not high.

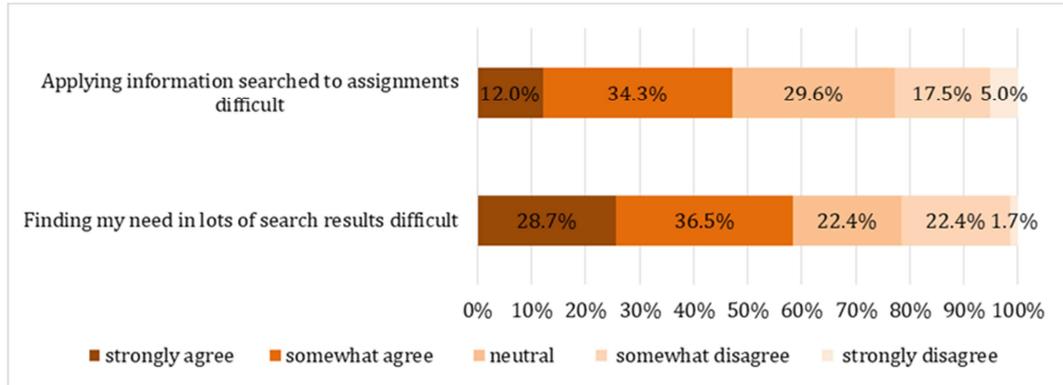


Figure 8. Information processing and usage abilities in undergraduates.

3.6. Information Ethics and Security

In the Information Age, there are important social implication and influence from information. Ethics and morals are important guarantees for healthy developments of individuals and society. In the statistical results of the investigation, 60.4% of the students consider under specific situations, using specific media to influence the reaction of the audience is moral and legal. Only 10.3% of the students believe that is immoral. Respectively 43.60% and 45.9% of the students respond that knowing where citations and notes are needed and how to cite correctly to be difficult. Education on academic morals and information ethics received by undergraduates is not much.

While publicizing their own information in social media (e.g., renren.com), 38.9% of the students can always be aware that their privacy might be intruded upon by commercial bodies or the government. There are 50.9% of the students who although are aware of the problem, consider that isn't very important. 10.2% of the students are totally unaware of the problem. The results illustrate that the awareness to be vigilant of information security in Chinese undergraduates is quite poor and the privacy consciousness quite weak.

4. Improvements in Education on Information and Media Literacy for Chinese University Students

This IMILS research was planned and carried out in 2011-2012. It reflected the state of information and media literacy education in Chinese university students then. In recent years, as new media are used widely, mobile Internet becomes popular and information literacy education broadly initiated in universities and colleges, we discovered some changes in information needs, information usage and information evaluation within Chinese higher education students. Some problems highlighted in the IMILS investigation are also gradually being alleviated.

4.1. Effects of Library Education Displayed

Libraries are crucial bastions in higher education. Their own information and media strengths doubtlessly play important roles in information literacy and media literacy education in universities and colleges. In practice of the education in these two areas both in China and overseas, many projects are initiated under library leadership. Examples include many libraries undertake fresh (wo)men guidance activities, information literacy courses, sessions on media use methods, etc. From these efforts some effects have been seen. However results of this investigation indicate that librarians in China could not play their supposed roles in students' learning.

First, libraries should be intimately related to students' learning. However from our results it can be discovered that no matter when undergraduates were completing their coursework and research or conducting daily life searches, their first choice information resource in both cases would be search engines, with encyclopaedic question and answer platforms coming next. Usage rates of library collection, library databases and librarians were far lower than these two. Next, when the students were evaluating information, "opinions of librarians" was the choice the least checked. When students sought assistance from others, they considered librarians the least.

After a few years of development, at present in China among Project 985 Universities, 72% of their official microblogs can be searched and 92% of them have utilized official WeChat. Through technical means such as new media they have enhanced reference consultation service. Libraries of University of Science and Technology of China and Sun Yat Sen University even have small images indicating WeChat robots that can reply automatically. Contents in the replies are quite precise and detailed. It is believed that as the waiting time needed for libraries to respond continue to shorten and the quality of the replies ceaselessly rise, means for reference consultation are continuously perfecting. Thus the usage rate of libraries for university students will greatly

go up. [11]

Between Sept 2014 and March 2015, a survey on the state of information literacy education in 545 Chinese higher education libraries was conducted. It was led by the library of Shenyang University, assisted by 17 universities and colleges, incl. Tsinghua University and Beihang University. From the survey results, the hardware of most libraries can basically fulfill the needs of information literacy education. The instructors mostly have undergraduate degrees and above, with most of them of middle ranks. At the same time, 68.8% of the libraries have studied students' information literacy awareness and competency, 69.17% of higher education institutions have a course related to information search, at least for undergraduates. In recent years, contents and methods of teaching in information literacy in universities and colleges have been further enriched. Reading clubs, searching competitions and seminars have become information literacy education activities favored by students. Interaction between students and libraries have obviously been enhanced, illustrating the majority of higher education libraries are playing ever more significant roles in information literacy education. [12]

4.2. Teaching of Practical Information Tools Strengthened

As society progresses, in their study higher education students are in ever greater need to employ software and tools to be more efficient.

When the research then asked "use of productivity tools in completing course related research tasks in the last six months ", microblogs and document sharing web sites were used most by undergraduates. However for utilities such as citation management tools, electronic tags and virtual research environments, some students indicated they even had not heard of them. This was owing to most of these excellent information tools were developed overseas, with the usage experiences of Chinese software of the same genre hard to be compared or there wasn't enough localization regarding usage habits. Another reason was education on the productivity tools was not widespread enough. Concerning commonly used data analysis software, according to the survey by Huang Jing in 2016-2017, 99% of higher education students use EXCEL, 77% use SPSS, 66.6% take Minitab, 33.9% employ SAS, with 35.2% on MATLAB and 45.8% having used other data processing software. [13]

In the past few years, as microcourses, MOOC (Massive Open Online Courses) and flipped classroom emerge; many libraries are in tandem with the times. They employ newest teaching means and include state of the art course contents into related programs. Using MOOC as the example, in the four main Chinese MOOC platforms XuetangX, MOOC icourse 163, CNMOOC and TopU, multiple higher education institutions including Wuhan University, Sun Yat Sen University and Sichuan Normal University have set up information literacy courses on them. The contents mainly cover information search, using search engines, writing research papers. [14] With these online courses on the one hand time and space limitations are broken and the audience

can be broadened to the maximal. On the other strengths are concentrated on introducing practical information tools, enriching the contents taught. Students can watch and have real time hands-on from distance. They can also restudy after course delivery and deepen their impressions.

4.3. Awareness of Information Security and Privacy Protection in University Students Awaiting Improvement

Although the Internet has given huge boost to social development, it is also a double-edged sword, with hidden potentials for crime. Indeed in the Information Age, this kind of criminal activities is harder and harder to prevent. Whether one has the awareness of protecting information privacy is an important aspect in evaluating the level of information literacy. In the original research, although many students were aware of this point, most felt that to be unimportant. Such a viewpoint could let the personal information of university students be easily exposed to others, giving them unnecessary troubles in student life and even hidden security pitfalls.

At present, the state of information security and privacy protection in Chinese higher education students is still unoptimistic. Results from the survey organized by Wuhan University's Association of Information Literacy in 2014 indicated that the Chinese students in the study still did not pay enough attention to backing up their data. When asked "how frequently you backup important data on the computer", 19.86% of the students never backup. Only about 8% of the students would backup in real time. Combining students backing up daily and those weekly constitute only 3.79%, with 12.27% of them backup once a month. Those backing up irregularly make up 56.02% of the total. Another study showed the top five security incidents university students could come across during their university life were all connected with online information security. The probability for their QQ account, electronic payment (Alipay) password or Internet banking password stolen was as high as 38.1%. 34.2% of them have encountered embezzlement attempts on the phone. 28.5% experienced thefts. There were 27.4% getting calls, emails or SMS from cults. 19.2% of the students have received messages and lures from multi-level marketing groups. [15]

However, regarding contents in research on information literacy education in recent years, knowledge of information security is still just generally covered. Indeed protecting information privacy is rarely touched upon. Education on technical knowledge, responsibility consciousness and legal morals of information security and privacy is still insufficient. Hence in forthcoming information literacy education, inculcating university students' responsibility consciousness of being modern civilized citizens is still an aspect that has to be strengthened. That would include related legal morals and clear understanding of various kinds of security pitfalls in the Information Age, as well as able to actively safeguard personal information.

5. Conclusion

This paper is based on the of UNESCO IMILS study on Chinese university students in 2012 which surveyed the state of their information literacy and media literacy. Through data analysis on valid samples, the authors discovered Chinese university students had very earnest information needs in both coursework tasks and everyday life. Search engines and encyclopaedic sources were the avenues of information access the university students selected as priorities. The university students already had some understanding on the characteristics of various information carrying mediums and the media. They were also quite clear about the influences that different mediums could bring. In evaluating information, its currency was found to be the factor the students considered first. Also through the data analysis the authors discovered some issues. They mainly included the function of the library in information literacy education was not fully displayed, types of widely used productivity tools in the university students were quite homogenous and with fewer functionalities, over half of the students strongly felt evaluating information they found to be difficult. In terms of information ethics and security, Chinese university students received not much education in academic ethics and information ethics. Their awareness of information security was quite poor and that on privacy quite weak.

Regarding issues discovered in the investigation then, the authors have conducted follow up analysis and research. They found out that some of the issues have already been somewhat improved. As techniques of library reference service are continually perfecting and libraries are actively holding multiple types of interesting information literacy activities such as searching competitions, the contributions from libraries in information literacy education are continuously rising. Concerning practical information tools, education on productivity tools have become much more widespread. University students as a whole have some understanding on common information analysis and processing software such as EXCEL, SPSS, Minitab, SAS, MATLAB. As microcourses, MOOC and flipped classroom emerge, means of teaching in information literacy education have become media rich. The contents taught are getting richer and more dazzling. However, information security and privacy protection are still topics urgently requiring strengthening.

6. Limitations of this Study and Further Thoughts

In the survey process, owing to too many questions in the questionnaire used, we could not continually encourage the subjects answering. There might be a very few number of cases answering blindly. In addition, although the investigation has tried the best to balance number of samples across regions, limited by human resources and time a perfect percentage balance of the regions still could not be realized.

On the one hand this survey reflected the status quo of

information literacy and media literacy in Chinese undergraduates. On the other its objective is designing and setting benchmarks of information and media literacy based on the results, to facilitate scholars and instructors to further improve their methods and tools of teaching, so as to accomplish curriculum goals better. Achieving these, students can raise their ability in gathering, utilizing, analyzing, evaluating and employing information and media, thus finishing related tasks with higher quality and more efficiently.

Acknowledgements

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