

7. A Study on Impact of Online Resources upon Research In Chinese Higher Education¹

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A Personal Observation on Chinese Students' Internet Adoption

The impact of information technology on research is both apparent and pervasive. The reduction of data, searching from web, communication with email could not be done before. These applications have transformed the nature of education investigation. They led to questions that would not even have been asked before. In traditional practice, we apply five main search strategies: library catalogs, journal articles, indexes, browse library shelves and advice of colleagues and students. But computer-based tools search information in different ways. What kind of people can search on-line resources more successfully than others? How Chinese students adopt Internet technology? Some studies have concluded that most end-users obtain poor results. But some literatures claim different results that end-users are able to search on-line databases with good results².

In the past years, I have being taught course "Methods for Educational Research". How to use on-line information is a component of the course. In the meantime, I was also in charge of some projects in which some graduate students were involved to conduct international comparative study. They were asked to search an adequate amount of information of 6-7 countries or regions, and analyzed them. Most of the students were graduate students in the Graduate School of Education in Peking University. Following points are mainly come from my observation and personal guesses from teaching and research experiences, which might be helpful for understanding the behavior and adoption of Chinese students of higher education field.

1. On-line searching strategies as well as tips are important for effective job. Finding information on the web is often a frustrating experience to graduate students of China since most of them did not get professional training on the subject during their undergraduate program. I found some of student's usually only use simple statements and limited use of Boolean operators or other tips. Students get discouraged when they

1. This is a part of paper submitted to National Institute of Multimedia Education for the project R&D Collaborative Networks

2. Hertzberg, Scott and Rudner, Lawrence: "Quality of ERIC Search Practices" Education Policy Analysis Archives Vol.7 No.25, 1999

- conduct a search and get back too many irrelevant and useless materials.
2. However, searching skill is not only factor to determine the final quantity and quality of resources, which be found. Beside of mastering of computerized searching tips, attitudes and behaviors are more dominant factors of doing an effective search. I found that students with good searching tips usually could give more prompt responses by searching, but students with good understanding about the subject or research purpose and professional interest as well as persistent with research objectives can finally do a better job and give more precise results.
 3. When conducting a research, students' favorites include official websites belonging to governments or reputed international organizations, and sites full of various statistics. They prefer to visit websites or database online that seem to offer high quality articles and information.
 4. The information is seldom received in an objective or neutral way. There are a lot of biases might influence our knowledge. Because web sites often link multiple sources, reliability of information is a serious problem for using. Critical thinking is extreme important for evaluation of resources found on line. It is critical for researchers to have the capability of querying and criticizing along with reading when using Internet as a tool for information gathering and studying. But it seems to me that once the students find information from on-line, they often overlook inconsistencies since they tend to form a framework already. Students are more likely to be influenced by handy and available information on-line. They take what they can get on the Internet rather than spending time to supplement the information with other kind of resources (such as printed journals, books and reports).
 5. Time spent searching is a factor which will influence quality of findings significantly. Usually, the more time a student spends on searching, the more satisfied and confident he or she will be about findings.
 6. I used to ask some of my students how many pieces of information on the top of list from searching they usually pay attention. The answer usually was no more 20. That is, students tend to ignore the other searching finds that come after 20 results.
 7. It seems to me that students' perception of reliability and quality of online information will be affected by where the information actually comes from, but would not affect their personal favorites and the judgments upon information value. Information without an indication of where it comes from still could be used because the information be seen as important or support their pre-views.
 8. Effectiveness of using information on-line requires users develop academic level mastery of international languages. Since majority resources are written by English, the information or voices from English speaking countries are in the predominant position. In one hand, it is a great drive for Chinese students to improve their English

proficiency, but in the other hand, some of students who have other languages (Such as Japanese, German, French,) as their second language are getting more discouragement from on line searching.

To summarize, the quality of student searching appears to vary depending on the individual. Some are better than others. The factors which might determine findings' quality include: skill of searching, English proficiency (if searching foreign language on-line resources), subject understanding, professional interests as well as persistent with the objectives of mission and critical thinking about findings. The reality is that very few Chinese students are capable or experienced enough to identify good as well as correct resources on the net. Most of them just have learned how to use search engines or access particular sites recommended by others to find information. So might Chinese professional scholars also be, I guess. These opinions are mainly based on my personal observations and experienced judgments than on scientifically based study. To find out whether there is empirical support for these assumptions, I make a tentative research design as followings.

A Tentative Research Design for Further Research

Motivations for Further Research

There are two major motivations behind of this design. First of all, in my opinion, many Chinese higher education institutions have behaved to pursue improving hard ware environments for teaching learning and researching without paying much attention to effectiveness issues for a long time. The academic society have put great enthusiasm for desirable campus infrastructure construction, but have not given sufficient efforts to prove the investment on the physical establishment are worthwhile. One result is that costs of Chinese public regular higher education has been grew rapidly. Let's take 1993 to 2000 as an example. During that time, expenditures per student increased at an average annual rate of 14 %. It is hard to believe that such cost increase can be sustained much longer, especially in the background of a dramatic enlargement of enrolment of Chinese higher education in these years. I doubt China can continue simply to increase the price of higher education as the principal means for improving it, and especially for meeting apparently insatiable demands for information technology. Within this context, research on impacts of IT upon universities should be given more priority to show academic society's accountability to public.

Secondly, how to identify on-line information is very popular issue among academic society. More and more experienced professionals are conducting programs to instruct students in using the Internet as a medium. Chinese universities should also pay seriously attention to train students as well as faculty-self with aggressive and positive attitudes towards the Internet and then further help them to pro-actively screen and recognize correct information on the net instead of just accepting information at face value. Since Mainland

China has some special social and culture natures, Internet adoption and IT views among academic society might have some differences from western countries or even Japan, Taiwan. What I formulated points of view above were based on observation to graduate students. However, I feel that some thing might be common among members of Chinese academic society. Curiosity for confirming and expanding the points, which I have given above, based on my experience and observation also drives me to call for further research, both qualitative and quantitative.

Research questions and hypothesis:

The study is going to shed light on some of the substantive issues related to Internet impacts on research in Chinese universities. The study is going to aim to obtain a clearer idea of faculty members and graduate students' usage and attitudes towards on-line information when they are using technology tools like computers and the Internet to do research. The main questions asked will be related with following objectives :

What are the major activities conducted by Chinese teachers and graduate students in the Internet?

What kind of behaviors or habit do Chinese teachers and graduate students usually have when they use resources online?

What kind of attitudes do Chinese teachers and graduate students have toward online resources?

What kind of professional training do Chinese teachers and graduate students need to improve effectiveness of usage of online resources?

Also, according to the personal observation I mentioned above, some of hypothesis relevant to these research objectives are formulated as follows:

1. Academic experiences (represented by ①working or studying years in the fields; ② academic position; ③ numbers of publication; etc.) have positive influence on the effectiveness on the web(represented by ①more advantaged search methods be used; ② adjust confine conditions; ③ persistency on finding; ④ critical thinking about online resources; etc.).
2. Age has negative influence on willingness of use online resource to do research (represented by frequency of using online resources; degree of believing in online information; etc.).
3. People's attitude toward Internet's impact on research is difference by their subjects. If subjects are ranked by following order: Nature Science, Social Science; Humanity Science, then the more frontal, the more positive.

Literature Review

There exist a large number of publications on the effectiveness of technology based distance education³. But there are relative limited studies (especially of empirical studies) on the effectiveness of technology on academic research.

Some of available references explore the impact of Internet access on intellectual professional lives, experiences and capabilities. For example, Schofield and Davidson conducted a study in 2000. They use qualitative observations, semi-structured interviews, account holder surveys, and the collection of archival material. Their findings related to the following consequences of teacher Internet use are reported: increased work-related communication with others; increased interaction within the school; increased interaction outside of the school; increased opportunities for engagement in professional development activities; increased professional pride and enthusiasm⁴.

But not all voices are so positive toward Internet and on-line information's influence on academic life. Critics say that cautions must be taken when all conclusions seem to be favoring IT application in academic activities⁵.

Herring explored faculty attitudes toward the Web as a tool for their students' research. Results show although faculty members generally feel positive about the Web as a research tool, they question the accuracy and reliability of Web content and are concerned about students' ability to evaluate the information found⁶.

Rudner exams the quality of on-line searches and argues that researchers and other Internet users do not look for and hence do not find the best resources. The paper concludes that ready access to resources can lead to decreased research quality and ill-informed practice⁷.

In Japan, Prof. Sakamoto Takashi and Prof. Ikuo Amano led a hot debate in public about IT's impact on higher education. Yuan contrasted the major points of them and argued that IT use in higher education has either substitute or complement functions for conventional way⁸.

Some of studies have also been done to explore people' adoption, attitude and behavior

3. Chen Xiaoyu "Cost, Effectiveness and Benefit of Mediated Instruction and Distributed Learning in Higher Education: Literature Review", a report submitted to National Institute of Multimedia Education for the project R&D Collaborative Networks, March, 2002

4. Schofield, Janet Ward and Davidson, Ann Locke: "Internet Use and Teacher Change" ERIC-ISSUE+RIEAPR2001

5. Chen, Pingyuan: "Humane Studies in the Digital Age"

6. Herring, Susan David: "Faculty Acceptance of the World Wide Web for Student Research", College & Research Libraries; v62 n3np251-58, May 2001

7. Rudner, Lawrence: "Who Is Going To Mine Digital Library Resources? And How?" ERIC Clearinghouse on Assessment and Evaluation, ERIC-ISSUE: RIEJAN2001, 2000

8. Yuan, Fujie: "Multimedia Use in Higher Education: Substitute or Complement for Conventional Teaching" Media and Education No.4 2000

toward on-line information. Yoshida analyzed about IT adoptability of teachers in Japanese higher education institutes based on a survey by NIME. She points out that the challenges of IT implementation in Japanese education are not primarily technological, but social⁹. Peng investigated Taiwan daily reporters' usage of the Internet information toward the Internet¹⁰. The author wrote, "Most of the reporters in Taiwan probably only first notice the advantages of the Internet such as the search function. However, what looks good in the beginning will probably lead to disaster eventually."

Some of studies detail the use of established evaluation criteria that help identify quality Internet resources. Although some of them focus on the particular resources, the process is universal¹¹.

In a report from the Institute for Higher Education Policy (1999), the author took a critical review of some of the original researches of IT's impacts, and claimed some key shortcomings of the research, including the existing studies do not adequately address the effectiveness of digital "libraries"¹².

Yuan presents a conceptual model of multimedia use in higher education. She concludes that a flexible and decentralized support system plays critical roles in encouraging innovative uses of multimedia technology¹³.

To sum up, a few research already available on the impact of IT upon some professional sectors or some countries, there are still few of research focus on IT's impact upon the research in higher education, especially in China. Do those results can hold up over time, across places and culture? Are they consistent with Chinese situation? IT may be able to help scholars in higher education field in some desirable conditions to do research more effectively compared to traditional information searching. What kind of desirable conditions should be created in such countries like China with the different culture and academic tradition? That is, time, place and academic tradition are the key issues related to confirming the existing findings. And expanding on the available researches in several ways is also in need.

9. Yoshida, Aya: "What are the Roadblocks of Implementing IT in Higher Education in Japan?", paper presented in the International Conference on Educational Technology in Higher Education, Beijing, May, 2002

10. Peng, Hui-Ming: "The Challenge to Professional Journalism How Taiwan's reporters evaluate and utilize Internet Information" <http://www10.org.hk/program/society/peng/www10.html>

11. Mellendorf, Scott A: "Holocaust Resources on the Internet. A Presence and Usage Survey" Reference Librarian; n61-62 p265-85, 1998

12. The Institute for Education Policy, What's the difference? A Review of Contemporary Research on the Effectiveness of Distance Learning in Higher Education. Prepared for American Federation of Teachers and National Education Association. Washington, 1999

13. Yuan, Fujie: "Multimedia Application System in Higher Education-A Three-Layer Model and Its Application", Media and Education, 1999

Data collection and sampling

One of the data sources will be conducted by questionnaire survey to find out what the respondents views and attitudes are. As a questionnaire research, self-reports of use might have some disadvantages that could give a misleading picture of reality. A supplemented qualitative study which composed of interview is going to be undertaken in order to help understanding further more about actual online behavior of Chinese professional.

The sampling target will be teachers as well as graduate students in Peking University. Sample size (if possible) might be around 200 teachers and 500 graduate students. There will be around 10 teachers and 20 graduate students be interviewed by convenience also.

A Tentative Questionnaire Design

Questionnaire will be administered to faculty members and graduate students in Peking University.

Respondents are supposed to complete a questionnaire with questions on personal characteristics, online article use, information search behavior, factors impact on effectiveness, Sources of online information adopted, Factors to judge if the Internet information is credible, Sources of online information adopted, Response towards online information, Attitudes toward Internet.

Personal characteristics. Respondents will be asked to provide information on demographic characteristics, including: age, gender, specialty, academic position, background of education, working experience, number of publications, etc.

On line information use. On line information use will be assessed in following ways. First, respondents will describe their general use of resources from Web in terms of the frequency of browsing article contents, photocopying article contents, saving article contents, putting article contents on reserve, or passing article contents along to colleagues. Second, respondents will report their reaction to online information found (categories are as: prove online information all the time; Consider online information as research sources; believe in online information and try to prove it; consider anonymous information as rumor; always can find the person involved to confirm the unsure online information; tend to believe the online information with complete identification of sources) (measured on a five point scale, where 1 = never, 2 = rarely, 3 = sometimes, 4 = frequently, and 5 = always).

Information search behavior. Information search behavior will be assessed in three ways. First, respondents will report their level of use of the World Wide Web, e-mail, databases (e.g., ERIC, China Journal net, etc.), on-line library catalogs, and ftp (measured on a five point scale, where 1 = never, 2 = 2-3 times per year, 3 = monthly, 4 = weekly, and 5 = daily); Second,

respondents will describe the frequency of literature searches within their own field and the frequency of on-line literature searches within their own field (both measured on a five point scale, where 1 = never, 2 = 2-3 times per year, 3 = monthly, 4 = weekly, and 5 = daily); Third, respondents will report major strategies adopted by them from the Internet: The strategies will be classified into: use simple search method; use advanced search method; adjust confine conditions according last result and be persistent on searching until satisfied result be found; (measured on a five point scale, where 1 = never, 2 = rarely, 3 = sometimes, 4 = frequently, and 5 = always); Finally, respondents will report average time spent on per session and number of findings on list which they usually pay attention to.

Factors impact on effectiveness. Respondents will be asked to rank professional trainings which might offer good preparation for using IT (professional trainings are classified by English, Chinese, sociology, communications, psychology, physical sciences, mathematics); Respondents also be asked to rank the factors which carry weight on effective use of information on line (factors be classified by Language proficiency, Technique proficiency, professional interest, know well about the subject, persistent to objectives).

Sources of information adopted Respondents will first to be asked to rank sources of online information they adopted in their research (sources be classified into Governmental web-sites, Academic databases, International organization web-sites, Reputed scholar's websites, online news messages; Anonymous resources on-line; BBS; Others), and then to estimate the percentage of articles which coming from online resources on their bibliography of publication for the last year.

Factors to judge if the Internet information is credible Respondents will be asked to rank the factors as followings: Specific figures and details; Have heard about the information before; Logical thinking process; Reliable websites; Reliable information resources; Sensitive topics; Issued by traditional printings; others.

Attitudes toward Internet Attitudes toward Internet will be assessed by respondents' report level of agreement with statements about Internet's impact on research, such as: increased work-related communication with others; increased interaction within the academic society; increased interaction outside of the university; increased opportunities for engagement in professional development activities; increased professional pride and enthusiasm, increase quality of research, increased research productivity, online data will take the place of all books and materials, teachers should expand their areas of influence to meet the on line information searching needs of students etc. (measured on a five point scale, where 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree).

Data analysis

Using SPSS, a descriptive statistics based on questionnaire is expected to show present situation of Chinese professional usage of online information. Further more, T-TEST, ANOVA, CROSSTAB, and regression statistical methods might be applied to explore the relationship between usage behavior as well as attitude toward online information with various variables of demographic characteristics of respondents. Results from interview will be either as a guidance of completing the tentative questionnaire above, or as a complement to deeply understand inference results from quantitative study based on the questionnaire.

I'd like to quote a statement from Prof. Duderstadt as my concluding remarks: "It is our collective challenge as scholars, educators, and academic leaders to develop a strategic framework capable of understanding and shaping the impact that this extraordinary technology will have on our institutions. We are on the threshold of a revolution that is making the world's accumulated information and knowledge accessible to individuals everywhere, a technology that will link us together into new communities never before possible or even imaginable. This has breathtaking implications for education, research, and learning and, of course, for the university in the digital age."¹⁴

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