A Survey and Analysis on Chinese Graduate Students’ Use of Electronic Resources

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Abstract. Over three consecutive years (2017-2019), a survey of using electronic resources was conducted on graduate students from North China University of Technology. The results show that electronic resources have almost replaced paper resources as the most important source of information for graduate students’ daily scientific research activities, and the use frequency is very high. Their main purpose of the use of electronic resources is to write theses, publish journal and conference papers. Due to language barrier or other reasons, Chinese electronic resources are the first choice for Chinese graduate students. However, it is still a major problem that the resources cannot be downloaded, and the resources needed cannot be found. Students mainly solve by online web search and mutual communication with classmates.

1 Introduction

The ability of information search is the foundation of graduate students’ research and innovation ability and is also the embodiment of its information literacy. Especially for the academic information search, it directly affects students’ study and their progress and results of research. Thus, paying attention to the information search process of postgraduate, knowing and understanding the characteristics and laws of their information search behaviors is the basis and premise for the information education, and also provides the basis for the information system design and improvement, information resources construction development and information services improvement.

As a direct beneficiary of scientific research work in colleges and universities, graduate students are an important force for the sustainable development of scientific research. And the literature resources are the important foundation and guarantee for graduate research activities. In recent years, with the development of network information technology and computer technology, the traditional scientific research mode and academic information environment are facing fundamental changes. In this change, the information needs of graduate students have also changed a lot. Electronic resources have become the main way for graduate students to obtain scientific research information. An empirical study on the use of electronic resources of graduate student can be used to know the use of literature resources by graduate students in research activities, for example: Tella et al.\(^{[1]}\) this study assesses the use of electronic resources by academic staff at the University of Ilorin. Mosunova et al.\(^{[2]}\) thought the concept of electronic education resources is analyzed and refined. Snow et al.\(^{[3]}\) investigated the use of electronic resources on 68 medical college students.

For three consecutive years (2017-2019), this paper attempts to understand the use of electronic literature of Postgraduates through questionnaires and in-depth interviews of the third year Postgraduates from North China University of Technology. North China University of Technology is a comprehensive university with science and engineering as its main subject, has 10 colleges and 35 postgraduate majors, which can reflect the general characteristics of a comprehensive university to similar institutions. The research results can provide some reference value for similar universities to fine the management of research library collection construction, optimize the collection structure and the fund allocations, and cultivate students.

This survey focuses on four questions that graduate students use in their own electronic resources:
(1) What are the ways and habits of obtaining graduate research literature resources?
(2) What are the commonly used research literature resources for postgraduates?
(3) What is the main purpose of using scientific research literature resources for postgraduates?
(4) What are the factors that affect the use of postgraduate research literature resources? How to solve?

2 Survey Design and Sample Description

In 2017, 2018 and 2019, a questionnaire survey was conducted on the graduates of the upcoming master’s degree from North China University of technology. The purpose is: after three years of academic training, graduate students have the most typical understanding of academic resources. The three-year accumulative data can help avoid data deviation in a given year. The survey adopts the electronic questionnaire method. The content design of the questionnaire includes basic information of the interviewees; use time, location and terminal; the way of obtaining electronic resources and contents; the common use problems and solutions on the use of electronic resources. Survey occurred from June 2017 to July 2019.

364 valid questionnaires were collected, including 201 in 2017, 63 in 2018 and 101 in 2019. Among them, 244 majored in science and engineering, 120 majored in literature, history, economics and management. This paper uses SPSS software to number, count and analyze the survey results. Of those 364 people, 24 chose to pursue a Ph.D. degree, 7 chose to study abroad, 20 chose to work in universities or research institutions, 240 went to work in a position related to the profession, and 58 chose to work, but little relevance to the majors studied.

3 Survey Results of Graduate Students' Use of Electronic Resources

3.1 Analysis of the Total Use of Electronic Resources by Graduate Students

According to the survey, 89.29% of graduate students choose to use electronic resources, far more than 10.71% of paper resources (Tab. 1). More than 90% of graduate students choose to use desktop computers or laptop in terms of terminal selection (Tab. 2).

According to statistics of the time results (Tab. 3) of graduate students' daily use of the Internet, the Internet has almost become an important part of graduate students' life. For the daily use time of electronic resources (Tab. 4), most spend 1-2 hours per day, accounting for 35.96%, followed by 23.35% of them use 0.5-1 hours, and 23.63% of them use 2-4 hours every day.

From the statistical results of places where graduate students use electronic resources (Tab. 5), 59.89% choose to use in laboratories or teaching and research rooms, and 24.45% choose to use in libraries. However, few graduate students choose to use electronic resources in self-study classrooms, dormitories or other places, a total of only 15%.

Table 1. Document carrier type usage statistics.

| Items            | Results | Proportion |
|------------------|---------|------------|
| Paper Resources  | 39      | 10.71%     |
| Electronic Resources | 325   | 89.29%     |

Table 2. Distribution of commonly used terminals using database electronic resources.

| Items                        | Results | Proportion |
|------------------------------|---------|------------|
| Desktop Computer/ Laptop Computer | 335     | 92.54%     |
| Smartphones/Tab.ts           | 27      | 7.46%      |
Table 3. The average online hours per day.

| Items         | Results | Proportion |
|---------------|---------|------------|
| 0.5-1 Hours   | 3       | 0.82%      |
| 1-2 Hours     | 33      | 9.07%      |
| 2-4 Hours     | 91      | 25%        |
| 4-5 Hours     | 83      | 22.8%      |
| 5-6 Hours     | 42      | 11.54%     |
| More than 6 hours | 112  | 30.77%     |

Table 4. The average time of reading or using electronic documents every day.

| Items         | Results | Proportion |
|---------------|---------|------------|
| 0.5-1 Hours   | 85      | 23.35%     |
| 1-2 Hours     | 144     | 39.56%     |
| 2-4 Hours     | 86      | 23.63%     |
| 4-5 Hours     | 24      | 6.59%      |
| 5-6 Hours     | 10      | 2.75%      |
| More than 6 hours | 7     | 1.92%      |
| Not Used      | 8       | 2.2%       |

Table 5. The places using electronic resources.

| Items                                      | Results | Proportion |
|--------------------------------------------|---------|------------|
| Library                                    | 89      | 24.45%     |
| Laboratory/Teaching and Research Office    | 218     | 59.89%     |
| Study Hall                                 | 25      | 6.87%      |
| Dormitory                                  | 21      | 5.77%      |
| Other place                                | 11      | 3.02%      |

From the above survey results, we can see that: at present, graduate students have a choose tendency in terms of using academic information. Compared with paper-based information, electronic resources, with its powerful search function and convenience, have an advantage in information search. Moreover, in study or scientific research activities, it has become an indispensable part of graduate students to use desktop computers and laptops to access electronic resources in the fixed places such as laboratory or library every day.
3.2 Survey on the Access and Use of Electronic Resources for Graduate Students

The survey results of the purpose of using electronic resources for graduate student (Tab. 6) show that the purpose of using electronic resources is mainly application-oriented reading, while understanding reading and interest reading are relatively less. It can be seen that for graduate students, electronic resources play a more important role in meeting the needs of daily experiments and writing papers.

According to the survey results of graduate students' electronic resource acquisition methods (Tab. 7): the professional database and Internet search engine provided by the library have become the two most important ways for graduate students to search for electronic academic information. Compared with the Internet search engine, the professional database provided by the library is more professional and accurate for its academic information, and it is the first choice for them to search for electronic academic information. Moreover, these professional academic information can be used in schools for free, and access is also convenient.

In the survey results of the types of graduate students' electronic resources (Tab. 8), it can be seen that the most used resources are electronic journals and dissertations, followed by conference papers and e-books. In contrast, graduate students use less of reference books, academic videos, scientific reports, and information resources. Combined with the data in Tab. 6, it can be shown that at present, the main purpose of using electronic resources by graduate students is to write graduation thesis and publish papers. It can also be seen that dissertation, journal papers and conference papers have the greatest role in the daily academic activities of graduate students.

According to the survey results of Chinese and foreign databases (Tab. 9), the graduate Chinese databases are still the main resources for them to obtain scientific research resources. North China University of technology has purchased 88 electronic resources including academic journals, academic papers and academic videos. The utilization of these 88 resources are counted respectively, and the top 20 database resources and utilization results are shown in Tab. 10. It can be seen that the use rate on the full-text database is significantly higher than that of index database. The use of Chinese database is also significantly more than that of foreign database.

Table 6. Survey results on the purpose of reading with electronic resources.

| Items                              | Results | Proportion |
|------------------------------------|---------|------------|
| Interest reading - like, want to read, etc. | 27      | 7.42%      |
| Application reading—such as writing papers, doing experiments, etc. | 286     | 78.5%      |
| Understand reading—in order to learn a certain knowledge, etc. | 51      | 14.0%      |

Table 7. Statistics of electronic resource acquisition methods (multiple choice)

| Items                              | Results | Proportion |
|------------------------------------|---------|------------|
| Library resources                  | 346     | 94.79%     |
| Provided by classmates or teachers | 111     | 30.41%     |
| Foreign school                     | 59      | 16.16%     |
| Web searching                      | 232     | 63.56%     |
| Own purchase                       | 38      | 10.41%     |
Table 8. Statistics of electronic resource usage types (multiple choices).

| Items                                           | Results | Proportion |
|------------------------------------------------|---------|------------|
| Electronic Journals                            | 341     | 93.42%     |
| Digital books                                  | 119     | 32.6%      |
| Information class                              | 43      | 11.78%     |
| Reference book (dictionary, yearbook, encyclopedia) | 73      | 20%        |
| Academic video                                 | 68      | 18.63%     |
| Skill training                                 | 26      | 7.12%      |
| Technology report                              | 60      | 16.44%     |
| Proceedings                                    | 176     | 48.22%     |
| Thesis                                         | 284     | 77.81%     |

Table 9. Statistics of usage of Chinese and foreign databases.

| Items             | Results | Proportion |
|-------------------|---------|------------|
| Chinese database  | 267     | 74.17%     |
| Foreign database  | 41      | 11.39%     |
| Almost            | 52      | 14.44%     |
Table 10. Top 20 database are used in the database purchased by the school.

| Item                                           | Language   | Type         | Results | Proportion |
|------------------------------------------------|------------|--------------|---------|------------|
| CNKI-China Journal                             | Chinese    | Full text    | 137     | 37.5%      |
| CNKI-China Master's Thesis                     | Chinese    | Full text    | 125     | 34.2%      |
| CNKI-China PhD Thesis                          | Chinese    | Full text    | 111     | 30.4%      |
| CNKI-China Important Conference Papers         | Chinese    | Full text    | 104     | 28.4%      |
| WoS-SCI                                        | Foreign    | Index        | 98      | 26.8%      |
| WANFANG-China Thesis                           | Chinese    | Full text    | 94      | 25.7%      |
| IEEE/IEE                                       | Foreign    | Full text    | 90      | 24.6%      |
| CNKI-China Tools Book                          | Chinese    | Full text    | 76      | 20.8%      |
| WANFANG -Data Knowledge Service Platform       | Chinese    | Full text    | 65      | 17.8%      |
| CNKI-China Economic and Social Development     | Chinese    | Full text    | 59      | 16.1%      |
| CNKI-China Important Conference Papers         | Chinese    | Full text    | 59      | 16.1%      |
| WANFANG China Science and Technology Library   | Chinese    | Index        | 58      | 15.8%      |
| VIP Journal                                    | Chinese    | Full text    | 58      | 15.8%      |
| WANFANG Standard Full-text Database            | Chinese    | Full text    | 57      | 15.6%      |
| CSCD                                           | Foreign    | Index        | 54      | 14.8%      |
| WoS-SSCI                                       | Foreign    | Index        | 52      | 14.2%      |
| EI Village 2                                   | Foreign    | Index        | 49      | 13.4%      |
| WANFANG Foreign Language Abstracts Database    | Chinese    | Index        | 48      | 13.1%      |
| WANFANG Science and Technology Achievement     | Chinese    | Full text    | 41      | 11.2%      |
| CSSCI                                          | Foreign    | Index        | 36      | 9.86%      |
| Springer Link                                  | Foreign    | Full text    | 31      | 8.49%      |
| Elsevier SDOL                                   | Foreign    | Full text    | 29      | 7.95%      |
From the above survey results, it can be seen that the purpose of graduate students to use electronic resources is mainly on applied reading, while dissertations, journal articles, conference papers, etc. are the academic resources of choice for graduate students. Also, can be seen that the main purpose to use is to publish papers and write graduation thesis. Among them, Chinese databases are the most used databases for graduate students due to language and other reasons. The database resources purchased by the school can basically meet the needs of students.

### 3.3 Survey of Common Problems and Solutions for the Use of Graduate Electronic Resources

The survey results of common problems in the use of electronic resources by graduate students (Tab. 11) show that the most common problem encountered is that the retrieved resources cannot be downloaded, and the second is that they cannot find the resources they need. Low foreign language level is also a big problem to use resources. When graduate students experienced difficulties in resources use, the first choice is to gain resources through web search, and then to turn to their classmates or tutors. Less than 10% turn to library teachers (Tab. 12).

| Items                                              | Results | Proportion |
|----------------------------------------------------|---------|------------|
| Can't retrieve what they need                      | 174     | 47.67%     |
| The retrieved documents cannot be downloaded       | 186     | 50.96%     |
| Unfamiliar search method                           | 80      | 21.92%     |
| Inconvenient use of the database interface         | 57      | 15.62%     |
| Lack of foreign language level                     | 142     | 38.9%      |

Table 11. Statistics on common use of electronic resources (multiple choice).

| Items                                              | Results | Proportion |
|----------------------------------------------------|---------|------------|
| Asking for help from the tutor                     | 75      | 20.55%     |
| Asking for help from classmates                    | 178     | 48.77%     |
| Ask the literature search teacher for help         | 37      | 10.14%     |
| Ask the library teacher for help                   | 38      | 10.41%     |
| Find solutions through Baidu and others.           | 270     | 73.97%     |
| Replace it with a method or database                | 157     | 43.01%     |

Table 12. Statistical results of solutions to problems encountered in electronic resources (multiple choice).

These survey data indicate that graduate students will communicate with their classmates and consult with the library and information center in the initial stage of academic information search. Moreover, although in most cases, libraries and information centers have an advantage in terms of information quality and reliability, students, as the source of information closest to them, tend to be their first choice. The language is a big obstacle for graduate students to use foreign electronic resources.
4 Discussion and Conclusion

(1) Electronic resources have become an important source of information for graduate students to complete scientific research tasks. When using electronic resources, graduate students choose to use laptops or desktops in labs, teaching rooms and libraries for reading. This aspect is related to the purpose of graduate students' use, because it can be seen from the survey that the purpose of using electronic resources for graduate students is mainly to write a thesis. It can be also seen graduate students has certain passiveness.

(2) For the sources of electronic resources used, they mainly come from what sources own school purchased, and only a few students use the resources of the external schools or purchase relevant literature resources themselves. This shows that the electronic resources in our school can basically guarantee the daily use. However, at the same time, it also found that the two most common problems encountered in graduate students' use of resources are that they cannot find the resources they need and that they cannot download them, which shows that our school still needs further improvement in resource construction.

(3) From the perspective of the language of electronic resources used, graduate students choose Chinese resources more. Simultaneously, it can be seen that the lack of foreign language level is an important factor affecting the reading of foreign literature.

(4) In terms of the types of databases used, journals, dissertations and e-books, etc. are the main resources used by graduate students. Secondly, the use of information, technology reports, etc. is relatively small, and the utilization of resources is relatively single.

(5) From the specific database of electronic resources used, CNKI, WANGFANG and VPCS, etc. are the most widely used full-text databases for graduate students, among which journals, dissertations and conference papers in CNKI are still the first choices for students, followed by WANGFANG dissertations, and VPCS journals are the least used. The use of IEEE is next to that of CNKI.

(6) In the process of using electronic resources, graduate students prefer to solve problems by themselves or with their classmates. Library staff or literature retrieval teachers did not play a role. This may come from that the graduate students need to solve the problems quickly, but also may be a role of library teachers not forming consensus in the minds of students, or the limited staffing.

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