Discussion on Improving Literature Review Ability of Engineering Graduate Students

Yufeng Su [1], Dan Guo [2], Fengxia Zhao [1], Zhigang Jia [1], Zheng Tao [1], Jiangming Zhao [1]

1.School of Mechanical and Power Engineering, Zhengzhou University, Zhengzhou 450001, China

2.Graduate School of Zhengzhou University, Zhengzhou 450001, China

Abstract: Literature review is a key link in the process of graduate training. To fully carry out literature review is particularly important for the selection of research topics and research directions. It is also a part of postgraduate comprehensive ability and determines the quality of postgraduate dissertation. Combined with the experience of guiding graduate students for many years, this paper analyzes each link of literature review for engineering graduate students, and discusses the important link in depth to provide help for graduate students to carry out literature review research. Through the research of the paper, the author analyzes the literature review research work is a gradual process with no end point, and researchers follow up the research progress in the work, which helps to accurately grasp the research direction.

Keywords: Literature review; Graduate engineering dissertation

1. Introduction

The report of the 20th National Congress of the Communist Party of China proposed to build a "powerful country in education, science and technology, and talent". Higher education plays an irreplaceable strategic role in the realization of Chinese-style modernization [1]. In 2022, the enrollment of graduate students in China will reach 1.24 million [2], and the expansion of graduate education will help train more high-level talents and make important contributions to building China into a modern country. In recent years, in order to improve the quality of postgraduate education, we have adopted the measures of submitting papers for examination before defense and spot checking after defense, but there are still some problematic papers, the main problem is that the copy ratio of papers exceeds the standard, and one of the main reasons is that the research status is not sufficient, leading to duplication of work. Strengthening the process training of graduate students is the key link to ensure the quality of graduate students' training, and literature review is the primary link to carry out research work in the graduate stage. Sebastisan[3] discussed the literature review work graphically. Xiao and Waston[4] conducted research and analysis on literature review in the planning field. Wang Qi [5] discussed the meaningful steps and common problems in writing literature reviews. Wang Jingxiu [6] analyzed the influence of literature review courses on the ability cultivation of liberal arts graduate students.

In the postgraduate stage, academic research and applied research are carried out, and innovation ability is improved through the training of various research links. Graduate students who have just come into contact with the research topic are usually not clear about their own topic. In the process of literature review (reading or writing), they will gradually deepen their understanding of the relevant research content through in-depth understanding of the topic, and then determine the main work direction of their master's degree thesis on this basis. In the process of determining the research topic, it is necessary to consider its own ability, energy and conditions, to ensure appropriate workload and innovation, but not too broad or too inclusive. It can be said that determining the research topic is a process of gradually narrowing the scope and refining the research work. In the early stage of graduate school (the

first academic year), it is necessary to carry out appropriate training and guidance on literature review related abilities, and graduate students also need to improve relevant abilities purposefully.

2. Literature review each link

In combination with the current situation of engineering research and development, there are more research literatures or reference books in most research directions, and the university library subscribes to relevant databases, which provides convenience for graduate students to understand research topics. The relatively large number of digital literature also brings difficulties to the screening, reading and summarizing of literature. From an academic point of view, the quality of published literature varies from different publishing houses and journals. Therefore, we cannot just search, obtain and read literatures at will. In the process, we also need to improve the ability of literature identification to ensure that the literatures selected are worthy of reference in this field, and then conduct intensive reading and analysis on this basis, and then determine our research direction and work content. The literature review process mainly includes identifying the theme (direction), searching the literature, evaluating/screening the literature, reading the literature, summarizing the literature, determining the research question, etc., interspersed with the literature management, which is discussed and analyzed below.

2.1 Define the theme

Graduate students need to discuss and read the existing research papers (journal papers and dissertations) of the research group with their supervisors, have a general understanding of the research topic, understand the knowledge needed to carry out research, and be familiar with the terms related to the topic, so as to organize suitable keywords and different writing forms when searching literature. If there is no research basis for this topic, it is necessary to discuss with the supervisor, who will recommend relevant dissertations or books, and get familiar with the research topic. In this process, the graduate tutor has the role and obligation to lead the students to get started, and appropriate guidance helps the students to familiarize themselves with the subject as soon as possible.

2.2 Literature Retrieval

Carry out document search after clear research topic. Some school libraries provide an internal integrated retrieval system and subscribe to relevant databases, such as EI (Engineering Index), WoS Science Network database, CNKI China Knowledge Network database, etc. Most English and Chinese journal literature can be searched in these three databases. If the school orders the relevant original database, you can click to download. At present, the literature retrieval function provided by the database is relatively rich, but we can obtain preliminary literature mainly by searching keywords in "Abstract abstract", "Subject" and "Title". On this basis, in order to improve the accuracy AND completeness of obtaining literature retrieval, the logical combination of keywords "and", "OR" and "NOT", as well as the truncated character "*" and the wildcard character "? "are used. . We can use the search domain options provided by WoS data to focus on the literature we are concerned about. For example, at the beginning of literature search, we may be more willing to read review literature. In the search domain of WoS, we have the option of "literature type" and select "Review" to search review articles. When the search results are listed, the "citation frequency" of different articles can be seen, and we can focus on "highly cited papers" and "hot papers". Due to the timeliness of the research, it is also necessary to pay attention to the publication time when paying attention to the frequency of article citations. Further, the Refine function provided by WoS data is used to select desired documents from the obtained search results.

Although EI database and WoS data can search Chinese literature, perhaps the function provided by CNKI is more suitable for searching Chinese literature. CNKI provides the selection of search fields such as "Subject", "title", "keyword" | "abstract", etc. CNKI also provides some English literature search functions, which is convenient for the students who first contact with literature search. In CNKI, search results are listed according to "main topic" and "secondary topic", which can narrow the scope of literature concerned through these two options. Meanwhile, "search in results" is also provided, which can be searched by re-entering the search term in the initial search results. Usually, after multiple searches of literature, it is best to record the keywords used in the search to avoid subsequent repetition. In addition to searching journal articles, it is sometimes necessary to pay attention to patent databases, especially for work related to technology research and development, which can be searched through the websites of national patent offices, such as the State Intellectual Property Office of China (CNIPA), the United States Patent Office (USPTO), the European Patent Office (EPO) and the Japanese Patent Office (JPO).

2.3 Evaluation/screening of literature

After obtaining the search results for the first time, it is necessary to make a retort of each search document to judge whether it is necessary to further download the full text for intensive reading. We can choose the literature related to our research topic through

the relevance and abstract content of the literature title, and download the full text through the library database to read. Documents downloaded with different search terms also need to be distinguished, and folders can usually be set up according to search terms to store relevant documents.

2.4 Read literature

Reading the literature is the most important part of this process. How can we identify the useful information in the literature? The ability to read literature is a process of gradual improvement. With the accumulation of relevant basic knowledge, research methods and cutting-edge information, the ability to read literature is gradually improved. Most of the papers published in high-quality journals are written in English, and it is also very important to improve the reading ability of English literature, which requires a certain amount of training. Combined with the reading of literature, we usually start with the title, abstract, summary and illustration of the literature to determine whether the literature is closely related to the research theme. For closely related literature, we need to read closely to understand the theory, model, analysis method, experimental means, data processing and other important links used in the research. In the process of reading, it is necessary to make appropriate notes and summarize the main methods and conclusions of the literature. At the same time, in this process, it is necessary to properly establish logical connections among various literatures, so as to prepare for the subsequent literature induction and research direction.

2.5 Summarize the literature

By reading the literature, we can establish the logical connection between the research methods, experimental schemes and contributions to the field of literature, combine the work of different literatures, and analyze the possible improvement direction of literature work. By reading the above key information in the literature and summarizing the literature in my own language, I not only have an understanding of the current situation of this research topic, but also have a basic understanding of the possible work direction of this research topic, which is convenient to determine my own research question.

3. Summarize

It is a necessary link in the process of postgraduate study to consult literature, obtain research-related information, and formulate their own research direction according to it, and it is also the preliminary work to ensure the graduate degree thesis. Through the discussion and analysis of this paper, the main links of literature review and the points needing attention are clarified, which is helpful for graduate students to carry out literature review work.

References:

[1] With the development of higher education quality comprehensive service support the Chinese modernization, China education news, 2022.11-15, http://paper.jyb.cn/zgjyb/html/2022-11/15/content_616439.htm?div=-1

[2] 2022 years in the national education career development statistical bulletin, http://www.moe.gov.cn/jyb_sjzl/sjzl_fztjgb/202307/t20230705_1067278.html

[3] Sebastian K. Boell and Dubravka Cecez-Kecmanovic, A Hermeneutic Approach for Conducting Literature Reviews and Literature Searches[J], Communications of the Association for Information Systems, 34, 2014, 257-286.

[4] Yu Xiao and Maria Watson, Guidance on Conducting a Systematic Literature Review[J], Journal of Planning Education and Research, 39(1), 2019, 93-112.

[5] Wang Qi, The significance, steps and common problems of writing literature review [J], Academic Degree and Graduate Education, 2010.11, 49-52.

[6] Wang Jingxiu, Research on the practical mechanism of enhancing the research ability of Liberal arts graduate students through "Literature review Course" [J], China Geological Education, 2023, 32 (2), 24-28.