

Research on Teaching Reform and Practice of Information Engineering Graduate courses: A Case study of Scientific Writing

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ABSTRACT:

Innovation is a comprehensive ability, including a lot of factors, such as learning ability, imagination ability, analytical ability, problem solving ability and so on, mainly composed of two levels: one is innovative thinking ability; the another is innovation and practice ability. In order to improve the innovation ability of graduate students, taking the course of literature retrieval and Science and Technology writing as an example, the teaching reform and practice of diversified courses for graduate students are carried out to improve the quality of graduate education. Firstly, the background significance of scientific and technological writing is analyzed, the basic process of scientific and technological paper writing is introduced, and the main tasks and requirements of each link are elaborated in detail, so as to prepare for the curriculum system and content reform based on CDIO (CONCEVE, DESIGN, IMPLEMNTATION, OPERATION) project in the next step, which is conducive to improving the innovative thinking ability of graduate students.

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I. INTRODUCTION

Scientific and technological papers play an important role in promoting the development of science and technology and promoting social progress. As a new force of scientific research, graduate students have become the main authors of various scientific and technological journals. The writing level of postgraduate thesis can reflect the knowledge category, theoretical basis and comprehensive accomplishment of postgraduate to a certain extent. Literature Retrieval and Writing of Scientific and technological Papers is a theoretical and practical course to train college students and graduates in the ability of scientific and technological literature retrieval, reading and literature information processing and processing, and on this basis to master the writing methods of scientific and technological papers. It provides powerful tools for students to successfully complete extracurricular scientific and technological academic competitions, thesis writing and publication, courses and graduation thesis, etc. [1].

With the rapid development of science and technology and the promotion of the strategy of "rejuvenating the country through science and education" implemented in China, graduate education in China has witnessed rapid development, and the number of graduate students recruited by colleges and universities has increased year by year. Graduate students have gradually become the new force of scientific research and the main author group of various scientific and technological journals [2-4]. However, the lack of innovation ability is one of the problems existing in the training of postgraduates in China. Improving the research ability of postgraduates is of great significance for promoting the level of national scientific and technological innovation and strength. The course of scientific paper writing is an important way for graduate students to quickly master scientific research methods, cultivate innovative thinking and improve comprehensive quality. Through the reform of this course, first of all, students can quickly master the ideas and methods of research topic selection. Since most authors are writing papers for the first time, many manuscripts have similar problems. For example, lack of rigor, inconsistent statements. Poor icon design, mixed results and discussion. Paper conditioning is not clear, just a lot of information listed, the lack of their own scientific research and discussion and significance. Even if the research content of the graduate author is very valuable, the paper does not reflect the value of the research result, i.e., the paper written is of poor quality/unreadable. These problems not only affect experts' evaluation of papers in the review, but also prevent high-quality papers from being published [5]. For graduate students, writing and publishing high-level papers is also an important part of their studies and future work.

Western advanced countries generally attach importance to the cultivation of scientific writing ability and regard scientific writing as an important way to cultivate scientific research ability and literacy. The United States, in particular, attaches great importance to the cultivation of students' scientific and technological writing ability. Not only graduate students, but also students have been educated in scientific and technological writing since middle school [6-7]. In China, science and technology writing education courses are widely offered at graduate level, which plays a positive role in improving graduate students' writing ability and cultivating their innovative consciousness. However, the main problems are as follows:

In recent years, domestic scholars have been fully understand the course of ideological significance, and emphasized that there is a fundamental goal of colleges and universities should strengthen moral education and cultivate people, political theory in colleges and universities and the specialized courses both organic into a new system of political education in colleges and universities, combined with political theory on the dominant and recessive education on the professional course for student to carry on the omni-directional, the whole process of collaborative education [8]. Course education lies in practical teaching methods and teaching modes, especially the major aspect of the recessive education, how can according to the characteristics of the course, undertake to the student ideological education, can together not only promote the development of the education theory of the course, at the same time also can make the imparting professional knowledge and the further deepening of socialist core values. However, although some scholars have conducted various researches on curriculum ideological and political education, the current researches mainly involve analysis from the macro guidance level, and there are still few researches on curriculum ideological and political education reform involving individual specialized courses and specific courses. It is necessary to think about how to strengthen the in-depth penetration and resonance of the same frequency in the teaching of specific professional courses [9-10].

Therefore, it is an urgent task to carry out diversified teaching reform in the course of literature retrieval and scientific writing for graduate students

II. TECHNICAL PAPER WRITING PROCESS AND REQUIREMENTS

Scientific writing: usually refers to the presentation of original research in a scientific journal in the form of a scientific paper in a standard format.

Scientific paper: it is a scientific statement of innovative scientific research results, a scientific record of some theoretical, experimental or observational new knowledge, and a scientific summary of some known principles applied in practice to make new progress and new achievements.

The technological paper writing process is shown in Figure 1.

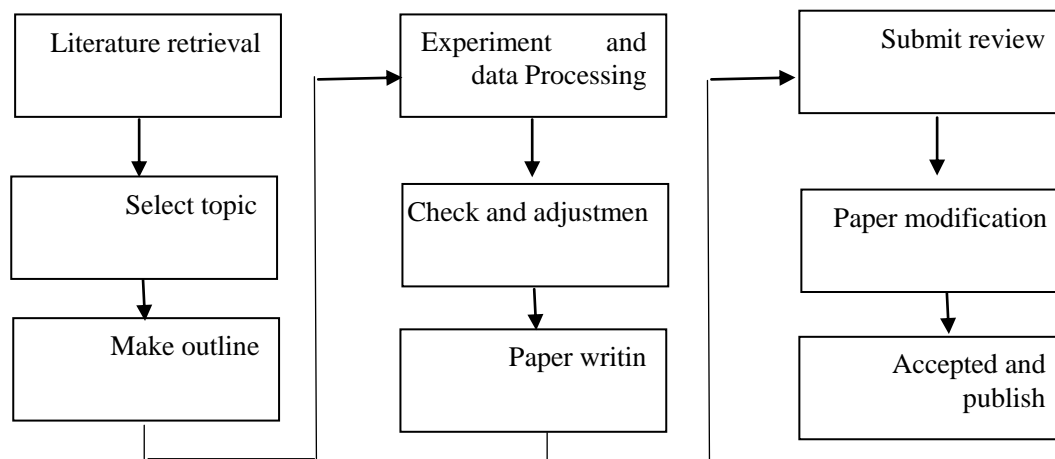


Fig. 1 Technical paper writing process

2.1 data collection

Collecting data is an important step in the project research, which runs through the whole process of the research.

First of all, the data provides the basis of the topic selection.

Secondly, when the research topic is determined, it is necessary to consult a wide range of materials around the topic, which is the starting point of innovation based on the inheritance of previous research results, and is related to the speed, quality and success of the research.

Finally, it can help researchers to comprehensively and correctly grasp the situation of the research problem, provide scientific evidence and research methods for the research problem, avoid repeated labor, and improve the benefits of scientific research.

While gathering material for a paper, the author may often come up with new ideas. For example, he may think of an idea to add to the "discussion" section, or he may come up with a good way to organize data in a table. When you have an idea, write it down in time. It is best to create a separate file (electronic or paper) for each section of the paper and list your ideas in the corresponding file. Not only will you be able to jot down your ideas so you don't forget them later, but you'll also be able to quickly find the material you need when you actually start writing.

2.2 The significance of scientific research

- (1) the essay can determine the value and effectiveness of the thesis.
- (2) the topic can plan the direction, Angle and scale of the article, make up for the lack of knowledge.
- (3) Appropriate topic selection can ensure the smooth progress of writing and improve the research ability.

Basic requirements of topic selection

- (1) Choose the subject to be solved.
- (2) Choose a topic that is at the forefront of the subject.
- (3) the theme of choosing the desired effect is expected.

Topic source

- (1) national project
- (2) ministries, provincial and municipal projects
- (3) the so-called "horizontal project" entrusted by foreign units
- (4) the subject of new products to be developed by the unit
- (5) choose your own topic

Specific method of topic selection

- (1) browse and capture method
- (2) retrospective verification method
- (3) master theoretical methods
- (4) methods of accumulating data
- (5) outline the structure
- (6) form arguments and arguments

2.3 Write an outline

Writing an outline has the following advantages:

it can reflect the author's overall thinking. Conducive to the paper before and after echo. Conducive to timely adjustment, avoid major rework.

There are three main principles for drafting the outline:

- 1) To have a global concept, check the status and role of each part in the paper from the whole.
- 2) From the central point of view, decide the choice of materials, and discard the materials irrelevant to the theme without pity.
- 3) Consider the logical relationship between the parts.

The method of drawing up an outline:

- 1) Draft the title first;
- 2) Write a general argument.
- 3) Consider the overall arrangement of the whole paper: from several aspects, in what order to discuss the general argument, this is the skeleton of the structure of the paper;
- 4) After the major projects are properly arranged, consider the argument of each project one by one until the paragraph level is reached, and write the argument sentence of the paragraph (that is, the topic of the paragraph);
- 5) Consider the arrangement of each paragraph in turn, and code the materials to be used in order for use in writing.
- 6) Make a thorough check and make necessary additions and deletions

2.4 Experimental design and data processing

Experimental design and data processing play an important role in experimental research in various scientific fields. Scientific and reasonable experimental design can achieve twice the result with half the effort, while strict and accurate data processing can help researchers find the internal laws of things from the chaotic data.

In numerous experimental research has the characteristic of kind of experiment is that there are many different

kinds of influence factors and each factors tend to consider multiple values, for this kind of multiple factors (value) level influence under the condition of a certain index (or some) value is optimized, according to the conventional experimental methods tend to be large Numbers of traversal, to find out the influence law, To determine the most significant influencing factors and levels. For many experimental systems, when there are too many influencing factors and/or the value level of each factor is too detailed, ergodic experimental research is usually difficult to achieve. Orthogonal experiment, which originated from agricultural experimental research, is such a scientific experimental design method, that is, to obtain the most significant information of influencing factors and standards from experiments with as few experimental times as possible. Orthogonal experimental design has become an important and efficient scientific experimental method in the field of subject engineering. Experimental materials include technical indicators of materials, parameters used, sources, methods used, and sometimes even list the relevant technical indicators of devices used in the paper. In general, avoid using the commercial name of the device in the paper. It is better to use the generic name. Statistical analysis of data is necessary, but it is data, not statistical knowledge, that should be highlighted and discussed. It is not necessary to expend a great deal of space on the statistical methods used.

2.5 Checking Changes

Good writing depends heavily on good revision. No one has the patience to read an author's first draft, and no one cares how bad it is. (Not having to read a draft is a blessing.) All you have to do is revise the draft of your paper until you are satisfied. First is their own revision, and then the revised draft to others, listen to the opinions of others and then modify the paper.

Are the ideas presented in the draft simple and straightforward? In other words, is the draft concise? Is all the information contained in the draft accurate? Is the content in the draft well organized? Is every sentence in the draft clear? Are there problems with grammar, spelling, punctuation and accuracy in the draft?

2.6 paper writing

The first thing is to draft a good essay title. The title of the article is also called title, title, title (or "general title", to distinguish from the "level title"), is the general outline of the paper, is to reflect the most important specific content of the paper the most appropriate, the most concise logical combination of words. The title of the title has special requirements on the expression of the text, that is, the title is higher than the content of the writing requirements, that is, must conform to the grammar, rhetoric and logic rules of modern Chinese, must not appear language problems, but also try to give people a sense of beauty. The title of the paper should outline the content of the paper clearly and accurately.

The abstract section generally includes the purpose, methods, results and conclusions of the research work. Focus on results and conclusions. The writing requirements of the abstract are as follows:

- (1) In the third person
- (2) Brief and concise, clear and specific
- (3) the format should be standardized
- (4) The language should conform to the requirements of "smooth language, rigorous structure and accurate punctuation"

The introduction provides the readers with background and meanings of the research, whose function is to arouse their attention and make them have an overall understanding of the paper. The content to write in the introduction is roughly as follows

- (1) Reasons, objectives and background of the study.
- (2) Theoretical basis, experimental basis and research methods. If known theories, principles and methods are followed, only one reference or note is required. If new concepts or terms are to be introduced, they should be defined or clarified.
- (3) Expected results and their status, role and significance. Write naturally, generically, concisely and accurately.

2.7 Submit review

The main steps of submission evaluation are as follows:

- (1) select journal
- (2) web access
- (3) register
- (4) fill in
- (5) select reviewer

Before submitting an article, review the "Instructions to Authors" of the journal you wish to submit to ensure that you have complied with all the requirements in the "Instructions to Authors". If the journal receives a submission that is substantially different from what is required in the Notice to Authors, it is highly likely that

the submission will be returned to the author for revision before submission.

2.8 Paper modify

There is no need to feel bad when you receive a rejection or correction letter. In fact, it is rare for a paper to be accepted by a journal editor without any modification. Most contributors receive either a rejection letter or a rejection letter, so be thankful that you get a rejection letter instead of a rejection letter.

After receiving the letter, you should carefully read the letter and the reviewer's comments (in most cases, the letter is in standard format, and the reviewer's comments are important; Sometimes, the letter will give some specific guidance, such as suggestions for the author to revise where the reviewers disagree). At this point, the most important question is whether the author is able and willing to revise the submission as required.

2.9 Publication

Finally, the author will receive notification of whether the paper has been accepted. Suppose the editor sends a letter announcing that the contributor has been accepted. When this notification is received, it means that the paper has been accepted and some journals can be published, while others need to pay APC (Article Process Charge) to be published.

III. CASE DESIGN METHOD

After being familiar with the writing requirements, it is necessary to go through strict training to write works that meet the requirements. The common ways are: The first method is to read a lot of literature and write a review, but it is more difficult.

The second approach, by reading the students professional content related master's thesis, refining a topic, to squeeze the content for a certain length of paper, practice, according to science and technology thesis writing standard completely, from the topic and formulate, in writing, introduction, text writing, conclusion, charts, references, and in accordance with requirements of the journal of Xinyang Normal University, author of the guidelines, Thus, students can quickly understand the structure of the thesis framework and the main body. Similar to the middle school stage using compression method to practice composition training.

IV. CONCLUSION

To graduate student literature retrieval and technical writing course teaching reform and practice as the breakthrough point, through improve the bilingual teaching in the teaching content and the improvement of the outline, build a teaching mode in order to take the student as the main body of the project document retrieval and technical writing course as an example, explore the CDIO graduate courses teaching reform and practice of project and OBE teaching effect evaluation mechanism; Excavate ideological and political elements in graduate courses, cultivate people with morality, and improve the quality of graduate education.

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