



Study on Teaching Reform of Literature Retrieval Course under Engineering Education Accreditation

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Abstract: Professional certification of engineering education puts forward new requirements for talent training in the new era. Literature retrieval course, as a highly practical course, can not only cultivate students' information quality, but also provide strong support for the talent training requirements of engineering certification. Based on the practice of local universities and the requirements of professional certification of engineering education, this paper focuses on the problems of insufficient class time, irrational construction of faculty, and single assessment method in the literature retrieval course, combines the characteristics of biology majors, optimizes the teaching mode of the literature retrieval course in terms of the course concept, teaching method, case study, assessment and evaluation, etc., and puts forward a new thinking on the teaching reform of the course, with a view to improving the quality of teaching and cultivating students' information literacy and cultivate students' information literacy.

Keywords: teaching reform; literature retrieval course; Engineering Education Accreditation

1 Introduction

Engineering Education Accreditation (EEA) emphasizes student-centeredness, advocates the reverse design of teaching content from the objective of core competency cultivation, and allows students to adopt personalized and self-arranged learning processes. It is significantly different from the traditional "Course-Based Education (CBE)" educational philosophy and "Unified Learning" implementation model.^[1-3]

With the current rapid development of the Internet, cloud computing, and big data technology, we are faced with an explosion of information^[4]. How to effectively select useful information becomes an important condition for the sustainable development of personal knowledge and ability^[5]. Engineering Education Accreditation puts new requirements on undergraduate training. For example, students are required to be able to solve complex engineering problems in their own specialties, to communicate effectively with peers in the industry and the public on related issues, and to have a certain international perspective^[6]. All of these require students to have the ability to acquire and utilize effective information.

Literature retrieval class can improve students' ability of information retrieval and utilization in an all-round and multi-angle way, which helps students to utilize all kinds of literature resources quickly and effectively. It can improve the level of thesis topic research as well as thesis writing^[7-8], and lay a solid and firm foundation for their future study and work.

Most of the curriculum reforms in the context of professional Engineering Education Accreditation in foreign countries are demand-oriented and set up reasonable cultivation objectives. Under this guidance, reasonable structure of theoretical courses and practical courses is made to cultivate students' ability to deal with problems practically. There are quite a lot of excellent experiences and achievements, which are worthy of our study and reference^[9].

Domestic scholars' research on professional accreditation and curriculum reform in engineering education has mostly focused on a particular professional perspective. Lin (2021) based his study on the concept of student-centeredness in Engineering Education Accreditation to improve students' independent learning ability and enhance the quality of talent cultivation by reforming the teaching mode, teaching content and assessment and evaluation methods^[10]. Jing (2021) carried out teaching reform from the project objectives of engineering certification through practical training and scientific research orientation to enhance the interest level and gain of students' learning^[11]. Qu (2019) proposed to build a professional curriculum system of geological engineering based on the cultivation objectives and graduation requirements, through the participation of enterprises and industry experts as well as the tracking feedback of graduates, to optimize and set up the professional characteristics, which is in line with the actual development needs of the industry^[12]. Li (2017) took the cultivation of the ability to solve "complex engineering problems" as the core, and proposed the research on the reverse design of the curriculum system of electronic information engineering and the construction of a hierarchical practical teaching system^[13]. Other scholars believed that the professional accreditation of



engineering education should play a continuous role in the reform of teaching and learning at many levels, such as talent cultivation, teaching reform, curriculum design, teaching management and continuous improvement, etc., and advocated the solution of actual complex engineering problems as a guide, with the students as the center^[14].

2 Problems

2.1 Insufficient attention by schools and students

In 1984, China's Ministry of Education issued a notice on "Opinions on Opening (Literature Retrieval and Utilization Classes) in Colleges and Universities" with the aim of "improving the self-learning ability and independent research ability of college students" and cultivating the students from a knowledge-based to a quality-based talent. However, at present, most colleges and universities only regard the literature retrieval class as an elective course, and do not emphasize it as a method course. Moreover, universities have not invested enough in teaching conditions, and there is no reasonable positioning and institutional guarantee for the literature retrieval course^[15]. The literature retrieval class for biological science majors in local universities is located in the seventh semester. Although it has entered the information age, most of the students do not have enough knowledge about the literature retrieval class, and they cannot achieve effective retrieval of information in the face of the huge amount of literature and information materials, and they do not have the relevant retrieval skills, too.

2.2 Unreasonable curriculum

The transfer of basic knowledge is only the lowest level goal of Literature Retrieval Education. It is the ultimate goal of Literature Retrieval Education to prompt students to think independently and critically and guide them to practice purposefully and intelligently^[16]. Literature Retrieval Education is a highly practical subject. The improvement of students' retrieval skills and information literacy require a lot of practice time for exercising. Initially, the class hours of Literature Retrieval Education were set at 16 hours, including 12 hours of theory class and 4 hours of practice class. The teaching method of the theoretical class is the traditional PowerPoint lecture, where students are mainly passive learners, neglecting the cultivation of students' comprehensive ability of independent learning, exploring and discovering problems, and analyzing and solving problems by using information. The practice hours are few, resulting in students not getting enough practice, and it is difficult to transform theoretical knowledge into practical skills. This teaching mode leads to the fact that students cannot independently complete data collection, experimental design and thesis writing when they carry out scientific research projects and thesis work.

2.3 Unreasonable construction of faculty team

The strength of the faculty is a key issue in the quality assurance of the teaching of Literature Retrieval Education course^[17]. At present, the teaching of Literature Retrieval Education course for biological science majors in local colleges and universities are assumed by teachers majoring in biology, with sufficient reserves of professional knowledge. With the increasing number of documents in digital libraries and the more complex search methods, teachers majoring in biology are difficult to explain thoroughly the more abstract knowledge in the theory of Literature Retrieval Education because they have not been educated systematically in library and intelligence knowledge.

2.4 Simple assessment methods

At this stage, the assessment methods of the Literature Retrieval Education course mainly include attendance (30%) + closed-book examination (70%). The single assessment method cannot fully reflect students' classroom performance, and it is difficult to judge students' mastery of the course knowledge. Students still have more problems when encountering new research topics or writing thesis. In order to make students skillful in applying relevant knowledge points and improve their knowledge application ability, the course assessment method should be improved.

3 Suggestions

3.1 Construct new curriculum concepts and change teaching methods

With the popularization of the Internet and intelligent devices, Literature Retrieval Education class needs to update the teaching content and improve the knowledge system in time. Under the background of professional Engineering Education Certification, it is an important task to improve students' innovation and entrepreneurial ability and comprehensive quality, and cultivate talents adapted to the needs of social, economic and scientific and technological development for local colleges and universities at present. In the teaching of retrieval theory and retrieval skills, the main content of the reform of Literature Retrieval Education course is, taking the cultivation of students' scientific research ability as the starting point, to integrate biological professional knowledge, scientific and technological frontiers and social hotspots together. This plays an important role in enhancing students' sense of professional identity and learning motivation^[18]. For example, taking "reagent kit" as an example in the lecture course, the teacher firstly instructs the students to search the relevant literature in the last three years, and then selects representative reviews to share with the students in the classroom to explore its research status, point out its problems and solutions, and arouse students' research interest. When setting up practical exercises for searching, Literature Retrieval Education class takes professional scientific research projects as the carrier, completes the training of project ability as the main line, organizes and arranges the teaching content of literature search class according to the demand of the project, drives the teaching of knowledge points with examples, and helps students to build up the ability of comprehensive thinking and three-dimensional thinking. The change of teaching method is an inherent requirement to realize the teaching goal of improving innovation ability in

Literature Retrieval Education course. Teaching methods such as Microteaching, catechism, rain classroom, flipped classroom and other teaching modes are applied to the teaching process^[19]. In the course of teaching, it is beneficial to adopt the combination of online and offline to achieve the deep integration of knowledge before, during and after class, so that the content of the course is more colorful. Students' interest in learning improves, and their innovative thinking stimulates, too.

3.2 Improve the ratio of practical hours and adjust the teaching team

The core concept of professional Engineering Education Accreditation is to emphasize the cultivation of students' practical ability, guide students to effectively master theoretical knowledge in practice, and focus on the comprehensive development of students' ability quality^[20]. Practice is the most critical part of the curriculum. Literature Retrieval Education class is highly practical, which requires students to combine their professional knowledge and practice repeatedly. In order to improve the teaching efficiency of Literature Retrieval Education class, teachers have applied for the school computer room for the whole course. Literature Retrieval Education class is adjusted to 32 hours, and the ratio of practical class to theoretical class is 2:1, which ensures that students have enough time to combine theoretical knowledge with practical operation. Students will be able to master a variety of retrieval methods through searching specific documents and understand the advantages and disadvantages of different databases, which will better fulfill the teaching goal of cultivating students' information literacy.

Literature search courses for biology majors at local colleges and universities are now taught by both biology major teachers and library subject librarians. The professional teachers teach teaching content involving information innovation, deep disciplinary professional content, subject declaration and other teaching content. Library subject librarians have long stood at the forefront of subject-oriented services and accumulated rich practical experience in literature and information retrieval and application^[21]. Subject librarians can be at the fingertips of typical cases, in-depth analysis of difficult issues, to make up for the shortcomings of some professional teachers lack of practical experience. This mode of teaching makes classroom teaching energetic, stimulates students' interest in learning, enhances the enthusiasm and initiative of learning, and achieves good teaching results.

3.3 Change the assessment method and assess the comprehensive ability

Course assessment is an important part of teaching. Various forms of course assessment can improve teaching quality and teaching effect^[22]. Literature Retrieval Education class, combing the method of process-oriented assessment and course paper report to complete the final assessment of the course, from an all-round point of view to examine the level of students' comprehensive ability to analyze and manage information. The process-oriented assessment accounts for 60%, of which the online teaching platform assessment accounts for 30% and the comprehensive classroom performance accounts for 30%. The online platform mainly includes online video learning (15%) and online test (15%). The overall classroom performance consists of 3 aspects: attendance, answering and discussing questions and class presentation, each accounting for 10% of the total. This method of assessment motivates students to participate in the process of teaching practice, encourages student-teacher interaction and classroom participation, and allows students to follow the teacher's thinking, which is beneficial for them to focus their attention on classroom learning. The course report accounts for 40%, which requires students to conduct research on a specific field related to the major, search for, analyze and manage information, draw effective conclusions, and complete a literature review paper.

4 Conclusion

The professional Engineering Education Accreditation focuses on emphasizing the cultivation of students' practical abilities. As a tool class for information literacy of college students in local colleges and universities, Literature Retrieval Education course plays a supporting role in the teaching of students to reach graduation requirements. After the teaching reform of the Literature Retrieval Education course, students' learning enthusiasm has been greatly improved, especially in the utilization of school database resources, on-line practical ability and literature screening and analysis. Most of the students can complete the course paper better according to their professional questions, and the excellent rate reaches more than 90%.

However, the author believes that the next step can be explored and improved in terms of increasing the number of credit hours and how to further improve students' interest in scientific research, in order to improve the teaching level of the Literature Retrieval Education course and students' comprehensive ability.

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