

Research on integrated innovation education based on the course “Application of Statistical Product and Service Solution”

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Abstract: in the past, the teaching of professional courses and innovation education showed a trend of separation. The former focused on the teaching of professional theoretical knowledge and methods and skills, while the later focused on the normal training of innovation. This course reform will integrate professional course teaching and innovation education as a whole, based on the course “Application of statistical product and service solution”, this project builds an integrated innovation framework for students, so as to integrate the core characteristics and main methods of innovation into the whole process of professional course teaching. Professional curriculum knowledge can provide theoretical culture and methodological support for innovation, and innovation can deep students’ understanding of professional curriculum knowledge. It improves students’ ability of reading, summarizing, considering, designing, implementing and evaluating schemes

Keyword: application of statistical product and service solution; Integrated innovation framework; Innovation education; Course reform

introduction

One of the important purposes of professional course teaching is to build students’ innovative thinking and improve students’ innovative ability. However, due to the weak connection between innovative education and professional course teaching in the past, there are some problems in the process of students’ innovation, such as the use of professional theoretical knowledge, the use of professional methods, the establishment of research framework, and the analysis of data, which make it difficult to effectively carry out innovative education for students. Therefore, the basic idea of this course teaching reform is: Based on the online open course alliance platform of colleges and universities in Guangdong, Hong Kong, Macao Greater Bay Area, to establish online resources for the sociology professional course “Application of social science statistics software”, to carry out online and offline hybrid teaching, to combine the curriculum resources related to innovation, and to combine the knowledge acquired by students in the professional course teaching, in which methods and skills are transplanted into innovation education, so as to realize the organic integration of the two. The concept of this curriculum reform is based on the recent development zone proposed by the famous educator Lev Vygotsky. It refers to the distance between the achievements that learners can achieve and the achievements that learners can achieve with the help or cooperation of a subject with more knowledge. The course team carefully studied and judged: the knowledge reserve and ability representation of the third year undergraduate students who are about to enter the sociology undergraduate course, compared with the national standard for teaching quality of undergraduate majors in ordinary colleges and universities, analyzed the level they should reach, and absorbed Professor Stephen D. Brookfield’s views on innovative thinking teaching and learning through online and offline mixed teaching methods, to realize the dual interaction with students, so as to improve students’ innovative thinking and innovative ability, and realize the integrated development of professional curriculum teaching and innovative education.

The goal of the teaching reform of this course is to build an integrated and innovative framework for students’ social phenomena, theoretical assumptions, research design, data analysis and results presentation. Under the guidance of this framework, students carry out professional actions, and enhance their sensitivity to research problems, literature reading and critical ability, research design, ability to implement and summarize, so as to consolidate students’ innovative thinking and improve students’ innovative ability.

1. implementation process of curriculum reform

1.1 build curriculum resources based on alliance platform

The course team firstly sorted out the syllabus, courseware, data files, after-school exercises, recommended reading materials, question bank, test papers and other resources of the course “Application of social science statistics software”. After improving the curriculum resource system, we will carry out the construction of online resources on the platform of Guangdong Hong Kong Macao Greater Bay Area online open course alliance. In the construction process, we will refer to the form and logic of national quality online open courses to improve the quality of online course resources.

Subsequently, through literature retrieval, the course team selected research papers that were consistent with the students’ cognitive level and the professional cultivation program, these sources were quantitative research papers in first-class journals such as Sociological Study, News Tribune and The Forum of Leadership Science, which can ensure the standardization of research examples. Then, the team searches the public, national and large-scale social survey data used in the selected papers for the reason that students can successfully

register and download. After that, according to the research ideas and research design of the paper, the course team reproduced the results of the paper, making preparations for answering the difficulties of students in the process of reproduction. Finally, through interviews with teachers and students, we learned about the problems existing in the process of group cooperative learning, so as to make targeted improvements and ensure the effect of group cooperative learning.

1.2 innovative cognitive training based on professional courses

Benjamin Bloom, a famous educationalist, divides learning objectives into memory, understanding, application, analysis, synthesis and evaluation, which correspond to six different levels of cognitive thinking. This course is based on the students' acquisition of corresponding theories, knowledge and methods, and the application of statistical software to respond to research problems or practical needs. Therefore, the application of this theory in teaching design has natural advantages.

Specifically, students complete online learning on the platform before each class. First, they watch the self-study video of each chapter recorded by the teaching team (about 10 minutes), and then complete the corresponding self-test, including the test of objective questions or the discussion in the topic, so as to achieve the memory, understanding and preliminary application of the guiding and basic content of the course. In offline classroom teaching, the lecturer identifies students' weaknesses according to the score data of students' pre class self-test, and then makes targeted explanations to help students consolidate their knowledge points. After that, the lecturer began to teach the new knowledge in this chapter, and realized the transfer application of the new knowledge through classroom work. Finally, through the course summary, the integration of knowledge points is realized to achieve the effect of integration and evaluation. After the first 47 class hours of study, students comprehensively use the course knowledge to report the theme papers in the last 9 class hours of the course. Theme papers are selected by the teaching team from the core journals to meet the students' cognitive level and the teaching purpose of the course. The theme paper will be uploaded to the platform in the first week. Students will choose partners to complete the PPT report and data reproduction of a theme paper according to their personal interests. After the report of one group, other groups will ask innovative or critical questions around theories, methods, logic and other aspects.

1.3 practice based on Integrated Innovation Framework

Course team at this stage: encouraged students to form research teams across disciplines, majors and grades, and select topics around the national and local 14th five year plan; Guided students to read books such as □How to do literature review: Six steps to success□and □How to write a research plan□; On the basis of the above, guided the student team to write the project application form from the aspects of importance, innovation and feasibility.

Subsequently, the course team guided the student team to carry out research based on the research scheme; Teachers responded to students' difficulties in the process of research and promote the smooth progress of research; Guided the student team to examine the quality of the survey data, and judge the saturation of the data's response to the research questions from the breadth and depth of the data.

Finally, the course team led the student team to conduct a multi-dimensional and multi-level in-depth analysis of the survey data based on the research framework; Guided student teams to write research reports and academic papers; Helped the student team to select appropriate journals to publish academic papers, or select related competitions to compete, which will enhance the students' ability to judge the research scheme and research results.

1.4 curriculum assessment and evaluation scheme

The evaluation of this course includes two parts: process evaluation (30%) and result evaluation (70%).

The process evaluation consists of the completion rate of online self-study (10%), the score of online self-test (30%) and the score of homework in class(60%). The online self-study part is composed of 5-10 minutes of short video. The online self-test is composed of two types of questions: Theory and practice. The homework in class is discussed or completed by students for a total of four times. To evaluate students' cognition of the integrated innovation framework.

The result evaluation consists of subject report (30%) and final examination (70%). The topic report is divided into 9 groups by students, and corresponds to nine typical papers of quantitative research one by one; In the last three classes, PPT interpretation was conducted around the paper and the data results were reproduced on the spot. The teacher randomly selected one student from each group to report on the spot, and his score was used as the report score of his group. The report score and the question score together constituted the theme report score; The topic report contains six points: (1) research questions: what are our concerns?(2) Literature review: around the problem, which literature have we reviewed and criticized, and what are the final views?(3) Research hypotheses: what hypotheses have we put forward according to the literature review?(4) Operationalization: in order to test the research hypothesis, what variables are involved and how are they measured and coded?(5) Data analysis process: we operate the pre-processed data on site to reproduce the paper data result table. (6) Conclusion: what conclusions or suggestions do we get after data analysis? The scoring standard of the theme report consists of two parts: the report score and the question score, so as to evaluate the effect of students' application of the integrated innovation framework. The final examination adopts the closed book written examination method, which is different from the process assessment focus. It focuses

on the two abilities of the course, that is how to select appropriate methods under the background materials and accurately interpret the analysis results, so as to reflect the effect of students' integration of professional curriculum knowledge in the new situation.

2. summary

This course reform features two aspects: firstly, the cognitive education of the integrated innovation framework, the past professional curriculum teaching and innovation education showed a trend of separation. The former focuses on the teaching of professional theoretical knowledge and methods and skills, while the latter focuses on the normative training of innovation. Therefore, this course reform will integrate professional course teaching and education of innovation and entrepreneurship. Based on the online course resources of "Application of social science statistics software" built on the alliance platform, this project uses the quantitative research papers of core journals as the teaching carrier, and guide students to deeply understand the following four groups of relationships in five stages: social phenomenon-theoretical hypothesis, theoretical hypothesis-research design, research design-data analysis, data analysis-result presentation, to build an integrated innovation framework for students, so as to integrate the core characteristics and main methods of innovation into the whole process of professional course teaching. Secondly, based on the first point above, the curriculum reform team carried out the transfer of theoretical knowledge and the consolidation of professional skills for students, assisted students to complete the recurrence of canonical quantitative research, and provided theoretical and methodological support for innovation with the help of practical training, and let innovation deepen students' understanding of professional curriculum knowledge. The combination of the two enhances students' ability to read, summarize, conceive, design, implement and evaluate programs.

The teaching reform and innovation of this course are as follows: in the early stage of the course construction, the task driven method is used throughout the teaching process of professional courses, and the task of studying and reproducing typical papers is arranged for students to deepen students' understanding of the integrated innovation framework; In the later stage of the course, the project-based teaching method is introduced into innovation education. The task of the project is to promote students' literature reading, scheme design, research implementation and report writing, and to practice the integrated innovation framework. In contrast, other statistical software courses only focus on the operation of software, which is prone to "students don't know how to use it after learning, and don't know why to use it after learning"; Other innovative courses only carry out the normative education of innovation, resulting in "students do not know where innovation is and how to realize innovation". This project has expanded the former and the latter two aspects: problem innovation, theoretical innovation, method innovation and data innovation, providing a favorable basis for the organic integration of professional curriculum teaching and innovative education.

The results of the curriculum reform are as follows: (1) students master how to retrieve the literature related to research problems; (2) Students know how to sort out and reflect on the literature, and find out the research problems and theoretical innovation points; (3) Based on innovation, students know the design of the research scheme; (4) Guided by the research plan, students creatively and skillfully use the research method to collect relevant data; (5) Students have a clear idea of data analysis, and accurately use mathematical models and statistical software to respond to research questions; (6) Students present the research conclusions in an appropriate way, learn to reflect on the lack of research and make future prospects; (7) Based on the above six points, students were able to actively participate in summer social practice, successfully applied for the undergraduate innovation and entrepreneurship training program, won the second prize in the 16th "Challenge Cup" undergraduate extracurricular academic and technological works competition in Guangdong Province, and published academic papers in professional journals.

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