

# Exploration and Practice of Course Reform of Network Security & Law Enforcement Major in Police Higher Education

Zhijun Liu\*

Information Technology Department  
Hubei University of Police  
Wuhan 430034, China  
seraphtear@163.com

Ning Wang

Collaborative Innovation Center of Digital Forensics and  
Trusted Application  
Wuhan 430035, China  
assemblylp@163.com

**Abstract**—The network security & law enforcement major in police higher education as a emerging major that develop at a short time is still in the process of perfection and development, there inevitably exist many issues on the subject and major construction, teaching team construction, course construction, etc. This paper selects the course reform as the study object, analyzes and discusses the problems existing in the course teaching process, and then combines the teaching purpose and police education characteristic, proposes the course reform of network security & law enforcement major, take “Introduction to Database System” as an example to do some exploration and practice on the course reform. The teaching practice demonstrates that it can effectively improve the students’ abilities of knowledge combination, practical operation and comprehensive application, which is very important for the cultivation of police talents.

**Keywords**—teaching reform; police education; course reform; talent cultivation; major construction

## I. INTRODUCTION

The police education is an important part of higher education. Apart from following the general law of higher education, it has its own special requirements to meet. Compared with the general higher education, police education have two characteristics on talent training. Firstly, teaching contents focus on practicability [1]. Course teaching not only highlight the practicality of knowledge for practical demands, but also should associate with academic hot spot content. Secondly, the students are required to complete both the bachelor’s degree education and the police education, Course arrangement is busier during study period, leisure time after class is less as well.

In 2012, The network security & law enforcement major was added in police education according to “the Undergraduate Specialty Catalogue of Higher Institutions(2012)” by the Ministry of Education [2]. Up until now, the majority of the provincial police colleges and some political and law high schools were allowed to set up this major and started to enroll students with the approval of the Ministry of Education.

The network security & law enforcement major cultivates applied talents of maintaining the safety and order of network space security with high comprehensive quality, strong professional skills [3]. As a newly arisen and interdisciplinary major, its developing history is not long, therefore, there inevitably exist some problems that need to be solved in the major development.

Course system is the core of ship outfitting major set-up and guarantee to achieve professional training goal. Course content design, course teaching implementation and teaching effect evaluation are the important parts of course construction [4]. The rest of this paper is organized as follows. In Section II, the authors introduce the research backgrounds and motivations. The design of course reform of network security & law enforcement major is proposed in Section III. The teaching implementation of “Introduction to Database System” course as an example and conclusion are covered in Sections IV and V respectively.

## II. BACKGROUNDS AND MOTIVATIONS

The provincial police colleges are in different districts, the conditions for running a school are different, the characteristics of school-running are different. In the respective process of running schools, the police colleges has formed their unique school-running characters and advantages respectively. Because of multidisciplinary major with highly specialized applications, the network security & law enforcement major opened by police colleges, attached to different departments which have the characteristic & preponderant disciplines [5].

This paper investigates the teaching systems and small class teaching methods of several provincial police colleges and political and law high schools which take the leading position in the field of the network security & law enforcement major teaching and scientific research. Generally, the major is a group form the course, that is to say, the course system determines the quality level of talent training and the ability of comprehensive technology application. According to our survey, the course system and core course setting of the network security & law enforcement major which attached to different teaching

departments are different. In the actual teaching, it still exists following problems.

Firstly, course contents put too much emphasis on the theories and pay less attention on the practice. The teaching contents and the instructional design incline the knowledge education. The teaching time of theory teaching is more but the teaching time of practical teaching is less, which weakens practical skill training for students. For another, course content designs do not connect closely with the practical activities of police work, even few core courses transplant or copy the existing courses from those disciplines of common institutions of higher learning, which take insufficient account of the effect on the characteristic of police course system in application, adaptability and actual combat.

Secondly, teaching method is teacher-centered and a spoon-fed indoctrination style of classroom teaching is adopted by most police colleges in the actual teaching practice. The teaching process is that the teacher teaches in class, assigns homework, and adopts final assessment characterized by paper-and-pencil test, etc., which causes the students' inactive participation, less interesting and the effect of learning in the class.

Thirdly, compared with current college students, the provincial police college freshmen most come from the home provinces and the college entrance examination scores are not high. Most students are lack of the self-learning ability and the initiative to learning ability, and have poor study habits. The students mainly pay attention to the test-taking and become accustomed to mechanical learning, while rarely care for thinking and creativity.

### III. THE DESIGN OF COURSE REFORM

After analyzing and discussing the problems existing in the teaching process, the course design principles and requirements are established. Firstly, the network security & law enforcement major of our college attaches to the information technology department, but the course arrangements cannot transplant the course system of Information Security major in our college. Secondly, the integrity of the knowledge structure need to be considered, such as the sequence of the pre-course and the course, logical structure of knowledge points, etc. Thirdly, course arrangements should consider the professional skill cultivation integrated with the major characteristic, which should meet the requirements that the police work requires high-quality applied professionals educated by the police colleges. Lastly, the actual situations of our college and the characteristics of teaching object should be considered. The concrete actions in the design of course reform are as follows.

#### A. Course Knowledge Points Construction

Firstly, Survey and analyze the job requirements of the public security organ, refine the ability requirements for the job qualifications, such as the capacity of cybercrime investigation, digital forensics, system maintenance and development, internet governance, digital evidence analysis, internet public sentiment monitoring and early warning, etc. Secondly, on the premise of ensuring the integrity of original knowledge structure of course, we integrate these ability requirements into

the corresponding courses and form corresponding course knowledge points. Thirdly, each module should have its own course ware and that enable development of knowledge, skills and abilities prescribed by program outcomes [6]. We integrate the theoretical knowledge and practical knowledge of each knowledge point, organize and select the teaching contents, construct knowledge modules the students need to learn. Generally the teaching contents of each course are divided into four modules: basic part, application part, design part and frontier part.

#### B. Teaching Methods Selection

For different teaching modules, diversified teaching methods are adopted. For the basic part, similar to the traditional teaching method, the teaching method of "teach + self-study + practice + test" is adopted. For application part, the teaching method of "self-study + teach + practice + flip" is used. In flip classroom teaching method, the corresponding teaching contents of the heavy difficulty are concentrated into a 10 to 15 minutes of video, and then according to the problems and issues proposed by the teacher, the students participate in classroom discussion, debate, and questions in class. At the end of the teaching activities of the flip classroom, the teachers give comments. For the design part, combine the situation and prospects of police work with the course characteristics, the teacher gives some projects, the teaching method of "self-study + group discussion + task-driven" is used.

For the frontier part, the teaching method of "tech + special lectures" is adopted. The teacher invites the police in the front line from practical police departments to give lectures, the chance to communicate face to face and learn from them is provided for students.

#### C. Assessment Method Introduction

In teaching assess mechanism, process assessment method is introduced to arouse students' study enthusiasm. Compared to traditional simple test paper examination method, the process assessment method takes the students' attitude, performance and participating depth of teaching modules, etc. as one of the criteria for evaluation students' grades during the teaching process [7]. In teaching activities, according to different course module, the teacher distributes different tasks into students' learning procedures, such as simulation operation, project study, role playing, oral presentation, online examination, written report, video-case, field trip, group discussion, classroom discussion, etc., and then gives the timely feedback and evaluation after examining the learning outcomes.

### IV. TEACHING IMPLEMENTATION AND TEACHING EFFECTS

Supported by the teaching reform project of Hubei University of Police, such as "The talents training mode reform of police colleges in the background of new engineering", etc., we accelerate the course reform of the network security & law enforcement major. Due to space limitations, we take the course of "Introduction to Database System" as an example, discuss the course teaching implementation. For this course, on the basis of the previous course reform, according to

different particularity of learners, we further optimize the course content and strengthen the students' application ability. The teaching practice with a small class teaching mode was tested and the students of network security & law enforcement major in grade 2017 of Hubei University of Police were selected. The teaching implementation is as follow.

#### A. Teaching Implementation

The course is divided into four modules, which includes basic part, application part, design part and frontier part. For teaching content of each module, diversified teaching methods are used, as shown in Table I below. To evaluate the learning outcomes, lots of assessment methods are adopted for each corresponding module, as shown in Table II below.

TABLE I. TEACHING MODULES AND THE CORRESPONDING TEACHING METHODS

Num	Teaching Modules	Brief description of Teaching contents	Teaching methods
1	Basic part	Architecture, SQL, Database integrity, Database security, etc. (theory knowledge)	Teach + self-study + practice + test
2	Application part	Query operations of MIS, Database concurrency, Database backup, Database recovery, Database maintenance, etc. (skill operation)	Self-study + teach + practice + flip
3	Design part	The development of middle and small database system based on police application, Project design of Database forensic derived from practical police work, etc.	self-study + group discussion + task-driven
4	Frontier part	Big data, practical case of the development and application in industry, Heterogeneous database analysis	Teach + lectures

TABLE II. THE ASSESSMENT METHODS

Num	Teaching modules	Assessment methods	Percentage of scores
1	Basic part	oral presentation(5'), written report(5'), Online examination(10'), classroom discussion(5')	25%
2	Application part	classroom discussion(5'), simulation operation(5'), skills examination(25')	35%
3	Design part	written report(5'), group discussion(5'), project study and development(20')	30%
4	Frontier part	classroom discussion(5'), oral presentation(2'), written report(3')	10%

For example, For the design part, the concrete actions of teaching implementation are as follows: firstly students preview before class under the problem guidance, and at the same time the teacher provides some subject-based learning websites and learning materials for students to learn. Secondly the teacher gives several projects tightly associated with the course characteristics and police work, such as the development and design of online communities, the development and design of management information system of law case, the design and implementation of database forensics of internet fraud case, etc. Thirdly the teacher arranges the students in groups and students in groups select a project as

their task, and then students deliver reports in groups. Fourthly one student of the group is selected to give explanation on the project, other groups ask questions and discuss what the project needs to do and how it needs to do it, and then the teacher gives comments.

Fifthly, during three-weeks design part, the teacher uses exchange platform of Webchat, QQ and teaching resources platform to help students to digest teaching contents which they don't master in class, and to solve the problems in project development. Lastly, the teacher invites several teachers form a rejoin committee, one student of the group is selected to summarize the design process, function realization, group members and its responsibility through the PPT in class. After Q&A session, the average score of several teachers for every group in design part was adopted.

#### B. Teaching Effects

Through the teaching practice of one semesters and the questionnaire survey of part students, the following teaching effects are tentatively drawn.

One aspect of teaching effect is that by setting up group discussions and projects nearly connected with course contents and using multiple teaching methods to carry out teaching activities, the students' ability, such as speaking ability, writing ability, operating skills, collaboration & communicative ability, innovation ability, are trained; by providing learning resources outside of class and using exchange platform, it create conditions for students to better grasp course contents; applying the process assessment method can urge students to learn actively outside the classroom, therefore which cultivates students' good study habits and improves the quality of talent training.

Especially for each module, different teaching methods and assessment methods are adopted. By analyzing each teaching module's score and the constitution of the score obtained by the student individual, it can scientifically help teachers to find students' shortcoming, correct their learning methods, adjust their learning process and carry out the learning goals. For example, as the same scores of two students, Figure 1 shows the the different degree of student's learning ability, Figure 2 shows the mastery condition of each teaching module.

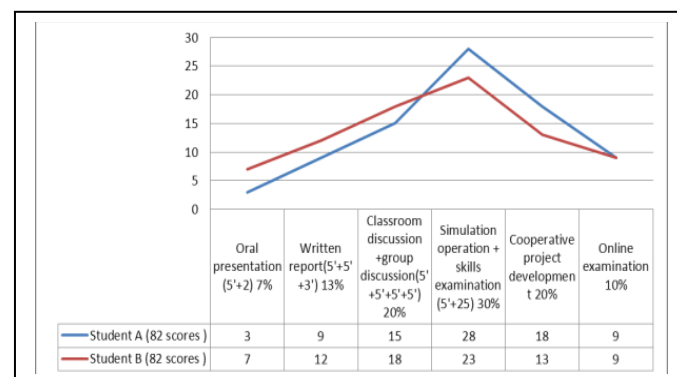


Fig. 1.

The different degree of student's learning ability

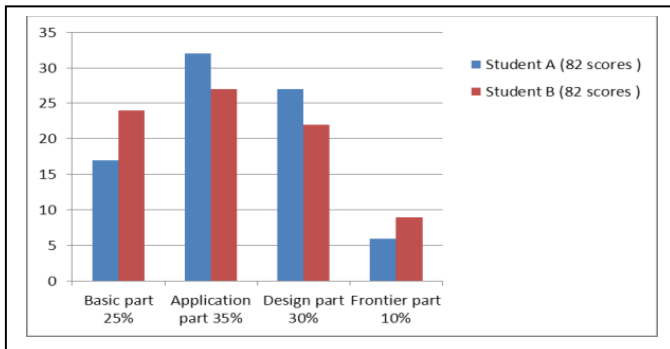


Fig. 2. Mastery condition of each teaching module

Over teaching practice of a semester, there still has a bit of room for improvement. A problem is the enhancement of teacher's course ability. For the teacher, in addition to being familiar with course content, the teacher need to know the hot issues of police work associated with course characteristic, be able to design course modules and reasonable assessment methods, integrate the lasted scientific achievements with class, provide students with extra-course guidance and assistance. What's more, diversity process assessment methods are adopted into different course module, the teacher need to spend much time to give the timely feedback and evaluation after examining the students' self-study results in the classroom. Another problem is diversification of teaching resources. The student still find it difficult to find some adapted learning resources during previewing link, and it lacks certain platform for the students to exercise after class.

## V. CONCLUSION

Apart from following the general law of higher education, police education has its own special requirements to meet. In this paper, the course reform combines police college characteristics and course characteristics, integrates the lasted scientific achievements with class, has perspectiveness and practice. The course "Introduction to Database System" as an example was taken to do some exploration and practice on the course reform. By constructing course knowledge points, selecting diversified and specific teaching methods for different

teaching module, introducing process assessment methods, the teaching practice shows that it can improve the study habits and learning abilities of students, enhance students' abilities of practice, science and innovation, which will be favorable for improving talents cultivation quality of the Network Security & Law Enforcement Major in Police Higher Education.

## ACKNOWLEDGMENT

This work is supported by teaching reform project of Hubei University of Police (JYXM2018A04, JYXM2019B11), the project of humanities and social sciences, the Ministry of Education in China (17YJCZH172). Finally, the authors would like to thank the anonymous reviewers for their time and valuable suggestions that contributed to the overall quality of this paper.

## REFERENCES

- [1] Liu Sanman, Practice and Reflection on Training Objectives for Major of Network Security and Law Enforcement, *Journal of Shanxi Police Academy*, 2019, No.2, pp125-128. (In Chinese)
- [2] Luo Zhao, Chen Ya, Chen Yong, Research on Cultivation of Practical Combat-oriented Network Security and Law Enforcement Professionals, *Journal of Guangxi Police College*, 2017, No.1, pp116-120. (In Chinese)
- [3] Zhou Jianhua, Chen Yanyu, Li Huanhuan, Research on Cultivation Goals and Approach of Network Security and Law Enforcement, *Journal of Hubei Adult Education Institute*, 2018, No.1, pp20-23. (In Chinese)
- [4] Liu Changwen, Tong Hui, Liu Ming, A Research on the Curriculum Construction of Network Security and Law Enforcement, *Journal of Beijing Police College*, 2014, No.4, pp113-116. (In Chinese)
- [5] Liu Zhijun, Huang Fenglin, Exploration and Thinking on the Talent Training of Network Security and Law Enforcement, *Journal of Hubei University of Police*, 2017, 3, pp116-112. (In Chinese)
- [6] Svetlana V. Rybushkina, Tatiana V. Sidorenko, Modular approach to teaching ESP in engineering programs in Russia, 2015 International Conference on Interactive Collaborative Learning (ICL), 2015, pp20-24.
- [7] Wang Ning, Liu Zhijun, Applying the Process Assessment Method into Computer Forensics Course in Police Higher Education, 2015 2nd International Conference on Education and Social Development (ICESD 2015), 2015, pp.496-510.