Research on the Cross Application of Teaching and Policing Practice Oriented Key Laboratory

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Abstract. In order to better carry out experimental teaching, conduct scientific research, cultivate students' innovation ability and practical ability, hatch high level research results, and finally promote the development of policing sciences, this paper proposed a new cross application mode for the teaching and policing practice oriented key laboratory of public security. The idea of this new mode was firstly explained through basic platform it adopted for the laboratory. Secondly, it put forward its practice oriented service mechanism for the different departments. Finally, the achievement in teaching, research and social effectiveness demonstrated its rationality, scientific, and practicality for policing sciences.

Introduction

Laboratory is the cradle of science and the source of the development of science and technology. It plays an important role in the history of the human’s science and technology development. The prestigious laboratories in the world are often referred as the Mecca in the scientific field and attracting numerous researchers all over the world to engage in the enviable research work [1] [2]. With the rapid development of society and the intense competition of talents, institutions, colleges and universities are actively adjusting their strategies of personnel training. Training high-quality talent with spirit of innovation, practical ability and social competitiveness is the common goal of all colleges and universities [3]. Just as theoretical teaching, experimental teaching is an important way to realize quality education and innovation talents training.

In order to better carry out experimental teaching, conduct scientific research, cultivate students' innovation ability and practical ability, and hatch high level research results, it is necessary to explore the construction mode, experimental teaching system and practical application oriented development platform, so that students can better integrate the theoretical knowledge with practices and explore the new world in scientific experiments in person.

In this paper, the key laboratory of police bigdata is used as a research target case to explorer the mode and role in police bigdata application research, professional and technical capacity training for policemen and cadets, and cross application of public security practice.

Cross Application Mode of the Key Laboratory

In this paper, the cross application mode for the key laboratory is studied from the following three aspects:

The Idea of the Basic Platform

The laboratory organizes and implements key laboratory research platform and demonstration base
program around the four fields and direction, i.e., intelligent policing oriented police big data application, intelligent security oriented smart video big data application, intelligent transportation oriented smart transportation big data application and public security oriented cyber-space big data application. Its aim is to promote the construction of the basic research environment and condition, strengthen the integration of internal resources and external cooperation, and enhance the comprehensive strength of resource and talent aggregation of the platform and ability of innovative research.

The main contents of the basic platform can be shown from Fig. 1 as follows:

1. Policing big data application based research base: It can provide necessary supporting environment for the test of policing application software and development of technology.

2. Cybercrime investigation and prevention center: Its main role is to provide a research environment for the research of malicious code, botnet, infringement of intellectual property rights, E-commerce case investigation, and online crime investigation, such as violence, fraud, pornography, gambling, drugs, guns, and so on.

3. Digital forensics center: The cloud architecture based digital forensics center is an ideal place for the research of digital evidence inspection and analysis. This nationally approved center can provide a physical environment for the research of digital forensics and the real cases from the frontline departments where advanced technology and forensics equipment are lack. The collected cases and materials from the frontline departments will be used as teaching and research material for the laboratory. Both researchers and students of the college and investigators from the department of grass-roots level will benefit from the center.

Reform and Construction of Experimental Teaching System

The key laboratory is an important place for scientific research, teaching and experimental training, hatching for high level of research achievements, training students with innovative ability and practical ability and improving their comprehensive quality. So, this paper proposed the reform and construction of experimental teaching system for the key laboratory.

Specially speaking,

1. The independent teaching and experimental training oriented open mode can provide a corresponding training platform for the key discipline of network security and law enforcement, make it possible for the teachers and students to deeply contact with the actual combat platform to transform the theoretical knowledge into practical usage.

2. Open and self-regulated innovation ability training mode: the key laboratory follows the
principles of “geared to all, diversified in forms”, opens all kinds of experimental platform for all the students and policemen of the grassroots, and carries out innovative ability training in the form of students’ interest group, so as to improve students’ practical ability and comprehensive quality.

**Practice Oriented Cross Application Mode**

In order to solve the problem of inefficiency in dealing with increasingly complex policing big data, the laboratory provided a more rapid and efficient policing application platform that integrated cloud computing and big data application related technologies with policing tactics in the public security practice. Meanwhile, measures are made to promote the mobility and openness of the laboratory. For example,

1. “open program” mechanism
   It aims to implement and promote the running mechanism of “open, flow, corporate and compete”, make full use of the experimental facilities and data of the laboratory, and meanwhile to improve the academic level of the laboratory and make it a high level academic exchange and scientific and technical personnel training base in the nation wide [4][5].

2. “practice oriented service mode”
   The laboratory not only attract a lot of researchers from universities, institutions and enterprises, but also many law enforcement officials from the frontline departments, such as policemen, legal staff. The laboratory will provide advanced and complete experimental equipment, advanced technology and excellent theoretical achievements and experience for the frontline departments [6]. And the frontline departments will bring the real cases, data, practice tactics as well as their thinking of certain problems for the laboratory. This multi-win corporation mode can help the grass-roots departments solve a lot of tricky problems and can enhance the academic level of the laboratory (see Fig. 2).

![Figure 2. Cross application mode of the laboratory.](image)

**Achievements of the Cross Application**

Laboratory construction is a systematic project. How to make full use of the laboratory to create more and better research is an important topic for researchers. The key laboratory that adopted the cross application mode has achieved great results in two years. This can be concluded from three aspects, as is shown in Table 1.

1. (1) Teaching
   The key laboratory has provided a practical platform and research environment for the related disciplines as network security and law enforcement. It has created condition for the policing bigdata
application and cyber-crime investigation oriented joint training of post-graduate master's degree program. Both students and young teachers from the police academy have benefited a lot from the platform. In addition, curriculum construction, reforms of teaching content and teaching methods, and the updates and innovation of teaching material have also got a lot of good ideas from it.

(2) Research
The laboratory has given full consideration to the need of policing work, integrated the technical advantages and accumulated experience of each technical research departments, went deep into the research of method and forms of applying the new technology to policing practice, and constructed a more efficient platform for the policing science. As for the research project, the laboratory has hit a record high, with 12 government-sponsored projects and 18 crosswise projects. It also provided 15 open programs for the other colleges, institutions and enterprises so as to fully absorb their advantages and make up its own shortcomings. In addition, it created a good atmosphere for scientific research for the researcher, engineers and technical export from the institutions and grassroots departments.

<table>
<thead>
<tr>
<th>Achievements of the Cross Application mode</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching</td>
<td></td>
</tr>
<tr>
<td>Student benefited</td>
<td>300+</td>
</tr>
<tr>
<td>Courses</td>
<td>14</td>
</tr>
<tr>
<td>Cultivation of young teachers</td>
<td>20+</td>
</tr>
<tr>
<td>Research</td>
<td></td>
</tr>
<tr>
<td>Government sponsored research</td>
<td>12</td>
</tr>
<tr>
<td>Crosswise projects</td>
<td>18</td>
</tr>
<tr>
<td>Open programs</td>
<td>15</td>
</tr>
<tr>
<td>R &amp; D products</td>
<td>9</td>
</tr>
<tr>
<td>Laboratory &amp; enterprise cooperation</td>
<td>11</td>
</tr>
<tr>
<td>Social effectiveness</td>
<td></td>
</tr>
<tr>
<td>Cadets training</td>
<td>160+</td>
</tr>
<tr>
<td>Case solving</td>
<td>16</td>
</tr>
<tr>
<td>Effective solution for the grassroots departments</td>
<td>20+</td>
</tr>
<tr>
<td>Resource sharing</td>
<td>30+</td>
</tr>
</tbody>
</table>

(3) Social effectiveness
The laboratory aimed at the curriculum system for the strategic personnel training in policing sciences, trained and cultivated a large number of professionals of network security and law enforcement, intelligent information processing, cyber-crime investigation and digital forensics. Meanwhile, the laboratory has helped the grassroots and frontline departments solve a lot of problems, such as case solving, case database construction, network attack and defence training, online public opinion analysis, cyber-crime investigation, digital forensics practice, cadets training, and so on. In addition, the incubation of innovative achievements, development of prototype and its promotion has also generated great social benefits.

Summary
This paper proposed a new cross application mode for the teaching and policing practice oriented key laboratory of public security. The reasonable adoption of this new running mode of the laboratory was firstly due to its reasonable and scientific idea of basic platform. In order to better the deal with the specified problems from the specified departments, the laboratory set up three main research centers according to corresponding business and service object. Meanwhile, it introduced its advantages form the aspects of the reform and construction of experimental teaching system. Finally, the achievement
of the laboratory in the last two years demonstrated that the practice oriented cross application mode of the laboratory is effective to the development of the laboratory and can benefit a lot of related personnel and departments.

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