

Research on Simulation Experiment of Intellectual Property Course under the Situation of Intellectual Property Rights Powerhouse

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Abstract: With the issuance of *Outline of the National Intellectual Property Strategy*, the demand for intellectual property applied talents in China is increasingly high. However, in contradiction to that, the cultivation of intellectual property talents in China is still more grounded in theory level, which also directly results in the shortage of intellectual property applied talents of our country. The reason lies in the lack of practical teaching of intellectual property rights in colleges and universities in China, and the curriculum has failed to match ability demands for intellectual property talents. In order to further improve the teaching effect of intellectual property course in colleges and universities, a simulation experiment platform of intellectual property course suitable for students' learning situation is constructed by means of self-construction. With the help of the platform, course resources are improved, and the implementation of simulation experiment design and practice method are promoted. The concrete measures are as follows: first, design the virtual simulation experiment platform of intellectual property course; second, design the virtual simulation experiment teaching of intellectual property course; thirdly, carry out the teaching practice of virtual simulation experiment of intellectual property course.

1. Introduction

With the *Outline of the National Intellectual Property Strategy* promulgated by China, it is clearly pointed out that intellectual property talents are the fundamental resources for the development of intellectual property cause and the construction of an intellectual property powerhouse. Accelerating the cultivation of national intellectual property talents and improving their professional knowledge attainment, skill quality, innovative ability and professional quality have become the focus of attention. However, the cultivation of intellectual property talents in our country is difficult to meet the practical needs of the development of intellectual property cause, and the problems in the aspects of target orientation, scientific literacy, practical skills and internationalization are still prominent. [1] In 2018, the Ministry of Education issued the *National Standard for Teaching Quality of*

Undergraduate Majors in Ordinary Institutions for Higher Learning, and then revised the *National Standard for Teaching Quality of Law* in 2021. Although this provides a basis for the cultivation of intellectual property undergraduate talents, most schools still adjust only from the aspect of curriculum setting and there is a certain lack of exploration in the simulation experiment of intellectual property course. Through virtual simulation technology, this paper creates a multi-functional and intelligent virtual simulation experiment platform, carries out intellectual property course teaching, promotes the dual formation of students' theoretical knowledge and practical ability, which has certain value. At the same time, virtual simulation technology is applied to the teaching of intellectual property courses to build a simulation experiment platform dedicated to the intellectual property course. It is not only conducive to the collection of high-quality curriculum resources, breaking through the limitations of traditional offline teaching space, but also conducive to providing students with an experimental environment for simulated trials, legal negotiations and enterprise intellectual property management scenarios, and promoting students' dual mastery of theoretical knowledge and skills of intellectual property courses.

2. Current Situation of Intellectual Property Talent Cultivation in China

2.1. Theoretical Level: The Proposal of the *Intellectual Property Powerhouse Strategy* Further Enhances the Importance of Cultivating Intellectual Property Applied Talents

Since China officially promulgated and implemented the national intellectual property strategy in 2008, the ability of creation, application, protection and management of intellectual property has been significantly improved. The awareness of intellectual property protection in the whole society has been generally enhanced. Intellectual property rights play an important role in technological innovation and economic development. However, at the same time, there are still many practical problems urgently needed to be solved in various works of intellectual property undertakings in China, such as low quality, weak competitiveness, lax protection and frequent infringement. [2] In December 2016, the State Council officially issued the *13th Five-Year Plan for the National Intellectual Property Protection and Application*, making a comprehensive deployment of the national intellectual property work. This is also the first time that the intellectual property planning has been included in the national key special plan. It is clearly proposed that "Strengthening the cultivation system of intellectual property talents, including strengthening the cultivation system of intellectual property talents, optimizing the growth system of intellectual property talent, and establishing the mechanism for the development and evaluation of intellectual property talent" is one of the four major projects of intellectual property development. In June 2017, in order to deepen the implementation of the national intellectual property strategy, accelerate the construction of an intellectual property powerhouse, and implement the strategy of developing a country with strong talents and innovation-driven development, China National Intellectual Property Administration promulgated and implemented the *13th Five-Year Plan for Intellectual Property Talents*, which clearly points out that intellectual property talents are the most basic, core and key elements for developing intellectual property undertakings and building China into an intellectual property powerhouse. [3] In October of the same year, the *14th Five-Year Plan for the National Intellectual Property Protection and Application* further emphasized the need to promote the construction of intellectual property disciplines, promote the upgrading and digital transformation of intellectual property-related majors, develop high-quality courses in intellectual property, and encourage and support qualified science and engineering universities to set up intellectual property-related majors and courses. [4] All kinds of policies indicate that the cultivation of intellectual property talents is no longer centered on the theoretical level, but pays more attention to the development of applied intellectual property talents, which provides a good impetus for the society.

2.2. Practical Level: the Intellectual Property Courses in China are Mainly Based on Theoretical Training and Comprehensive Cultivation

Jiang Chunlin, Zhang Liwei and Sun Junwei found that there are a wide variety of intellectual property courses in colleges and universities at home and abroad, and the content of relevant courses varies greatly; basic theory courses are the main courses in domestic colleges and universities, while applied practical courses are few. [5] After a comparative study on the intellectual property curriculum between China and the United States in the process of intellectual property talents cultivation, Guo Xiaomei and Luan Chunjuan found that the intellectual property course curriculum of our country ignored cross-discipline education and the cultivation of practical application skills. [6] It can be seen that at present, the cultivation of Master of Intellectual Property Law in China mainly focuses on two aspects: theoretical cultivation and comprehensive cultivation. In the training mode of Academic Master of Intellectual Property Law, the training objective of colleges and universities is mainly cultivation of theoretical talents, and the main career direction lies in theoretical research and legislative selection. In the aspect of comprehensive cultivation, it mainly relies on the cultivation of professional masters. In the course design of professional masters, the course arrangement is usually relatively comprehensive and the course design covers almost all categories of law. For the course design of intellectual property, some universities may only offer one intellectual property course, and the students' study time in school is less than two years or even less. So the curriculum is concentrated and the study time is short.

3. Analysis of the Problems in the Cultivation of Intellectual Property Talents in China

There is an obvious contradiction in the cultivation of intellectual property talents in China. On the one hand, driven by the national intellectual property strategy and policy, intellectual property education and talent cultivation is developing rapidly. On the other hand, compared with foreign developed countries, our cultivation of intellectual property talents and intellectual property education started relatively late, with limited accumulated experience, and lack of uniform normative requirements in all aspects such as subject development, curriculum structure and training mechanism, which restricts the quality and effect of intellectual property talents cultivation in China. [7] Talent cultivation is seriously out of line with market demand.

At present, the course education of intellectual property in China has formed a relatively fixed talent cultivation mode. Undergraduate education of intellectual property is mainly aimed at general-purpose talents who have both basic theory and application ability of intellectual property rights. The graduate education of intellectual property focuses on cultivating students' solid theoretical knowledge of intellectual property. However, the society's demand for intellectual property talents is mostly towards practical talents, while the demand for intellectual property theoretical talents is relatively small. To some extent, this reflects the serious disconnection between the cultivation of talents in colleges and universities and the market demand, resulting in the awkward situation that the relevant enterprises fail to recruit the intellectual property talents suitable for their own needs and the graduates majoring in intellectual property cannot are unable to achieve ideal employment.

3.1. The Curriculum Fails to Effectively Match the Ability Demand of Intellectual Property Talents

Intellectual property has obvious multidisciplinary and international characteristics. At present, many colleges and universities mainly rely on the resources of their law schools to set up courses and the teachers of intellectual property are mostly teachers of law schools, so they can only teach the content of intellectual property courses that is biased towards law. Secondly, in the aspect of practical

courses of intellectual property, as the major of intellectual property has more requirements for practical skills, it is decided that the professional course design cannot be separated from practical training. In this regard, although most colleges and universities in China have set up practical courses and hired teachers with rich practical experience to give lectures or guidance, the actual implementation effect is insufficient due to the fact that practical teachers have no fixed office space in the school and are busy in practice. Thirdly, in terms of internationalization, since the major of intellectual property involves a lot of international treaties and conventions on intellectual property, it is necessary to offer a certain number of courses on international protection of intellectual property. However, most of the colleges and universities in China are unable to offer relevant courses to students due to lack of teachers or curriculum in the process of intellectual property talent cultivation. [8]

3.2. The Teaching Mode of Intellectual Property Course Lacks Practicality

On the one hand, intellectual property course is a key course for intellectual property major and law major. The orientation of course construction is to cultivate applied, compound and international intellectual property talents with intellectual property protection awareness, intellectual property legal knowledge and intellectual property judgment skills. [9] The intellectual property course is unique. Compared with other courses, the course of intellectual property is more practical. For students, it requires both interdisciplinary professional knowledge of arts and science, and a lot of practical skills. Students are required to: 1. Master the legal knowledge of intellectual property rights; 2. Have trademark and patent retrieval skills, be able to judge similar trademarks and patentability. 3. Familiar with the whole process of trademark and patent management. 4. Able to independently deal with trademark and patent management related processes. 5. Proficient in operation of patent management system. [10] The strong practical nature of intellectual property determines that practical teaching must be introduced into the teaching mode. At present, some domestic colleges and universities still adopt the traditional education mode, that is, teacher's control the classroom and course is mainly delivered unilaterally, due of the factors such as limitation by teaching resources of colleges and universities and the shortage of class hours. During practical internship, there is a lack of opportunity to work in specialized intellectual property department. This is because most law firms do not focus solely on intellectual property business. Intellectual property administrative departments offer relatively few internship opportunities, and the court intellectual property adjudication business has higher professional requirements, but also they have more stringent qualification requirements. These reasons make it difficult for intellectual property students in colleges and universities to find suitable positions when participating in social practice or professional practice. To some extent, it influences the cultivation and improvement of intellectual property students' practical ability. According to the survey, enterprises are unable to recruit intellectual property graduates whose practical abilities match the position. Even if they enter the enterprise and go through job training, they cannot carry out work immediately, so as to cope with the increasingly fierce intellectual property competition in enterprise. [11]

4. Improve the Path of Intellectual Property Talent Cultivation: Carry out Design and Practice of Intellectual Property Simulation Experiment

As mentioned above, intellectual property law is highly scientific and technological and a multidisciplinary knowledge background is required. The cultivation of intellectual property talents should focus on the cultivation of compound and applied talents. [12] For the cultivation of applied talents, the teaching method system should further emphasize learning by doing, researching in doing and innovating in doing on the basis of vigorously advocating advanced teaching methods such as

heuristic teaching, interactive teaching, problem-based teaching and case teaching. Emphasize comprehensive training, simulation training, innovation training and so on. Highlight project teaching and enterprise practice links. Therefore, this paper proposes solutions to the dilemma of intellectual property talents cultivation from the perspective of simulation experiment design and experiment of intellectual property course, and details the process of intellectual property simulation experiment, mainly from the following aspects.

4.1. Design the Virtual Simulation Experiment Platform of Intellectual Property Course

4.1.1. Register the Website and Open the Platform

In order to ensure the effectiveness of the virtual simulation experiment platform of the intellectual property course, the teachers of colleges and universities specially contact cooperative enterprises to learn the process and characteristics of enterprise intellectual property management through school-enterprise communication, and analyze the work scenes involved in enterprise intellectual property management so as to clarify the practical direction of intellectual property courses. According to the practical direction and actual needs of the courses, a third-party institution is hired to specially design the virtual simulation experiment platform to simulate the enterprise intellectual property management scene, and a website of the virtual simulation experiment platform is specially set up for the school intellectual property course teaching. The Multifunctional Intelligent Classroom Interactive System is independently developed, which is a customized 3D virtual simulation experiment teaching platform for intellectual property courses. The technical principle of virtual simulation teaching platform is to apply advanced 3D engine, multimedia technology and VR/AR technology to build real and realistic three-dimensional scenes and a humanized interactive operating terminal. Learners can roam and operate in three-dimensional scenes from a first-person perspective, and take the initiative to conduct more training and learning. [13]

4.1.2. Integrating Resources, Designing Courses

On the basis of designing the virtual simulation experiment platform of intellectual property course, the searching function of the virtual simulation experiment platform is brought into play. The platform is connected with the "National Virtual Simulation Experiment Teaching Course Sharing Platform", and the course search engine is established. As long as teachers log in to the virtual simulation experiment platform through a special account, they can directly search for the shared resources of domestic intellectual property courses, and realize sharing, exchange and reference of course resources. At the same time, in the design of the virtual simulation experiment platform, the experimental parameters on the platform are improved, and the curriculum system and modules under the subject of intellectual property are constructed. The courses covered include: similar trademark judgment, trademark inquiry, trademark monitoring, trademark law, trademark examination, patent agent examination, patent application, patent retrieval, patent analysis, patent law, operation management and other related courses. According to the course modules, the online teaching plans and operation resources needed for course teaching are respectively designed, and the basic data needed for course experiments are improved. The experimental data are all the latest user data obtained from the mobile Internet information service enterprises, and the experimental application environment is built after desensitization. [14]

4.2. Virtual Simulation Experiment Teaching Design of Intellectual Property Course

4.2.1. Define Objectives of Experiment Teaching

According to the orientation of intellectual property courses, it mainly aims at cultivation of students' theoretical knowledge and skills. The theoretical knowledge literacy of courses aims to enable students to consolidate the intellectual property knowledge they have learned through experiments, familiarize themselves with various processes of enterprise intellectual property management, master precautions and corresponding handling specifications in each process of enterprise intellectual property management, master the intellectual property management standards and relevant laws and regulations, especially patent infringement analysis and patent litigation. The skill practice literacy of courses aims to enable students to integrate into all aspects of enterprise intellectual property management through experiments. Through simulating the intellectual property management scenarios of start-up enterprises, large and medium-sized enterprises, and enterprises with mature patent mechanism and other enterprise, students can carry out intellectual property course skill training and apply theoretical knowledge into practice. So as to improve students' practical ability.

4.2.2. Refine the Content of Experiment Teaching

Enterprise trademark and patent management is the key part of intellectual property course teaching, and it is also the difficult point. In order to promote students to master the knowledge of the module, the experiment teaching content designed in this paper is mainly to let the students simulate the process of trademark and patent management in enterprises. From the content of enterprise trademark and patent management in the course of intellectual property, it mainly involves trademark infringement analysis, trademark maintenance and operation, trademark litigation and response, patent annual fee monitoring and so on. The knowledge elements emphasize students' practical ability, and they need to participate in specific business simulation and case analysis in a practical environment (See Table 1 for details).

Table 1: Practical Training Contents of Simulated Enterprise Trademark and Patent Management

Trademarks	Patents
Collect brand name and trademark pattern	Collect disclosure
Inquiry or outsourcing inquiry of trademark name or drawing	Search the disclosure and judge its patentability
Determine the category, country and territory of trademark application	Writing of Patent Application Documents or Entrusted Writing
Application for trademark registration by outsourcing	Interface with entrusted service organization
Monitor trademark dynamic process and monitor the status changes of similar trademarks	Monitor patent application process (require patent disclosure, control response time)
Receipt of official documents	Receipt of official documents
Analyze and Deal with Rejection	Patent annuities to achieve monitoring
Analyzing and Handling Objections	Handling of relevant subsidies and awards
Analysis of Trademark Infringement	Establishment of Enterprise Internal Patent System
Trademark maintenance and operation (Declaration of famous trademarks, well-known trademarks, licensing, transfer, etc.)	Patent operation (patent license, transfer, pledge, financing)
Trademark litigation and litigation response	Patent litigation and litigation response

4.2.3. Develop Experiment Teaching Methods

In intellectual property course teaching, students are not only required to master the trademark and patent management process of enterprises and have a deep understanding of the legal knowledge required for intellectual property management, but also required to apply the intellectual property course knowledge to deal with practical problems of enterprise trademark and patent management. Therefore, based on this teaching orientation, this paper focuses on adopting fixed-scene and fixed-flow experiment teaching method, fixed-scene flow diversified experiment teaching method and collaborative learning method.

4.2.4. Conduct Experiment Teaching Evaluation

In terms of teaching evaluation criteria, it is set as follows: total evaluation of intellectual property course (100%) = evaluation of theoretical knowledge (50%) + evaluation of course skill (50%); theoretical knowledge literacy (100%) = enterprise trademark management theory (50%) + enterprise professional management process theory (50%); course skill literacy (100%) = enterprise trademark management technology (management method, management tools, etc.) (50%) + training on the whole process of enterprise patent management (50%). [15] In terms of teaching evaluation methods, it mainly adopts the form of teachers' evaluation and students' self-evaluation. When students are organized to participate in course training, students should complete corresponding classroom assignments or training tasks, participate in classroom answering and other forms to systematically reflect the learning situation. The teacher makes a general evaluation according to the student's learning situation. The evaluation dimension mainly includes five aspects: first, master intellectual property legal knowledge; second, have trademark and patent retrieval skills, be able to judge the similar trademark and patentability; third, be familiar with the whole process of trademark and patent management; fourth, able to independently handle trademark and patent management related processes; fifth, be able to master the operation of patent management system. [16]

4.3. Teaching Practice of Virtual Simulation Experiment of Intellectual Property Course

4.3.1. Carry out the Whole Process Concept Teaching of Application Based on Fixed Scenes

In terms of the fixed-scene fixed-flow experiment teaching method, course teachers provide students with videos and pictures related to enterprise trademark and patent management by virtue of a virtual simulation experiment platform. In the fixed scene of the virtual simulation experiment platform, the whole process of enterprise trademark and patent management is taught to students, so as to help the students clarify the knowledge concepts related to trademark and patent management and identify the process elements. For example, the teacher leads the students to log in the designed virtual simulation experiment platform, open the module of "enterprise trademark management theory" or "whole process of enterprise patent management" on the virtual simulation experiment platform, and implement the course concept education for the students. Taking the course plate of the whole process of enterprise patent management as an example, the teacher mainly guides the students to open the fixed training scenes on the system platform and each training scene has introduction of practical training tasks and theoretical knowledge. The teacher guides the students to receive the practical training tasks, watch the practical training videos, and teach the students relevant theoretical knowledge of the enterprise patent management process on the spot. Comprehensively promote students to master the theory of enterprise patent management. [17]

4.3.2. Select Fixed Scenes to Carry out Diversified Training on Trademark and Patent Management Processes

Fixed-scene flow diversified experiment teaching method focuses on providing students with a variety of enterprise trademark and patent management cases by virtue of experiment parameters preset in advance by teachers when the virtual simulation experiment platform is designed, allowing students to log in the virtual simulation experiment platform and participate in the simulation practice of trademark and patent management of large, medium and small enterprises, allowing them to master the whole process of trademark and patent management in simulation practices. Through the diversified experimental environment, let the students fully understand the key points and norms of trademark and patent management of different enterprises. [18] For example, when teaching the course of “Enterprise Trademark Management”, the teacher guides students to log in the virtual simulation experiment platform and open the training module of “Enterprise Trademark Management” on the simulation experiment platform. First, the teacher guides the students to use the theoretical knowledge of enterprise trademark management that they have learned in advance to try to collect the relevant trademark names and patterns in the enterprise scene through the trademark search engine. Then, they simulate enterprise personnel to conduct independent inquiry or outsourced inquiry on the trademark names or patterns, communicate with relevant personnel remotely through the online learning platform, determine the category, country and region of the trademark application, and conduct outsourced trademark registration. By guiding students to participate in the whole process of enterprise trademark management, Teachers cultivate students' intellectual property rights course skills, enable students to use corresponding knowledge, simulate enterprise scenarios for practical operation, and improve students' practical ability. [19]

4.3.3. Team Collaboration, Simulation of Enterprise Practical Scenes

The method of group collaborative learning is to divide students into groups, let each group receive learning task of intellectual property course, and by virtue of a virtual simulation experiment platform, conduct independent exploration and practical training of learning task in the form of division of labor and cooperation among the group members, so as to cultivate students' course skill literacy and enhance their autonomous learning ability. At present, in the research of teaching methods of intellectual property courses in colleges and universities, collaborative learning method is mainly realized through the way that learning groups play various roles , such as CEO, R&D personnel, service agencies, examination institutions, etc., so that students can flexibly use relevant tools to deal with patent management quickly and efficiently. For example, when teachers teach the course section of “Whole Process of Enterprise Patent Management”, first of all, teachers should group the students reasonably according to the number of students in the class, which can be set as a group of 3-6 groups. Team members play different roles, such as CEO, R&D personnel, service agency, examination agency, etc. Second, the teacher guides the group students to log in the virtual simulation experiment platform through their personal learning account. Then, click the “Whole Process of Enterprise Patent Management” learning module on the simulation experiment platform, and each group receives different training tasks. Finally, the teacher asks each team member to play different roles and use the virtual simulation platform to conduct online practical training and learning to simulate the patent management scene of enterprises. For example, simulate enterprise staff, select the mode of receiving the disclosure, photos or characters through operations on the system side, use the retrieval tool to search for the patent, thereby training the students' patent retrieval skills. Instruct the students to send the feedback results after retrieval to another student (simulate the role of the service institution or the examination institution). Instruct students to carry out the exercises and training according to the whole process of patent management. [20]

5. Conclusion

In a word, the course of intellectual property is a practical course, among which, the process of enterprise trademark and patent management is the key chapter and section of the intellectual property course, and also the key and difficult part for students to learn the course knowledge. As the process of trademark and patent management involves a large amount of intellectual property legal knowledge and requires students to apply their course skills in the actual legal situation, more emphasis shall be placed on the implementation of fixed-scene fixed-flow experiment teaching method, the fixed-scene flow diversified experiment teaching method and cooperative learning method supported by the virtual simulation experiment platform. Through these three teaching methods, appropriate knowledge of relevant process of enterprise trademark and patent management is incorporated. When leading students to participate in simulated legal practice scenes, they can fully master the key points of intellectual property course knowledge and form the practical ability of course skills. Although the simulation experiment of intellectual property curriculum is not perfect enough, it is believed that through continuous improvement and school-enterprise cooperation to promote the design of simulation experiment of intellectual property course in practice, the number of intellectual property applied talents in China will increase continuously, contributing to the realization of intellectual property powerhouse.

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