Analysis of Laboratory Planning and Management
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Keywords: Laboratory, Management ownership, Acquisition and management, MOOC experimental credits.

Abstract. The present situation of the laboratory of engineering major in ordinary non-engineering colleges, the plan of laboratory setup, the method of purchasing and managing experimental equipment, the ownership of laboratory management department, the allocation of laboratory teachers and the choice of students' learning mode, the opening and management of the experimental project matching with MOOC; This paper analyses and conceives these aspects.

Introduction
In engineering colleges with a long history, laboratory management, purchase and use of experimental equipment, experimental teachers, students' practice patterns in the laboratory, has perfect management system. With effective learning evaluation mechanism; With reasonable model of equipment purchase use. However, in the engineering colleges and universities, laboratory affiliated office management, mainly responsible for the arrangement of the experimental course; Equipment procurement by the school asset management office is responsible for the bidding procurement; Maintenance use laboratory belongs to the secondary college, even each specific management use; Laboratory, a serious shortage of teachers, more than 20 professional laboratory, only three full-time experiment teachers; Laboratory equipment purchase and school funds, nearly 10 years, the laboratory construction can only rely on to apply for the central and local special laboratory construction funds to purchase or update the device; Experimental equipment of the need to purchase only on the basis of professional courses of urgent degree, lined up to take turns to the construction of the professional laboratory. At present, in addition to the outdoor public basic course experiment, in their own way in their own way other professional laboratory teaching and research section, college; Equipment using narrow and low efficiency. Experimental model is granted by the instructor led course class students to do experiments, time efficiency is low, as to the project target certification and increase ratio to 30%, the practice credits when implementing credit system reform, this experiment mode met a fatal obstacles, experiment schedule arrangement not bottom go to, can only be arranged in the evening, arrange in the weekend, arranged in the exam week, even in holiday. This situation has seriously affected the quality of teaching, is an urgent need to reform.

Laboratory Settings
Traditional laboratory setting and curriculum, using "school - system - room" three-level management model [1], the laboratory set up a single function, professional laboratory belongs to the management of teaching and research section. When the course lab also need corresponding changes. Laboratory experiment equipment efficiency is low, resulting in waste.
Laboratory setting scheme, first of all, the school should be based on long-term planning, determine the type and scale of the opening of a professional, ask professional personage to demonstration project; Construction engineering lab building, set aside enough high voltage lab and weaknesses lab; Consider the corresponding bearing, power supply, ventilation pipes, laboratory, water supply and drainage, etc. Secondly, starting from the school level, the school laboratory unified planning, construction, management, according to the mode of management, realize the test site, the full use of the experimental equipment, experimental resources, from the school level to ensure the real open laboratory, is open to students all the time, people in the study of social or
corporate staff training and opening, etc. Third, combined with laboratory management information system, entrance guard system, the experiment course of MOOC resources, realize the student guidance and experiment examination, reduce the burden of experimental teachers; Liberated from experiment courses arranging system, by the students according to their own time, choose their own learning progress, and make an appointment the experimental time; Experimental teachers need only experiment report based on the experimental results and the experimental results are given, the student can obtain the experiment courses for credit.

**Laboratory Equipment Purchase and Management**

Laboratory instruments and equipment mainly has two parts, the first part is needed to complete the talent training scheme is used to open the experiment content, the second part is the need for teachers to carry out scientific research institute laboratory equipment, general is to belong to large instruments and equipment.

The first part of equipment, to meet the engineering certification requirements of the talent training scheme, the device type is relatively fixed, only need to regularly update the tender, and in accordance with the provisions of the state, equipped with corresponding maintenance cost and material cost. According to the level of management mode, according to the purchase time demand, professional demand, industry and technology development, unified make a purchase, replace, update schedule.

The second part of the equipment, for relatively stable research direction of the discipline team, little change; Generally focus on a few advantage disciplines; Can be in the early part of the team building, school equipment, in the process of the investment to purchase or with the progress of the scientific research project, the team used research step by step to update and improve the new technology, new method for instruments and equipment, this part can reflect the history of a school.

In the level of management mode, all laboratory, laboratory equipment, are reflected in the school laboratory information system usage, usage; Easy to maintain, update, etc.

**Laboratory Management Department**

"Article 20 of the institutions of higher learning should be a school (courtyard) long, director of the school laboratory and to establish or determine the competent administration of the work in the laboratory." [2]

Education ministry make specific provision, director of the school, led by a field laboratory, laboratory in the status and importance of a higher school.

Requires organizations formulated and implemented the laboratory construction plans and annual plans, review, formulate and review, equipment equipped with solutions to perfect the laboratory management system, including the experimental teaching, scientific research and social service system of audit evaluation, etc. [2].

Domestic colleges and universities experiment management organization known as the "lab and equipment (assets) administration" (74%), in a laboratory scale is small, scattered various duties to the school office, school, different departments such as asset management [3]. Increased along with the development of schools, professional, laboratory scale, the need for a dedicated department management laboratory various matters, USES the level of management mode, the establishment of laboratory equipment in guangxi university, is a successful example. Guangxi university laboratory equipment, responsible for all the instruments and equipment procurement, management, laboratory construction and experimental teaching, etc.

In addition, in the "211 project", "985 project" construction, office office, asset management of laboratory equipment and 985 colleges and universities independent laboratory and the department in charge of equipment to recover [4].

Laboratory equipment management including procurement management, asset management and use management; Laboratory have discipline construction expenditure and teaching equipment, respectively by the planning department and executive office is responsible for the argument.
Laboratory Teachers and the Students Learning Mode

Laboratory teachers should comply with the conditions of the "double division type", should not only know the professional theory knowledge, and all kinds of professional equipment, the application principle of skilled use of instruments and equipment.

University laboratory is a college student practice ability training base, as the practice credits in increasing proportion of talent training plan, experiment teaching management mode is given priority to with teachers have been out of date, gradually introducing students to participate in higher school laboratory management center [5].

Such as the Tibetan "secondary management" between teachers and students of the university of open laboratory management mode, the students instead of teachers do auxiliary part of the laboratory work, teachers can save much energy, save the teaching resources, students can also from to participate in the organization and management in laboratory, get exercise and improve [6].

"Ningbo, derviser college teachers unified guidance, student grouping management" based on students' participation in laboratory management mode, the students after the selection, divided into different groups to participate in the laboratory management, exercise the student, solves the problems of laboratory management on [7].

After the above development stage, in the full implementation of all-weather open lab, students can arrange their own time to experiment independently, can also take part in the management of the laboratory of part-time.

Experiment with the MOOC Opening and Management of the Project

In the current international and domestic MOOC curriculum development, the Chinese university MOOC many free education resources such as great convenience for college students and social studies.

With practice of engineering courses, such as "digital electronic technology", "analog electronic technology" course, MOOC alone can't complete master the course, must cooperate with appropriate proportion of practice link, to form a complete system of knowledge, this part of the function MOOC no way to realize.

Solution from the combination of classroom and network, and the combination of school and society, promote with the practice of engineering foundation courses teaching quality improvement; In view of the engineering courses, repositioning MOOC status, cooperate on the open sharing of the society, institutions of higher learning laboratory with the functions of the school of continuing education in colleges and universities, the implementation of the ordinary institutions of higher learning credit system, to explore a way to improve the teaching quality of engineering courses and patterns.

The specific practices are as follows:

First, in view of the students, MOOC play a supporting role, key theoretical knowledge anytime, anywhere learning difficulties, convenient students to practice some can understand, simulation on MOOC, guide the students in the school laboratory spontaneous experiment, with the purpose of real play to the role of the students' active learning.

Second, colleges and universities teachers' role into learning mode, guides the student to study, from the emphasis on teaching to focus on coaching answering questions; Counselling object is not limited to students, extended to MOOC course social trainees. Among them, the experiment teachers focus on counseling practice.

Third, social students, on the MOOC learning theory knowledge, through the local contact university school of continuing education, opening laboratory, the curricular practice to make an appointment time.

Fourth, social students learning engineering course grade certification, as well as complete theory for credit, also want to complete the practice credits.

Fifth, the open course coalition of colleges and universities all over the country, and there are Chinese universities online open courses alliance electrical and electronics, mutual recognition of
practice credits, convenient social students to obtain the corresponding certificate, from the long-term planning, coordination need around colleges and universities.

**Summary**

In the level of management mode, with the open laboratory management, form a complete set of laboratory information management system, is more advantageous to play to the function of the laboratory, play the potential of experimental equipment, experimental study the subjective initiative of students into full play. For students to learn and for teachers' work, is helpful to social progress.

**References**


