

# Exploration on Cultivating Engineering Practice Ability Relying on Virtual Simulation Experiment Teaching Center——Taking the Course of Mobile Communication Principle of Guangyou Electronic Information Engineering as An Example

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**Abstract:** “Virtual simulation experiment” is equivalent to a supplement to real experiment, which can fully exercise students’ thinking ability and practical ability, and stimulate students’ enthusiasm for practical learning. Taking the course of “mobile communication principle” as an example, this paper mainly discusses the two aspects of “the importance of building a virtual simulation experiment teaching center” and “relying on the virtual simulation experiment teaching center to cultivate engineering practice ability”, focuses on the characteristics and advantages of the virtual simulation experiment teaching center, and hopes that through the construction of the virtual simulation experiment teaching center, so as to further improve students’ practical ability, let students demand themselves towards the standard of practical application, and strive to become a practical talent.

**Keywords:** Virtual Simulation Experiment; Teaching Center; Engineering Practice; Mobile Communication

In recent years, with the continuous development of the field of mobile communication, the virtual simulation experiment with “mobile communication” as the core has gradually entered the campus. The establishment of virtual simulation experiment teaching center can indeed bring a series of advantages. For example, “realize the experiment that cannot be completed due to insufficient hardware equipment or non system of mobile communication experiment”, “practice is more controllable”, “it is convenient to implement distance teaching”, “enrich the form of practice and training”... Relying on the virtual simulation experiment teaching center, students can complete some system experiments in mobile communication and master theoretical knowledge through experiments, strengthen and innovate the knowledge system in practice. It can be seen that the construction of virtual simulation experiment teaching center is of great significance, plays an important role in training students’ practical ability, and is conducive to the cultivation of high-tech talents with practical ability in colleges and universities.

## 1. Importance of constructing virtual simulation experiment teaching center

With the continuous development of mobile communication technology, the impact on all walks of life is becoming more and more in-depth. Under this trend, in order to help students better understand the mobile communication industry, schools should strengthen practical teaching. After the construction of virtual simulation experiment teaching center, the school can design practical teaching in mobile communication with the help of virtual simulation experiment.

### 1.1 The existing equipment cannot complete relevant experiments

With the continuous development and integration of mobile communication technology, the equipment required for various experiments is becoming more and more complex, huge and expensive, and the requirements for students’

professional knowledge are becoming more and more systematic, in-depth and cutting-edge. It is difficult for ordinary professional laboratories to open the course system experiment of “mobile communication principles”. At present, they mostly complete the experiment by investigating mobile companies, visiting computer rooms, searching data online, etc. This kind of experiment does not really have the effect of combining practice and theory. The virtual experiment can complete all kinds of experiments and achieve the goal of combining practice and theory.

### **1.2 Practice is more controllable**

In the information communication system, the transmission of signals is very abstract, and students will have a feeling of “invisible and untouchable”. With the help of the technical system of virtual simulation experiment, the signal transmission process can be simulated concretely, so that students can intuitively feel and even control. In this case, students can better understand the internal principle of signal transmission. Moreover, in various practical learning around “signal transmission”, based on students’ good understanding ability, students can accurately grasp the direction of practice and improve the effectiveness of practical learning.

### **1.3 Unlimited learning time**

In the traditional mobile communication experiment teaching, students’ time to contact the experiment is very limited. Moreover, restricted by hardware conditions, some students can only observe and associate, and can’t practice in person. After the establishment of virtual simulation experiment teaching center, students have more experimental learning opportunities. For example, students can flexibly arrange experimental learning plans and carry out fragmented learning according to their personal time. Alternatively, students can conduct repeated experiments for problems they don’t understand, explore the laws, and actively resolve difficult problems they don’t understand. In short, the establishment of virtual simulation experiment teaching center does not limit students’ learning time.

### **1.4 Facilitating the implementation of distance learning**

When carrying out offline mobile communication experimental teaching, teachers and students should achieve various matches, such as “time matching”, “place matching”, “prepared material matching”, etc. In case of accidents, the experimental teaching of offline mobile communication may be forced to stop. After the emergence of virtual simulation experiment teaching center, teachers can carry out online mobile communication experiment teaching and truly realize “distance teaching”.

### **1.5 Enriching the forms of practice and training**

When learning mobile communication related knowledge, students need to receive systematic practice and training. In the traditional practice and training stage, the sense of participation of off campus enterprises is not strong, and the form of practice and training is relatively single. The reason is that some enterprises are unwilling to invest too much cost and energy, and are unwilling to fully act as an assistant. Based on the virtual simulation experiment teaching center, the forms of school enterprise cooperation can be more diversified. Enterprises are not only a single helper, but also an active builder.

## **2. Relying on virtual simulation experiment teaching center to cultivate engineering practice ability**

When learning mobile communication knowledge, relying on the virtual simulation experiment teaching center, students can enter situational learning, give full play to their subjective initiative and exercise their practical ability. So, how to design and apply the virtual simulation experiment teaching center? Specifically, it includes the following aspects:

### **2.1 Creating a virtual simulation experiment platform**

Around mobile communication, the school can create a “virtual simulation experiment platform”, which has many advantages. Specifically, the virtual simulation experiment platform can simulate the working principle of the communication system, make the communication knowledge more concrete and easy to be understood by students. Moreover, the virtual simulation experiment constructs a virtual scene without the problem of base station radiation, which belongs to a very green experiment. In addition, with the help of virtual simulation experiment system, we can integrate “virtualization technology”, “audio technology”, “video technology” and so on, break through the limitations of real conditions, and truly realize “resource sharing” and “remote sharing”.

### **2.2 Implementing the whole process of virtual simulation experiment**

The construction of “mobile communication virtual simulation experiment teaching center” is a systematic

project, and schools need to consider many problems. For example, from “communication foundation” to “communication principle” and then to “communication technology”, schools should do a good job in system construction. A perfect mobile communication virtual simulation experiment teaching center can basically cover the whole process of communication. It includes: ① Communication equipment from installation to configuration, and then to debugging, testing and optimization. ② From network access to network transmission. ③ From service interface to signaling interface. ④ From bottom signal processing to communication principle.

### **2.3 Online experimental teaching process management**

The virtual simulation experiment teaching center has the characteristics of “openness” and “sharing”. The school can make overall arrangements for students’ learning through the virtual simulation experiment teaching platform. For example, before the formal start of experimental teaching, we can guide students to conduct online preview, exercise students’ autonomous learning ability, and cultivate students’ ability to integrate learning materials. In the process of experimental teaching, we can design Q & A and practice to highlight the main role of students. After the experimental teaching, the students are evaluated in combination with the results and data of the experimental teaching. At the same time, according to students’ learning performance, teachers can also formulate “differentiated experimental teaching scheme” to improve the accuracy of virtual simulation experiment teaching.

### **2.4 Deepening the industry integration mechanism**

In the process of building the mobile communication virtual simulation experiment teaching center, the school can unite with the communication industry and deepen the mutual combination mechanism of the industry. For example, the school can cooperate with the mobile communication industry to formulate virtual simulation experiment teaching plans and objectives and jointly promote talent training. For another example, ZTE, SUGON and other enterprises integrating industry and education with the school belong to the leaders in the communication field, and there are a large number of engineering practice projects and cases, which can build the system through the virtual platform to complete the simulation. Through course learning and enterprise project development, wrong can further carry out teaching and scientific research cooperation, add some typical experimental cases, and enrich the teaching content of virtual simulation experiment.

At present, the practice links of the course “mobile communication principles” in most colleges and universities are completed in the form of simulation, and the effect is also very good. It is urgent for our university to build a simulation platform, which is also a necessary requirement for efficient learning of the course.

## **3. Conclusion**

To sum up, when learning mobile communication related knowledge, virtual simulation experiment can play a role in many aspects to help students better understand knowledge, memory knowledge and application knowledge. In the future, in order to give further play to the advantages of virtual simulation experiment, the school should seriously grasp: ① Create a virtual simulation experiment platform. ② Implement the whole process of virtual simulation experiment. ③ Online experimental teaching process management. ④ Deepen the industry integration mechanism. In addition, the school should actively improve the “teacher training mechanism”, lead teachers to go deep into the mobile communication industry, and accumulate front — line experience, so as to gradually upgrade the teaching level of virtual simulation experiment and improve the construction of virtual simulation experiment teaching center.

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