

# Innovation in Online Teaching of UAV Operation and UAV Management Courses

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## Abstract

**This paper analyzes the existing problems of UAV operation and management teaching, such as insufficient hands-on training, weak practice teaching and assessment, free sharing of resources in the society, and insufficient utilization of application cases in the industry. On the basis of online teaching experience sharing, this paper further proposes innovations of accurate teaching based on data analysis, such as "project-based course teaching group" and "one person one case" customized practical teaching.**

## Keywords

**Accurate Teaching; Big Data on Education; Customized Practical Teaching; Project Teaching Group.**

## 1. Introduction

The application of intelligent UAV is essentially the integration and innovation of "flying robot" in the air and industrial applications. UAV operation and management courses include knowledge of human-machine construction, flight principle, mechanical assembly basis, radio remote control, labor protection and safety, relevant laws and regulations and management norms, etc. Both theoretical knowledge and practical operation, but also combined with the actual understanding of the understanding of regulations and management systems. For example, the Regulations on the Operation of Light and Small Unmanned Aerial Vehicles (Trial) issued by civil Aviation Administration stipulates that students can better understand relevant laws and regulations only on the basis of mastering the application of technology, so as to cultivate the practical and innovative spirit of students.

In 2020, "home learning" has become a hot topic. Online learning in this period has played a significant role and been widely recognized, which requires us to rethink and examine the significance and use methods of UAV application online teaching under normal conditions.

Actually hiding a major by-product of online teaching is generated a lot of teaching online data, the data are automatically generated and objective existence, if ignored it didn't, but if use the good they can from the perspective of multidimensional analysis the feasibility and the advantages and disadvantages of teaching methods, process, especially in deep mining of traditional teaching methods can't perceive learning and teaching status, this can let each student according to their own learning situation and the characteristics of autonomous learning.<sup>[1]</sup> on the other hand, teachers, teaching staff in the assessment of teaching technology, the allocation of resources utilization, management, efficiency optimization direction, from the corresponding teaching strategies, teaching measures how two perspective with the aid of abundant teaching resources and data analysis, to seek effective and precise teaching methods and measures, the perfect combination of online and offline teaching and promoting education

management innovation. We can also learn from the model of precise prevention and control for UAV precise online teaching reform.

## 2. Problems and analysis of UAV application teaching

UAV application teaching and flight training are the result of coordinated eye, brain and finger movements. They require students to be highly concentrated, which can well train students' patience and ability to overcome difficulties, cultivate students' sense of competition and competitive spirit, and build students' firm character. Taking the comprehensive simulation training of UAV application and control as an example, the teaching experience was summarized. Combined with the demand for automation and intelligence talents in the current practice of IT enterprises, the problems in the teaching process of operation courses were analyzed and summarized in the following aspects.

- (1) Lack of practical ability training can not meet the needs of actual combat;
- (2) There is a big difference in basic ability in operation practice;
- (3) Practice teaching and assessment are weakened;
- (4) Limited faculty and experimental conditions;
- (5) A large number of free resources and tools Shared by the society have not been utilized;
- (6) Application cases and methods in all walks of life have not been fully utilized.

In the modern information society, UAV and computer technology have been deeply applied. We should transform the teaching concept from "applied technology" to "applied technology", let students learn and master knowledge points and methods in the application of examples, and show their own characteristics and values by gathering the strength of a hundred schools of thought. The analysis of the problems in the teaching process of UAV application course has certain general significance and reference value for online teaching.

## 3. Sharing of experience from offline teaching to online teaching

One of the characteristics of online teaching is to make data run more and teachers and students run less, so as to improve the utilization rate of data resources and thus improve teaching efficiency. Therefore, some teaching links using online teaching effect is better than offline, of course, in the form and content of preparation and arrangement. The following take QQ group as an example to share some methods and experience. Other platforms such as nails or video conferencing systems are similar in principle and use.

### 3.1. Platforms and methods

In the absence of self-built teaching and management platform, the choice of online teaching platform is very important, it is better to be a cloud platform, or a large number of users of the platform strong stability, can stand the test of large traffic. The other thing is to choose the popular platform that everyone is familiar with. Students don't need to download new clients (but the version may need to be updated), and they don't need to be familiar with and trained how to use it.

### 3.2. Make full use of the advantages of online teaching to explore their own features.

Before class, we will create a good class atmosphere by using such methods as class Shouting, solitaire sign-in, group video (live broadcast, audio ban, linma) and so on. With the help of the abundant online resources in the platform, we can also build and manage the resource management by ourselves, or use whiteboards, Shared screens and PPT, etc. In addition to operation, discussion and other issues, let them do feedback and print pictures in the group,

can also turn on the student microphone and camera for interactive communication. Use live and online presentations and operations as much as possible. Middle can design good every process and link, including group operating in the video demonstration (sharing the screen broadcast, also after record operating screen sharing, students can demonstrate), Shared whiteboard, analytical answer questions, questions (named selecting examination, always gave the students a sense of online), put a1 (set with a group of vote choice, to ensure that students have in class), summary (upload file sharing, video), homework and homework last review, and so on.

### **3.3. Offline preparation is very important**

Before class, the platform should be used to prepare materials and design teaching plans, especially to strengthen the construction of audio and video resources, which are easy to be accepted by students. We can improve the efficiency with the help of text-to-speech interconversion tool.

On the basis of good application of platform tools, the focus of online courses is to design the theoretical knowledge points and methods of teaching and presenting examples. The focus is to make students feel online at all times. These processes and links will generate a large amount of online teaching data, providing a foundation for the realization of accurate data analysis and accurate teaching.

### **3.4. To avoid students "stand on one's side apparently but actually on another's"**

The downside to online teaching is that students tend to lose focus. More questions and answers and interactions should be set up to create a good classroom environment and learning atmosphere. Learning methods and content cases should have a sense of viscosity, participation, relevance, so that children can actively immerse in the learning content; We can also combine the authentication mechanism and so on, otherwise we will not know how to cherish the online learning opportunity like "the book cannot be read unless borrowed"; At a deeper level, it is necessary to cultivate self-learning ability, provide online experiments and learning platforms to make knowledge "move", and design more attractive online experiments or learning content.<sup>[1]</sup>

In fact, online teaching should have the awareness of competing for users' online time with digital video, online games and online literature, because they are all online digital products in form, and their competitiveness is inferior to nature. We need to think about how to avoid this adverse situation.<sup>[3]</sup>

## **4. The teaching reform mode of UAV application should be formed step by step**

### **4.1. Set up "Project-based Course Teaching Group"**

With "unmanned aerial vehicle (UAV) is applied to safety management training" course as an example, this course is helpful to cultivate students' practical ability and innovative thinking, but if the promotion of this kind of course for the public elective courses, elective courses, number, and time may be relatively concentrated in the evening, need to have enough UAVs, such as experimental environment conditions, so is a big challenge for teachers and experimental conditions. So we hope that through online simulation experiments or setting up virtual simulation experiment platform for online teaching experiment, to form a "project course teaching group" the curriculum according to online teaching link and the function module partition, the teacher according to their own characteristics, the specialty is responsible for the corresponding modules, collective assistance, division of online teaching, to solve the

problem of insufficient teaching and experimental conditions are relatively. Other professional teachers with modern education technology center, youth corps committee, tube, counselor, psychology teacher collaboration, professional technical force, different from the online teaching mode innovation, online teaching methods, online teaching technology, student data statistical analysis, psychological and ideological and political guidance Angle do the preparatory work, such as division of segments the whole process of data collection, sorting, to adapt to the different requirements and conditions; It can also be combined with enterprise practice to achieve a variety of cross-professional applications and practices.

Using special organization form of online teaching, break the traditional teaching of a teacher to complete a course, in charge of a class, in the form of multiple class Shared a course according to online teaching link and the function module division, including online lecture, demonstration, interactive, FAQ, examine, resources construction, online teaching method research, technical support, online teaching student data statistical analysis, pattern innovation research, etc. As long as teachers focus on the modules according to their own characteristics and expertise, they do not need to be distracted to consider all aspects of the course, but they can share all teaching resources and information. This is more conducive to each teacher to fully tap their own professional expertise, division of labor and cooperation to do their own links to do the best.

#### **4.2. "One person, one case" customized practical teaching**

Online teaching and simulation experiment can carry out learning practice anytime and anywhere, which is convenient for fragmented learning. Combined with the teaching group, online q&a and discussion can be arranged to ensure that problems do not delay and promote independent learning and personalized learning.

Online classes have a natural advantage of data have to benefit for the convenience of the online teaching to collect data, the whole process of teaching according to the result of learning behavior, operation, teaching feedback and assessment of accurate analysis and precise teaching and learning is beneficial to realize hierarchical, small classes, personalized customization "one person one case" teaching;<sup>[2]</sup> Through big data analysis, pattern innovation and development, automatic, intelligent accurate learning situation analysis, early warning and accurate teaching, students can have more targeted practical resources for online learning and practice. In addition, learners' experience model can be built based on big data, and the online courses and teaching effects can be evaluated in combination with question bank construction and assessment system. Standardized assessment and knowledge acquisition can be used to improve the efficiency and accuracy of "one person, one case" customized practical teaching.

#### **4.3. Innovation of online teaching mode**

The teaching data can analyze the feasibility, advantages and disadvantages of the teaching method from a multi-dimensional perspective, especially conducive to mining the deep learning and teaching state that cannot be perceived by the traditional teaching method, which enables each person to carry out independent learning according to his own learning situation and characteristics. According to different learning states and stages (based on basic education data resources), effective and accurate teaching methods and measures based on data improvement are analyzed from the corresponding teaching strategies and teaching measures, so as to promote the innovation of education management.

### **5. Conclusion**

The combination of the teaching application of big data and the form of project-based teaching group can achieve the optimization of the state matching between the two sides of online teaching. Teachers are encouraged to carry out model innovation in terms of strategies and

technical methods of accurate learning situation analysis based on big data, as well as online teaching such as accurate teaching.

Such innovation and optimization of teaching resources and teachers more scientific and reasonable configuration, combined with the system to follow up and change in policies, transform its resources and manpower cost savings in order to promote teachers' further study, improve the dividend, encourage teachers and students to participate in the educational reform, improve efficiency and teaching effect, implement the tripartite win-win between teachers and students and the school.

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2. Fujian Police College 2020 Online Teaching Reform Research Project "Online Teaching Innovation Of Practical Courses Based On Accurate Data Management And Online Simulation Experiment".

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