

Application of Online-and-Offline Blended Teaching Mode in Teaching Aviation Meteorology

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Abstract—Online-and-offline blended teaching mode is popular in universities for recent years, and it is applied in aviation meteorology course. The characteristics of application are discussed in this paper including audience objectives, teaching aims, teaching implementation and teaching evaluation methods. This teaching mode can transform the role of teachers, extend students' space and time of learning, enhance enthusiasm and creativity of students.

Keywords: *online-and-offline blended teaching mode, aviation meteorology, micro-lesson*

I. INTRODUCTION

Teachers were the main part of teaching in universities once, teachers dominated the whole teaching activities in class, and students participated the activities as passive individuals [1]. In recent years, online teaching mode has become more and more popular. MOOC (Massive Open Online Courses) and micro-lesson are two primary online teaching modes [2], they provide new idea for teaching. Some universities have developed their characteristic online courses and these courses can be obtained online for everyone, such as official websites of universities, Khan Academy, Coursera, NetEase Open Class, etc. Students and people who want to learn can participate courses online.

Courses, especially information technology, economics, management science, art, are multitudinous online, while aviation related courses can hardly be found online. Aviation meteorology is one of required courses for some majors of aviation, it contains a great many knowledge points and needs combination of theories and practices [3]. Expository method makes students receive amounts of knowledge passively, online-and-offline blended teaching mode may improve the efficiency and effect [4].

II. AUDIENCE OBJECTIVES

A. Students of Flight Technology Major

Aviation meteorology is one of required courses of flight technology major. For this major, students must pass all the

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ground theoretical courses, then take three license tests, after pass these three tests, they are allowed to further practical courses. Aviation meteorology is contained in these three license tests. And in practical courses, students need to make pre-flight plan according to meteorological condition.

B. Students of Flight Dispatch Major

For flight dispatch major aviation meteorology is also an important required course. Flight dispatchers must have a solid foundation of aviation meteorology to make pre-flight plan and do the dispatch release.

C. Students of Air Traffic Control Major

Air traffic control need aviation meteorological knowledge to ensure flight safety during take-off, climbing, cruising, approaching and landing in case of hazard weather and adverse atmospheric condition. Hence aviation meteorology is essential for air traffic control major.

D. People Interested in Weather and Aviation

With the development of civil aviation, more and more people choose plane as their way to travel, and population of aviation enthusiast are increasing. They may want to know the relationship between weather and flight, such as why the flight delay under shower weather or fog condition, why the safety belt must fasten during the whole flight, etc. They need a professional and efficient way to get relative knowledge.

III. ONLINE-AND OFFLINE BLENDED TEACHING MODE

For those audience objectives mentioned above, online-and-offline blended teaching mode is the most optimum way. Before class, preview online assignments are given by teacher, and students must complete online preview assignments including basic knowledge points, reference reading and relative questions. In class, students raise questions and teacher explains using offline method like expository method and online method such as videos, analyzing relative news or accidents. After class, students can raise questions and discuss online, teacher can join the discussion and rethink of the feedback of students.

A. Teaching Aims

Aviation meteorology is a course featured with theory and practicality. Its aim is to let the students master basic meteorological knowledge, utilize the weather condition in practice, get familiar with basic methods of weather analyze and forecast and apply weather information to practice. In practice, advantageous weather condition should be fully utilized, adverse weather should be avoided to prevent weather induced hazard and ensure the flight safe.

B. Teaching Implementation

Online-and-offline blended teaching need to be designed elaborately to exploit the advantages of online teaching and offline teaching to the full. Online teaching should not be main method but the extension and supplement of offline teaching [5]. In order to enhance the teaching effect, key points of blended teaching mode are described as follows.

- Online teaching is used to transform the role of teachers. Teaching syllabus, teaching material and reference material (including videos, websites, PowerPoint files, etc.) are listed on the website. Students can preview online and teacher can concentrate on key points, difficulties and assessments in offline class. Teachers become organizer, guider, problem solver and evaluator of teaching rather than relater of textbook. For example, in chapter 6 (Atmospheric Condition of low-level and middle-level flight) of aviation meteorology course, students preview relative concepts and theories online using micro-lessons, videos and PowerPoint files. Then in offline class, teacher does not describe the evident knowledge in detail, but introduce them synoptically. And cases learning are organized by teacher in offline class, teacher need observe and master how well the students learn and apply.
- Online teaching is used to extend space and time of learning. Time of offline class is limited, teachers can use time to explain key points and difficulties in detail, organize and supervise students to master contents of certain chapter and section. Some students who do not follow the schedule can use online courses to catch up, while some students who have finished their learning can find more profound and extensive knowledge online.
- In aviation meteorology online course, there are micro-lessons, videos, PowerPoint files and other materials for students and people interested in this course. Several knowledge points are explained in micro-lessons. For example, in micro-lesson 'Visibility', concepts are explained, different visibility conditions are shown, why the flight will be canceled under fog or haze weather is stated. Students can preview before offline class and review after offline class. For those people interested in aviation meteorology can learn what they want.
- Combined offline teaching with online teaching will enhance enthusiasm and creativity of students. Online teaching is conducive to learn on students' own initiative. But the defect is that students may take the

online course as tasks to be done, they may cope them with the negative. So offline teaching must be attached importance to. Aviation meteorology is a course featured with theory and practicality, on the one hand, discussion, group assignment and testing on study platform of online course can enhance the teaching supervision, on the other hand, assessment, evaluation, practical teaching guidance and innovation appraisal are used to improve the effect and efficiency of offline teaching. For instance, in chapter 11 and 12 (Aviation Meteorological Information), making a pre-flight plan using meteorological information in groups is an online assignment, in offline class, students introduce their pre-flight plan and why they make the plan like that, and teachers comment on the briefing. So there is more time for students to know whether and why their consideration is reasonable.

- Teachers must pay attention to the feedback of learning, including questions, assignments, testing and evaluation of students. Deficiencies of teaching and learning can be found through that. Teachers should attach importance to the otherness and individuation, and encourage them.
- At the first stage of aviation meteorology online-and-offline blended teaching mode, micro-lesson is the main method of online teaching, videos, reference material and PowerPoint files are supplement. Massive open online course can be in the future so that more students can join the course.

C. Teaching Evaluation

Whether online teaching or offline teaching, teaching evaluation is an essential way to promote students' active learning. In online-and-offline blended teaching mode, teaching evaluation consists online part and offline part.

According to the characteristics of aviation meteorology, key points of assessment are basic theories and comprehensive application. Explicit knowledge is the main evaluation object for online evaluation, while tacit knowledge like practical application are the primary evaluation object for offline [6]. Final score is consisted by online assignment and offline test. For online assignment, students can analyze accidents or incidents and make pre-flight plan using meteorological knowledge in group, then teachers organize offline demonstration, discussion and comments, and give marks to students' work. Offline test is mainly for basic theories inspection, and accounts for lower percentage than conventional teaching mode [7].

This kind of evaluation can build a synergic and coadjutant learning environment. Students will become more proactive, explorative and synergistic through finishing online assignment, and offline evaluation and discussion will make students to compare, analyze and think, so that their comprehension of the knowledge will be consolidated.

IV. CONCLUSIONS

With the development of civil aviation, demand for professional talents is changing, professional curriculums are changing, teaching mode is changing, too. Aviation meteorology is one of required courses of flight technology major, flight dispatch major and air traffic control major, online-and-offline blended teaching mode is used in aviation meteorology teaching. The blended teaching mode is not the displacement of conventional teaching but change of traditional one. In online-and-offline teaching mode, organization of teaching, tacit knowledge teaching and evaluation are the key points. In application of online-and-offline blended teaching mode, design of teaching mode must be based on characteristics of course, and teaching law suits the course should be summarized for further teaching reform.

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