Research on Exact Flight Theory Learning Strategies for Non-flight Instructors of Flight Universities

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Abstract. In flight universities where highly professional pilots are cultivated, there are only a few flight instructors among the faculties most of whom do not have professional experience. Therefore, it is inevitable that flight teaching deviates from the main line, which will affect the quality of pilot training. Based on the transfer and time-space compression theory and from the related perspectives, this Paper analyzes the reasons why non-flight instructors in flight universities shall learn flight theories and also proposes exact learning strategies.

Introduction

As the global flight industry thrives, flight universities are no longer able to meet the demand on the quantity of pilots required nowadays. Although flight personnel must be with strong professional skills due to the specialty of flight industry, instructors, except for only a few flight instructors among the faculties, have no professional experience and do not master complete and systematic flight theories, which will affect the quality of pilot training inevitably. At present, flight behaviors are always involved with pilots only, and lots of flight relevant activities are totally irrelevant to others, even the non-professional teachers of flight universities. This special phenomenon has gradually led to the group division (flight personnel and ground personnel) inside military aviation and civil aviation. Along with the rapid high-tech development and evolution in the field of aviation technology, as well as the increasing urgent demand of flight theory innovation, there shows up significant bottlenecks and deal ends in the flight theory research carried out by flight personnel, restricted by lots of factors. Base on this situation and considering that many studious non-flight major teachers have the intention to research flight theories or are engaging in flight education, we brought up menu complementing-brushing up on flight theory study for quick and systematic flight theory learning, after summarizing the experience of pilot talent cultivation and with positive transfer and time-space compression theory as guidance, in order to explore a strategy for flight recognition and research and flight theory development and innovation, compensate for the shortage in the human resources of flight theory research, and form an interactive and complementary relationship between non-flight personnel and flight personnel together with simulated flight and flight experience.
Theory Basis

Positive Transfer Theory

Transfer is the process by which learners use the concept of their original knowledge structure to analyze and summarize new tasks, and reveal the common essence between new and old tasks, and also the process to “assimilate” recognition structure and new tasks \(^1\). Transfer is realized in the process of knowledge utilization and active and positive thinking by learners when they fully play their main body role.

Learning of any kind will be affected by the prior knowledge and experience, skills and attitude of learners, and transfer will be generated as long as learning occurs \(^2\). If a kind of learning can promote another kind of learning positively, then it is called positive transfer; conversely, if this learning will disturb or inhibit the learning of another kind, it will be called negative transfer. Moreover, transfer can be affected by learning methods and learning materials.

Obviously, the learning of flight theory is a typical kind of positive transfer learning as it shall be. For this reason, learners are required to use positive transfer to promote learning effects in addition to the understanding of the common factors of learning materials and correct methodological direction of learning process.

Time-space Compression Theory

Jean Francois Lyotard, the French philosopher pointed out in his work The Postmodern Condition that the core meaning of time-space compression theory is that “due to the transcending strategy and leap-forward development they implemented, developing countries will walk through the roads that developed countries have worked through for a very long historical period in shorter time. Comparing with developed countries, their time and space seem compressed”\(^3\). In general, time-space compression includes positive effect and negative effect.

The national construction and development process of China is exactly verified by the time-space compression theory. The positive effect enabled China to finish its construction tasks, which were completed by developed countries in a very long time, in a really short time period by virtue of our advantage of backwardness, making us achieve a lot in national modern construction; while the negative effect made the contradictions and problems that were generated in a long historical period act out in a compressed short time, which brought lots of unprecedented pressures and challenges to national modern construction and leap-forward development.

The menu complementing- brushing up on flight theory study strategy for non-flight instructors is also included in the application field of time-space compression theory. The positive effect, based on the existing knowledge system, enables non-flight instructors to finish complementary learning of flight theories within a relatively short time, by taking advantages of the special advantages of flight universities in flight training and the individual advantages of teaching and research professionals. There is no doubt that various contradictions between work and learning and the combination problem of profession and post in the process of complementary learning process. In this case, solutions shall be sought for from both the organizational and individual aspects.
Strategy Design

Academic Learning Strategy Design

Considering most of the non-flight instructors who are interested in flight theory learning are teaching and researching professionals with advanced degrees majored in science or engineering, with a solid foundation of scientific culture and also insufficient and non-systematic flight experience and flight theories, we plan to abandon the ideological and political education and P.E courses offered in undergraduate education for current flight cadets, and tease out the required courses on general foundations and aviation theories, so as to pave a way for learning of comprehensive cognitive flight curriculum. Each learner can select courses from the “menu” and formulate a learning program based on these courses according to their own characteristics in the self-studying process.

In the regular pilot training program, the in-class curriculum module is divided into political theory, leadership foundation, scientific and cultural basics, engineering technology basics and professional basics. The learning programs of non-flight instructors are selected from and planned based on scientific and cultural basics, engineering technology basics and professional basics.

This module is further detailed into humanities and social sciences, natural sciences and common tools. Courses about humanities and social sciences are not required to taken into consideration. Natural sciences courses are divided into 2 curricula groups, mathematics and physics, and they are the mathematical and physical basics for flight theories. Each participant can review them according to their own conditions so as to lay a more solid foundation and avoid eagerness for quick results. Courses of common tools are divided into two task groups, foreign language and computer, and they are the basics for flight theory learning. Learners can replenish and review these courses by quick reading, according to personal learning basis.

Courses of basic engineering technology include engineering mechanics, fundamental of electrical & electronic technology, introduction to information technology, aerodynamics and aircraft flight mechanics. According to personal condition, contents of this part can be mastered by review or learning new knowledge.

Professional basic courses include introduction to aeronautics & astronautics, introduction to equipments, aerial navigation, and principles of airborne equipments, aeronautical meteorology, aircraft structure and power plant, theory of model aviation and model conversion theory. These courses are preparation for entering flight industry; therefore, participants shall learn them carefully and deeply and master the essentials. Moreover, the introductions should be fully understood, theories should be made clear, and model aviation theories should be further studied and researched.

The above 3 kinds of courses can be finished within 2 years. It is preferred to carry all teaching materials in hands in order consult them at any time when they are needed. In the future, a Flight Knowledge Manual can be researched and formulated to tease the knowledge systems for academic flight theory learning more systematically.

Flight Simulation Strategy Design

For the special advantages, such as flexibility, efficiency and safety, flight simulation training is becoming an important teaching method for flight training. After finishing academic learning, learners should participate in flight simulation training to experience flight practices, so as to
deepen their understanding of theories and apply the experiences from the practice of simulating training to theory learning, and then complement learning weakness more pertinently. Basic flight courses, such as taking off, climbing, turning, descending, aerodrome approach and landing, can be arranged for non-flight instructors according to the procedures regulated in flight program, so as to make learners get certain knowledge about flight senses, flight awareness and flight appearance. Learners can also take targeted task training according to the detailed teaching and research posts that are engaged in, so as to perceive the flight actions and the whole flight activity purposefully and systematically. In this way, more people can learn about flight at different levels at low equipment consumption.

**Flight Practice Strategy Design**

After finishing academic learning and simulated flight, learners should carry out a series of flight practices in a planned manner to raise flight theories to real practice of knowledge. Flight universities can arrange teachers to experience flight training and real flight in a planned way, so as to strengthen airborne situational awareness and verify the effect of theoretical learning through practices.

**Interactive Research Strategy Design**

After learners master certain flight theory and practice accumulation, and also the perceptual knowledge of flight, they can take part in the research of flight theories with their own professional knowledge, and also discuss and communicate with flight instructors, so as to close the distance between theoretical research and flight training and promote the deep integration of aviation theory and flight practice. Based on task items, the research management department of flight universities can build research teams with non-flight instructors and flight instructors who can take their own advantages to form a flight theory research and innovation team.

**Summary**

Flight learning of non-flight instructors is not only one of the critical development and reform tasks, but also the responsibility for all the teaching and researching staffs of flight universities. It can definitely improve the quality of pilot training. In the practice of organizing and participating in the preparation and translation of flight education and training materials, I experienced the effect of transfer theories in flight learning; therefore in person, so I am sharing it with my peers here deeming it as my understanding of an academic research, for the purpose of promoting the prosperity of the research on national military and civil aviation flight theories.

**References**


