Task I.F: Techniques of Flight Instruction

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Lesson Overview

Overview

The student should develop knowledge of the elements related to the different techniques of flight instruction as described in the CFI PTS.

References

- *FAA-H-8083-9A.*
- AIH, Chapter 9: Techniques of Flight Instruction
- PDF Version

Elements

1. Obstacles in Learning During Flight Instruction
2. Demonstration-Performance Training Delivery
3. Positive Exchange of Controls
4. Sterile Cockpit
5. Use of Distractions
6. Integrated Flight Instruction
7. Assessment of Piloting Ability
8. Aeronautical Decision Making

Schedule

1. Discuss lesson objectives
2. Present Lecture
3. Ask and Answer Questions
4. Assign homework

Equipment

1. White board and markers
2. References
3. iPad / Projection Device

IP Actions

1. Discuss lesson objectives
2. Present Lecture
3. Ask and Answer Questions
4. Assign homework

SP Actions

1. Participate in discussion
2. Take notes
3. Ask and respond to questions

Completion Standards

The student can competently explain and teach the range of topics discussed in this lesson.

Instructor Notes

Attention

Interesting fact or attention-grabbing story.

Overview

- Review Objectives and Elements/Key ideas.

What

Practical strategies flight instructors can use to enhance their instruction, the demonstration-performance training delivery method of flight instruction, integrated flight instruction, positive exchange of flight controls, use of distractions, obstacles to learning encountered during flight training, and how to evaluate students, followed by a look at Aeronautical Decision Making.

Why

Flight instructors are a critical part of the aviation system and must competently pass along standards and practices that encourage safe flying to encourage safer skies for all pilots.

Lesson Details

Obstacles in learning during flight instruction

There are various obstacles to learning which must be watched for, and addressed by, the instructor. Some of the more common ones are enumerated here.

Feeling of unfair treatment

Students who believe their instruction is inadequate, or that their efforts are not conscientiously considered and evaluated do not learn well. Assignment of challenging goals can make

Impatience to proceed to more interesting operations

Impatient students don't understand the need for training and only desire their final goal. But, basics must be mastered to complete the whole task. Disinterest can grow from unnecessary repetition and drill on operations that are adequately learned.

Worry or lack of interest

Think about a time when you wanted to focus on something complicated, or even talking to a co-worker but thinking about something that is going on at home. A crisis or problem in your personal life will without question bleed over to your flight training. A worried or emotionally upset student is not ready to learn. Outside influences may create stresses that are brought into the training sessions.

Physical discomfort, illness, fatigue, and dehydration

Physical issues will, obviously, hamper the learning process. Instructors need to be on the lookout for chronic fatigue as opposed to acute fatigue.

Apathy due to inadequate instruction

If the student feels the instructor is not prepared, it can impact learning. It is understandably frustrating when the instructor is poorly prepared or seems to not care.

Anxiety

The student must be comfortable with the instructor in the airplane. A healthy environment promotes learning.

Demonstration-performance training delivery

Best used for the mastery of mental or physical skills that require practice, the demonstration-performance method is based on the principle that people learn by doing. The instructor first shows the student the correct way to perform an activity and then has the student attempt the same activity. This method of training is divided into five phases:

- Explanation
- Demonstration
- Student Performance
- Instructor Supervision

- Evaluation

Positive exchange of controls

1. When the flight instructor wants the student to take control of the aircraft, the instructor says to the student: **“You have the flight controls.”**
2. The student acknowledges immediately by saying, **“I have the flight controls.”**
3. The flight instructor again says: **“You have the flight controls.”**

Sterile cockpit

14 CFR §121.542 requires flight crewmembers to refrain from nonessential activities during critical phases of flight, which are defined as all ground operations involving taxi, takeoff, and landing, and all other flight operations below 10,000 feet except cruise flight.

Use of distractions

To determine that the student possesses the skills required to cope with distractions while maintaining the degree of aircraft control required for safe flight.

Pilots at all skill levels should be aware of the increased risk of entering into an inadvertent stall or spin while performing tasks that are secondary to controlling the aircraft.

Techniques for Teaching Distraction

1. Drop a pencil, ask the student to pick it up.
2. Ask the student to determine a heading to an airport using a chart.
3. Ask the student to reset the clock.
4. Ask the student to get something from the back seat.
5. Ask the student to compute true airspeed with a flight computer.
6. Ask the student to identify terrain or objects on the ground.
7. Ask the student to identify a field suitable for a forced landing

Integrated flight instruction

A technique of flight instruction in which students are taught to perform flight maneuvers by reference to both the flight instruments and outside visual references from the time a maneuver is first introduced.

Assessment of piloting ability

There are many types of assessment, but the flight instructor generally uses the following to ascertain knowledge or practical skill levels:

1. Review
2. Collaborative assessment
3. Written tests
4. Performance-based tests

Aeronautical decision making

Aeronautical decision making (ADM) is a systematic approach to the mental process used by aircraft pilots to consistently determine the best course of action in response to a given set of circumstances.

- Systematic = Consistent!

Steps of ADM

1. Define the problem.
2. Choose a course of action.
3. Implement the decision.
4. Evaluate the outcome.
    - As a flight instructor, it's your responsibility to have an iron-clad understanding of *all* the emergency procedures in the POH of the aircraft you're managing. **Anything short of thorough understanding is unacceptable.**

Reference: Various Tools to Practice ADM

- The **3Ps**
    - **Perceive** the given set of circumstances for a flight.
    - **Process** by evaluating their impact on flight safety.
    - **Perform** by implementing the best course of action.
- **PAVE** - divides the risks of flight into four categories:
    - **P** ilot
    - **A** ircraft
    - en **V** ironment
    - **E** xternal Pressures.
- **CARE** - determine level of risk by assessing the:
    - **C** onsequences
    - **A** lternatives
    - **R** eality
    - **E** xternal Pressures

- **TEAM** - manage the risk by deciding whether to:
  - **T**ransfer
  - **E**liminate
  - **A**ccept
  - **M**itigate.
- **DECIDE** - Simple and logical decision making
  - **D** etect a change needing attention.
  - **E** stimate the need to counter or react to the change.
  - **C** hoose the most desirable outcome for the flight.
  - **I** dentify actions to successfully control the change.
  - **D** o something to adapt to the change.
  - **E** valuate the effect of the action countering the change.
- The **5Ps** - used to assess risk in each of the five categories:
  - the **P**lan
  - the **P**lane
  - the **P**ilot
  - the **P**assengers
  - the **P**rogramming.

Conclusion

The tools and techniques involved in flight instruction are broad, and varied. It is important to bring all techniques and resources to bear to result in a good outcome.

ACS Requirements

To determine that the applicant exhibits instructional knowledge of techniques of flight instruction by describing:

1. Obstacles to learning during flight instruction.
2. Demonstration-performance training delivery.
3. Positive exchange of controls.
4. Sterile cockpit.
5. Use of distractions.
6. Integrated flight instruction.
7. Assessment of piloting ability.
8. Aeronautical decision making.

Memory Sheet

1. **Obstacles to learning during flight instruction.**
    a. Feeling of unfair treatment
        i. Learners who believe their instruction is inadequate, or that their efforts are not conscientiously considered and evaluated, do not learn well
    b. Impatience to proceed to more interesting operations
        i. Impatient learners don't understand the need for training and only desire their final goal
    c. Worry or lack of interest
    d. Physical discomfort, illness, fatigue, and dehydration
    e. Apathy due to inadequate instruction
        i. Be prepared to teach competently, learners are spending large amounts of money on training
        ii. It is frustrating when the instructor is not prepared/doesn't care
    f. Anxiety
        i. Learners must be comfortable/confident in the instructor and the airplane
        ii. A healthy atmosphere is very beneficial to learning
2. **Demonstration-performance training delivery.**
    a. This training method has been in use for a long time and is very effective at teaching kinesthetic skills. Four phases:
        i. Explanation Phase
            A. Instructor discusses lesson objectives, completion standards, and a thorough pre□ight brie□ng
            B. Learners need to know what they will learn, and how they will learn it
        ii. Demonstration Phase
            A. Show the actions necessary to perform a skill
            B. May describe the actions simultaneously
        iii. Learner Performance and Instructor Supervision Phase
            A. Learner performs the skill and learns from repetition
            B. Instructor supervisors and offers advice
        iv. Evaluation Phase
3. **Positive exchange of controls.**
    a. Incident statistics show a need for emphasis on a change of control
        i. Numerous accidents have occurred due to a lack of communication or misunderstanding of who had control of the aircraft, particularly between learners and instructors

b. There must be a clear understanding of who has control of the aircraft
c. Use 3-way exchange when giving (or taking) the controls:
    i. “You have the flight controls”
    ii. “I have the flight controls”
    iii. “You have the flight controls”

4. **Sterile cockpit.**
    a. The idea is to avoid non-essential activities during critical phases of flight
        i. Critical phases are taxi, takeoff, landing and all other operations below 10,000’ other than cruise
    b. Came from the airlines, but beneficial to all
5. **Use of distractions.**
    a. Most spin/stall accidents occur when the learner is distracted from flying the plane
        i. A sterile cockpit is important
    b. The FAA encourages instructors to simulate scenarios that could cause the learner to be distracted
        i. This teaches the learner to divide attention
    c. A learner must be able to take charge and tell passengers, the DPE, etc. when something is distracting
6. **Integrated flight instruction.**
    a. The learner is taught to perform maneuvers by outside visual and by reference to flight instruments
    b. Development of Habit Patterns
        i. Teach it right the first time and reinforce desired behavior
        ii. Learners who monitor instruments and outside references from the start will develop this habit
    c. Operating Efficiency
        i. As learners get better at mastering their flight technique, aircraft performance will also increase
    d. Procedures
        i. Explain the control inputs used and the associated visual and instrument references
    e. See and Avoid
        i. From the start, the instructor must ensure learners develop the habit of looking for other traffic at all times
        ii. It is always the pilot’s responsibility to see and avoid
            A. Don’t let them depend on you, teach safety first
        iii. Perform clearing turns before maneuvers
        iv. Understand and follow the right of way rules

7. **Assessment of piloting ability.**
    a. It's important to keep a learner up to date with their progress
    b. Demonstrated Ability
        i. The learner's abilities must be based on standards of performance
            1. ACS, PTS, syllabus, etc.
    c. Postflight Evaluations
        i. Keep the learner up to date with progress
        ii. Keep a written record
    d. Correction of Learner Errors
        i. Don't immediately take controls during a mistake
        ii. If a learner can properly perform a maneuver but does not fully understand the principles or objectives, have them vary the performance slightly, combine it with other operations, or apply the same elements to the performance of other maneuvers
    e. Pilot Supervision
        i. Before endorsing a learner for solo flight ensure consistent ability in all required maneuvers
    f. Dealing with Normal Challenges
        i. Learners must be able to handle challenges thrown at them in the air
        ii. Ensure they are competent and confident with challenges on the ground
    g. Visualization
        i. Have learners visualize flight in normal conditions and add unforeseen events to see how they would handle them
        ii. While on the ground, present the learner with a situation in the air and have them talk through getting safely back to the ground (don't necessarily tell them what's wrong at the beginning, tell them what they would see, hear or feel that would indicate there is a problem and let them figure out what is causing the issue and how to handle the situation)
    h. Practice Landings
        i. Full stop landings (not just touch and goes)
            A. Full stops help the learner learn aircraft control and checklist usage
        ii. Stress touching down in the first third of the runway, and centerline control
            A. Go around if outside of requirements
            B. Requirements should vary based on the learner's progress and abilities
8. **Aeronautical decision making.**
    a. A systematic approach to the mental process used by aircraft pilots to consistently determine the best course of action in response to a given set of circumstances
        i. It is estimated that approximately 80% of all aviation accidents are a result of human

factors

b. Teaching pilots to make sound decisions is the key to preventing accidents
c. The Decision-Making Process
    i. Defining the Problem
        A. Recognize that a change has occurred and the expected result did not occur
        B. Incorrectly defining the problem can create a worse problem
    ii. Choosing a Course of Action
        A. Evaluate the need to react and determine what available actions can solve the problem in the time available
    iii. Implementing the Decision and Evaluating the Outcome
        A. Continue to evaluate how the decision will affect the flight
    iv. Very similar to Maintain Aircraft Control, Analyze the Situation, Take the Proper Action, Land as Soon as Conditions Permit, as discussed above
d. Dangerous Attitudes - Factors Affecting Decision Making
    i. **Anti-authority** - "Don't tell me."
        A. Follow the rules. They are usually right.
    ii. **Impulsivity** - "Do it quickly."
        A. Not so fast. Think first.
    iii. **Invulnerability** - "It won't happen to me."
        A. It could happen to me.
    iv. **Macho** - "I can do it."
        A. Taking chances is foolish.
    v. **Resignation** - "What's the use?"
        A. I'm not helpless. I can make a difference.
e. Stress Management
    i. A certain amount of stress is normal/good
    ii. Too much can be very bad
    iii. 3 types of stress that affect performance
        A. Physical
        B. Physiological
        C. Psychological
f. Use of Resources
    i. Use all available resources,
    ii. Internal Resources
        A. Found in the flight deck during flight

I. Equipment, systems, charts, books, etc.
II. Ingenuity, knowledge and skill
III. Other passengers

iii. External Resources
A. ATC and flight service specialists
I. Traffic advisories, vectors, weather info, emergency assistance

iv. Workload Management
A. Plan, prioritize, and sequence to prevent overload
B. Prompt learners to prepare for high workload situations
I. Don’t wait until you’re in the situation
II. i.e. prepare for the approach before it begins
C. Be able to recognize high workloads
I. Faster paced work along with divided attention
II. Stay ahead as much as possible to prevent high workloads
III. Manage tasks in order of importance when behind