

Appendix F

CFI Weather Training Survey – Paper/Pencil Version

CERTIFIED FLIGHT INSTRUCTOR SURVEY

This survey was designed to gather important information from Certified Flight Instructors regarding their opinions about and practices in training student pilots about weather-related topics. It was written specifically for CFIs who are currently instructing student pilots or who, within the last three years, have instructed student pilots (who are working toward their private pilot licenses).

If you have not instructed a student pilot within the last three years, please pass this survey on to another CFI colleague who has instructed student pilots within the past three years.

Thank you for your assistance in helping us to gather this important information.

Section I

1. Please circle the amount of time that best indicates the total **amount of training** you give your student pilots in the following weather-related areas, during ground school or in-flight (including preflight planning and post-flight briefings), **over the entire course of their training**. Do not include time your students study this topic on their own. **N/A** = No training given by you on this topic. **A Little** = approximately 1 to 30 minutes. **A Great Deal** = approximately 4-8 hours.

I. Causes of Weather & Weather Patterns

| | | A Little | | | | A Great Deal | |
|--|-----|----------|---|---|---|--------------|--|
| a. General Causes of Weather (e.g., Heating of the Earth, Atmospheric Circulation, etc.) | N/A | 1 | 2 | 3 | 4 | 5 | |
| b. Local Weather Conditions and Patterns | N/A | 1 | 2 | 3 | 4 | 5 | |
| c. Air Masses, Fronts, and Pressure Systems | N/A | 1 | 2 | 3 | 4 | 5 | |
| d. Stable and Unstable Air | N/A | 1 | 2 | 3 | 4 | 5 | |
| e. Temperature and Temperature Inversions | N/A | 1 | 2 | 3 | 4 | 5 | |
| f. Moisture, Precipitation and Rain | N/A | 1 | 2 | 3 | 4 | 5 | |
| g. Clouds and Ceilings | N/A | 1 | 2 | 3 | 4 | 5 | |
| h. Fog and Dewpoint | N/A | 1 | 2 | 3 | 4 | 5 | |

II. Weather Hazards

| | | A Little | | | | A Great Deal | |
|-------------------------------|-----|----------|---|---|---|--------------|--|
| a. Thunderstorms | N/A | 1 | 2 | 3 | 4 | 5 | |
| b. Turbulence | N/A | 1 | 2 | 3 | 4 | 5 | |
| c. Wind Shear and Microbursts | N/A | 1 | 2 | 3 | 4 | 5 | |

II. Weather Hazards, continued

| | | A Little | | | | A Great Deal | |
|-------------------------------|-----|----------|---|---|---|-----------------|--|
| d. Wind and Crosswinds | N/A | 1 | 2 | 3 | 4 | 5 | |
| e. Restrictions to Visibility | N/A | 1 | 2 | 3 | 4 | 5 | |
| f. Icing and Frost | N/A | 1 | 2 | 3 | 4 | 5 | |

III. Weather Services

| | | A Little | | | | A Great Deal | |
|--|-----|----------|---|---|---|-----------------|--|
| a. Flight Service Station Weather Briefings | N/A | 1 | 2 | 3 | 4 | 5 | |
| b. Flight Watch/Enroute Weather | N/A | 1 | 2 | 3 | 4 | 5 | |
| c. Television Weather Sources | N/A | 1 | 2 | 3 | 4 | 5 | |
| d. METARs and TAFs | N/A | 1 | 2 | 3 | 4 | 5 | |
| e. DUATS and Other Internet Weather Services | N/A | 1 | 2 | 3 | 4 | 5 | |
| f. ASOS/AWOS | N/A | 1 | 2 | 3 | 4 | 5 | |
| g. On-field Computerized Weather Stations | N/A | 1 | 2 | 3 | 4 | 5 | |
| h. Weather Radar and Charts (e.g., Weather Depiction Chart) | N/A | 1 | 2 | 3 | 4 | 5 | |
| i. PIREPS | N/A | 1 | 2 | 3 | 4 | 5 | |
| j. AIRMETS, SIGMETS, Convective SIGMETS | N/A | 1 | 2 | 3 | 4 | 5 | |

IV. Weather Regulations

| | | A Little | | | | A Great Deal | |
|---|-----|----------|---|---|---|-----------------|--|
| a. VFR Weather Minimums | N/A | 1 | 2 | 3 | 4 | 5 | |
| b. Weather Minimums by Type of Airspace | N/A | 1 | 2 | 3 | 4 | 5 | |
| c. Setting Personal Weather Minimums | N/A | 1 | 2 | 3 | 4 | 5 | |

V. Weather Interpretation

| | | A Little | | | | A Great Deal | |
|--|-----|----------|---|---|---|-----------------|--|
| a. Predicting Weather Conditions | N/A | 1 | 2 | 3 | 4 | 5 | |
| b. Decoding and Interpreting Weather Information | N/A | 1 | 2 | 3 | 4 | 5 | |
| c. Applying Weather Information in Flight Planning | N/A | 1 | 2 | 3 | 4 | 5 | |

VI. Weather-Related Decision Making

| | | A Little | | | | A Great Deal | |
|---|-----|----------|---|---|---|-----------------|--|
| a. Avoiding Hazardous Weather Situations | N/A | 1 | 2 | 3 | 4 | 5 | |
| b. Handling Encounters with Hazardous Weather | N/A | 1 | 2 | 3 | 4 | 5 | |
| c. Practical & Psychological Factors in Weather-Related Decision Making (e.g., “get-home-itis”) | N/A | 1 | 2 | 3 | 4 | 5 | |
| d. Making a “Go/No Go” Decision | N/A | 1 | 2 | 3 | 4 | 5 | |

If there are other topics that you cover related to weather, when training student pilots, please list them here:

Section II

1. Please rate the **confidence** you have in **your own mastery** of the following weather-related categories.

1 = No Confidence; 2 = Slightly Confident; 3 = Moderately Confident;
4 = Very Confident; 5 = Extremely Confident

| | | | | | |
|---|---|---|---|---|---|
| I. The Causes of Weather and Weather Patterns | 1 | 2 | 3 | 4 | 5 |
| II. Weather Hazards | 1 | 2 | 3 | 4 | 5 |
| III. Weather Services | 1 | 2 | 3 | 4 | 5 |
| IV. Weather Regulations | 1 | 2 | 3 | 4 | 5 |
| V. Weather Interpretation | 1 | 2 | 3 | 4 | 5 |
| VI. Weather-Related Decision Making | 1 | 2 | 3 | 4 | 5 |

Section III

1. As honestly as you can, please rate the **quality** of the instruction you give student pilots with regard to the following weather related topics. By “quality” we mean how well you feel that you teach this information.

N/A = No Instruction; 1 = Very Poor; 2 = Poor; 3 = Adequate; 4 = Good; 5 = Very Good

| | | | | | | |
|---|-----|---|---|---|---|---|
| I. The Causes of Weather and Weather Patterns | N/A | 1 | 2 | 3 | 4 | 5 |
| II. Weather Hazards | N/A | 1 | 2 | 3 | 4 | 5 |
| III. Weather Services | N/A | 1 | 2 | 3 | 4 | 5 |
| IV. Weather Regulations | N/A | 1 | 2 | 3 | 4 | 5 |
| V. Weather Interpretation | N/A | 1 | 2 | 3 | 4 | 5 |
| VI. Weather-Related Decision Making | N/A | 1 | 2 | 3 | 4 | 5 |

Section IV

1. In the blank lines before each category name, please rank order the importance you feel each category has for the training of student pilots (**1** = most important, **6** = least important). Please do not assign the same ranking for more than one category (i.e., do not rank two categories as a tie).

- _____ The Causes of Weather and Weather Patterns
- _____ Weather Hazards
- _____ Weather Services
- _____ Weather Regulations
- _____ Weather Interpretation
- _____ Weather-Related Decision Making

2. Assuming you have a student pilot with no prior training, on average how much total time (in hours) over the entire course of this student's training would you estimate that you spend covering weather-related topics in:

A) Ground school: _____ hours

B) In-flight (including preflight and post-flight briefings): _____ hours

3. What problems, if any, do you see with regard to training student pilots about weather?

4. What factors do you think should be considered in making a "go/no go" decision for a student or new private pilot? Please include all factors, not just weather-related factors.

Section V

In this section we are interested in your opinions and beliefs. Some of these statements are related to weather and some relate to more general topics in aviation and training. Please circle one of the following responses to indicate your opinion about each statement: **SA** = Strongly Agree, **A** = Agree, **N** = Neutral (neither agree nor disagree), **D** = Disagree, **SD** = Strongly Disagree.

- | | | | | | |
|----|---|---|---|----|---|
| SA | A | N | D | SD | 1. I typically don't get into teaching much weather-related information until a student has soloed and is getting ready to start making cross-country flights. |
| SA | A | N | D | SD | 2. Decoding TAFs and METARs is easy for my students. |
| SA | A | N | D | SD | 3. When I don't know the answer to a question a student asks me, I always find out the answer or tell him or her where to find the answer. |
| SA | A | N | D | SD | 4. Knowing the basics of meteorology (e.g., cloud development, pressure systems, etc.) is probably some of the most useful information a student can have related to weather. |
| SA | A | N | D | SD | 5. I complete a thorough pre-flight briefing with my students before every flight. |
| SA | A | N | D | SD | 6. I have never made a mistake when working with a student. |
| SA | A | N | D | SD | 7. Early in their training, I generally set personal minimums for my students without their input. |
| SA | A | N | D | SD | 8. The current minimum number of hours, knowledge, and skills required to become a private pilot is not sufficient for turning out safe and competent pilots. |
| SA | A | N | D | SD | 9. I sometimes feel that students don't study hard enough. |
| SA | A | N | D | SD | 10. There have been times when I have not checked the weather (other than ATIS) before flying. |
| SA | A | N | D | SD | 11. Most students are able to make good "go/no go" decisions without a lot of discussion or instruction. |
| SA | A | N | D | SD | 12. Knowing how to file a PIREP is important for most student pilots to learn. |
| SA | A | N | D | SD | 13. I check to make sure the required paperwork is on board the plane before every flight. |
| SA | A | N | D | SD | 14. The most important information for student pilots to learn regarding weather is how to apply weather information for a given flight. |
| SA | A | N | D | SD | 15. There have been times that I have skipped a thorough preflight inspection of the plane before flying. |
| SA | A | N | D | SD | 16. Occasionally, I have had to work with a student whom I didn't like and found to be disagreeable and difficult. |

SA = Strongly Agree **A = Agree** **N = Neutral** **D = Disagree** **SD = Strongly Disagree**

- SA A N D SD 17. I am always willing to admit when I have made a mistake.
- SA A N D SD 18. I generally feel good about the quality of the instruction that I give related to weather.
- SA A N D SD 19. I never get frustrated by students when they ask me questions.
- SA A N D SD 20. After teaching my students how to obtain weather information, I leave the primary responsibility for obtaining a preflight weather briefing to them.
- SA A N D SD 21. On occasion, I have had doubts about my ability to be a good instructor.
- SA A N D SD 22. The weather questions on the FAA Private Pilot written test (the knowledge test) relate well to the kind of knowledge a private pilot needs to have about weather to fly safely and make good weather-related decisions.
- SA A N D SD 23. There are many students who can't be taught or can't learn how to safely fly a plane.
- SA A N D SD 24. I sometimes have to look up a specific FAR to answer a student's question.
- SA A N D SD 25. I have a good knowledge base about weather-related information.
- SA A N D SD 26. There have been times when I have flown with a student when I probably shouldn't have.
- SA A N D SD 27. Students often have a lot of difficulty learning how to obtain a weather briefing from a Flight Service Station Briefer.
- SA A N D SD 28. I generally feel good about the overall quality of the flight instruction that I give.
- SA A N D SD 29. I feel that CFI's are generally under-appreciated and underpaid.
- SA A N D SD 30. The Private Pilot Practical Test Standards should require more areas of knowledge, related to weather, than are currently required.

Section VI

1. Age: _____

2. Gender: Male Female

3. In what year did you begin flight instructing?

19_____

4. How many total flight hours do you have?

_____ hours

5. How many total hours of flight instruction given do you have? _____ hours
6. How many hours of flight instruction given do you have for the past three years? _____ hours
7. On average, how many student pilots, who are working on their private pilot licenses, do you instruct each year? _____ students
8. How many student pilots, who are working on their private pilot licenses, have you instructed in the past three years? _____ students
9. Are you a full-time or part-time flight instructor?
 Full-time Part-time (please indicate the average number of hours per week: _____)
10. Are you working on building time for employment with an air carrier? Yes No
11. For what category(ies) of aircraft do you hold a certificate(s)? (Please **check all** that apply)
 Airplane Rotorcraft
 Glider Lighter-than-air
12. What certificates/ratings do you hold? (Please **check all** that apply)
 SEL MEL SES MES Instrument Commercial CFI CFII
 MEI ATP A&P Others (Please list): _____
13. Zip Code (to be used for sorting purposes only): _____
14. Please indicate which type of syllabus, if any, you use in your private pilot instruction.
 Self-created Commercially available (name: _____) Do not use a syllabus
15. As a CFI, where do you provide flight instruction? (Please **check all** that apply)
 FBO (Part 61) Flight school (Part 141)
 Freelance (Part 61) Community College
 University Other (please specify): _____
16. In which state(s) do you do most of your flight instruction? _____

Section VII

Many CFIs have discussed difficulties they have had in teaching and assessing pilot weather-related decision making. Some have said such things as “How can you teach decision making? It is really just common sense and a student either has it or he (she) doesn’t.” Similar comments have been made about the difficulty in assessing the quality of a pilot’s weather-related decisions.

However, you may have come up with good and/or creative ways of doing both – teaching weather-related decision making and assessing weather-related decision making. In the boxes below please describe ways that you have developed to **teach and assess weather-related decision making** with your primary student pilots.

If you are willing to have your responses to these two questions (and only these two questions) posted on an FAA website, please check the appropriate box and sign your initials in the space provided below. This website has recently been developed by the FAA Office of Aviation Medicine and your responses might be selected to be posted in a section that assists and gives training suggestions to CFIs. If you do not wish to give permission for your responses to these two questions to be posted to this website, please check the appropriate box below, but please still go ahead and answer the questions for use in this research study. Thanks.

- Yes, I give my permission to have my responses to Section VII, questions 1 and 2 posted to a FAA website designed to assist other CFIs. Please sign your initials: _____
- No, I do not give my permission to have my responses to Section VII, questions 1 and 2 posted to a FAA website designed to assist other CFIs.

1. Please describe ways that you **teach weather-related decision making** to your primary student pilots:

(please use the back of the last page of the booklet if you need more space)

2. Please describe the ways that you assess the **weather-related decision making** of your primary student pilots.

(please use the space below if you need more space)

Thank you very much for your assistance! If you have any comments you would like to make about the survey, please feel to write them above. Then please fold and put the survey in the business reply envelope provided and mail it.

Do not forget to self-address and include the mailing label if you would like to receive a summary of the results of this survey. Mailing labels will be separated immediately from the surveys to ensure the anonymity of your responses.

Thanks again for your help!

Appendix G

CFI Weather Training Survey – On-Line Version

Because of peculiarities in viewing printed .htm documents, the on-line CFI Weather Training Survey is probably actually best viewed on-line. It can be found at:

http://flysafe.faa.gov/Flysafe/archive/cfi_survey/cfi_survey.htm

Appendix H

Impression Management Scale Items

CFI Weather Training Survey – Impression Management and Filler Statements

Impression Management Statements (Positive Direction)

3. When I don't know the answer to a question a student asks me, I always find out the answer or tell him or her where to find the answer.
5. I complete a thorough pre-flight briefing with my students before every flight.
6. I have never made a mistake when working with a student.
13. I check to make sure the required paperwork is on board the plane before every flight.
17. I am always willing to admit when I have made a mistake.
19. I never get frustrated by students when they ask me questions.

Impression Management Statements (Negative Direction)

10. There have been times when I have not checked the weather (other than ATIS) before flying.
15. There have been times when I have skipped a thorough preflight inspection of the plane before flying.
16. Occasionally, I have had to work with a student whom I didn't like and found to be disagreeable and difficult.
21. On occasion, I have had doubts about my ability to be a good instructor.
24. I sometimes have to look up a specific FAR to answer a student's question.
26. There have been times when I have flown with a student when I probably shouldn't have.

Filler Statements (Positive Direction)

1. I typically don't get into teaching too much weather-related information until a student has soloed and is getting ready to start making cross-country flights.
7. Early in their training, I generally set the personal minimums for my students without their input.
9. I sometimes feel that students don't study hard enough.

Filler Statements (Positive Direction), cont.

14. The most important information for student pilots to learn regarding weather is how to apply weather information for a given flight.
18. I feel generally good about the quality of the instruction that I give related to weather.

20. After teaching my students how to obtain weather information, I leave the primary responsibility for obtaining a preflight weather briefing to them.
25. I have a good knowledge base about weather-related information.
28. I feel generally good about the overall quality of the flight instruction that I give.
29. I feel that CFIs are generally under-appreciated and underpaid.

Filler Statements (Negative Direction)

2. Decoding TAFs and METARs is easy for my students.
4. Knowing the basics of meteorology (e.g., cloud development, pressure systems, etc.) is probably some of the most useful information a student can have related to weather.
8. The current minimum number of hours, knowledge, and skills required to become a private pilot is not sufficient for turning out safe and competent pilots.
11. Most students are able to make good go/no go decisions without a lot of discussion or instruction.
12. Knowing how to file a PIREP is important for most student pilots to learn.
22. The weather questions on the FAA Private Pilot written test (the knowledge test) relate well to the kind of knowledge a private pilot needs to have about weather to fly safely and make good weather-related decisions.
23. There are many students who can't be taught or can't learn how to safely fly a plane.
27. Students often have a lot of difficulty learning how to obtain a weather briefing from a Flight Service Station Briefer.
30. The Private Pilot Practical Test Standards should require more areas of knowledge, related to weather, than are currently required.

Appendix I

CFI Weather Training Survey Tables

Table 8a

Certified Flight Instructor Participant Demographics (N = 410)

| | <u>n</u> | <u>%</u> |
|--|----------|----------|
| <u>Source</u> | | |
| Part 141 Flight School (Paper/Pencil) | 172 | 42.0 |
| NAFI (Paper/Pencil) | 5 | 1.2 |
| NAFI (On-line) | 58 | 14.1 |
| Av Web (On-line) | 138 | 33.7 |
| Other or Not Stated (On- line) | 37 | 9.0 |
| Total (Paper/Pencil) | 177 | 43.2 |
| Total (Online) | 233 | 56.8 |
| <u>Gender</u> | | |
| Male | 357 | 87.1 |
| Female | 49 | 12.0 |
| <u>Category</u> ¹ | | |
| Airplane | 398 | 97.1 |
| Glider | 31 | 7.6 |
| Rotorcraft | 25 | 6.1 |
| Lighter-Than-Air | 5 | 1.2 |
| <u>Certificates and Ratings</u> ¹ | | |
| CFI (but not CFII) | 70 | 17.1 |
| CFII | 330 | 80.5 |
| MEI | 184 | 44.9 |
| ATP | 72 | 17.6 |
| Airframe and Powerplant | 27 | 6.6 |

¹ Participants were instructed to “check all that apply”

Continued

Table 8a, Continued

Certified Flight Instructor Participant Demographics (N = 410)

| | <u>n</u> | <u>%</u> |
|---|----------|----------|
| <u>Workweek</u> | | |
| Full-time Instructor | 188 | 45.9 |
| Part-time Instructor | 212 | 51.7 |
| <u>Time Buider (yes)</u> | | |
| | 125 | 30.5 |
| <u>How to Instruct</u> ¹ | | |
| FBO- Part 61 | 168 | 41.0 |
| Freelance- Part 61 | 140 | 34.1 |
| Flight School- Part 141 | 202 | 49.3 |
| University | 43 | 10.5 |
| Community College | 36 | 8.8 |
| Other | 40 | 9.0 |
| <u>Type of Syllabus Used</u> ¹ | | |
| Self-Created | 101 | 24.6 |
| Commercially Available | 184 | 44.9 |
| Self – Created and Commercially Available | 87 | 21.2 |
| Other | 26 | 6.3 |

¹ Participants were instructed to “check all that apply”

Table 8b

Certified Flight Instructor Participant Demographics (N = 410)

| | M | SD | Median | Range |
|--|----------|-----------|---------------|--------------|
| Age | 42.22 | 14.6 | 43.00 | 19 - 76 |
| Total Flight Hours | 3249.87 | 3867.40 | 1700.00 | 100 - 31,000 |
| Number of Years Flight Instructing | 10.65 | 11.57 | 4.50 | 0 - 47 |
| Hours of Flight Instruction Given | 1560.97 | 2135.99 | 800.00 | 20 - 15,000 |
| Hours of Flight Instruction Given in Preceding 3 years | 549.44 | 497.28 | 400.00 | 10 - 3,000 |
| Average Number of Students per year | 8.19 | 8.21 | 5.00 | 0 - 60 |
| Number of Students in preceding 3 years | 15.93 | 19.02 | 10.00 | 1 - 150 |

Table 9

Frequencies- Instruction Experience by Type of Certificate by How Instruct ¹

| Lowest Amount of Instruction Experience (20 to 270 hours) | | | | |
|--|------------------------|------------|-------------|------------|
| | CFI² | | CFII | |
| | % | (n) | % | (n) |
| Part 61 Only | 47.2 | (17) | 52.8 | (19) |
| Part 141 + | 56.0 | (14) | 44.0 | (11) |
| Part 141 Only | 50.0 | (9) | 50.0 | (9) |
| Academic ++ | 23.5 | (4) | 76.5 | (13) |
| Academic Only | 42.9 | (3) | 57.1 | (4) |
| Subtotal ³ | 45.0 | (36) | 55.0 | (44) |

| Highest Amount of Instruction Experience (2, 300- 15,000 hours) | | | | |
|--|------------------------|------------|-------------|------------|
| | CFI² | | CFII | |
| | % | (n) | % | (n) |
| Part 61 Only | 3.3 | (1) | 96.7 | (29) |
| Part 141 + | 3.3 | (1) | 96.7 | (29) |
| Part 141 Only | 4.8 | (1) | 95.2 | (20) |
| Academic ++ | - | | 100.0 | (16) |
| Academic Only | - | | 100.0 | (4) |
| Subtotal ³ | 2.5 | (2) | 97.5 | (79) |

¹ How Instruct: Part 61 Only = participant checked “Part 61-Freelance” or “Part 61-FBO” but did not check “Part 141” or “University” or “Community College”; Part 141+ = participant checked “Part 141” and may or may not have also checked “Part 61-Freelance” or “Part 61-FBO” but did not check “University” or “Community College”; Academic++ = participant checked “University” or “Community College” and may or may not have also checked “Part 61-Freelance” or “Part 61-FBO” or “Part 141”; Part 141 Only = participant only checked “Part 141”; Academic Only = participant only checked “University” or “Community College”.

² CFI = participants checked that they had obtained a CFI rating but not a CFII

³ Participants who indicated they instruct through another means (e.g., military) are included in

the subtotals.

Table 10a

Emphasis Given to Weather Categories and Topics During Instruction¹

| <u>Weather Category/ Topic</u> ² | <u>All Participants</u> | | <u>Type of Certification</u> ² | | | | <u>Amount of Instructing Experience</u> ⁴ | | | |
|---|-------------------------|------------|---|------------|---------------|------------|--|------------|---------------------------|-------------|
| | <u>M</u> | <u>SD</u> | <u>CFI</u> ³ | | <u>CFII</u> | | <u>Lowest Experience</u> | | <u>Highest Experience</u> | |
| | | | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> |
| Causes of Weather and Weather Patterns | 2.47 | .94 | 2.11** | .92 | 2.54** | .93 | 2.43 | .98 | 2.65 | 1.10 |
| General Causes of Weather | 2.02 | 1.06 | 1.77* | 1.01 | 2.07* | 1.07 | 1.98 | 1.03 | 2.27 | 1.29 |
| Local Weather Conditions and Patterns | 2.97 | 1.26 | 2.56** | 1.30 | 3.05** | 1.24 | 2.72** | 1.37 | 3.32 | 1.22 |
| Air Masses Fronts and Pressure Systems | 2.33 | 1.13 | 1.90** | 1.08 | 2.40** | 1.13 | 2.29 | 1.16 | 2.62 | 1.28 |
| Stable and Unstable Air | 2.34 | 1.16 | 1.93** | 1.13 | 2.41** | 1.14 | 2.44 | 1.28 | 2.43 | 1.23 |
| Temperature and Temperature Inversions | 2.07 | 1.06 | 1.80* | 1.02 | 2.12* | 1.06 | 2.15 | 1.09 | 2.27 | 1.19 |
| Moisture, Precipitation and Rain | 2.46 | 1.18 | 2.03** | 1.17 | 2.54** | 1.17 | 2.44 | 1.26 | 2.59 | 1.30 |
| Clouds and Ceilings | 3.04 | 1.24 | 2.69** | 1.20 | 3.11** | 1.23 | 3.02 | 1.24 | 2.99 | 1.39 |
| Fog and Dewpoint | 2.56 | 1.28 | 2.20* | 1.27 | 2.62* | 1.27 | 2.43 | 1.31 | 2.76 | 1.35 |

¹ Participants were asked to indicate the amount of emphasis given to each weather topic in ground school or in-flight (including pre-flight briefings and post-flight debriefings) over the entire course of a student pilots training. 0 = No Instruction Given on this Topic, 1 = Very Little Instruction (approximately 1-30 minutes), 5 = A Great Deal of Instruction (approximately 4-8 hours).

² Weather category Means and Standard Deviations were obtained by aggregating across all weather topics within each category.

³ CFI = participants checked that they had obtained a CFI rating but not a CFII

⁴ Low Experience Group = 20 to 270 hours of flight instruction given; High Experience Group = 2,300 to 15,000 hours of flight instruction given

* Significant at the .05 level

** Significant at the .01 level

*** Significant at the .001 level

Continued

Table 10a, Continued

Emphasis Given to Weather Categories and Topics During Instruction¹

| <u>Weather Category/ Topic</u> ² | <u>All Participants</u> | | <u>Type of Certification</u> ² | | | | <u>Amount of Instructing Experience</u> ⁴ | | | |
|---|-------------------------|-------------|---|-------------|---------------|-------------|--|-------------|---------------------------|-------------|
| | <u>M</u> | <u>SD</u> | <u>CFI</u> ³ | | <u>CFII</u> | | <u>Lowest Experience</u> | | <u>Highest Experience</u> | |
| | | | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> |
| Weather Hazards | 2.86 | 1.05 | 2.51** | 1.08 | 2.94** | 1.04 | 2.76 | 1.06 | 3.03 | 1.18 |
| Thunderstorms | 3.03 | 1.30 | 2.65** | 1.23 | 3.12** | 1.31 | 2.91 | 1.24 | 3.14 | 1.46 |
| Turbulence | 2.66 | 1.23 | 2.29** | 1.21 | 2.73** | 1.22 | 2.46 | 1.29 | 2.85 | 1.32 |
| Windshear and Microbursts | 2.57 | 1.24 | 2.29* | 1.33 | 2.62* | 1.21 | 2.60 | 1.28 | 2.77 | 1.26 |
| Wind and Crosswinds | 3.57 | 1.21 | 3.13** | 1.26 | 3.65** | 1.19 | 3.51 | 1.31 | 3.67 | 1.23 |
| Restrictions to Visibility | 2.84 | 1.23 | 2.57 | 1.27 | 2.88 | 1.22 | 2.80 | 1.24 | 2.93 | 1.34 |
| Icing and Frost | 2.49 | 1.30 | 2.11** | 1.31 | 2.59** | 1.29 | 2.29* | 1.30 | 2.75* | 1.39 |
| Weather Services | 2.51 | .97 | 2.25* | 1.03 | 2.57* | .96 | 2.51 | 1.05 | 2.57 | 1.10 |
| FSS Weather Briefings | 3.26 | 1.23 | 2.86** | 1.22 | 3.33** | 1.22 | 3.17 | 1.33 | 3.26 | 1.35 |

¹ Participants were asked to indicate the amount of emphasis given to each weather topic in ground school or in-flight (including pre-flight briefings and post-flight debriefings) over the entire course of a student pilots training. 0 = No Instruction Given on this Topic, 1 = Very Little Instruction (approximately 1-30 minutes), 5 = A Great Deal of Instruction (approximately 4-8 hours).

² Weather category Means and Standard Deviations were obtained by aggregating across all weather topics within each category.

³ CFI = participants checked that they had obtained a CFI rating but not a CFII

⁴ Low Experience Group = 20 to 270 hours of flight instruction given; High Experience Group = 2,300 to 15,000 hours of flight instruction given

* Significant at the .05 level

** Significant at the .01 level

*** Significant at the .001 level

Continued

Table 10a, Continued

Emphasis Given to Weather Categories and Topics During Instruction¹

| <u>Weather Category/</u> <u>Topic</u> ² | <u>All Participants</u> | | <u>Type of Certification</u> ² | | | | <u>Amount of Instructing Experience</u> ⁴ | | | |
|---|-------------------------|-----------|---|-----------|-------------|-----------|--|-----------|---------------------------|-----------|
| | <u>M</u> | <u>SD</u> | <u>CFI</u> ³ | | <u>CFII</u> | | <u>Lowest Experience</u> | | <u>Highest Experience</u> | |
| | | | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> |
| Flight Watch/ Enroute Weather | 2.38 | 1.18 | 2.16 | 1.22 | 2.43 | 1.17 | 2.24 | 1.21 | 2.63 | 1.36 |
| Television Weather Sources | 1.64 | 1.15 | 1.51 | 1.20 | 1.67 | 1.14 | 1.67 | 1.25 | 1.89 | 1.36 |
| METAR and TAFs | 3.23 | 1.23 | 2.86* | 1.42 | 3.29* | 1.17 | 3.21 | 1.31 | 3.23 | 1.19 |
| DUATS and Other Internet Weather Services | 2.56 | 1.37 | 2.29 | 1.40 | 2.62 | 1.36 | 2.65 | 1.41 | 2.64 | 1.48 |
| ASOS / AWOS | 2.69 | 1.34 | 2.49 | 1.39 | 2.73 | 1.32 | 2.63 | 1.49 | 2.75 | 1.41 |
| On -Field Computerized Weather Stations | 2.15 | 1.54 | 1.94 | 1.62 | 2.20 | 1.62 | 2.20 | 1.53 | 2.00 | 1.57 |
| Weather Radar and Charts | 2.28 | 1.28 | 1.96* | 1.40 | 2.36* | 1.25 | 2.21 | 1.36 | 2.44 | 1.26 |
| PIREPS | 2.28 | 1.23 | 2.11 | 1.31 | 2.33 | 1.22 | 2.37 | 1.39 | 2.31 | 1.32 |

¹ Participants were asked to indicate the amount of emphasis given to each weather topic in ground school or in-flight (including pre-flight briefings and post-flight debriefings) over the entire course of a student pilots training. 0 = No Instruction Given on this Topic, 1 = Very Little Instruction (approximately 1-30 minutes), 5 = A Great Deal of Instruction (approximately 4-8 hours).

² Weather category Means and Standard Deviations were obtained by aggregating across all weather topics within each category.

³ CFI = participants checked that they had obtained a CFI rating but not a CFII

⁴ Low Experience Group = 20 to 270 hours of flight instruction given; High Experience Group = 2,300 to 15,000 hours of flight instruction given

* Significant at the .05 level

** Significant at the .01 level

*** Significant at the .001 level

Continued

Table 10a, Continued

Emphasis Given to Weather Categories and Topics During Instruction¹

| <u>Weather Category/ Topic</u> ² | <u>All Participants</u> | | <u>Type of Certification</u> ² | | | | <u>Amount of Instructing Experience</u> ⁴ | | | |
|---|-------------------------|-------------|---|-------------|--------------|-------------|--|-------------|---------------------------|-------------|
| | <u>M</u> | <u>SD</u> | <u>CFI</u> ³ | | <u>CFII</u> | | <u>Lowest Experience</u> | | <u>Highest Experience</u> | |
| | | | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> |
| AIRMETS, SIGMETs, Convective SIGMETs | 2.65 | 1.29 | 2.43 | 1.30 | 2.70 | 1.29 | 2.77 | 1.36 | 2.59 | 1.30 |
| Weather Regulations | 3.27 | 1.12 | 3.20 | 1.10 | 3.28 | 1.13 | 3.28 | 1.18 | 3.27 | 1.31 |
| VFR Weather Minimums | 3.39 | 1.23 | 3.29 | 1.21 | 3.41 | 1.23 | 3.45 | 1.27 | 3.29 | 1.42 |
| Weather Minimums by Type of Airspace | 3.30 | 1.26 | 3.24 | 1.17 | 3.31 | 1.28 | 3.40 | 1.33 | 3.28 | 1.38 |
| Setting Personal Weather Minimums | 3.13 | 1.32 | 3.06 | 1.24 | 3.13 | 1.34 | 3.00 | 1.31 | 3.24 | 1.42 |
| Weather Interpretation | 3.05 | 1.04 | 2.79* | 1.14 | 3.10* | 1.01 | 3.02 | 1.10 | 3.20 | 1.09 |
| Predicting Weather Conditions | 2.66 | 1.21 | 2.46 | 1.20 | 2.67 | 1.20 | 2.67 | 1.17 | 2.89 | 1.30 |
| Decoding and Interpretation Weather Information | 3.03 | 1.20 | 2.67** | 1.30 | 3.11** | 1.17 | 2.95 | 1.24 | 3.22 | 1.23 |

¹ Participants were asked to indicate the amount of emphasis given to each weather topic in ground school or in-flight (including pre-flight briefings and post-flight debriefings) over the entire course of a student pilots training. 0 = No Instruction Given on this Topic, 1 = Very Little Instruction (approximately 1-30 minutes), 5 = A Great Deal of Instruction (approximately 4-8 hours).

² Weather category Means and Standard Deviations were obtained by aggregating across all weather topics within each category.

³ CFI = participants checked that they had obtained a CFI rating but not a CFII

⁴ Low Experience Group = 20 to 270 hours of flight instruction given; High Experience Group = 2,300 to 15,000 hours of flight instruction given

* Significant at the .05 level

** Significant at the .01 level

*** Significant at the .001 level

Continued

Table 10a, Continued

Emphasis Given to Weather Categories and Topics During Instruction¹

| <u>Weather Category/ Topic 2</u> | <u>All Participants</u> | | <u>Type of Certification</u> ² | | | | <u>Amount of Instructing Experience</u> ⁴ | | | |
|--|-------------------------|-------------|---|-------------|-------------|-------------|--|-------------|---------------------------|-------------|
| | M | <u>SD</u> | <u>CFI</u> ³ | | <u>CFII</u> | | <u>Lowest Experience</u> | | <u>Highest Experience</u> | |
| | | | M | <u>SD</u> | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> |
| Applying Weather Information in Flight Planning | 3.46 | 1.16 | 3.23 | 1.28 | 3.50 | 1.12 | 3.39 | 1.28 | 3.46 | 1.22 |
| Weather-Related Decision Making | 3.14 | 1.09 | 2.96 | 1.13 | 3.17 | 1.08 | 3.13 | 1.14 | 3.20 | 1.18 |
| Avoiding Hazardous Weather Situations | 3.30 | 1.19 | 3.07 | 1.27 | 3.33 | 1.17 | 3.30 | 1.32 | 3.30 | 1.29 |
| Handling Encounters with Hazardous Weather | 2.90 | 1.18 | 2.76 | 1.20 | 2.94 | 1.19 | 2.84 | 1.20 | 2.98 | 1.28 |
| Practical and Psychological factors in Weather Related Decision Making | 2.92 | 1.25 | 2.74 | 1.32 | 2.95 | 1.25 | 2.83 | 1.30 | 3.06 | 1.26 |
| Making a “ Go /No Go ” Decision | 3.44 | 1.25 | 3.24 | 1.35 | 3.47 | 1.23 | 3.52 | 1.32 | 3.48 | 1.27 |

¹ Participants were asked to indicate the amount of emphasis given to each weather topic in ground school or in-flight (including pre-flight briefings and post-flight debriefings) over the entire course of a student pilots training. 0 = No Instruction Given on this Topic, 1 = Very Little Instruction (approximately 1-30 minutes), 5 = A Great Deal of Instruction (approximately 4-8 hours).

² Weather category Means and Standard Deviations were obtained by aggregating across all weather topics within each category.

³ CFI = participants checked that they had obtained a CFI rating but not a CFII

⁴ Low Experience Group = 20 to 270 hours of flight instruction given; High Experience Group = 2,300 to 15,000 hours of flight instruction given

* Significant at the .05 level

** Significant at the .01 level

*** Significant at the .001 level

Table 10b

Emphasis Given to Weather Categories and Topics During Instruction¹

| <u>Weather Category/ Topic</u> ² | <u>How Instruct</u> ³ | | | | | | <u>F</u> | <u>df</u> |
|---|----------------------------------|------------|-------------------------|-------------|-------------------------|------------|---------------------------|---------------|
| | <u>Part 61</u> | | <u>Part 141 +</u> | | <u>Academic ++</u> | | | |
| | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | | |
| Causes of Weather and Weather Patterns | 2.28^a | .84 | 2.58^b | 1.00 | 2.80^b | .89 | 9.07^{***} | 2, 369 |
| General Causes of Weather | 1.75 ^a | .90 | 2.16 ^b | 1.10 | 2.36 ^b | 1.17 | 10.85 ^{***} | 2, 386 |
| Local Weather Conditions and Patterns | 2.87 | 1.20 | 2.99 | 1.29 | 3.27 | 1.30 | 2.68 | 2, 386 |
| Air Masses Fronts and Pressure Systems | 2.13 ^a | 1.09 | 2.41 | 1.14 | 2.63 ^b | 1.11 | 5.72 ^{**} | 2, 386 |
| Stable and Unstable Air | 2.13 ^a | 1.04 | 2.44 ^b | 1.22 | 2.68 ^b | 1.22 | 6.73 ^{**} | 2, 386 |
| Temperature and Temperature Inversions | 1.89 ^a | .99 | 2.14 | 1.14 | 2.37 ^b | 1.02 | 5.69 ^{**} | 2, 386 |
| Moisture, Precipitation and Rain | 2.24 ^a | 1.13 | 2.58 ^b | 1.22 | 2.79 ^b | 1.04 | 7.01 ^{**} | 2, 386 |
| Clouds and Ceilings | 2.81 ^a | 1.15 | 3.13 ^b | 1.34 | 3.40 ^b | 1.10 | 6.74 ^{**} | 2, 386 |

¹ Participants were asked to indicate the amount of emphasis given to each weather topic in ground school or in-flight (including pre-flight briefings and post-flight debriefings) over the entire course of a student pilots training. 0 = No Instruction Given on this Topic, 1 = Very Little Instruction (approximately 1-30 minutes), 5 = A Great Deal of Instruction (approximately 4-8 hours).

² Weather category Means and Standard Deviations were obtained by aggregating across all weather topics within each category.

³ How Instruct: Part 61 Only = participant checked "Part 61-Freelance" or "Part 61-FBO" but did not check "Part 141" or "University" or "Community College"; Part 141+ = participant checked "Part 141" and may or may not have also checked "Part 61-Freelance" or "Part 61-FBO" but did not check "University" or "Community College"; Academic++ = participant checked "University" or "Community College" and may or may not have also checked "Part 61-Freelance" or "Part 61-FBO" or "Part 141"; Part 141 Only = participant only checked "Part 141"; Academic Only = participant only checked "University" or "Community College".

^{a, b, c, d} Each topic with different superscripts differs by at least $p < .05$

* Significant at the .05 level

** Significant at the .01 level

*** Significant at the .001 level

Continued

Table 10b, Continued

Emphasis Given to Weather Categories and Topics During Instruction¹

| <u>Weather Category/ Topic</u> ² | <u>How Instruct</u> ³ | | | | | | <u>F</u> | <u>df</u> |
|---|----------------------------------|------------|-------------------------|-------------|-------------------------|------------|----------------------------|---------------|
| | <u>Part 61</u> | | <u>Part 141+</u> | | <u>Academic ++</u> | | | |
| | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | | |
| Fog and Dewpoint | 2.33 ^a | 1.19 | 2.66 | 1.31 | 2.86 ^b | 1.27 | 5.47 ^{**} | 2, 386 |
| Weather Hazards | 2.55^a | .98 | 3.05^b | 1.07 | 3.27^b | .91 | 15.99^{***} | 2, 369 |
| Thunderstorms | 2.62 ^a | 1.15 | 3.25 ^b | 1.36 | 3.56 ^b | 1.18 | 17.88 ^{***} | 2, 381 |
| Turbulence | 2.31 ^a | 1.16 | 2.88 ^b | 1.27 | 3.01 ^b | 1.11 | 12.69 ^{***} | 2, 381 |
| Windshear and Microbursts | 2.23 ^a | 1.17 | 2.80 ^b | 1.32 | 2.97 ^b | 1.03 | 13.14 ^{***} | 2, 381 |
| Wind and Crosswinds | 3.31 ^a | 1.23 | 3.71 ^b | 1.23 | 3.96 ^b | 1.00 | 8.95 ^{***} | 2, 381 |
| Restrictions to Visibility | 2.60 ^a | 1.19 | 3.01 ^b | 1.28 | 3.08 ^b | 1.05 | 6.17 ^{**} | 2, 381 |
| Icing and Frost | 2.22 ^a | 1.23 | 2.55 ^a | 1.33 | 3.04 ^b | 1.24 | 10.73 ^{***} | 2, 381 |

¹ Participants were asked to indicate the amount of emphasis given to each weather topic in ground school or in-flight (including pre-flight briefings and post-flight debriefings) over the entire course of a student pilots training. 0 = No Instruction Given on this Topic, 1 = Very Little Instruction (approximately 1-30 minutes), 5 = A Great Deal of Instruction (approximately 4-8 hours).

² Weather category Means and Standard Deviations were obtained by aggregating across all weather topics within each category.

³ How Instruct: Part 61 Only = participant checked “Part 61-Freelance” or “Part 61-FBO” but did not check “Part 141” or “University” or “Community College”; Part 141+ = participant checked “Part 141” and may or may not have also checked “Part 61-Freelance” or “Part 61-FBO” but did not check “University” or “Community College”; Academic++ = participant checked “University” or “Community College” and may or may not have also checked “Part 61-Freelance” or “Part 61-FBO” or “Part 141”; Part 141 Only = participant only checked “Part 141”; Academic Only = participant only checked “University” or “Community College”.

^{a, b, c, d} Each topic with different superscripts differs by at least $p < .05$

* Significant at the .05 level

** Significant at the .01 level

*** Significant at the .001 level

Continued

Table 10b, Continued

Emphasis Given to Weather Categories and Topics During Instruction¹

| <u>Weather Category/ Topic</u> ² | <u>How Instruct</u> ³ | | | | | | <u>F</u> | <u>df</u> |
|---|----------------------------------|------------|-------------------------|------------|-------------------------|------------|----------------------------|---------------|
| | <u>Part 61</u> | | <u>Part 141+</u> | | <u>Academic ++</u> | | | |
| | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | | |
| Weather Services | 2.25^a | .86 | 2.67^b | .99 | 2.90^b | .92 | 14.72^{***} | 2, 369 |
| FSS Weather Briefings | 2.94 ^a | 1.11 | 3.41 ^b | 1.23 | 3.75 ^b | 1.16 | 13.71 ^{***} | 2, 382 |
| Flight Watch/ Enroute Weather | 2.11 ^a | 1.04 | 2.54 ^b | 1.27 | 2.70 ^b | 1.10 | 8.76 ^{***} | 2, 382 |
| Television Weather Sources | 1.44 ^a | 1.06 | 1.75 ^b | 1.14 | 1.87 ^b | 1.27 | 4.84 ^{**} | 2, 382 |
| METAR and TAFs | 2.91 ^a | 1.08 | 3.36 ^b | 1.27 | 3.70 ^b | 1.20 | 12.74 ^{***} | 2, 382 |
| DUATS and Other Internet Weather Services | 2.45 | 1.28 | 2.58 | 1.44 | 2.84 | 1.36 | 2.07 | 2, 382 |
| ASOS / AWOS | 2.32 ^a | 1.19 | 2.85 ^b | 1.40 | 3.20 ^b | 1.30 | 13.43 ^{***} | 2, 382 |
| On -Field Computerized Weather Stations | 1.94 ^a | 1.45 | 2.26 | 1.55 | 2.57 ^b | 1.68 | 4.71 ^{**} | 2, 382 |

¹ Participants were asked to indicate the amount of emphasis given to each weather topic in ground school or in-flight (including pre-flight briefings and post-flight debriefings) over the entire course of a student pilots training. 0 = No Instruction Given on this Topic, 1 = Very Little Instruction (approximately 1-30 minutes), 5 = A Great Deal of Instruction (approximately 4-8 hours).

² Weather category Means and Standard Deviations were obtained by aggregating across all weather topics within each category.

³ How Instruct: Part 61 Only = participant checked "Part 61-Freelance" or "Part 61-FBO" but did not check "Part 141" or "University" or "Community College"; Part 141+ = participant checked "Part 141" and may or may not have also checked "Part 61-Freelance" or "Part 61-FBO" but did not check "University" or "Community College"; Academic++ = participant checked "University" or "Community College" and may or may not have also checked "Part 61-Freelance" or "Part 61-FBO" or "Part 141"; Part 141 Only = participant only checked "Part 141"; Academic Only = participant only checked "University" or "Community College".

^{a, b, c, d} Each topic with different superscripts differs by at least $p < .05$

* Significant at the .05 level

** Significant at the .01 level

*** Significant at the .001 level

Continued

Table 10b, Continued

Emphasis Given to Weather Categories and Topics During Instruction¹

| <u>Weather Category/ Topic</u> ² | <u>How Instruct</u> ³ | | | | | | <u>F</u> | <u>df</u> |
|---|----------------------------------|-------------|-------------------------|-------------|-------------------------|-------------|----------------------------|---------------|
| | <u>Part 61</u> | | <u>Part 141+</u> | | <u>Academic ++</u> | | | |
| | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | | |
| Weather Radar and Charts | 2.07 ^a | 1.21 | 2.34 | 1.31 | 2.67 ^b | 1.27 | 6.06 ^{**} | 2, 382 |
| PIREPS | 1.99 ^a | 1.10 | 2.43 ^b | 1.30 | 2.65 ^b | 1.23 | 9.06 ^{***} | 2, 382 |
| AIRMETS, SIGMETS, Convective SIGMETS | 2.34 ^a | 1.15 | 2.89 ^b | 1.36 | 2.97 ^b | 1.24 | 10.08 ^{***} | 2, 382 |
| Weather Regulations | 2.99^a | 1.03 | 3.47^b | 1.11 | 3.68^b | 1.03 | 13.30^{***} | 2, 369 |
| VFR Weather Minimums | 3.02 ^a | 1.13 | 3.59 ^b | 1.26 | 3.86 ^b | 1.13 | 16.12 ^{***} | 2, 387 |
| Weather Minimums by Type of Airspace | 2.94 ^a | 1.18 | 3.47 ^b | 1.29 | 3.82 ^b | 1.12 | 15.84 ^{***} | 2, 387 |
| Setting Personal Weather Minimums | 3.01 | 1.22 | 3.22 | 1.42 | 3.30 | 1.29 | 1.64 | 2, 387 |
| Weather Interpretation | 2.90^a | .97 | 3.12 | 1.09 | 3.40^b | .91 | 6.37^{**} | 2, 369 |

¹ Participants were asked to indicate the amount of emphasis given to each weather topic in ground school or in-flight (including pre-flight briefings and post-flight debriefings) over the entire course of a student pilots training. 0 = No Instruction Given on this Topic, 1 = Very Little Instruction (approximately 1-30 minutes), 5 = A Great Deal of Instruction (approximately 4-8 hours).

² Weather category Means and Standard Deviations were obtained by aggregating across all weather topics within each category.

³ How Instruct: Part 61 Only = participant checked "Part 61-Freelance" or "Part 61-FBO" but did not check "Part 141" or "University" or "Community College"; Part 141+ = participant checked "Part 141" and may or may not have also checked "Part 61-Freelance" or "Part 61-FBO" but did not check "University" or "Community College"; Academic++ = participant checked "University" or "Community College" and may or may not have also checked "Part 61-Freelance" or "Part 61-FBO" or "Part 141"; Part 141 Only = participant only checked "Part 141"; Academic Only = participant only checked "University" or "Community College".

^{a, b, c, d} Each topic with different superscripts differs by at least $p < .05$

* Significant at the .05 level

** Significant at the .01 level

*** Significant at the .001 level

Continued

Table 10b, Continued

Emphasis Given to Weather Categories and Topics During Instruction¹

| <u>Weather Category/ Topic</u> ² | <u>How Instruct</u> ³ | | | | | | <u>F</u> | <u>df</u> |
|--|----------------------------------|-------------|-------------------------|-------------|-------------------------|-------------|--------------------------|---------------|
| | <u>Part 61</u> | | <u>Part 141+</u> | | <u>Academic ++</u> | | | |
| | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | | |
| Predicting Weather Conditions | 2.59 | 1.15 | 2.71 | 1.29 | 2.82 | 1.17 | 1.05 | 2, 386 |
| Decoding and Interpretation Weather Information | 2.84^a | 1.08 | 3.09 | 1.30 | 3.44^b | 1.08 | 7.19^{**} | 2, 386 |
| Applying Weather Information in Flight Planning | 3.27 ^a | 1.13 | 3.53 | 1.17 | 3.86 ^b | 1.03 | 7.50 ^{**} | 2, 386 |
| Weather-Related Decision Making | 2.94^a | 1.04 | 3.32^b | 1.15 | 3.40^b | .96 | 6.60^{**} | 2, 369 |
| Avoiding Hazardous Weather Situations | 3.01 ^a | 1.11 | 3.46 ^b | 1.24 | 3.65 ^b | 1.10 | 9.98 ^{***} | 2, 385 |
| Handling Encounters with Hazardous Weather | 2.68 ^a | 1.14 | 3.10 ^b | 1.27 | 3.11 ^b | 1.01 | 6.19 ^{**} | 2, 385 |
| Practical and Psychological Factors in Weather Related Decision Making | 2.81 | 1.25 | 3.05 | 1.33 | 3.01 | 1.13 | 1.58 | 2, 385 |
| Making a “Go/No Go” Decision | 3.24 ^a | 1.20 | 3.52 | 1.29 | 3.78 ^b | 1.19 | 5.38 ^{**} | 2, 385 |

¹ Participants were asked to indicate the amount of emphasis given to each weather topic in ground school or in-flight (including pre-flight briefings and post-flight debriefings) over the entire course of a student pilots training. 0 = No Instruction Given on this Topic, 1 = Very Little Instruction (approximately 1-30 minutes), 5 = A Great Deal of Instruction (approximately 4-8 hours).

² Weather category Means and Standard Deviations were obtained by aggregating across all weather topics within each category.

³ How Instruct: Part 61 Only = participant checked “Part 61-Freelance” or “Part 61-FBO” but did not check “Part 141” or “University” or “Community College”; Part 141+ = participant checked “Part 141” and may or may not have also checked “Part 61-Freelance” or “Part 61-FBO” but did not check “University” or “Community College”; Academic++ = participant checked “University” or “Community College” and may or may not have also checked “Part 61-Freelance” or “Part 61-FBO” or “Part 141”; Part 141 Only = participant only checked “Part 141”; Academic Only = participant only checked “University” or “Community College”.

^{a, b, c, d} Each topic with different superscripts differs by at least $p < .05$

* Significant at the .05 level

** Significant at the .01 level

*** Significant at the .001 level

Table 11

Hours Spent Instructing About Weather During Ground School and In-flight

| | Ground School ¹ | | | | | <u>In-flight</u> ² | | | |
|--|----------------------------|----------|---------------|-----------|------------------------|-------------------------------|---------------------------|-----------|------------------------|
| | <u>n</u> | M | Median | SD | <u>Range</u> (hrs.) | M | Median n | SD | <u>Range</u> (hrs.) |
| All Participants | 409 | 7.84 | 5 | 7.28 | 0 - 60 | 8.14 | 5.25 | 7.10 | .5 - 50 |
| CFI ³ | 70 | 6.04** | 5 | 4.70 | 0 - 35 | 7.93 | 5 | 6.94 | 1 - 30 |
| CFII | 319 | 8.27** | 6 | 7.76 | 0 - 60 | 8.08 | 5.5 | 7.05 | .5 - 50 |
| Low Instruction Experience ⁴ | 78 | 7.27 | 5 | 7.02 | 1 - 50 | 8.13 | 5 | 6.88 | .5 - 30 |
| High Instruction Experience ⁴ | 80 | 8.76 | 5 | 8.70 | 1 - 50 | 7.99 | 6 | 7.17 | 1 - 40 |
| Instruct Part 61 Only ⁵ | 157 | 7.07 | 5 | 6.41 | 0 - 50 | 8.22 | 6 | 7.03 | .5 - 50 |
| Instruct Part 141+ ⁵ | 146 | 8.15 | 6 | 8.47 | 0 - 60 | 7.84 | 5 | 7.33 | 1 - 40 |
| Instruct Academic ++ ⁵ | 76 | 9.06 | 6 | 6.99 | 2 - 45 | 8.06 | 6 | 6.53 | 1 - 35 |

¹ Type of Ground School instruction was not specified and may be provided in a group setting (i.e., a ground school class) or individually (i.e., one-on-one).

² In-flight instruction includes pre-flight briefings and post-flight debriefings.

³ CFI = participants checked that they had obtained a CFI rating but not a CFII

⁴ Low Instruction Experience Group = 20 to 270 hours of flight instruction given; High Instruction Experience Group = 2,300 to 15,000 hours of flight instruction given.

⁵ Instruct Part 61 Only = participant checked “Part 61-Freelance” or “Part 61-FBO” but did not check “Part 141” or “University” or “Community College”; Instruct Part 141+ = participant checked “Part 141” and may or may not have also checked “Part 61-Freelance” or “Part 61-FBO” but did not check “University” or “Community College”; Instruct Academic++ = participant checked “University” or “Community College” and may or may not have also checked “Part 61-Freelance” or “Part 61-FBO” or “Part 141”

** Mean amount of time CFIs and CFIIIs spent instructing weather during ground school differed significantly at $p < .01$.

Table 12a

Mastery of Content and Quality of Instruction Ratings – All Participants

| | <u>Mastery</u> | | <u>Quality</u> | | <u>t</u> | <u>df</u> |
|--|----------------|-----------|----------------|-----------|---------------------|-----------|
| | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | | |
| Basic Causes of Weather and Weather Patterns | 3.69 | .75 | 3.33 | .95 | 8.92 ^{***} | 408 |
| Weather Hazards | 4.04 | .69 | 3.92 | .80 | 3.37 ^{**} | 407 |
| Weather Services | 4.10 | .74 | 3.97 | .86 | 2.93 ^{**} | 405 |
| Weather Regulations | 4.14 | .78 | 3.98 | .86 | 4.45 ^{***} | 407 |
| Weather Interpretation | 3.85 | .78 | 3.72 | .88 | 3.39 ^{**} | 408 |
| Weather -Related Decision Making | 4.30 | .66 | 4.19 | .79 | 2.93 ^{**} | 408 |

* Significant at the .05 level

** Significant at the .01 level

*** Significant at the .001 level

Table 12b

Mastery of Content and Quality of Instruction Ratings by Instructor Qualification Level

| Weather Category | Mastery ¹ | | | | Quality ² | | | |
|-----------------------------------|----------------------|-----------|---------------------|-----------|----------------------|-----------|---------------------|-----------|
| | CFI ³ | | CFII | | CFI ³ | | CFII | |
| | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> |
| Basic Causes of Weather | 3.67 ^a | .77 | 3.69 ^b | .75 | 3.13 ^a | .93 | 3.36 ^b | .95 |
| Weather Hazards | 3.89 ^a | .67 | 4.07 ^{a,b} | .70 | 3.70 ^c | .84 | 3.96 ^{b,c} | .79 |
| Weather Services | 3.96 | .77 | 4.13 ^b | .73 | 3.77 ^c | .95 | 4.00 ^{b,c} | .84 |
| Weather Regulations | 3.87 ^a | .88 | 4.19 ^{a,b} | .75 | 3.86 | .90 | 4.00 ^b | .85 |
| Weather Interpretation | 3.67 ^a | .91 | 3.87 ^b | .75 | 3.44 ^{a,c} | 1.00 | 3.77 ^{b,c} | .84 |
| Weather - Related Decision Making | 4.29 ^a | .68 | 4.29 | .66 | 4.04 ^a | .75 | 4.21 | .80 |

¹ Participants were instructed: “Rate the confidence you have in your own mastery of the following weather-related categories” according to the following scale: 1 = No Confidence, 2 = Slightly Confident, 3 = Moderately Confident, 4 = Very Confident, 5 = Extremely Confident.

² Participants were instructed: “As honestly as you can, please rate the quality of the instruction you give student pilots with regard to the following weather topics” using the following scale: N/A = No Instruction, 1 = Very Poor, 2 = Poor, 3 = Adequate, 4 = Good, 5 = Very Good.

³ CFI = participants checked that they had obtained a CFI rating but not a CFII

^{a,b,c} Means within the same weather category with the same letter differ by at least $p < .05$.

Table 12c
Mastery of Content and Quality of Instruction Ratings by How the Participants Instruct

| | <u>Mastery</u> ¹ | | | | | | <u>Quality</u> ² | | | | | |
|-----------------------------|-----------------------------|-----------|---|-----------|--|-----------|-----------------------------|-----------|---|-----------|--|-----------|
| | <u>Part 61</u> ³ | | <u>Part 141</u> ⁺ ³ | | <u>Academic</u> ⁺⁺ ³ | | <u>Part 61</u> ³ | | <u>Part 141</u> ⁺ ³ | | <u>Academic</u> ⁺⁺ ³ | |
| | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> |
| Basic Causes of Wx | 3.74 ^a | .75 | 3.64 ^b | .79 | 3.68 ^c | .71 | 3.41 ^a | .84 | 3.28 ^b | .99 | 3.24 ^c | 1.03 |
| Wx Hazards | 4.02 | .68 | 4.03 | .72 | 4.15 | .66 | 3.96 | .84 | 3.83 ^a | .82 | 4.01 | .71 |
| Wx Services | 4.11 | .74 | 4.07 ^a | .76 | 4.13 | .76 | 4.01 | .85 | 3.91 ^a | .90 | 4.04 | .80 |
| Wx Regulations | 4.08 ^a | .78 | 4.13 ^b | .77 | 4.35 ^{a,c} | .70 | 3.97 | .83 | 3.91 ^b | .89 | 4.18 ^c | .83 |
| Wx Interp. | 3.79 | .79 | 3.84 ^a | .81 | 4.01 ^b | .72 | 3.75 | .88 | 3.66 ^a | .91 | 3.79 ^b | .78 |
| Wx- Related Decision Making | 4.24 | .68 | 4.30 ^a | .68 | 4.44 ^b | .57 | 4.19 | .79 | 4.15 ^a | .86 | 4.28 ^b | .64 |

¹ Participants were instructed: “Rate the confidence you have in your own mastery of the following weather-related categories” according to the following scale: 1 = No Confidence, 2 = Slightly Confident, 3 = Moderately Confident, 4 = Very Confident, 5 = Extremely Confident.

² Participants were instructed: “As honestly as you can, please rate the quality of the instruction you give student pilots with regard to the following weather topics” using the following scale: N/A = No Instruction, 1 = Very Poor, 2 = Poor, 3 = Adequate, 4 = Good, 5 = Very Good.

³ Part 61 = participant checked “Part 61-Freelance” or “Part 61-FBO” but did not check “Part 141” or “University” or “Community College”; Part 141+ = participant checked “Part 141” and may or may not have also checked “Part 61-Freelance” or “Part 61-FBO” but did not check “University” or “Community College”; Academic++ = participant checked “University” or “Community College” and may or may not have also checked “Part 61-Freelance” or “Part 61-FBO” or “Part 141”

^{a, b, c} Means within the same weather category with the same letter differ by at least $p < .05$.

Table 12d

Mastery of Content and Quality of Instruction Ratings by High and Low Levels of Instructing Experience

| | Mastery ¹ | | | | Quality ² | | | |
|-----------------------------|----------------------|-----------|-------------------|-----------|----------------------|-----------|-------------------|-----------|
| | Low ³ | | High ³ | | Low ³ | | High ³ | |
| | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> | <u>M</u> | <u>SD</u> |
| Basic Causes of Wx | 3.56 ^a | .77 | 3.76 | .87 | 3.20 ^{a, b} | .85 | 3.58 ^b | 1.07 |
| Wx Hazards | 3.90 ^a | .68 | 4.16 ^a | .74 | 3.84 ^b | .74 | 4.15 ^b | .79 |
| Wx Services | 3.93 | .83 | 4.17 | .77 | 3.94 | .81 | 4.10 | .87 |
| Wx Regulations | 4.05 | .82 | 4.27 | .77 | 4.00 | .80 | 4.15 | .84 |
| Wx Interp. | 3.77 ^a | .81 | 4.04 ^a | .69 | 3.65 ^b | .88 | 3.91 ^b | .79 |
| Wx- Related Decision Making | 4.22 | .67 | 4.29 | .73 | 4.11 ^a | .69 | 4.36 ^a | .83 |

¹ Participants were instructed: “Rate the confidence you have in your own mastery of the following weather-related categories” according to the following scale: 1 = No Confidence, 2 = Slightly Confident, 3 = Moderately Confident, 4 = Very Confident, 5 = Extremely Confident.

² Participants were instructed: “As honestly as you can, please rate the quality of the instruction you give student pilots with regard to the following weather topics” using the following scale: N/A = No Instruction, 1 = Very Poor, 2 = Poor, 3 = Adequate, 4 = Good, 5 = Very Good.

³ Low Instruction Experience Group = 20 to 270 hours of flight instruction given; High Instruction Experience Group = 2,300 to 15,000 hours of flight instruction given.

^{a, b, c} Means within the same weather category with the same letter differ by at least $p < .05$.