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Assessing General Aviation Pilots' Weather Knowledge and Self-Efficacy

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Assessing General Aviation Pilots' Weather Knowledge and Self-Efficacy

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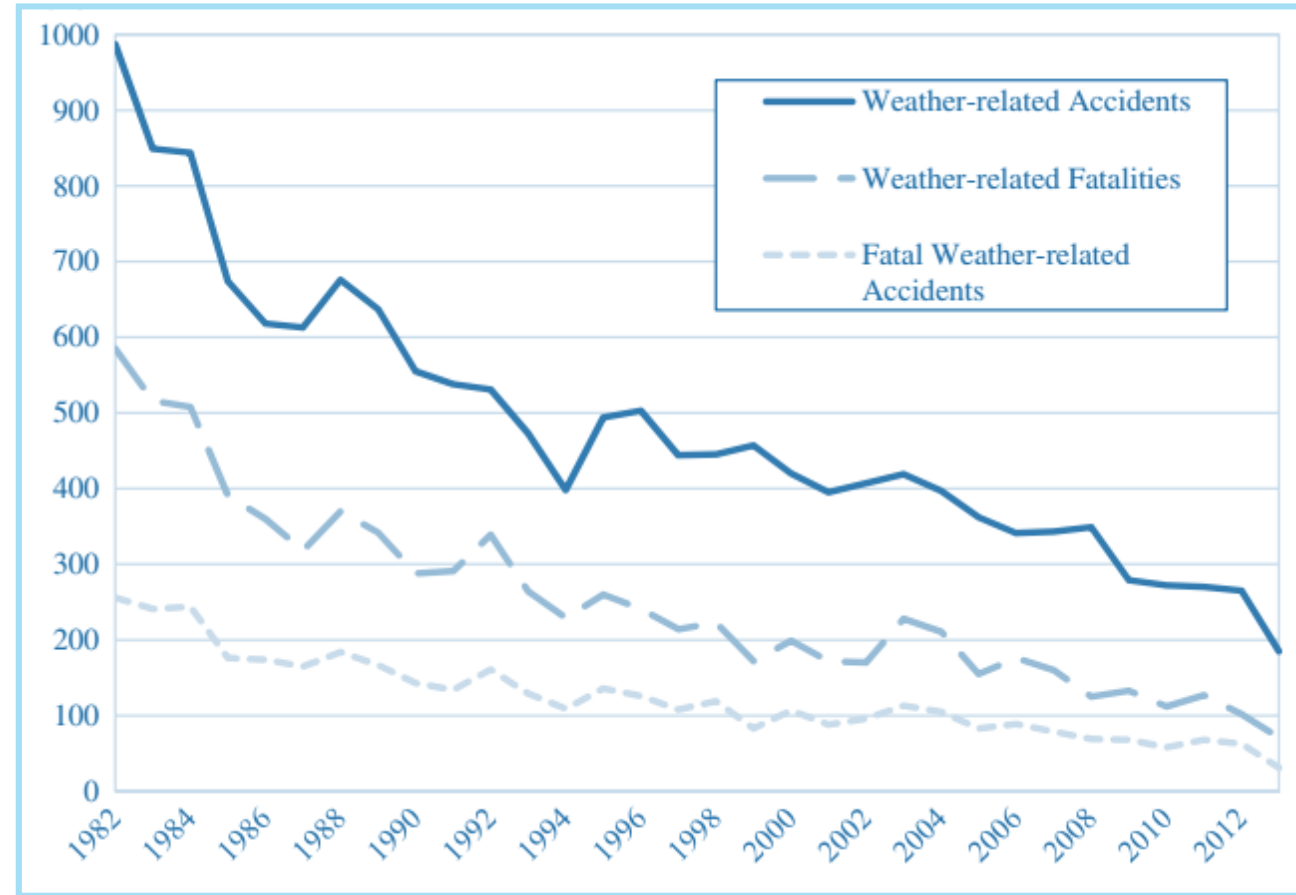
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The Problem...

- General Aviation accounts for a majority of weather related accidents
- Most GA weather-related accidents result in fatality
- NTSB Most Wanted List - loss of control
 - manage weather issues



GA Weather-Related Accident Rate

Contributing Factors to the Unchanging High General Aviation Weather-Related Accident Rate

- Research indicates numerous contributing factors to the General Aviation Weather Problem
 - Lack of Aviation Weather Knowledge & Skills
 - Poor Decision Making
 - Weather Technology & Product Usability
 - Limited Weather Training
 - Conflicting & Out-of-Date Pilot Resources

How to assess pilot weather knowledge?

- Current method is through FAA Knowledge Test Questions
 - Some questions are out of date and easy
 - Very few questions focused on interpretation of current products
- A multidisciplinary team of Human Factors Specialists, Meteorologists, & Pilots developed an Aviation Weather Knowledge Test
- 95 Questions
 1. Basic Weather Theory
 2. Product Interpretation
 3. Weather Sources

204 Pilots Participated

- Both ERAU Students and GA pilots at EAA Airventure
- Average Age: 22.5 years
- Part 61: 60 pilots & Part 141/142: 143 pilots

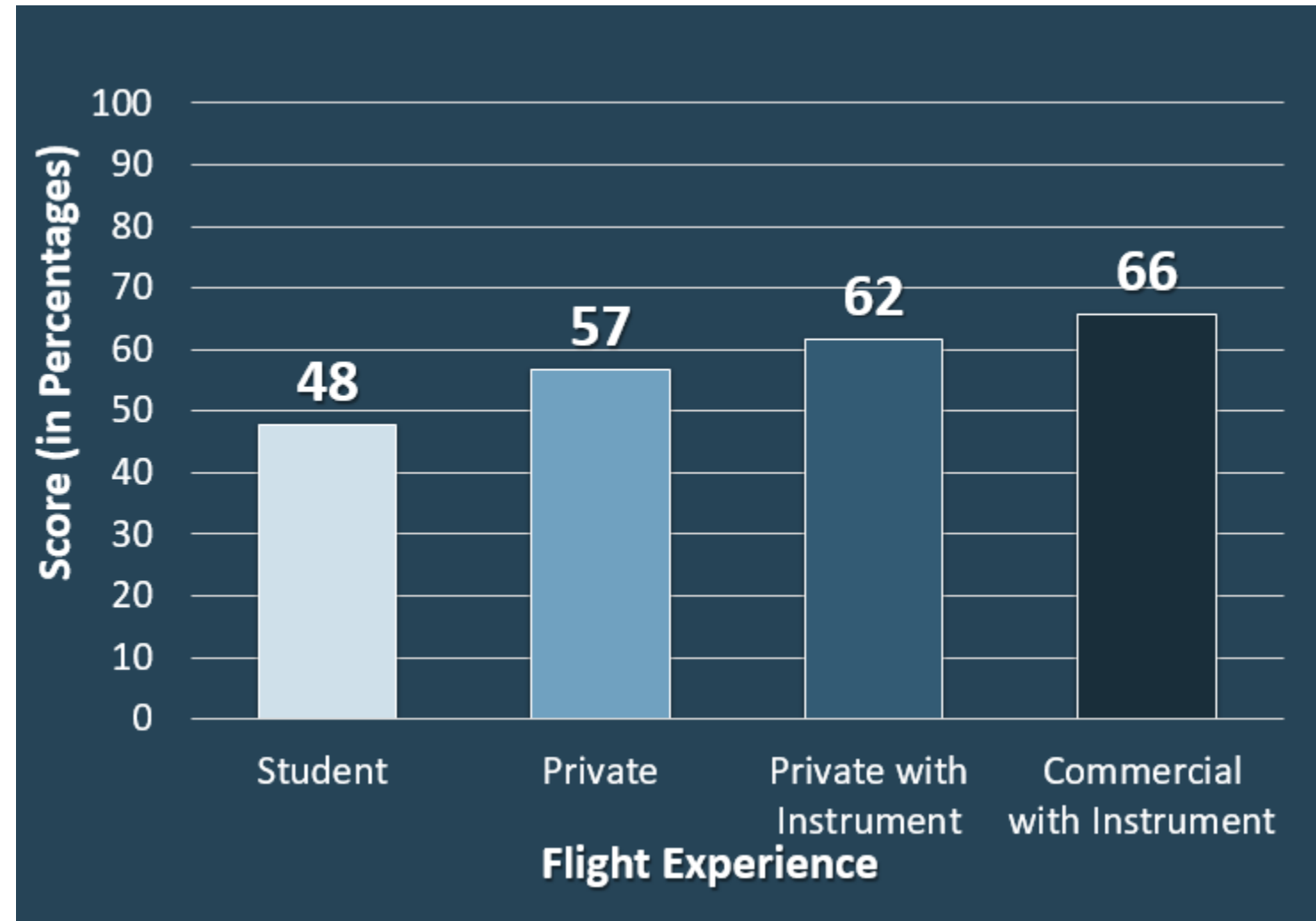
Pilot Certificate and/or Rating	Number of Pilots (Total = 204)	Flight Hours (Median)
Student	41	35 hours
Private	72	105 hours
Private with Instrument	50	172 hours
Commercial with Instrument	41	260 hours

The Results!



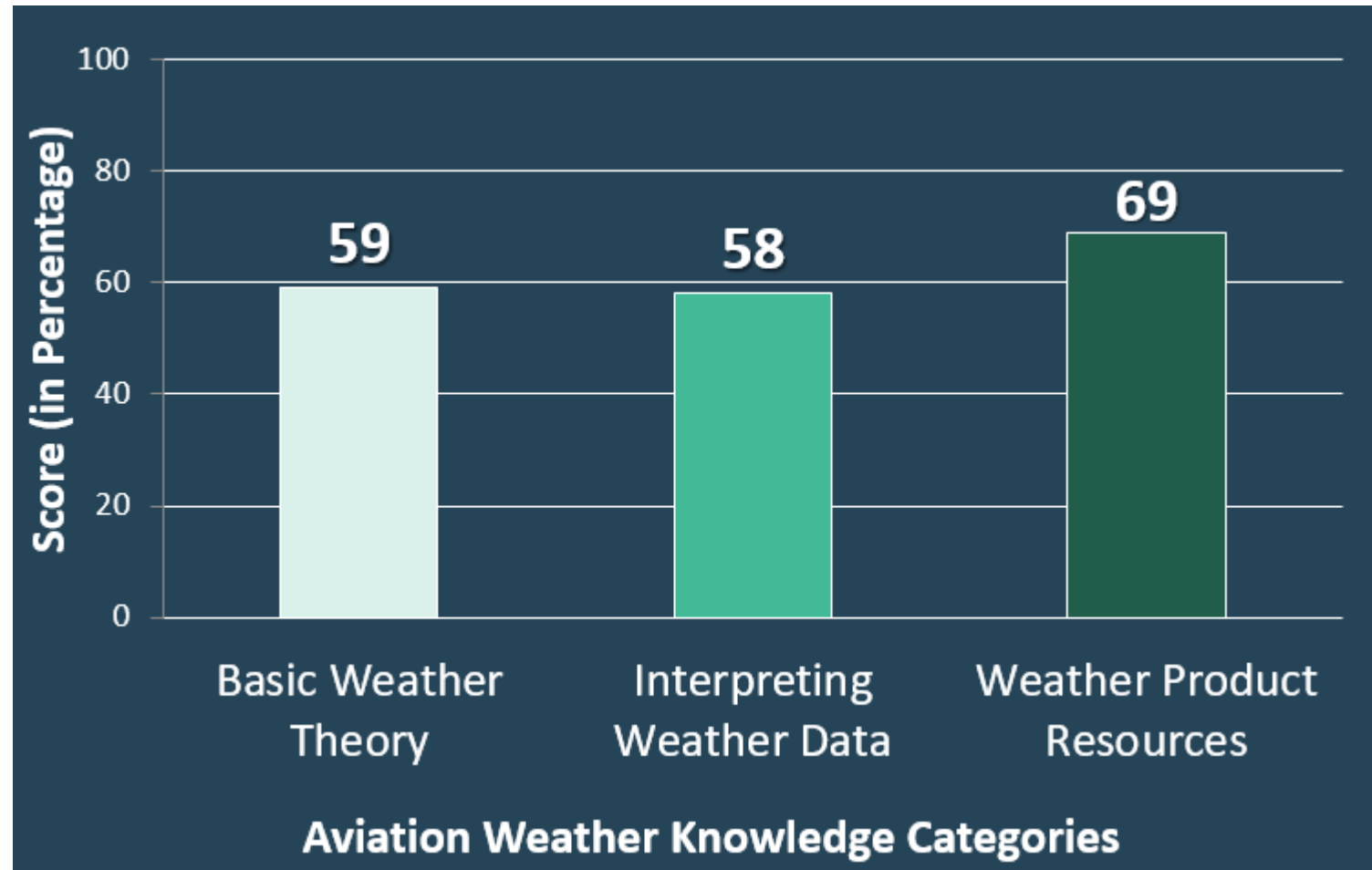
Overall GA Weather Knowledge

- Scores increased with flight experience
- Statistically significant differences between
 - student vs private pilot groups
 - private vs commercial with instrument groups
- These trends were consistent



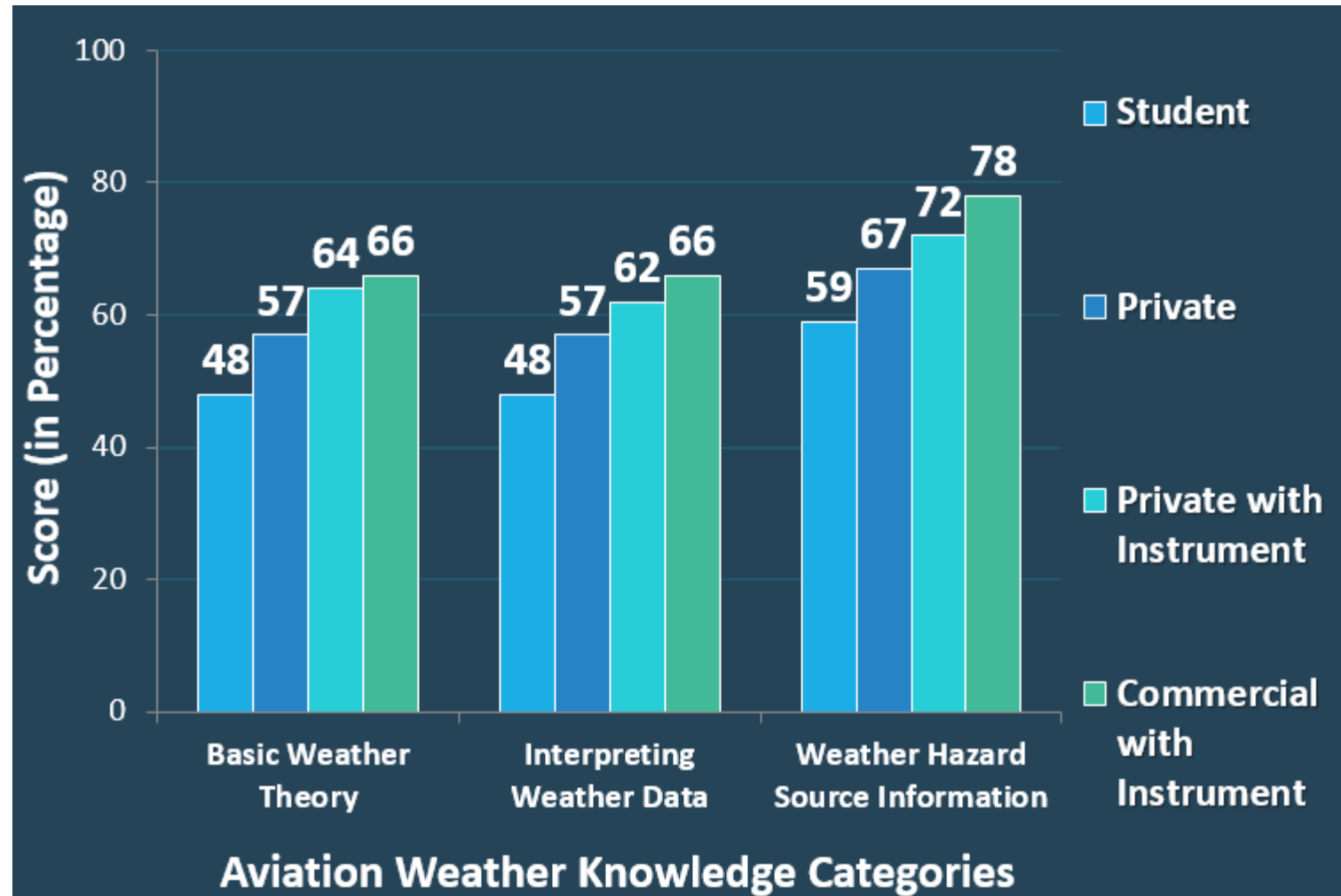
Basic Weather Theory, Product Interpretation, & Weather Product Sources

- Weather product sources was one of the highest scores

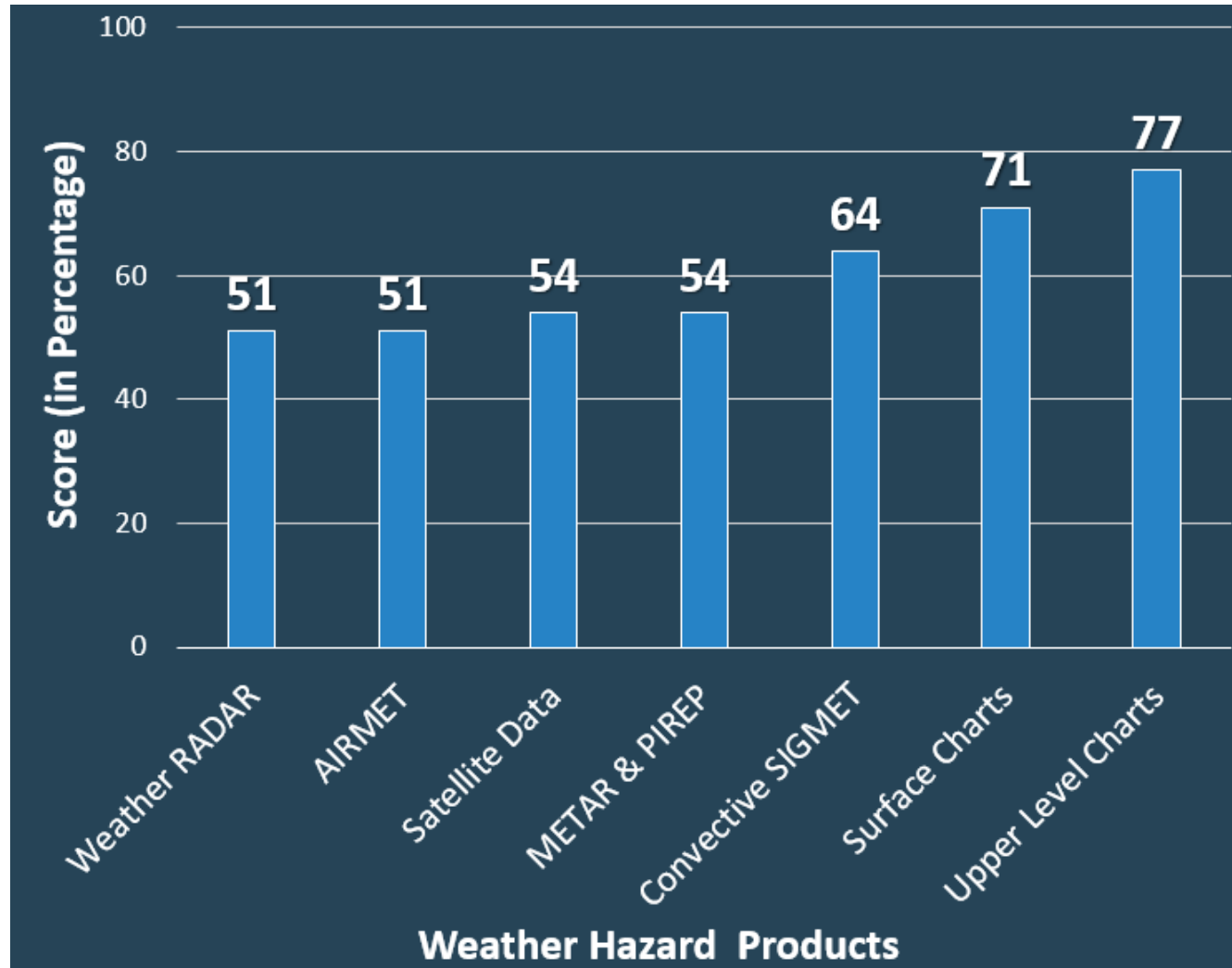


Impact of Flight Experience on Pilots' Aviation Weather Knowledge

- Scores increased with more flight experience

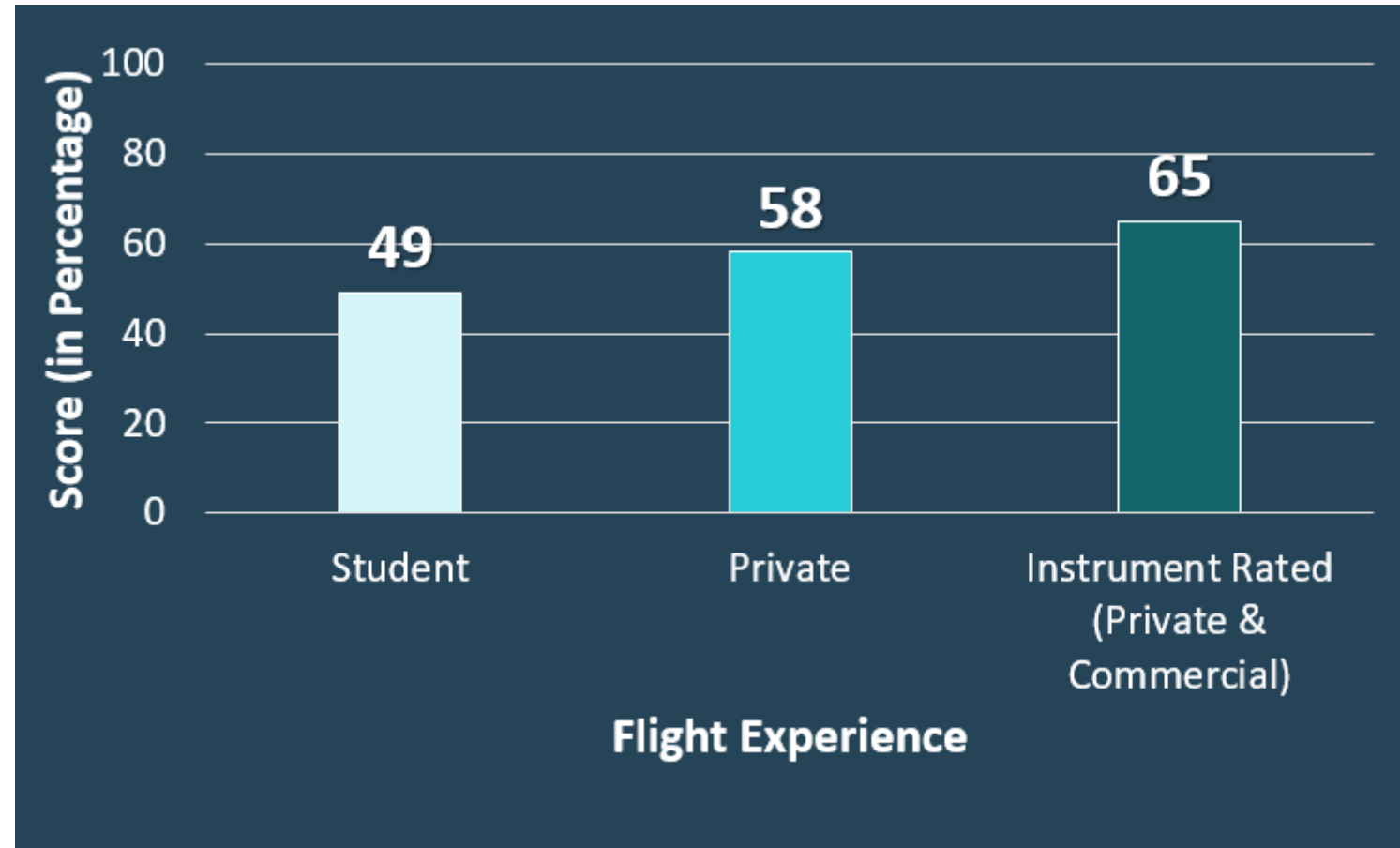


Weather Hazard Product Interpretations



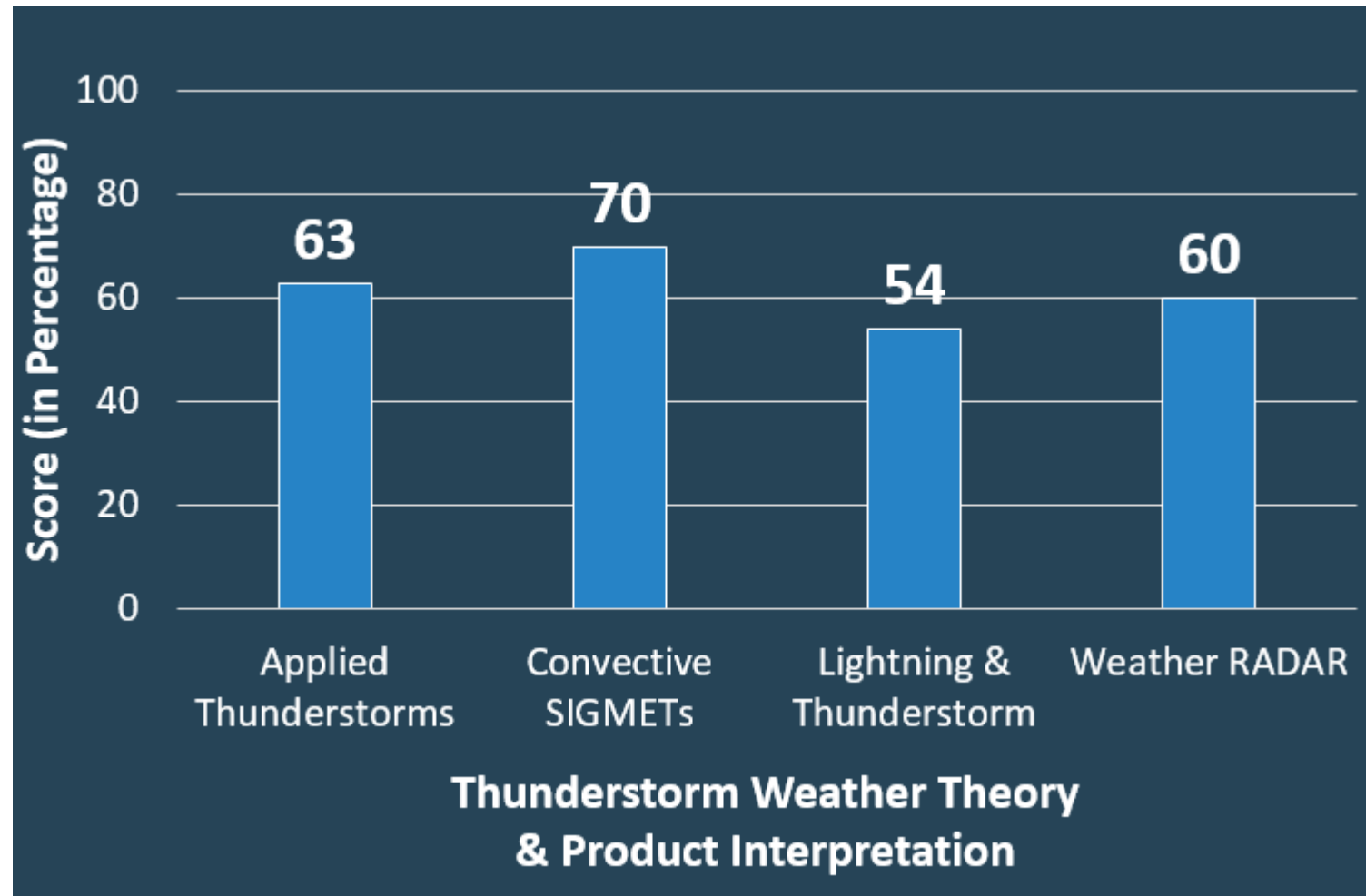
Pilot Performance on IMC and VFR Knowledge and Skills

- This includes Surface Charts, Satellite Data, & PIREPs involving IMC weather



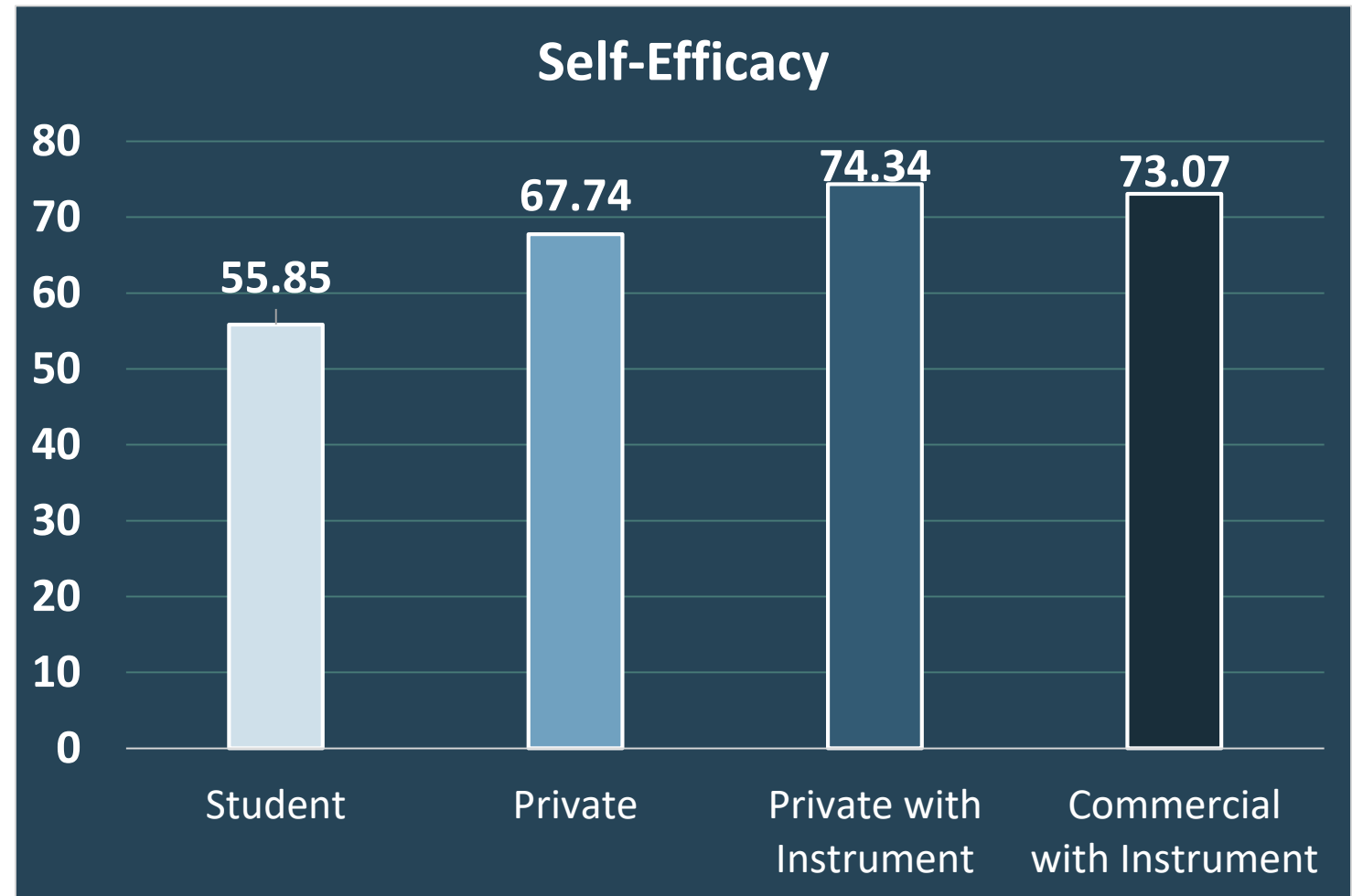
Thunderstorm Knowledge and Skills

- Pilots scored low on thunderstorm principles and radar interpretation



GA Pilots' Self-Efficacy

- Confidence level on weather topics
- Measured through a survey
- Positive correlation between knowledge scores and self-efficacy



Overall Summary

- General Aviation Pilots are weak in terms of weather knowledge
- Weakest Topics included
 - Thunderstorms
 - Radar interpretation
 - AIRMETs
 -and more
- The new automated weather products showed effectiveness through higher scores

Overall Summary

- The sample was 204 pilots – more participants will be needed to further verify the results
- More experience (flight hours) did relate to improved scores
- Weather self-efficacy was correlated positively with aviation weather knowledge.

Why the Knowledge Gap?

- Pilots can fail every weather question on FAA knowledge test and still achieve a passing score
- Lack of experience
 - GA pilots avoid flying on thunderstorm days?
- Convective weather and radar interpretation can be complex
- Lack of understanding of weather from instructor passed on to students?
- More instructional tools and focus needed on weather topics for GA pilots
- Consolidate weather info and ACs into a “Weather Handbook”

Thank you

