Comparing Traditional Training to an AI-Assisted Application for Instructing Ultrasound Image Acquisition

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What is Point of Care Ultrasound (POCUS)?

Obstetrics

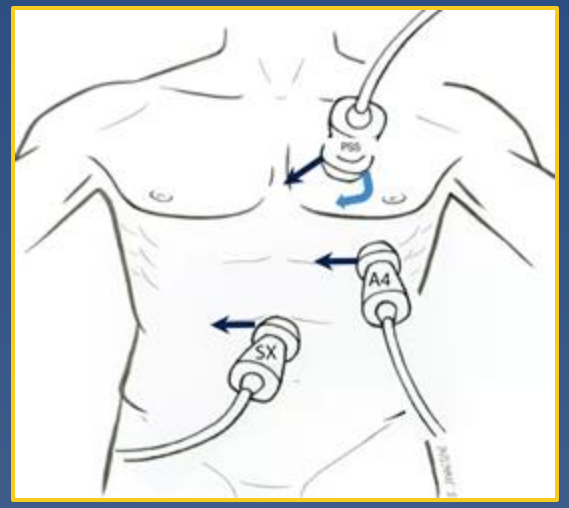
… and more!

Expensive

Time-Intensive

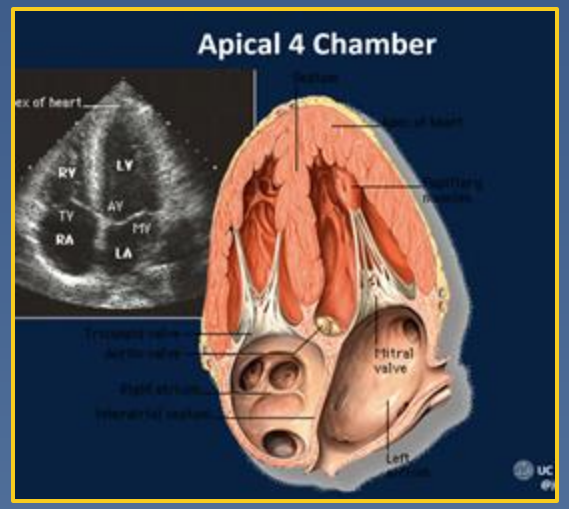
What is Butterfly's Scanlab?

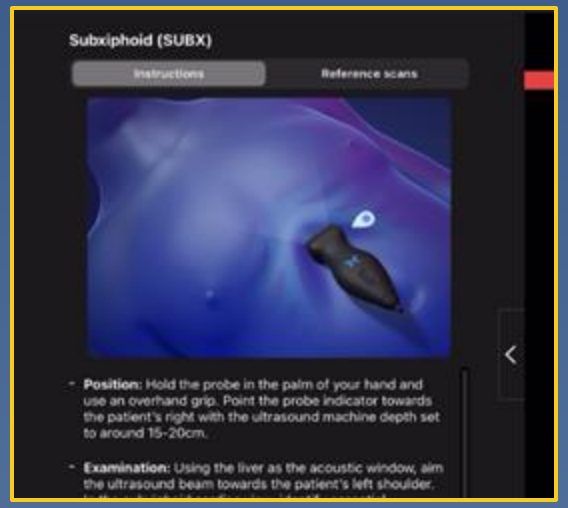
Didactic
PSAX Demo



Scanlab
PLAX Demo

Didactic
A4C Image





Scanlab
Animated
SUBX

OUR GOAL:

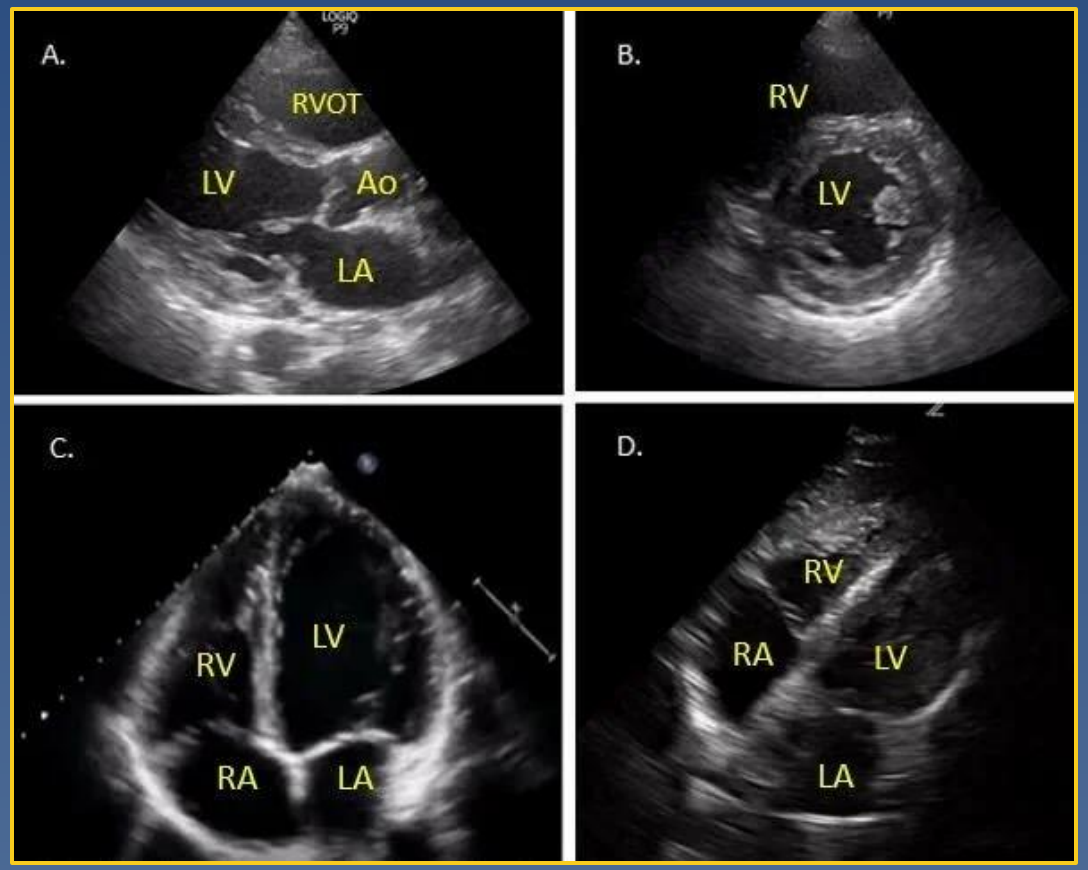
To compare Scanlab's efficacy in teaching essential POCUS techniques against a traditional didactic training curriculum

How?

Participants:

- ~30 undergraduates from EMRAP (Emergency Medicine Research Associates Program)
- Divided into 2 groups
- **Traditional vs Scanlab**

How?



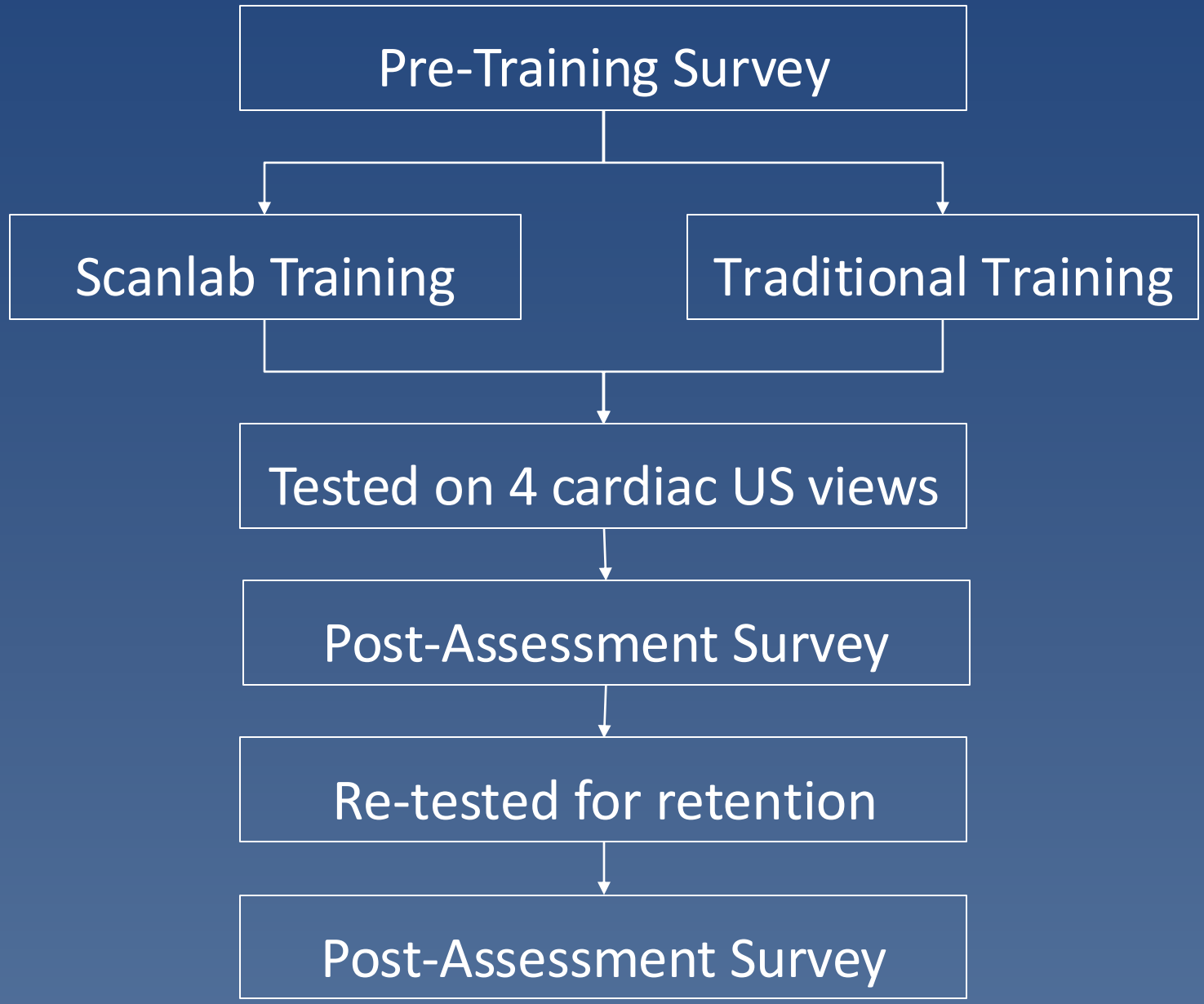
Both groups learned cardiac ultrasound

A. PLAX (Parasternal Long Axis)
B. PSAX (Parasternal Short Axis)
C. A4C (Apical 4-chamber)
D. SUBX (Subxiphoid)

How?

Training + Assessment (Session 1)

Re-assessment (Session 2, 4 weeks later)



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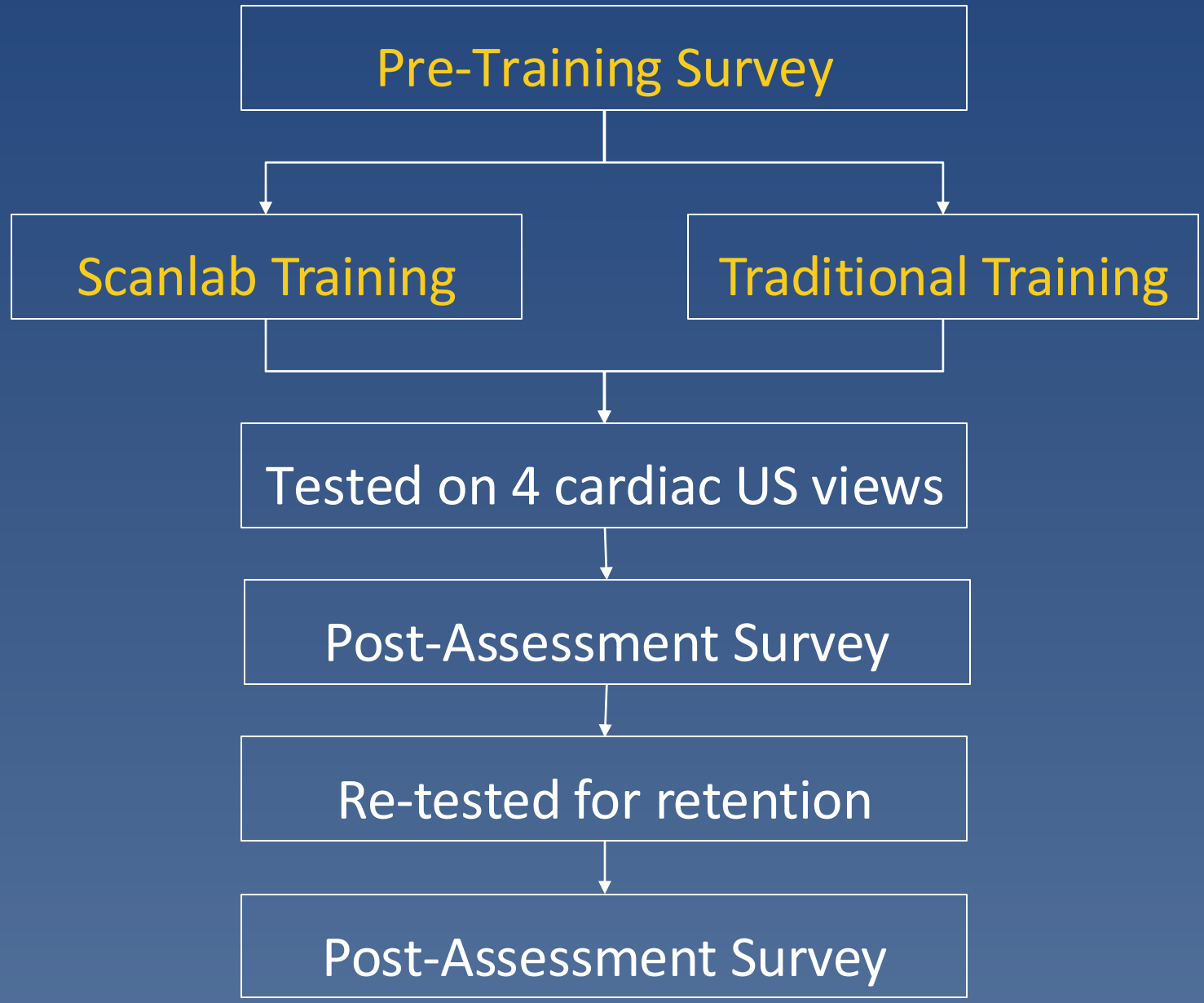

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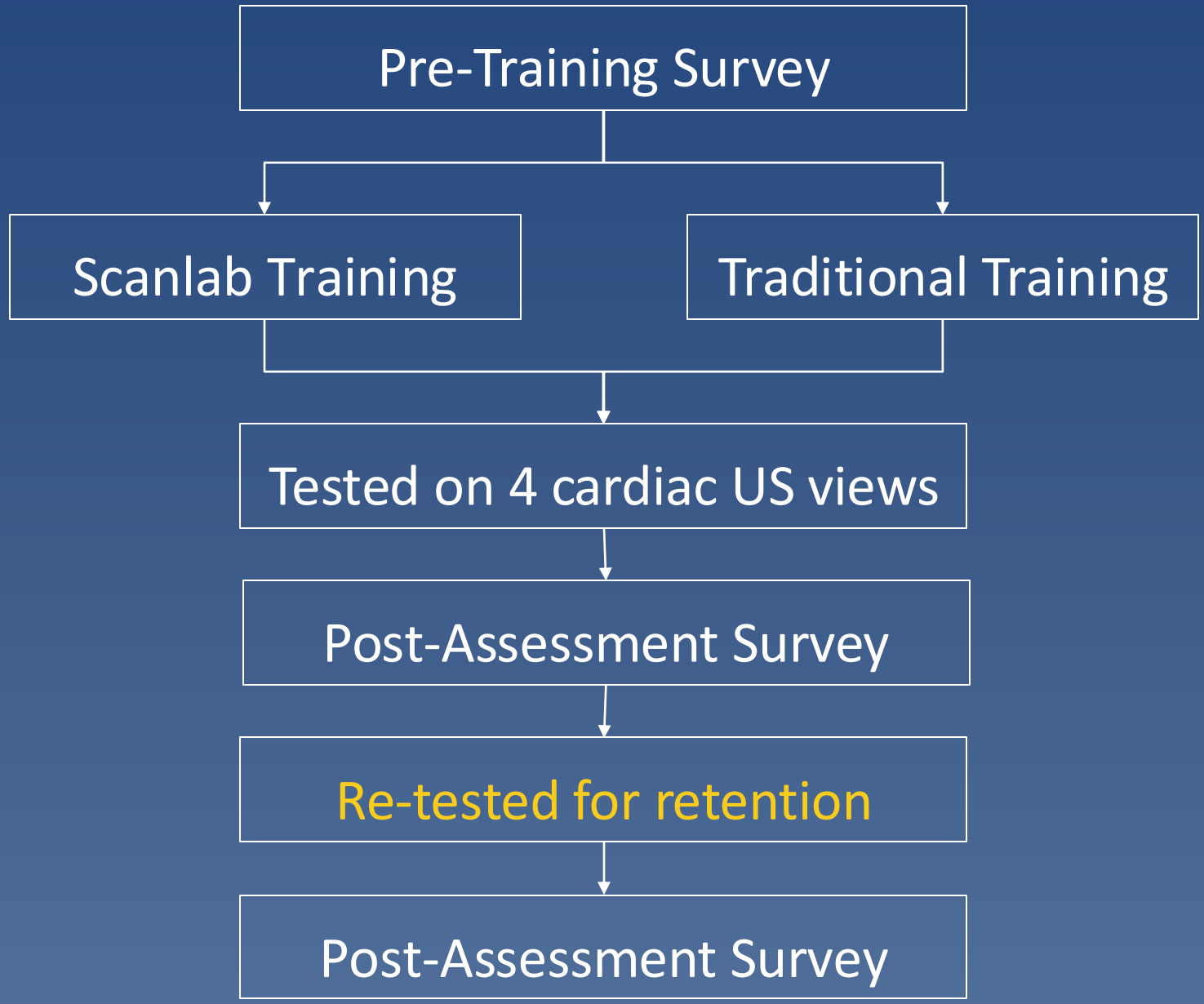

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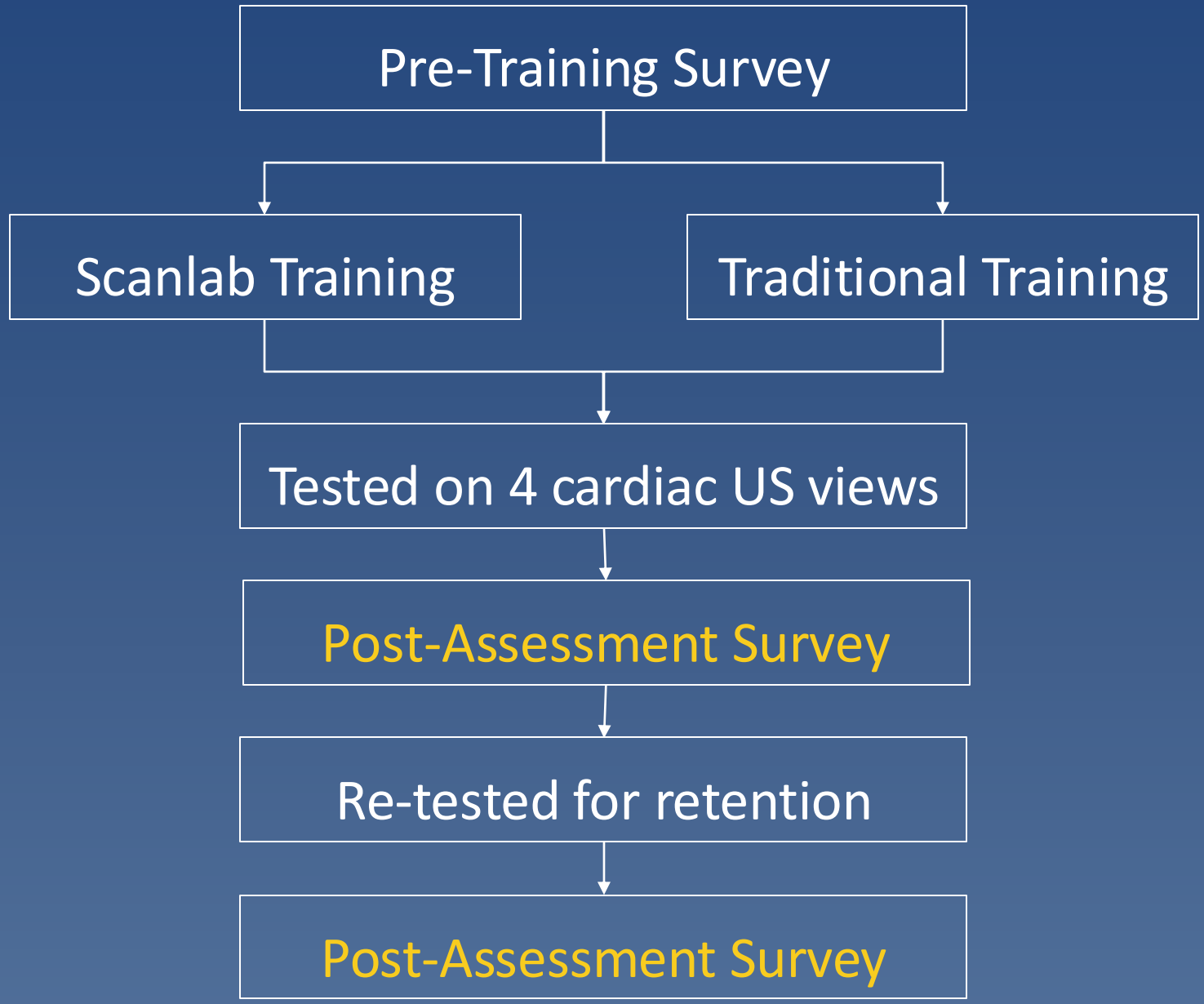


Skill and Confidence Assessment

4 graded assessments of
4 cardiac ultrasound views

+

5 confidence surveys
(1 pre- + 4 post-surveys)

=

- Image quality
- Confidence
- Retention

Image Rubric

4 cardiac POCUS views	Points	Image quality criteria	
PLAX	2	Excellent:	All 7 chambers and anatomical structures (LA, LV, LVOT, RV, AV, MV, and IVS) visualized or similar to the excellent quality reference[a].
	1	Acceptable:	One chamber (LA, LV, or RV) severely foreshortened or 1 anatomical structure (LVOT, AV, MV, or IVS) not visualized well.
	0	Poor:	Any 2 chambers or structures (LA, LV, LVOT, RV, AV, MV, and IVS) severely foreshortened/not visualized well, the left and right sides of the image are flipped, raters do not recognize the view as a parasternal long-axis view, or no image obtained.

Survey

On a scale from 1-5, to what extent the training you received was useful in improving your confidence in choosing the correct orientation of the probe?

* must provide value

- ○ 1 - Not at all
- ○ 2
- ○ 3
- ○ 4
- ○ 5 - Very well

On a scale from 1-5, to what extent the training you received was useful in improving your confidence in adjusting the gain and depth to maximize picture quality?

* must provide value

- ○ 1 - Not at all
- ○ 2
- ○ 3
- ○ 4
- ○ 5 - Very well

On a scale from 1-5, how well do you understand the relevant heart anatomy for cardiac ultrasound?

* must provide value

- ○ 1 - Not at all
- ○ 2
- ○ 3
- ○ 4
- ○ 5 - Very well

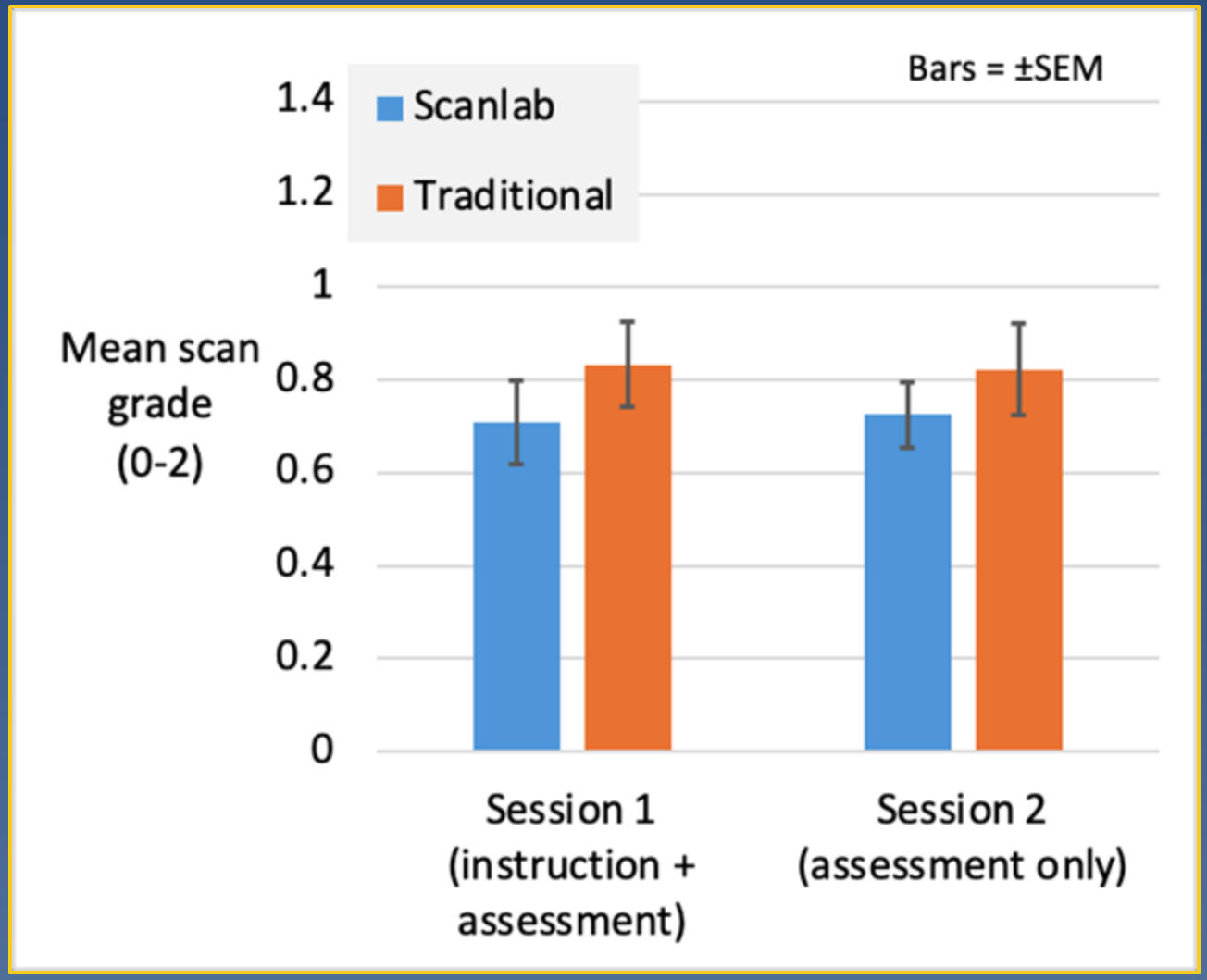
Grading Sessions 1 & 2

Session 1:

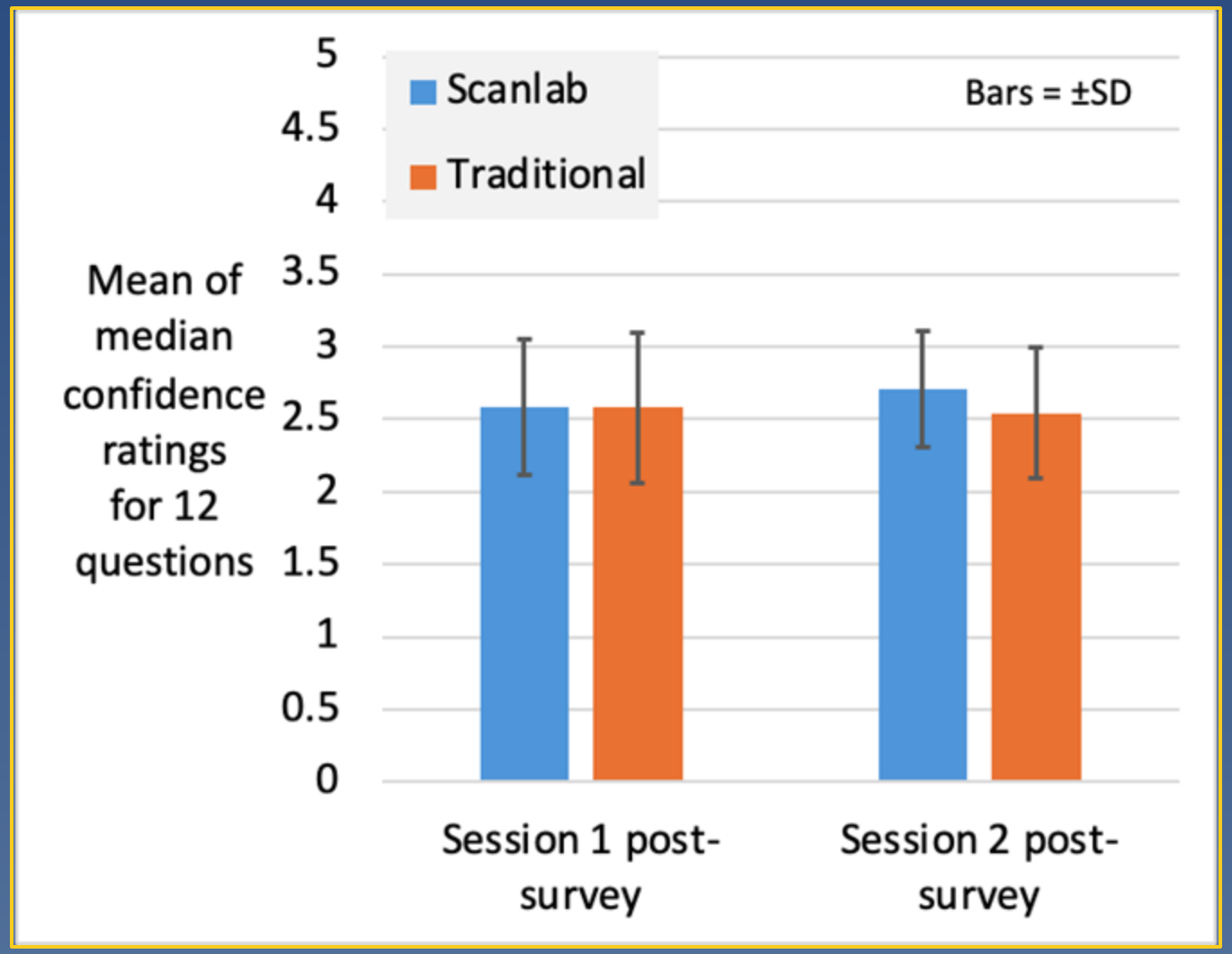
- Scanlab ($\bar{x}$=0.708, n=8)
- Traditional ($\bar{x}$=0.833, n=9)
- p=0.379

Session 2:

- Scanlab ($\bar{x}$=0.725, n=10)
- Traditional ($\bar{x}$=0.823, n=8)
- p=0.575



Confidence After Sessions 1 & 2



Hypothesis

Students trained with Scanlab will be as **effective** and **confident**

Significance

Scores are similar across groups for **image quality** and **confidence**

Limitations

Focused on non-medically trained students

Limited student availability

Limited number of participants

Limited physician availability

How does this impact us?

Less Resources

Saves Valuable Time

- ★ Reach more clinicians and healthcare workers in underserved areas
- ★ Improves access to ultrasound instruction for novice learners

Future Direction

New AI Software

- ★ Heart Focus
- ★ In-house tools from UCI
- ★ More to come!

New Populations

- ★ Medical students
- ★ Residents
- ★ Attendings
- ★ Youth

AI's use in medical education has limitless potential

Thank you!