



CAMPBELL
UNIVERSITY
SCHOOL OF ENGINEERING

Virtual Implementations: Heat Transfer

Virtual IUSE EDUC-ATE Workshop

October 2, 2020

Virtual Implementation Materials

Demo Videos

- ▶ ~10 minutes long (Shell & Tube, Double Pipe)
- ▶ Data Collection

Conceptual Videos

- ▶ 2-3 minutes
- ▶ 1-2 learning objectives

Sample Data

- ▶ Data from demo videos
- ▶ Can use in worksheets (students watch rather than run experiments)

Recommended Implementation Protocols

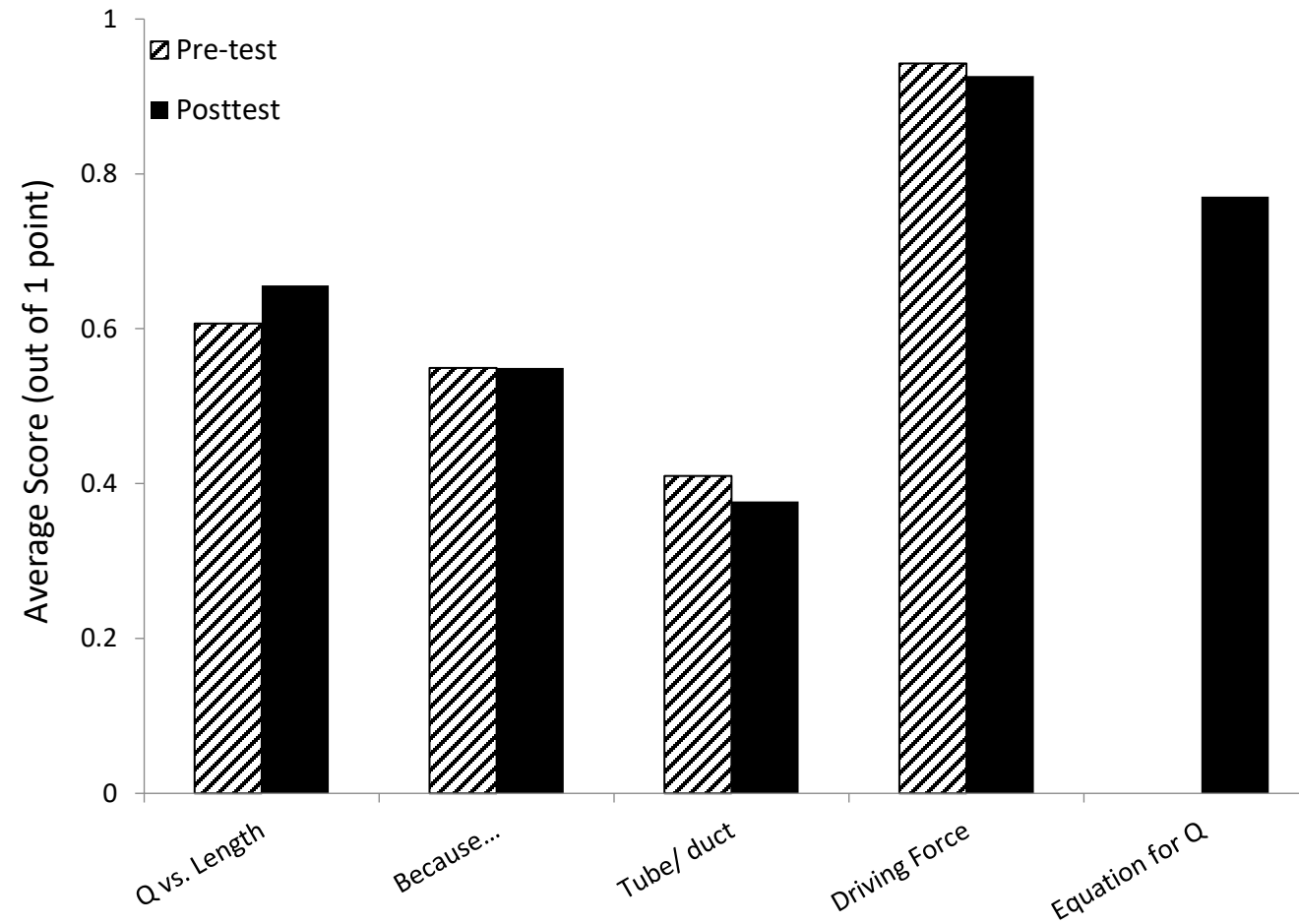
Synchronous Implementation

- ▶ Go over worksheets in class
- ▶ Show demo videos in class
- ▶ Show conceptual videos if time allows
- ▶ Pre-/posttests during class

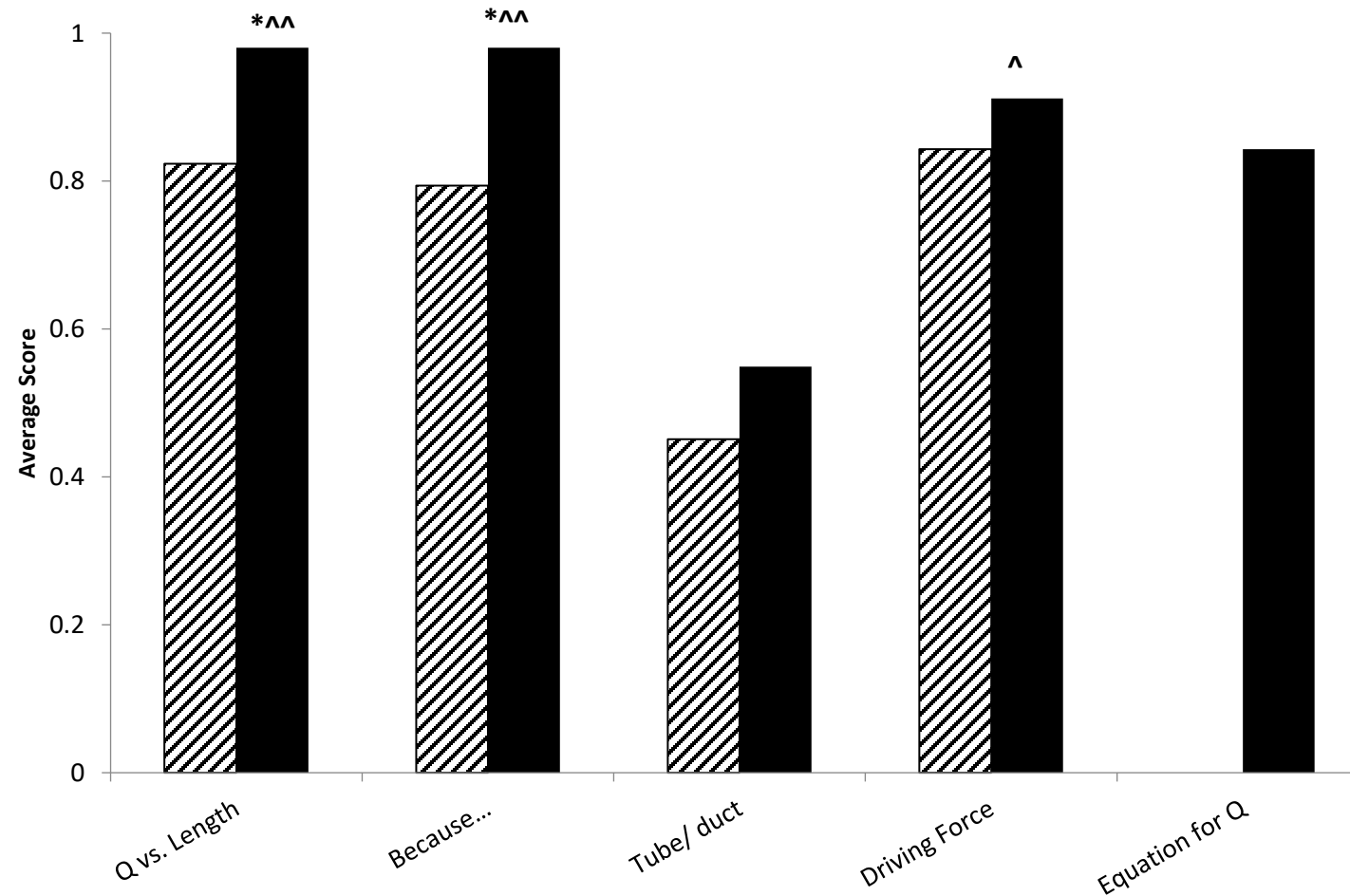
Asynchronous Implementation

- ▶ Ask students to complete worksheets
- ▶ Give links to demo and conceptual videos
- ▶ Pre-/Posttests as close together as possible

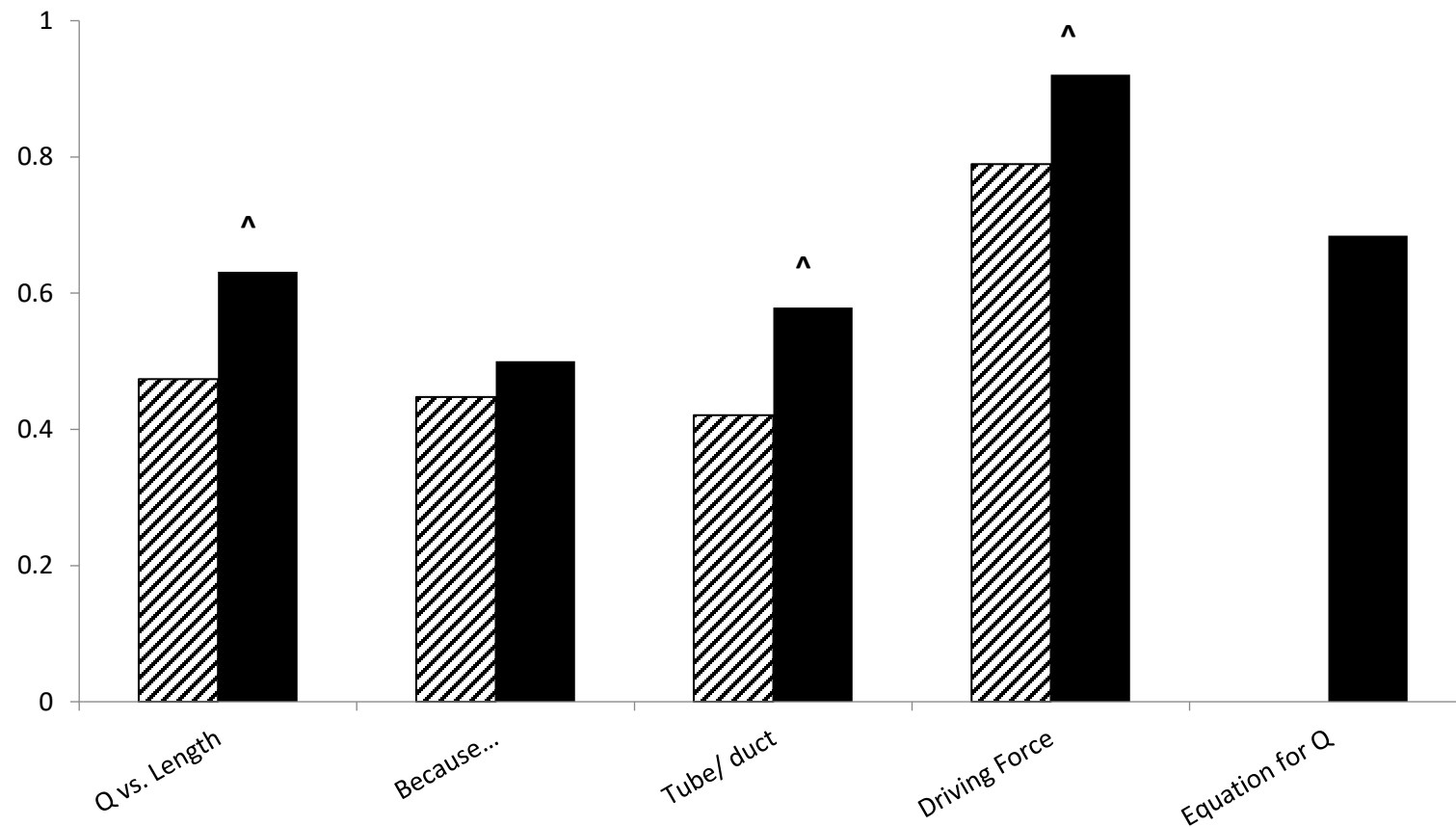
This was an asynchronous double pipe implementation (N=61) where students were only asked to watch the demo video and complete the pre/posttest as optional extra credit. They were not given the worksheet or links to the conceptual videos



This was an asynchronous double pipe implementation (N=51) where students could earn extra credit **only** if they watched the demo video, all the conceptual videos, and completed the pre- and posttest. Extra credit points were assigned **based on how well they did on the posttest**. The worksheet was not used. (^, ^^ = small, medium effect size, * = $p < 0.05$)



This was an synchronous double pipe implementation (N=19) where students watched the demo video and worked through the worksheet in Zoom breakout rooms (completed most of in-class portion). The instructor circulated around to answer questions. Unsure whether conceptual videos were used, but students had 1.5 hours in class to do this, so perhaps they were



Breakout Room Session

- ▶ Find and watch demo video for double pipe at <https://labs.wsu.edu/educ-ate/> (<https://www.youtube.com/channel/UCifbzIXEv-GazMBQkB-2uAA/videos>)
- ▶ Discuss:
 - ▶ Are you teaching online classes?
 - ▶ Which implementation method (synchronous/ asynchronous) will you use?
 - ▶ Which materials do you think will be useful?