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Using VR for Training how to Conduct A Tire Change on an Aircraft

Christopher J. Lee M.S.
Embry-Riddle Aeronautical University, leec18@erau.edu

Andrew R. Dattel Ph.D.
Embry-Riddle Aeronautical University, andy.dattel@erau.edu

Michael Valderrama
Embry-Riddle Aeronautical University, valderrm@my.erau.edu

Trevor Goodwin
Embry-Riddle Aeronautical University, goodwit4@erau.edu

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Effects of VR Practice on Changing an Aircraft Tire

Student Researchers: Michael Valderrama

Faculty and Staff Researchers: Dr. Andrew Dattel, Christopher Lee, Trevor Goodwin

Embry-Riddle Aeronautical University, College of Aviation

Research Questions

- Does the Tread VR program train students to the same level as a demonstration by an Instructor?

- Do students prefer the Tread VR instruction over one on one instruction?

- Is there a difference in the execution of a task between the Tread VR program over one-on-one instruction?

Participants: ERAU AMS 263 students

Apparatus: HTC Vive Pro head mounted display (HMD) and two hand controllers

Tasks: Change tire of an aircraft in a virtual environment

Standard Analytics System
- A standardized set of metrics captured by projects in the COA XR Lab
- Each trainee has their own file output
- Metrics for TreadVR include:
  - The time it took to complete the entire procedure
  - The time it took to complete each step

After each participant conducted a tire change, 1 question was verbally asked. The question was, "On a scale of 1 to 10 with 1 being "Not helpful at all," and 10 being "Extremely helpful," how helpful was the (Either "VR "or "Demonstration," depending on what group they were assigned to) session in preparing you to change the tire?

Self Report of How Beneificial Training to Transfer

$t(22) = 6.273, p < .001$

Correlations of Performance Variables for VR Group

	2.	3.	4.	5.	6.	7.
1. Helpful	-.074	-.539	-.493	-.505	-.570	-.649*
2. Found Procedure		.259	.631*	.399	.448	-.156
3. Jack up A/C			.675*	.790**	.742**	.729**
4. CotterPin				.820**	.851**	.434
5. Take Wheel off					.950**	.684*
6. Wheel Replace						.592*
7. Down Jack						

*<.05 **<.01

Correlations of Performance Variables for Demo Group

	2.	3.	4.	5.	6.	7.
1. Helpful	-.288	-.325	-.645*	-.613*	-.588*	.289
2. Found Procedure		.388	.280	.191	.375	-.106
3. Jack up A/C			.791**	.736**	.696*	.194
4. CotterPin				.968**	.942**	.077
5. Take Wheel off					.956**	.196
6. Wheel Replace						.250
7. Down Jack						

*<.05 **<.01

Found Procedure in Maintenance Manual
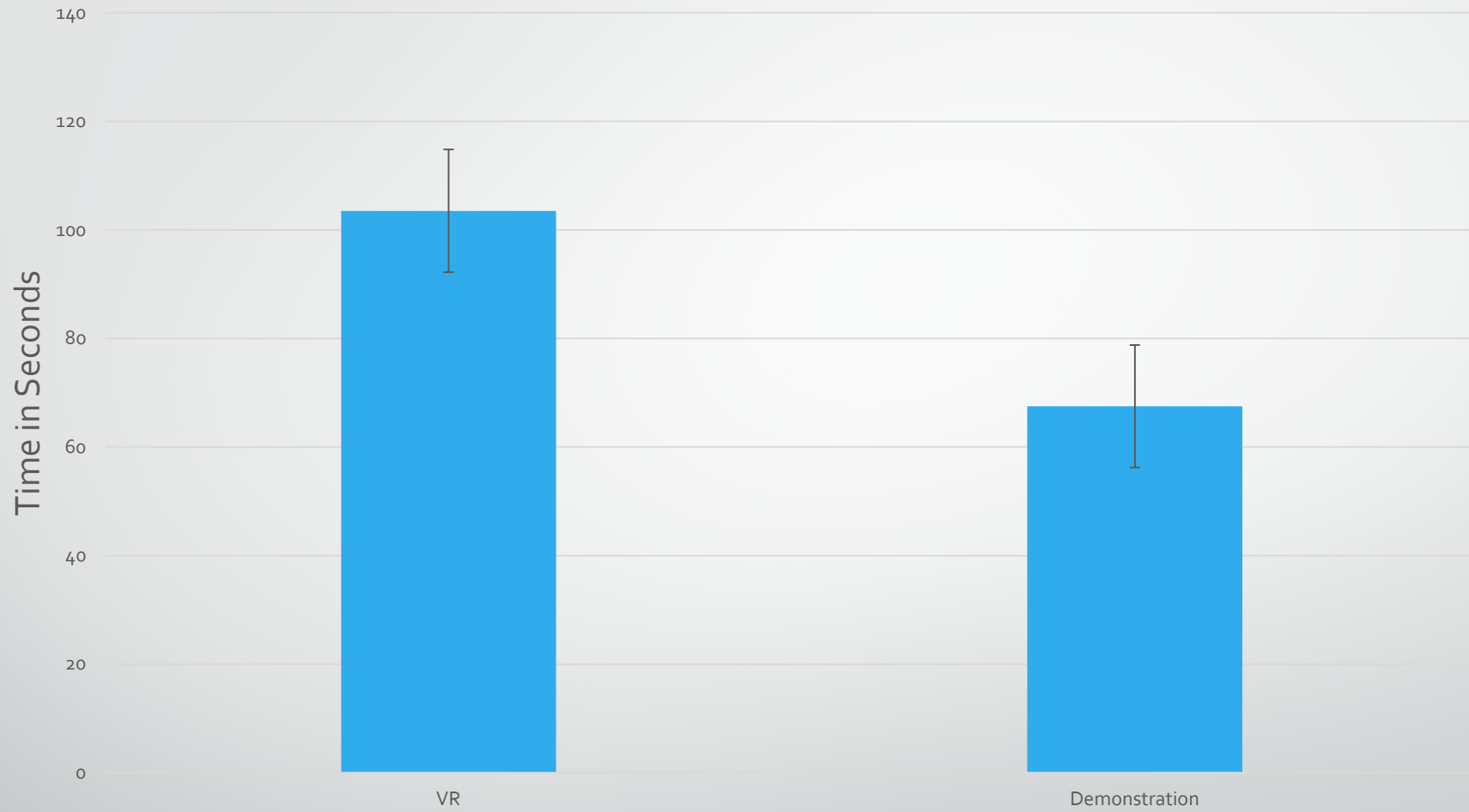
$t(22) = 2.251, p = .035$

Follow up

Observation of the subjects revealed items to follow up on in further studies

Students who trained on VR experienced problems installing the cotter pin during the real tire change.

Students who trained on VR did not spin the wheel while torqueing the wheel during the real tire change.

Research Questions Review

- Does the Tread VR program train students to the same level as a demonstration by an Instructor?

- Do students prefer the Tread VR instruction over one on one instruction?

- Is there a difference in the execution of a task between the Tread VR program over one on one instruction?

Questions ?

To expand on this study contact
Christopher Lee

Leec18@erau.edu