

Publications

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Strategies for Engagement of Non-Traditional Students in Engineering-Related Courses

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College of Aviation

Strategies for Engagement of Non-Traditional Students in Engineering-Related Courses

An NSF Project Engagement of Non-Traditional Students
in Peer-Led Learning Activities in an Asynchronous
Online Environment

EMBRY-RIDDLE
Aeronautical University



Leadership Team



**PI, Assistant Professor,
Associate Program Chair,
Undergraduate Studies**



Leadership Team Members:

Dr. David Harvie, Associate Professor;

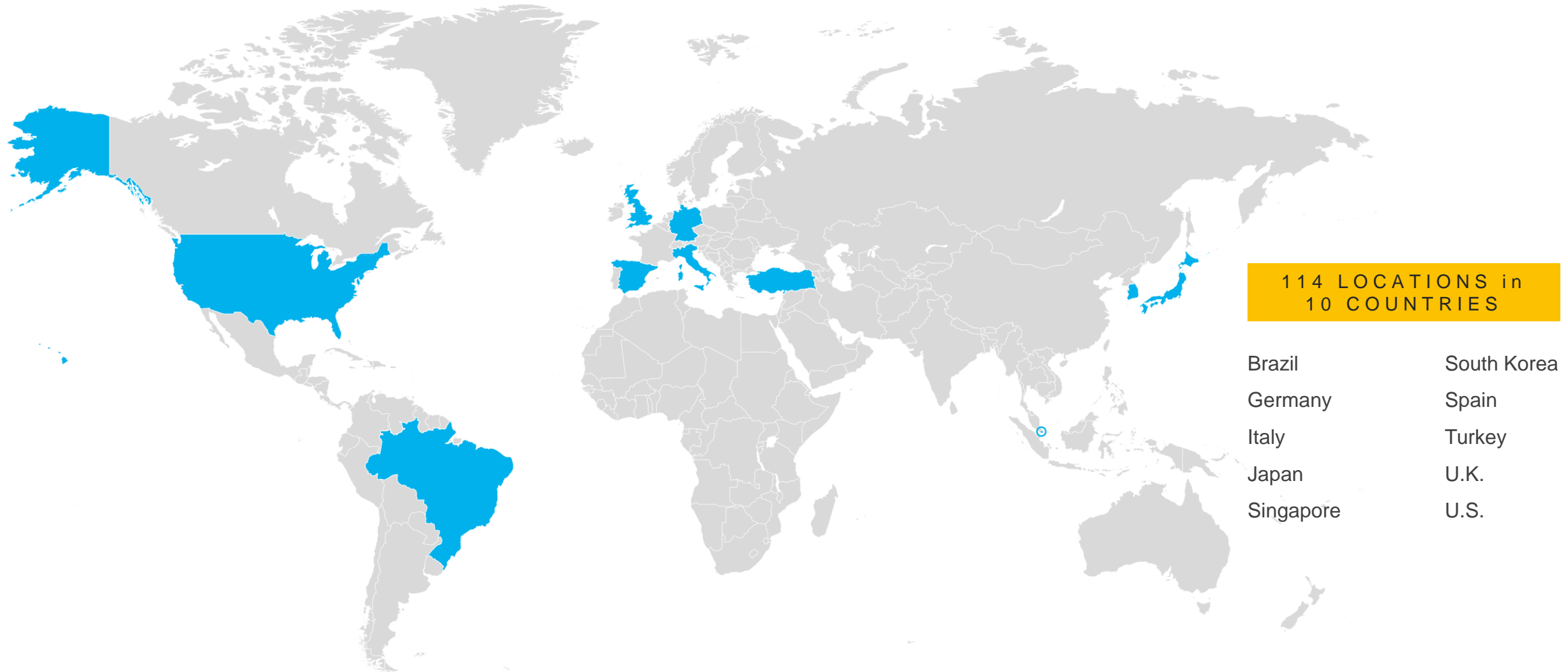
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College of Aviation;**

**Dr. Monica Surrency, Director of Instructional Design
Operations, IDD**



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Worldwide Campus

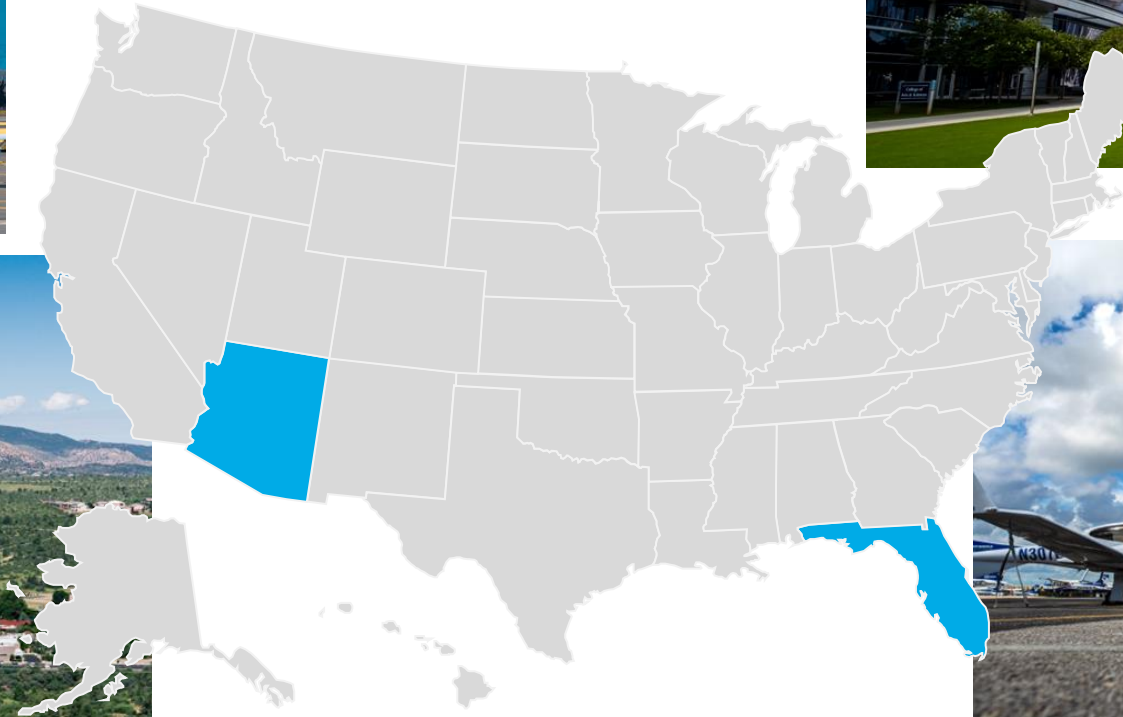
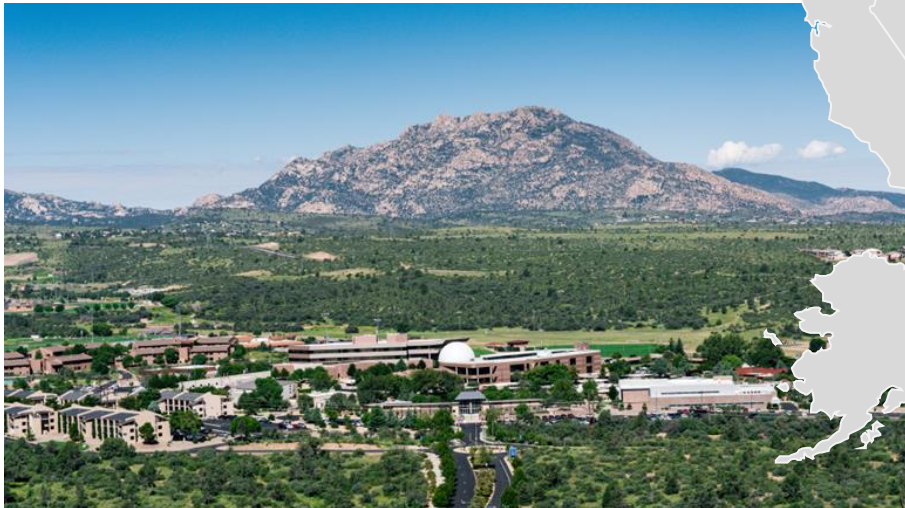


Embry-Riddle Aeronautical University

Residential Campuses



Two Residential
Campuses:
Prescott, AZ and
Daytona Beach, FL



RESEARCH GOALS

Project Goals

Overview

- Goal #1: Increase students' commitment to engineering pathways.
- Goal #2: Increase academic performance and persistence in engineering.
- Goal #3: Increase persistence of Veterans in engineering pathways.

Research Questions

- How does students' participation in peer-led team learning activities in online engineering courses correlate to their a) commitment to engineering, b) engineering identity, and c) self-efficacy?
- How do students in peer-led team learning activities compare to students in non-PLTL groups in terms of a) academic performance and b) persistence in engineering pathways?

Peer Leader Training



EMBRY-RIDDLE
Aeronautical University

10-hour Self-Paced Peer-Leader Training Course

Topics:

- How to include **diverse groups**, specifically **adult students** and **military students**
- How to **engage students** and break down stereotypes
- What the difference is between Mentoring and Tutoring and a **Peer Leader**
- How to create peer lateral relationships by showing **empathy** and sharing knowledge by transferring power to the learner
- How to engage others online through **effective communication**
- How to **build community** and assist others in their **identity development**

Peer-Leader Training Course

Technology Training and Resources

- Peer Leader Check-List and Expectations
- Padlet, Microsoft White Board, Canvas Studio, ERAU Media Hub, ect.

Teaching and learning strategies for PLTL activities

- Weekly videos, office hours and discussion posts.

Is it working?

Peer Leader Worklogs/Reflections

Relationships and Communication:

- What communication barriers did you face?
- How did you encourage diversity of thought?
- Where were there opportunities to engage other students in conversations
 - about their backgrounds and how their differences may differ
 - than others in engineering pathway?
- How does this make them a valuable member of the engineering workforce?

Peer Leader Worklogs/Reflections

Community Building and Leadership:

- In what ways were you able to show empathy and consideration while providing meaningful feedback to students?
- How did you use your leadership style based on the “Roles and Responsibilities of the Student Leader” to improve your team’s online learning experience?
- In what ways did you feel you developed professionally through these experiences considering your leadership style and personality type?

Considerations for Future Improvements and Scalability

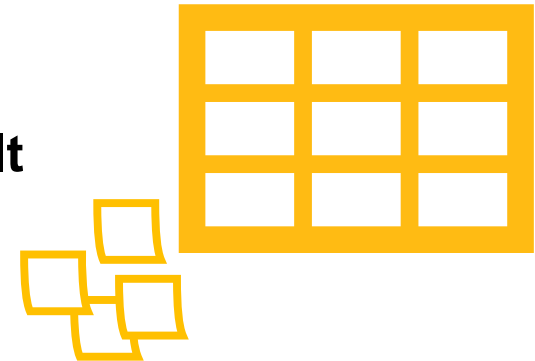
Recruitment of Non-Traditional Groups

Voluntary Participation

Consistency between 9-week terms

Relationship Building and Rapport with Peers and Peer Leaders for Adult Learners

Participation through Video and Non-Traditional Online Learning Tools



OVERVIEW OF PEER LED LEARNING CONCEPTS



Overview of Teaching Strategies



Think-Pair-Share



3-Step Interview



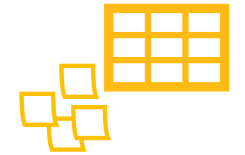
Round-Robin Brainstorming



Gallery Walk



**Muddiest Point/
Minute paper**



Categorizing Grid/Memory Matrix

Think-Pair-Share

Overview

- Prompt students w/challenge or question
- Provide time to reflect and think
- Pair classmates to discuss w/partner
- Reconvene as group and share

Suggested Tools

- Group Discussions in Canvas
- Various collaboration tools
 - ◆ Teams, text, chat tools, etc.
- Canvas Studio



3-Step Interview



Overview

- Faculty creates list of interview questions relating to course topic
- Organize students into pairs
- Students interview each other
- Students reconvene with all classmates
- Students present what they learned from each other

Suggested Tools

- Announcement
- Class/Group Discussions in Canvas
- Various collaboration tools
 - ❖ Teams, text, chat tools, etc.
- Canvas Studio

Round-Robin Brainstorming



Overview

- Structured brainstorming activity with equal contribution
- Each student posts their idea or solution to the prompt, then 'passes' to the next student to add their additional ideas
 - Instead of a physical table, utilize whiteboard tools to organize the brainstorming notes
- Reconvene and discuss collective ideas to create final concept/solution as a whole.

Suggested Tools

- Padlet or whiteboard tool
 - ❖ Suggest using columns to organize each contribution.
 - ❖ **Sample:**
 - ❖ [Example Round-Robin set up using Padlet](#)
 - ❖ [The Round Robin brainstorming technique & template \(Concept board\)](#)
 - ❖ [Round Robin template \(Mural\)](#)
- Table in a document or spreadsheet
- Group Discussion in Canvas
- Canvas Studio

Gallery Walk



Overview

- Similar to a conference poster session or museum gallery
 - ❖ Students examine challenges
 - ❖ Collaborate to answer prompts at each exhibit
 - ❖ Post solution for next group to build upon
- Groups rotate from one exhibit in the gallery to the next and build upon prior contributions
- Reconvene to discuss ideas and responses

Suggested Tools

- Padlet or whiteboard tool
- Group Discussion in Canvas
- Canvas Studio

Muddiest Point/Minute Paper



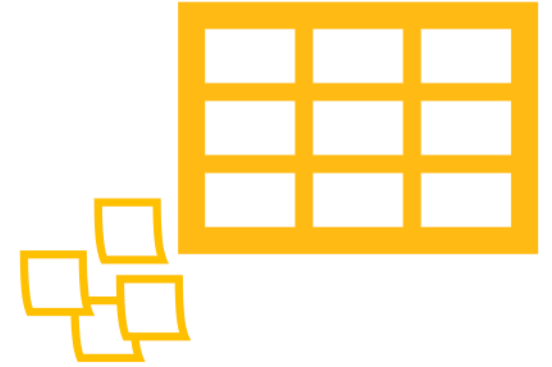
Overview

- Prompt students to reflect on challenges (aka 'muddiest point') or reflect on their learning and areas of improvement.
- Reflection posted in private (paper) or shared with classmates (discussion).
- Challenges identified and addressed to individuals or group of students

Suggested Tools

- Group/class discussions in Canvas
- Canvas Studio (for video recording)

Categorizing Grid/ Memory Matrix



Overview

- Both activities use a table or grid for students to fill in the information
- Categorizing Grid:
 - ❖ Provide students with categories and items (terms, images, equations, etc.)
 - ❖ Students sort items into appropriate categories and share results
- Memory Matrix
 - ❖ Provide students a matrix with row and column headings
 - ❖ Students fill in blank cells for the rows and columns

Suggested Tools

- Microsoft Word
- Microsoft Excel
- OneDrive (for sharing/collaboration)
- Whiteboard tool
- Canvas Discussion
 - ❖ Enable 'Post First' feature

YEAR 1 OUTCOMES

Overview

- Activities include a 10-hour self-paced Peer Leader Training. 8 peer leaders participated in the training.
- Four faculty served as peer leader mentors and developed curriculum for Digital Circuits, Statics and Aerodynamics
- 108 students enrolled in the targeted courses. We had 13 students participate in peer leader activities.
- Seven students were veterans and four were female

Outcomes

- We saw higher overall course scores in the students who participated in Peer Leader Training.
- Overall positive professional development experiences and acclimation by peer leaders shared in reflection entries.
- Increased motivation and social integration was experienced by students who participated in focus group interviews.

Considerations for Future Improvements and Scalability

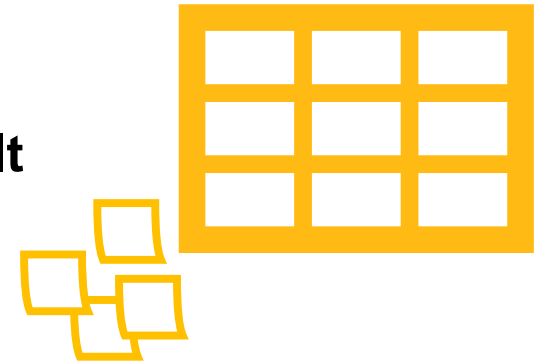
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Thank You

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