Opportunity: American Airlines had a need to enhance their training program

- Current program hadn’t changed in 20+ years
- Revolutionize how we trained the best Flight Attendants in the industry
- Create a learner centric program
- Reduce overall time in program
- Train a more qualified Flight Attendant
- Leverage technology
How We Did It

- Used focus groups
  - Previous new hires of those that attended preceding two (2) years
  - Instructors
  - Flight Service Managers who support our Flight Attendants

- We asked questions about the program:
  - What did you like and not like?
  - Where could you have had more reinforcement on?
  - What have you found most useful and what have you found least useful?
  - When speaking with your Flight Attendants, what have you found they have the most questions about?

- We reviewed our procedures, added the feedback from the focus groups… we knew could deliver better
What We Found Out

- Needed to produce a better way of training the aircraft
- Allow our Flight Attendants to learn at the pace they naturally learned
- We discovered that things we thought were working…were not
- Needed to see trainers that actually represented the current fleet
- Needed to change how we taught the information
One Piece of the Puzzle - Virtual Reality

VR had the potential to fill a number of the needs outlined

- Self-paced learner driven solution
- High-fidelity representation of fleet within limited space
- Engaging training medium
Why Virtual Reality?
Virtual Training
Engagement, skill acquisition, muscle memory

Physical Practice
Muscle Memory
Smaller Space
Full sized simulators not required
Engaging/Safe
Medium allows for exciting training and safe for high risk tasks

https://www.gartner.com/newsroom/id/3784363
Design Process - Iteration Is Key

- Defining Goals
- Design
- Research/Rapid Prototyping
- Final Design
- Delivery/Support
- Testing
- Refining
- Execution

01 08
02 07
03 06
04 05

IATA AVARS
## Problem

### Student Throughput
American Airlines would not have enough physical training platforms to keep up with training demands.

### Expanding Class Structure
American Airlines was changing their program to increase training demand and reduce training cycles.

### Student Engagement
Students are not engaged during classroom training due to lack of interactivity. This has the potential to lead to poor performance.

## Opportunity

### Breadth of scenarios
Within a physical training platform, creating and resetting a variety of scenarios takes a lot of time to do.

### New Focus to Student Driven Training
American Airlines wanted a way to allow their students to drive their own training on their own schedule with less instructor involvement.
VR Training

Turn-key 12-room VR training lab
Visual Representations
Cabin Crew Virtual Readiness: Two Training Goals, Two Modes

Training Mode
Guided door open and closing procedures as well as the location of emergency equipment

Optimizing training efficiency and effectiveness for door training and equipment knowledge

Evaluation Mode
Evaluation on door open and closing procedures and the location of emergency equipment
Impact
Without it, Why Are We Even Doing This?

Data Required
Self-Efficacy (After 20 Minutes of Use)

**Improved Self-Efficacy**
From February Class
High self-efficacy scores increased from 20% of students to 68%

**Scope/ Process**
50 Students completed self-efficacy measures given before and after training

**Limitations of Research**
Small Scale (50 Learners)
Transfer of Training Evaluation Methods

An Analysis of Variance was conducted to determine if various lengths of time in VR training had positive impacts on transfer performance.

- **Independent Variable:** Amount of time using VR training prior qualification evaluations:
  1: 1-10 minutes
  2: 10-20 minutes
  3: 20-30 minutes
  4: 30 plus minutes

- **Aircraft being qualified on:**
  - A-320, A-330, 737, 757, 767, 777, 787, E-190, MD-80, ALL
  - **ALL includes skills such as monitor and challenge and arming/disarming doors (general)**
Transfer of Training Evaluation Methods

- **Dependent variable**
  - Performance on qualification trials on each door/aircraft:
    - 5: Error Free (satisfactory)
    - 4: Error Captured (satisfactory)
    - 3: Debrief (satisfactory)
    - 2: Repeat (unsatisfactory)

- **Hypothesis:** Increased time in VR (rating 4: 30+ minutes) will lead to better mean performance rating levels than lower amounts of time in VR (rating 1: 10 minutes or less)
Transfer of Training Evaluation: Methods

- Each student was required to complete VR training until proficiency on the following doors and emergency exits:
  - A321, 737
- 777 and 787 training modules were available but not required
- “How to use” VR training took 3-5 minutes
- The most efficient learners completed training in under 10 minutes
- After the VR training (later in the week), learners complete qualification training on physical doors
Transfer of Training Results

There was a significant performance difference in live qualification performance based on the amount of time spent within VR training.

ANOVA

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Spending greater than 10 minutes in VR training significantly improved performance over less than 10 minutes.

Greater impacts are found with 20 minutes or more.

Diminishing returns after 20 minutes.

Details

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<th>(J) Time Classification</th>
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* The mean difference is significant at the 0.05 level.
Results/Transfer of Training

**Improved Performance**
From Jan – March
Unsatisfactory rate dropped from 25% to 2%
Error Free Increased from 34% to 82%

**Scope/ Process**
750 Students completed training
VR training changes added in February to focus on monitor and challenge skill

**Practical Implications**
Reduced need for physical trainers and instructors. Supports required throughput.
Practical Implications

Between March and April there were 28,561 new hire evaluation scenarios conducted!

• Each event takes on average 3 minutes to conduct (conservative)
• When the program started (January), 27% of those events required a repeat performance in order to pass: If that continued through March: 7,140 repeat events in 3 months.
• Integrating VR reduced that to 3 percent, Efficiency of 24% (6,854 Events)
• 6,854 * 3 minutes = 20,562 minutes (342.7 hours) of simulation time saved
• Scaled to a year (4X)
  • Almost 2/3 of a man-year of instructor time saved
  • 1370.8 hours of simulator time saved (bottleneck)
Summary

VR training has the potential to make real quantifiable impact on the training process by saving live trial iterations.

This can be accomplished with a limited amount of VR training:
- Diminishing returns after 30 minutes
- VR systems must be TRAINING SYSTEMS, not “Practice Systems” to be effective
- Quality VR development is key

Future Development

- 4 additional aircraft being developed
- Additional training being integrated