Title: Assessing the Impact of Interactive Technology on Aircraft Rescue and Fire Fighting Training

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Abstract: The presentation will discuss the current research being conducted by the Embry-Riddle Aeronautical University-Worldwide's Fire Science department concerning use of technology-advanced educational software at the Dallas/Fort Worth (DFW) Fire Training Research Center (FTRC). The research design is mixed methods, using quantitative data analysis to evaluate student survey results, integrated with qualitative observation and participation data, to create a sequential exploratory research strategy.

DFW FTRC means to combine the latest scientific fire research and hands-on training with technology-advanced educational software. It is used as part of the aircraft rescue and fire fighting (ARFF) educational curriculum to familiarize students with the unique features of various aircraft and airports; thus, students can visualize actual disaster scenarios at specific airports with certain aircraft. This study explores the extent to which the interactive learning technology creates a better learning experience for students and how it may translate to more effective ARFF response scenarios.

What is ARFF?

Aircraft Rescue Fire Fighter (ARFF) history
- Creation
- Military
- Commercial Airlines
- FAA & official creation of ARFF

Aircraft Rescue & Fire Fighting Working Group (ARFF WG)

The international professional organization dedicated to research and advancing the science of aircraft rescue and fire fighting

Who & What

- ARFF personnel
  - Different airports– municipal, state, national
  - Need to know airplanes landing
  - Change in culture of personnel
  - Multiple duties
    - Hazmat
    - Public Safety

FAA Requirements

FAA Federal Regulation Act (FAR), Part 139

- Hands on training

- Aircraft

Need for more in-depth training

- Civilian training

- Military training

ERAU – Worldwide and Dallas/Fort Worth Fire Training Research Center (DFW FTRC) signed a <u>Cooperative Agreement in August, 2013.</u>

- Operating since 1974
- Updated various times
- Newest renovation took place last year

- State of the art classrooms & training facilities
- Large student base
  - 15,000(to date) students,
    - 24 countries
    - 29 U.S. states

Interactive classroom - embracing technology

Set up:
- Large instructor lead touch screen at front
- 4 person desk set up

DFW FIRE TRAINING RESEARCH CENTER
A WORLD-CLASS FIRE TRAINING PROGRAM

Main Areas

1. Tactics and Strategies

2. Airport Familiarization

3. Aircraft Familiarization

BOEING 777

DFW FIRE TRAINING
RESEARCH CENTER

OPTIONS

GLOSSARY

TAXIWAY MARKINGS

RUNWAY MARKINGS

AIRFIELD SIGNAGE

TAXIWAY EDGE LIGHTS

Blue in color, spaced 200' apart, and used to outline the edges of taxiways.

TAXIWAY CENTER LIGHTS

Green in color, spaced 50' apart, and used to mark the center of the taxiway.

TAXIWAY INTERSECTION LIGHTS

Three steady yellow lights disposed symmetrically about the taxiway centerline that indicates multiple intersecting taxiways.

AIRBUS
A380

BOMBARDIER
CRJ-700

BOEING
737

BOEING
777

AIRBUS
A320

AIRBUS
A380

A380 AIRBUS

MOVE FORWARD
MOVE BACKWARD
CUTAWAY

VIEW ALL

RESET | AIRCRAFT EXTERIOR | INTERIOR: COCKPIT | INTERIOR: CABIN | MENU

AIRBUS A380
CABIN DOOR

MOVE FORWARD
MOVE BACKWARD
CUTAWAY

VIEW ALL

RESET | AIRCRAFT EXTERIOR | INTERIOR: COCKPIT | INTERIOR: CABIN | MENU

MOVE FORWARD

MOVE BACKWARD

CUTAWAY

VIEW ALL

RESET | AIRCRAFT EXTERIOR | INTERIOR: COCKPIT | INTERIOR: CABIN | MENU

A380

A380 AIRBUS

MOVE FORWARD

MOVE BACKWARD

CUTAWAY

VIEW ALL

RESET | AIRCRAFT EXTERIOR | INTERIOR: COCKPIT | INTERIOR: CABIN | MENU

AIRBUS
A380

A380

A380 **AIRBUS**

A MOVE

CLOSE

AIRCRAFT EXTERIOR

› CARGO HOLD	› BATTERIES
› FUEL TANKS	› APU
› HYDRAULIC SYSTEMS	› CABIN DOOR
› EMERGENCY CUT-OUTS	› LANDING GEAR

INTERIOR: COCKPIT

› THROTTLE
› EXTINGUISHERS
› APU SWITCH
› BATTERY SWITCH

INTERIOR: CABIN

› CABIN DOOR

RESET

MENU

1 2 3 4

VIEW ALL

RESET   AIRCRAFT EXTERIOR   INTERIOR: COCKPIT   INTERIOR: CABIN   MENU

Research Questions

1. Difficulty of using the technology

2. Integration of it within the curriculum

3. Create a better learning experience for students

4. Translate from the classroom to hands-on training

RESEARCH DESIGN

Quantitative

- FTRC Student Survey Data

Qualitative

- Observation of Students
- Key Informant Interviews (FTRC Instructors)

PRELIMINARY FINDINGS

Quantitative Data Analysis Suggests:

How well does the software augment hands-on training?

- 52% "Very Much"
- 36% more than "Somewhat" but less than "Very Much"
- Only 2% of respondents did not think the software enhanced hands-on training "at all"

PRELIMINARY FINDINGS

Quantitative Data Analysis Suggests:

How would your department/agency use the software?

- 55% Strategies and Tactics
- 37% Aircraft Familiarization
- 8%   Airport Familiarization

PRELIMINARY FINDINGS

Qualitative Data Analysis Suggests:

- There is some difficulty for students using the technology

- Technology is not well-integrated into the curriculum

PRELIMINARY FINDINGS

Qualitative Data Analysis Suggests:

- The technology DOES create a better learning experience for students

- The technology DOES translate from classroom to hands-on training

RECOMMENDATIONS FOR FURTHER STUDY

- How to better integrate the technology into the curriculum

- How to better manage the challenges/difficulties students have with the software

- How can the software, the curriculum, and/or the delivery method(s) be modified to leverage the utility of the software based on the 3 applications (strategies/tactics, airport familiarization, aircraft familiarization)