Effects of interdisciplinary high fidelity simulations: A look at initial industry success in aviation

Amanda Beaufore
Dr. Glenn Littlepage
Dr. Paul Craig
Dr. Michael Hein
Middle Tennessee State University
Background: Newcomer Adjustment

- Newcomer adjustment is “the process an individual goes through within the first year at an employing organization to learn how to perform the tasks of the job and develop positive attitudes toward the organization, work environment, and job requirements” (Klemme-Larson & Bell, 2013).

- Although all employees go through newcomer adjustment, it is particularly difficult for recent college graduates because of their lack of professional experience (Bauer et al., 2007).
Background: Recent Graduate’s Challenges

• New employees, and specifically new college graduates, are often not prepared for the work relationships that must be developed to be successful on the job, which often leaves new graduates struggling to relate to their coworkers (Pearson, 1982).

• Without formal instruction on teamwork competencies, students do not receive information or practice on specific group work processes or skills even after being forced to work in groups for four or more years.
Background: Training

- Once on the job, it can take up to ten years for an employee to be fully trained in their position (Gladwell, 2008).

- In order to conduct effective team training, high-fidelity simulations are often employed during training the aviation industry.

- The collaboration that multidisciplinary simulations bring allows team members to understand the roles of individuals in other disciplines with whom they are largely unfamiliar (Paige, Kozmenko, Morgan, Howell, Chauvin, Hilton, Cohn, & O’Leary, 2007).
The Problem

- As it stands, students in the aviation program are trained in silos creating a lack of a shared mental model between team members of different disciplines.

- With little to no prior training in teamwork between specializations, newly hired aviation employees may lack the knowledge, skills, and abilities to perform adequately.
The FOCUS Lab

• In order to aid in team training in the aviation industry, a high fidelity flight operation center unified system (FOCUS Lab) was implemented as a capstone course at a southeastern university.

• The NASA funded Flight Operations Center Unified Simulation runs through a fictional regional airline called “Universal E-lines.”

• The training that students’ partake in during the FOCUS Lab is job relevant and facilitates the learning of industry relevant teamwork competencies.
The simulation requires nine positions (pilot, pseudo pilot, ramp tower, maintenance, weather & forecasting, crew scheduling, flight operation dispatch (planning and scheduling), and flight operation coordinator) to be staffed by students at any given time.
The simulations required members of differing aviation specializations to cooperate and communicate effectively in order to problem solve and ensure the successful take offs, flights, and landings of 60-80 flights each session.
The Current Study:

• Studies have shown that participants of the FOCUS Lab like the training and are learning and improving across simulations despite the increasing difficulty level (Littlepage, Craig, Hein, Moffett, Sanders, Carlson, Ivakh, & Georgiou, 2013)

• However, there has not been a study looking to see if these skills transfer beyond the simulation.

• **Research Question:** what are the effects of high fidelity simulation training on initial employment experiences?
Hypotheses

**H1:** Participants in the FOCUS Lab will hold higher beliefs about their initial ability to perform their job adequately than those who did not complete the FOCUS Lab.

**H2:** Participants of the FOCUS Lab will have higher initial self-rated individual performance than those who did not complete the FOCUS Lab.

**H3:** Students who participated in the FOCUS Lab will report better teamwork knowledge and skills such as role clarity, coordination, and communication with team members at the beginning of employment, compared to participants who did not complete the FOCUS Lab.

**H4:** Students who participated in the FOCUS Lab will experience an easier transition into their first job and adjust better to the job overall than graduates who did not complete the FOCUS Lab.
Hypotheses (cont.)

**H5:** Adjustment to the job will mediate the relationship between FOCUS Lab completion and turnover intentions so that students who completed the FOCUS Lab will have higher adjustment to the job and therefore lower turnover intentions, compared to students who only received the lecture potion of class.

**H6:** Participants who perceive role clarity will have lower turnover intentions compared to individuals who do not perceive role clarity.

**H7:** Interdependence will be a moderator of the effect of FOCUS Lab participation on various facets of teamwork. Specifically, stronger effects of the following will be seen for jobs that are highly interdependent.

- **H7a:** Teamwork knowledge
- **H7b:** Teamwork communication
- **H7c:** Teamwork coordination/collaboration
- **H7d:** Teamwork self-efficacy
Measures

• Measures will ask questions under three broad categories:
  • Individual performance
    • Task Performance
    • Self-efficacy (individual)
  • Adjustment to the job
    • Organizational Knowledge
    • Role Clarity
    • Social Acceptance
    • Turnover Intentions
  • Teamwork
    • Teamwork Knowledge
    • Communication
    • Coordination and Collaboration
    • Self-efficacy (teamwork)
Pilot Study

• A pilot test was conducted to test the proposed measures.

• After the pilot test, the internal consistency for each scale was evaluated and items with low internal consistencies were removed from the survey.

• Once removed, internal consistencies for each scale were analyzed and range from $\alpha= .758$- $\alpha=.949$. 
Method

**Participants:**

- A total of 707 alumni students will be contacted between the two conditions with 371 in the lecture only condition and 336 in the FOCUS Lab condition.

**Procedure/Measures:**

- To test the hypotheses past aviation graduates will be contacted and asked to complete measures about their first six months in a professional job after graduation.
- Comparisons will be made between participants who have graduated from the FOCUS Lab vs. graduates who only obtained the lecture portion of the capstone course.
- Questionnaires will be administered via Qualtrics and reminder e-mails will be sent to those who do not complete the survey.
- Results from aviation graduates will be compared against results from I/O graduates to ensure differences between groups are not due to memory or other time-related differences such as the economy or history effects.
Method (cont.)

- A pretest-posttest non-equivalent group design (2x2) is utilized.
- One factor is college major of the participant (Aerospace vs. Industrial/ Organizational Psychology) and the second factor is date of graduation.
- I/O Psychology graduates will act as the control condition group due to the programs stability overtime and teamwork required on the job.
Select References


