TASK # HF001. UNIVERSAL DESIGN FOR LEARNING AND MULTI-MODAL TRAINING

PROJECT AT-A-GLANCE

- UNIVERSITY: University of Oklahoma
- PRINCIPAL INVESTIGATOR: Dr. Ziho Kang
- STUDENTS: Mattlyn Dragoo, Josiah Pippetoe, Lauren Yeagle
- INDUSTRY PARTNERS: Adacel, ATSI, KeyBridge Technologies

RELEVANCE TO TECHNICAL TRAINING AND HUMAN PERFORMANCE

- This project aims to benchmark, adapt, and introduce new approaches in UDL design-based learning and multi-modal training for air traffic controllers through classifying current pedagogical practices, benchmarking existing and new state-of-the-art learning technologies, recommending adapted and new learning pedagogies, and developing protocols for assessing student learning outcomes.

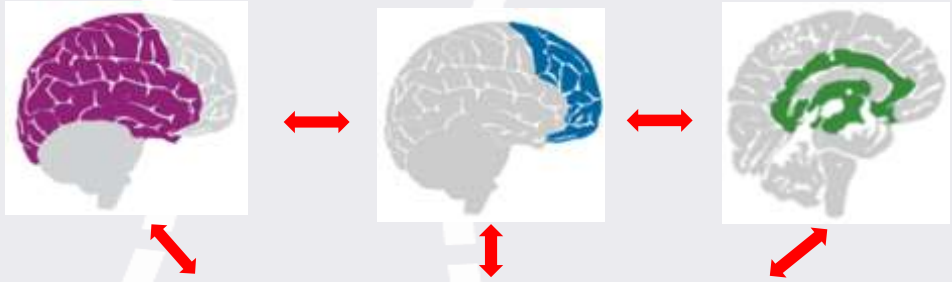
STATEMENT OF WORK

- ATC training content analysis: Map UDL principles to current teaching curriculum and develop classification system.
- Learning style evaluation: Investigate and classify preferred learning styles from ATC candidates.
- Benchmark best practices: Investigate UDL and multimodal training practices.
- Recommend approaches: Align the content analysis with the benchmarking study to recommend adapted and/or new ATC training methods.
- Develop protocols: Develop performance evaluation metrics and procedures to assess the learning outcomes.

Mapping UDL approaches with learning styles

UDL approaches:

Information representation ***Action and expression*** ***Engagement***



Learning styles (16 combinations):

Active vs. Reflective, Sensing vs. Intuition, Visual vs. Verbal, Sequential vs. Global

STATUS

- We have been juggling around the milestones to accommodate the delay of the union review process. We should be able to accomplish our goals within the duration; however, we will request no-cost extension if needed.

FUTURE WORK

- Upon completion, future work can be developing a software that accommodates the recommended approaches.
- The research was concentrated on ATC training that can be later expanded to other technical training.

The UNIVERSITY of OKLAHOMA

Publications, Presentations & Awards

- Publications

Kang et. al (2017). Adaptive Learning Pedagogy in Universal Design for Learning and Multi-Modal Training, In *proceedings of the 2017 National Training Aircraft Symposium*, Daytona Beach, FL.

Yuan et. al (2017). Universal Design for Learning in the Framework of Neuroscience-based Education and Neuroimaging-based Assessment, In *proceedings of the IEEE BioSmart 2017: 2nd International Conference on Bio-engineering for Smart Technologies*, Paris, France.

Additional journal papers are under preparation.

- Presentations

Adaptive Learning Pedagogy in Universal Design for Learning and Multi-Modal Training, In *proceedings of the 2017 National Training Aircraft Symposium*, August 14 – August 17, 2017, Daytona Beach, FL.
Presenter: Kang.

Universal Design for Learning in the Framework of Neuroscience-based Education and Neuroimaging-based Assessment, In *proceedings of the IEEE BioSmart 2017: 2nd International Conference on Bio-engineering for Smart Technologies*, September 28 – October 1, 2017, Paris, France.
Presenter: Kang.

In addition, Kang will be a keynote speaker for the IEEE BioSmart 2017 conference.

- Awards

Kang received the Andrew P. Sage Best Transactions Paper Award in October, 2016.

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Publications, Presentations & Awards

- Publications (continued)

Kang et. al (2017). Adaptive Learning Pedagogy in Universal Design for Learning and Multi-Modal Training, submitted August 1st to the joint publication of the Journal of Aviation/Aerospace Education & Research and International Journal of Aviation, Aeronautics, and Aerospace.

Preparing a conference or journal paper for the learning styles assessment from the FAA Academy trainees. (assessment is currently underway).

- Presentations (continued)

FAA SOAR Q2 presentation (Nov. 2016). Universal Design for Leaning and Multimodal Training Q1 progress presentation, November 30-December 1, 2016, Norman, OK.

Presenter: Kang.

FAA SOAR Q3 presentation (Mar. 2017). Universal Design for Leaning and Multimodal Training Q2 progress presentation, February 28-March 1, 2017, Daytona Beach, FL.

Presenter: Kang.

FAA SOAR Q4 poster session (Jun. 2017). Universal Design for Leaning and Multimodal Training poster presentation, June 13-15, 2017, FAA Headquarters, Washington D.C.

Presenter: Kang.

Publications, Presentations & Awards

- Other appointments

Kang was invited as a keynote speaker at the *Proceedings of the 2nd International Conference on Bio-engineering for Smart Technologies*, Paris, France.

Kang was elected as Chair Elect (3 year term) of the Education Technical Group within the Human Factors and Ergonomics Society.

Shehab was promoted to Associate Dean in the College of Education at the University of Oklahoma.