Assignment 3 Proposal –

Digital Simulation / Augmented Reality in Aviation

Details and Advantages/Opportunities

Topic:

Country: Computing in Education and Learning

Province: Digital simulation and Serious Gaming

City: Digital simulation in Aviation

Definition:

Flight Simulation Training Devices (FSTD) are a general term that covers a wide range of training equipment. All the FSTD equipment have one sole purpose to teach and replicate flying in a safe environment.

Reason we chose this topic:

With the recent advancements in the fields of virtual reality, we have chosen the topic of computing in education and learning, specifically focusing on digital simulation and augmented reality in aviation. This topic is of great relevance as it is forecasted to grow to a 4.6billion dollar field by 2030.

The Advantages to Augmented Reality and Simulations.

- The training simulation is designed to control the risks of a new student flying.
- Flight simulation Training Devices (FSTD) are available all year round.
- Emergency training and tutorials without risk.
- Economic benefits as it is more cost effective to train within the FSTD.
- Lower emissions / better for the environment.

- **Technology Used**

  - The main two types of technology used are Augmented Reality (AR) and Virtual Reality (VR).
  - AR provides real time data and digital elements such as terrain, weather and navigation, all through a headset.
  - VR offers the ability to see items such as the runway, sky and flight controls to become immersed in the FSTD

Drawbacks, Challenges and Choices

Drawbacks

- Lack of User Motivation
- Simulation Sickness
- Poor Motion Cueing
- Complex System Architecture
- High Costs

Challenges

- System Integration
- Software Faults and Stability
- Data Availability and Accuracy
- User Feedback and Testing
- Hardware Limitations
- Regulatory Compliance
- Cost and Resource Allocation

Potential Choices for Implementation in Society

- Augmented Reality Flight Simulators
  - Combats lack of user motivation through immersion and higher emotional involvement
- Non – AR Digital Flight Simulators
  - Combats cost issues – no need for additional AR equipment

Team member Responsibilities and Scholarly Resources

Team Members

- Coby: Researcher / Writer- Covering Advantages and Technology used
  - Investigating and Researching the opportunities and advantages within digital simulation in aviation.
- Georgia: Researcher/ Writer - Covering Drawbacks & Challenges
  - Investigating and researching the drawbacks and critiquing the limitations of the current digital simulation methods in existing adoptions
- Jan Karlo: Website –Development & General Editor
  - Developing the website that the project will be presented on. Investigate potential choices of implementation into society
- GitHub: https://github.com/CobyJM/COMP501

Scholarly Resources

- MASSON, M. (2021, March 4). *Use and benefits of simulators*. EASA Community. https://www.easa.europa.eu/community/topics/use-and-benefits-simulators
- *VR flight simulator training shaping the future*. (2022, March 29). Vaughn College. https://www.vaughn.edu/blog/virtual-and-augmented-reality-shape-the-future-of-the-aviation-industry/
- Myers, P. L., Starr, A. W., & Mullins, K. (2018). Flight Simulator Fidelity, Training Transfer, and the Role of Instructors in Optimizing Learning. *International Journal of Aviation, Aeronautics, and Aerospace*, *5*(1). DOI: https://doi.org/10.15394/ijaaa.2018.1203
- Ukwandu, E., Ben-Farah, M. A., Hindy, H., Bures, M., Atkinson, R., Tachtatzis, C., Andonovic, I., & Bellekens, X.. (2022). Cyber-Security Challenges in Aviation Industry: A Review of Current and Future Trends. *Information*, *13*(3), 146. https://doi.org/10.3390/info13030146
- Ebeid, E., Skriver, M., Terkildsen, K. H., Jensen, K., & Schultz, U. P.. (2018). A survey of Open-Source UAV flight controllers and flight simulators. Microprocessors and Microsystems, 61, 11–20. https://doi.org/10.1016/j.micpro.2018.05.002
- Moesl, B., Schaffernak, H., Vorraber, W., Braunstingl, R., Koglbauer, I. (2022). Multimodal Augmented Reality Applications for Training of Traffic Procedures in Aviation. MPDI. https://www.mdpi.com/2414-4088/7/1/3