Program-Level Assessment: Annual Report

Program Name (no acronyms): Master's in Aviation

Department: Oliver L. Parks Department of Aviation

[redacted]

College/School: School of Science and Engineering

Date (Month/Year): June 2022

Assessment Contact: Stephen G. Magoc

In what year was the data upon which this report is based collected? AY Fall 2021 – Spring 2022

In what yeat ently reviewed/updated? June 2022

Is this program accredited by an external program/disciplinary/specialized accrediting organization? No

1. Student Learning Outcomes

   Which of the program's student learning outcomes were assessed in this annual assessment cycle? (Please list the full, complete learning outcome statements and not just numbers, e.g., Outcomes 1 and 2.)

Student Learning Outcome 1 – Apply mathematics, science, and applied sciences at a level appropriate to aviation

learning outcome requirements. These courses were taught only in an online modality so there is no difference in achievement to note.

5. Findings: Interpretations & Conclusions

What have you learned from these results? What does the data tell you?

The data tells the faculty of the department that its graduates currently are able to apply mathematics, science, and applied sciences at a level appropriate to aviation-related disciplines at the master's level, including an adequate foundation in statistics.

6. Closing the Loop: Dissemination and Use of Current Assessment Findings

A. When and how did your program faculty share and discuss these results and findings from this cycle of assessment?

All faculty in the department met on 06/23/2022 to assess the student learning outcome, therefore all faculty are aware of the results and findings of this assessment cycle.

B. How specifically have you decided to use these findings to improve teaching and learning in your program? For example, perhaps you've initiated one or more of the following:

Changes to the Curriculum or Pedagogies	• Course content • Teaching techniques • Improvements in technology • Prerequisites	• Course sequence • New courses • Deletion of courses • Changes in frequency or scheduling of course offerings
Changes to the Assessment Plan		

Department of Aviation Science

Assessment of M.S. in Aviation Student Learning Outcomes

Student Learning Outcome #1: Apply mathematics, science, and applied sciences at a level appropriate to aviation- related disciplines at the master's level, including an adequate foundation in statistics.

Date of this

Performance Indicator Assessed	Do not Meet	Meet
Students and graduates develop preliminary skills in statistics needed to conduct research in aviation.		X
Students and graduates discuss the fundamental underpinnings of both qualitative and quantitative research methods.		X

assessment:

The following assessment is based on prior coursework of students and graduates and surveys of graduates.

List any prior change(s) made to the curriculum to aid students and graduates in meeting this student learning outcome: Faculty of the department developed more-explicit instructions for discussion board accountability.

Describe the effect of any change(s) made to the curriculum: The faculty of the department determined that due to the more-explicit discussion board instructions, the students were better able to complete assignments and interact with fellow students more efficiently.

List recommendation(s) for changes to be made to the curriculum as a result of this assessment:
See the following table.

Department of Aviation Science

Graduate Program Assessment – MS in Aviation

Continuous Improvement Items

06-23-2022

Course	Student Learning Outcome	Action Item
ASCI 5010 Introduction to Aviation Research Methods	SLO #1: Apply mathematics, science, and applied sciences at a level appropriate to aviation-related disciplines at the master's level, including an adequate foundation in statistics.	

Graduate Course Performance Indicator Rubric

Assess Student Learning Outcomes

Course: ASCI 5010 Introduction to Aviation Research Methods Course Instructor: Terrence Kelly

Semester Taught: Fall 2021 Number of Students in Course: 3

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum score of 80%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 80% = "B")
SLO 1: Assess relevant literature or scholarly contributions to the aviation field of study.	Precis Average Scores Precis LM2: 91.0% Precis LM4: 95.6% Precis LM6: 89.3% Precis LM8: 90.0%	Yes, 3 of 3 100%
SLO 2: Apply the major practices, theories, or research methodologies in the aviation field of study.	Assignment Average Scores Thesis Statement: 95% Problem Statement: 92% Source List: 100% Mini-Lit Review: 90% Research Questions: 93%	Yes, 3 of 3 100%

1. Fabrication and falsification or fraud: Fabrication entails creating, inventing, or making up false data or results that are then recorded or reported, whereas falsification or fraud entails manipulating materials, equipment, or processes to change outcomes or omit some findings data so that the research is not well-represented or recorded (Akaranga & Makau, 2016).

2. Financial & sponsorship issues: The research findings could be jeopardized if the funding organization does not entirely support the research financially and instead focuses on cost-cutting, lowering the study's quality (Akaranga & Makau, 2016).

3. Plagiarism: is most common in the initial pages, such as the introduction and literature review; this can be attributed to laziness, ignorance, or cultural diversity, which may compromise the researcher's honesty (Akaranga & Makau, 2016).

4. Writing & publication ethics: It is unethical to submit the same paper to two distinct journals or publish research findings twice without alerting the editors of the other publication (Akaranga & Makau, 2016).

5. Ethical issues related to research subjects: Human subjects are involved in the majority of research studies, which is why careful consideration must be given to how to interact with and relate to them in this noble endeavor (Akaranga & Makau, 2016).

6. Anonymity, confidentiality, and privacy: During the study, a researcher must protect the respondent's confidential information, but if any information must be shared, the respondent's consent must be obtained; this imp -0 0 12t (e)-6.1 Tc -8edm 2(t)4.9 (t)-6 (i)7.9 (tr-d(lic)-2 (a)10.6 t)-6 ( )10.6((b)10.1 (

ethical committee (EC), what the approval process looks like for this committee once it is setup, and how this EC should provide education to further ethical culture.

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Examples SLO 2

Thesis Statement Example 1

Using the guidance provided in LM 3 (Videos and Purdue Owl), upload an example Thesis statement for a research topic related to your research interest a
This item is due no later than Friday, September 24th by 6:00pm (central time).

Aviation is an extremely expensive and complex industry with high potential for safety incidents, leading experts to continuously research ways of lowering costs, increase quality of training, and minimize risk. Visual and augmented reality in aviation training simulation has begun to fill that need experts were loo for, as there have been proven studies on its ability to immerse the pilot in a more realistic environment and help improve their flying skillset. However, as this research will show, when the complexity of the aviation task at hand increases significantly there is a point at which simulation instead of performing the tas the aircraft can in effect hamper pilot learning and proficienc virtual and augmented reality training should occur in the early phase of training but taper down in more advanced training, as its benefit during complex e diminishes significantly when compared to the learning that happens when flying.

*note: I used the guidance from your video that discussed thesis being 7-6 sentences, as opposed to the Purdue guidance which made is seem more like just one sentence.

Thesis Statement Example 2

Previous aircrafts' accidents and incidents investigation findings should be the lieu to commence in the proactive hazard identification and reporting process for MROs and Line Maintenance providers:
The paper that follows should:
Explain how relying of previous findings of aircrafts' accidents and incidents investigation could increase the number of proactive hazards identification and reporting for MROs and Line Maintenance for their SMS program.

Problem Statement Example 1

The advances of virtual and augmented reality in aviation sim (e)-3 ()1.3 (i)10.6 (m)-6(s)-1.3 (o)-6.6sntificMC /-1.3 (h)13.1 th.98 0 (o)-6.r2.3 (an)2sh q-1.4

Carmigniani, J., Furht, B., Anisetti, M., Ceravolo, P., Damiani, E., & Ivkovic, M. (2011). Augmented reality technologies, systems and applications. Multimedia Tools
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One of the challenges for this research will be to gain permission and have access to the data required to effectively accomplish the proposed research. However, I have previously successfully completed a study comparing two classes of pilot training for a Master's level research project related to use of a GPS simulator to aid in GPS proficiency in the T-6 Texan II. During this research specific data was collected and analyzed with a quantitative design. The initial thought is to compare one class of around 25 students of UPT 2.5, which incorporates AR/VR, to another class of similar size that completes training the traditional way with no use of AR/VR. I am not sure if this will be able to produce statistically significant results with this sample size, and will need to do further research to determine this. Examples of data collected will be safety incident and accident trend information, along with specific grades and results of the different check rides accomplished throughout the training. The number of simulator and flight hours will be compared as well.

Additionally, as this research will try to uncover a given reality in comparing two pilot training methods, and will be conducted as objectively as possible, this ties into quantitative research as the ideal method (Sukamolson, 2007). Finally, as research will be accomplished via the testing of a hypothesis which attempts to explain at what point students training via augmented and virtual reality versus flight is of reduced value, quantitative research remains the best fit to test and prove a hypothesis.

One method that will likely be utilized is surveying the instructor pilots who have experience in both traditional and 2.5 pilot training to get their professional opinions on the incorporation of AR/VR into the training. According to Creswell in Table 1.4, these surveys can be done in a manner to produce quantitative results by using closed-ended questions (2020), or use of a Likert Scale to attribute numerical value to a response.

Existing Studies

While not numerous, there are a few existing studies that research AR or VR as it relates to aviation. One paper that researches a remote pilot with AR glasses uses an observational study method (Coleman & Thirtyacre, 2021). Another study conducted at Embry-Riddle Aeronautical University concerning VR in flight training used a quantitative research method with a cross-sectional survey design (Fussell, 2020). In a different but related field, Sportillo et. al. researched automated driving using VR to study response times using experimental pretest and posttest measures (2018). All of these studies, plus a few additional one that were not mentioned, used quantitative design to conduct their research.

Conclusion

There is potentially a way to perform this research with a qualitative design, but as previously discussed, there is overwhelming support for approaching it with a quantitative design. This will allow concrete and specific data sets to be gathered and analyzed in an attempt to produce statistically significant results and show that AR/VR is beneficial as a substitute for flying in Undergraduate Pilot Training, but only up to a certain point, after which it can become detrimenta

References

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Coleman, J., & Thirtyacre, D. (2021). RTd [(i),>>BD76 (x)-4.8 (e)4.90.7 (RT3 (p)2.8 (il)10.6 (o)-6.3 (t)-3 ( )10. (s)-1.3(it)7.u(d)2.3 (at)-2.96 (o)-6.6 (nc)-2 3 (

human factors, human factors systems, and aviation medicine (Constantin et al., 2012). However, great deal of researchers believes that using quantitative methodology in the aviation field has some drawbacks such as separation of the human element from the research (Constantin et al., 2012). Employing quantitative research in aviation field provides some benefits: objective, specific, rational analysis, simple to document, and it's useful for modeling while using qualitative research in aviation safety has some advantages, such as connecting and comparing unrelated pieces of data, evaluating the value of quantitative data, and narrowing the range of possible safety judgments (Britton, 2017). Many researchers believe that qualitative research is less rigorous than quantitative research, and it is more likely to produce common-sense results in the aviation field (Deaton, 2019). Qualitative research, or even mixed-method studies, could give new aspects to aviation research that is now being conducted (Deaton, 2019). Much of quantitative research in the field of aviation, like other disciplines, is based on participants' subjective answers, so what we consider "objective" may not be so (Deaton, 2019).

“Psychology in general has accepted the viewpoint that qualitative research is as valid as quantitative; however, I think aviation research is a bit behind in recognizing the value of qualitative data” (Deaton, 2019, para. 5). The realization of this necessity drives the increased need for qualitative research approaches in the aviation industry. Since qualitative research can study complex phenomena that are not suitable for quantitative research and can achieve the characteristics of complex behaviors and relationships, so more qualitative research methods are needed to support it (Constantin et al., 2012). The aviation researcher uses the observation of communication, interaction, and activity within a closed group of individuals in the qualitative study, and the results of this model's research present the cultural description, this concept is effective particularly in the aviation industry (Constantin et al., 2012). The human component in aviation, such as flight crews, air traffic controllers, and engineers, form independent professional teams in the aviation industry, but they must work together in a symbiotic relationship to meet operational requirements, hence the need for a qualitative study to interpret the human behavior along with the systems. (Constantin et al., 2012). Not only is the aviation world an 'evolved construct,' but the data collection tools themselves, performance narratives, Aviation safety reports, accident reports, etc., are usually unrestricted in format, so they are qualitative in nature (Constantin et al., 2012). Obviously, studies on human performance, particularly in aviation topics, frequently use hybrid approaches, in which the research topic is grounded in quantitative data, the research is ba on quantitative method, and the results are presented in a quantifiable way; However, careful study of the data collection raises questions about the method used, and the result is usually a numerical description of the qualitative process. This process often reduces the narrative to pure numbers (Constantin et al., 2012). Why is The Quantitative Research More Suitable for Aviation Field? The quantitative method is more suitable for aviation field research because the majority of aviation research is focused on the improvement of aviation safety. Hence, most researchers prefer to conduct their research from a positivistic standpoint due to the need for statistically driven measures by regulators and prudential authorities and a perceived requirement for findings free of subjectiv (Constantin et al., 2012). Quantitative research aims for results that are free of subjective interpretation and human influence; because of these facts, the quantitative method has become a prevalent and desirable research methodology in a wide range of disciplines, particularly when the results are meant to support organizational, governmental policy or capital investment (Constantin et al., 2012). For long time, quantitative research has dominated fields like physics and mathematics, and its influence even has spread to the medicine, psychology, and aviation science due to its reliance on both mathematics and physics. Historically, most organizational research, especially in aviation, is considered quantifiable in nature; this is why it is mostly conducted under a positivistic methodology (Constantin et al., 2012).

Conclusion Quantitative research in aviation is the dominant due to the nature of the aviation field and its reliance on the natural and technical sciences. The research in the aviation field is typical of most disciplines, in these disciplines, the progress of research results is defined by substantial initial breakthroughs followed by slightly insignificant improvements to existing knowledge (Wiggins & Stevens, 2016). The research question is the main factor that determines the research method (Creswell, 2014) (…) (lin)2.3 Bdete research, (h)5.2(a)2.7 (n)5.3 one of12.6 ( )10.6 (th)523 (e)10.6

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u(v)-5.5 (e7096 ((re)-3 (s9553 (e)-3 (a(c)-1.9 (h)2.3 ((s)-1.3 (li)10.6 re)-3 (s)-1.4 (s)-1.3 i)10.6 ri(g)2.6 (o)-6.

Qualitative

1. Do instructors who have experience in both traditional and Pilot Training Next 2.5 describe a perceived benefit to increase the amount of Augmented and Virtual Reality while simultaneously decreasing the flight hours a student pilot receives?

2. Whatare the main factors associated with transitioning to relying more on augmented and virtual reality than on flying during pilot training?