Teaching Complex Maneuvers for Training Effectiveness Study

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INTRODUCTION

The purpose of the Training Effectiveness study is to collect data and determine the viability of different training techniques for Experimental Pilots (EPs). Each EP was expected to study the material, and then come to the Operator Performance Laboratory for a simulator training day. The type of training in the simulator differed based on the subject group. EPs flew in the fixed base (2D screen) simulator, and with the In-Jet Oculus system.

For the Training Effectiveness Study 2019-2020 Experimental Pilots were given materials to study and then briefed about the various maneuvers. From this information, each EP then trained in a specific simulator configuration for their study group and then flew in live flight a few weeks later. It was important for this study that participants understand the general idea and execution of the maneuvers so that other metrics based on their performance and cognitive workload could be evaluated.

Each of 24 EPs were given a copy of the P-1209-Navy Handbook, access to the training videos, and access to the briefing PowerPoint prior to their simulator training day. On the day of training the pilot was given a quiz on the material, and the instructor presented the briefing following with a designated time for questions and answers.

The goal of the training program was to best prepare the EPs before their training day. By giving each EP an abundance of resources and references we were able to maximize opportunity for comprehension of the maneuvers. In order to prepare the pilots for the simulator and live flight, the following teaching methods were utilized.

OBJECTIVES

The objective of inquiring the utility of training methods is to decide which methods are both useful for the pilot and worth the time of the Operator Performance Laboratory to put together. As the team created training materials it was important that they would be able to be understood without in person explanation and be useful to different types of learners. In future studies it is important that these methods become more streamlined so that the instruction team does not waste time creating tools with little learning value. It took sixty-five hours to create both instructional videos. The PowerPoint presentation took thirty hours to create. The P-1209 Handbook took 0 hours to create for this study as it was an online manual already made and published by the US Navy. Lastly, the quiz took two hours to set up.

MATERIALS & METHODS

In order to best cater to the multitude of learning styles preferred by individuals and pilots several steps were conducted to get the pilot ready for their live flight in the Aero L-29. Before the pilot ever steps foot in the Operator Performance Laboratory they are sent the P-1209 Flight Training Instruction, a 3rd person view of the required maneuvers with a model and instructor auditory overlay, and a 1st person view of the required maneuvers with instructor auditory overlay through the oculus rift headset, and a PowerPoint presentation of the test cards containing each maneuver.

Upon arrival to the lab for the in house training day the pilots take a quiz of the material covered and then review their results with the instructor. After the quiz the instructor then presents the PowerPoint presentation explaining the apparatus and requirements for the simulator training day. The simulator training day then begins; each pilot spends over 4 hours in the simulator.

After the simulator training day is complete the instructor and test engineers debrief with him. The pilot comments on what training material was most useful and applicable to the simulator day and how they used each resource. These comments were then combined to form the utility analysis.
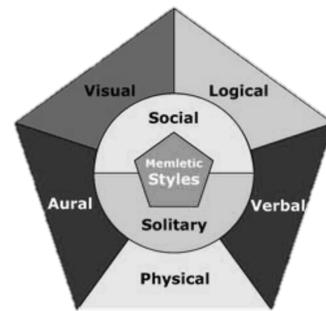
Memletics is a learning method developed by Sean Whiteley in 2003. There are seven memletic learning styles each of which certain people find more or less useful in their own learning. In the center are social and solitary learning styles, these are whether you prefer working alone or in a group. The visual style is preferring diagrams and videos. Logical style is as it sounds, using deduction to conclude to an answer. Aural is using sound while verbal is using words and writing to gain knowledge. Lastly, the physical learning style is to learn by hands on experience.

From the teaching methods used in the study the following memletic styles apply:
- P-1209 Book: Solitary, Verbal, Visual
- Videos: Visual, Aural
- PowerPoint+Breifing: Visual, Verbal, Social
- Quiz: Solitary, Logical, Verbal
- Simulator Training: Physical

RESULTS

After each simulator day nineteen of the pilots were asked how they liked the training material and they feel it affected their performance. Of the nineteen pilots, six indicated that the videos were the most useful. Three indicated that the briefing PowerPoint was the most useful. Two EPs indicated that the P-1209 Handbook was the most useful. None of the EPs commented that the quiz was particularly helpful. Additionally, six of the pilots indicated that the training methods were most useful as they complement each other. Those six pilots indicated that a combination of the videos, PowerPoint, and review of the P-1209 Handbook was more useful in preparing for the training day. Finally, two of the EPs indicated that they did not think any of the resources were helpful and that they were very unsure until they started using the simulator and having the hands on approach.

Frequency of Most Useful Tool for Learning As Percieved by the EP
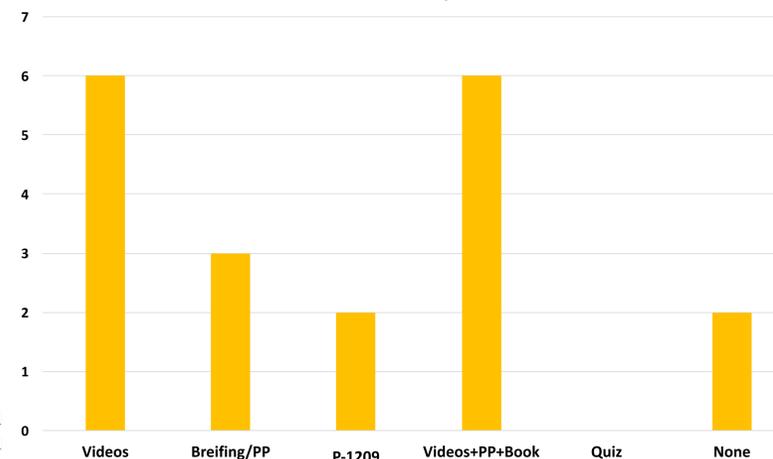
Ultimately, the most useful resources created by the team for the EPs were the videos. Twelve of the EPs indicated that the videos had either been the most helpful tool (6) or one of the most useful (6). The briefing PowerPoint was the second most useful with nine EPs indicating that it was either the most useful (3) or one of the most useful (6).

Within the nineteen EPs the memletic learning styles of visual, aural, verbal, and social were the most useful for learning the maneuvers. The videos contained visual information in the first person view and in the form of models with an aural overlay of step by step direction. The PowerPoint briefing allowed for the visual aspect again but the addition of the instructor speaking aided in verbal input and the open dialogue between the EP and instructor led to a social learning interaction.

It is interesting to note that the P-1209 by itself was not one of the most useful resources. The document is over two hundred pages long and is daunting to tackle in a solitary learning environment, it was best implemented in conjunction with other tools. The quiz was also not particularly useful as it was completed in a solitary environment.

CONCLUSIONS

In future research it is recommended to spend the time creating detailed instructional videos for complex maneuvers. The instructional videos and verbal social interactions associated with presenting the PowerPoint Briefing were most useful to EPs.

It is also recommended to keep some variety so that multiple learning styles can be catered to. Although most pilots indicated that some combination of the resources provided were useful not all did. In a study where a hands on approach to learning can be given this is recommended so that physical learners have a better chance of grasping the information. In regards to learning environment, videos and human-to-human interaction are more ideal than quizzes and readings done in solitary environments.

ACKNOWLEDGMENTS

REFERENCES

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