

Wright State University

CORE Scholar

International Symposium on Aviation
Psychology - 2021

International Symposium on Aviation
Psychology

5-1-2021

Psychological Aspects in Pilot Training: Cognition and Human Factors

Shagun Gupta

Follow this and additional works at: https://corescholar.libraries.wright.edu/isap_2021



Part of the [Other Psychiatry and Psychology Commons](#)

Repository Citation

Gupta, S. (2021). Psychological Aspects in Pilot Training: Cognition and Human Factors. *45th International Symposium on Aviation Psychology*, 250-255.
https://corescholar.libraries.wright.edu/isap_2021/42

This Article is brought to you for free and open access by the International Symposium on Aviation Psychology at CORE Scholar. It has been accepted for inclusion in International Symposium on Aviation Psychology - 2021 by an authorized administrator of CORE Scholar. For more information, please contact library-corescholar@wright.edu.

PSYCHOLOGICAL ASPECTS IN PILOT TRAINING:
COGNITION AND HUMAN FACTORS

Shagun Gupta

University of Delhi
New Delhi, India

Introduction- International Civil Aviation Organization's (ICAO) SHELL model was designed to study and investigate the way the pilot interacted with the various dimensions of the model. Aim-The present study aimed to explore psychological aspects while flying using the dimensions of ICAO's SHELL model of aviation. Methods- The study followed the qualitative research paradigm. The sample consisted of 9 (Males =4, Female =5) student trainee pilots in the age range of 18 – 21 years. They were subjected to in-depth interviews which lasted for around 30 minutes. The data were analyzed using the thematic network of analysis. Results-The results show that in the interaction of each dimension of the SHELL model various cognitive and human factors are involved in flying. Conclusion-This research is highly applicable to understand the psychological aspects that can be used to improve the efficiency of pilots and ensure safety measures in the aviation sector.

Pilots have a picture of being brave and allure, which incorporates that they are solidified experts. Psychologists and analysts have tried to explore and learned about it from the ideal mental qualities through research in the civil and military flight deck team. The SHELL model was created first by Edwards in 1972, with an adjusted chart to outline the model created by Hawkins in 1975. The model has four measurements which are the software, hardware, liveware and environment. The SHELL model was intended to contemplate and research the manner in which the information with the pilot's collaborated with different SHELL model factors and have any kind of effect in their proficiency. The SHELL model has four dimensions which are hardware, software liveware and environment.

The researchers Yu-Hern Chang and Chung-Hsing Yeh (2010) in the study of the human performance interfaces in air traffic control aimed to find using the SHELL model of ergonomics the ATC system performance interface. The research hypotheses were about the relationship between human performances. Interfaces of the system were developed and tested on the basis of the data collected from the air traffic controller using structural equation modeling. The research findings suggest that the organization plays a significant role than the individual differences in how the controllers interact with the

software, hardware, and the environment of the ATC system. The conclusion of the study was that there are mutual influences in all dimensions but there is an exception of the controller–controller interface. .

The study conducted by T. K. Matsuoka was to propose a human factors classification framework. The SHELL model was adopted for this study. The purpose of the study is to provide a framework intended to be applicable to the circumstances .The data was collected using the method of questionnaire surveys. They used a quantitative approach in order to analyze the data. Using statistical analysis and discussion on the profiles show that relation exists between safety attributes and others. The conclusion helps in classification and provides better understanding of human factors and their contribution in reducing future collisions and human errors.

Results

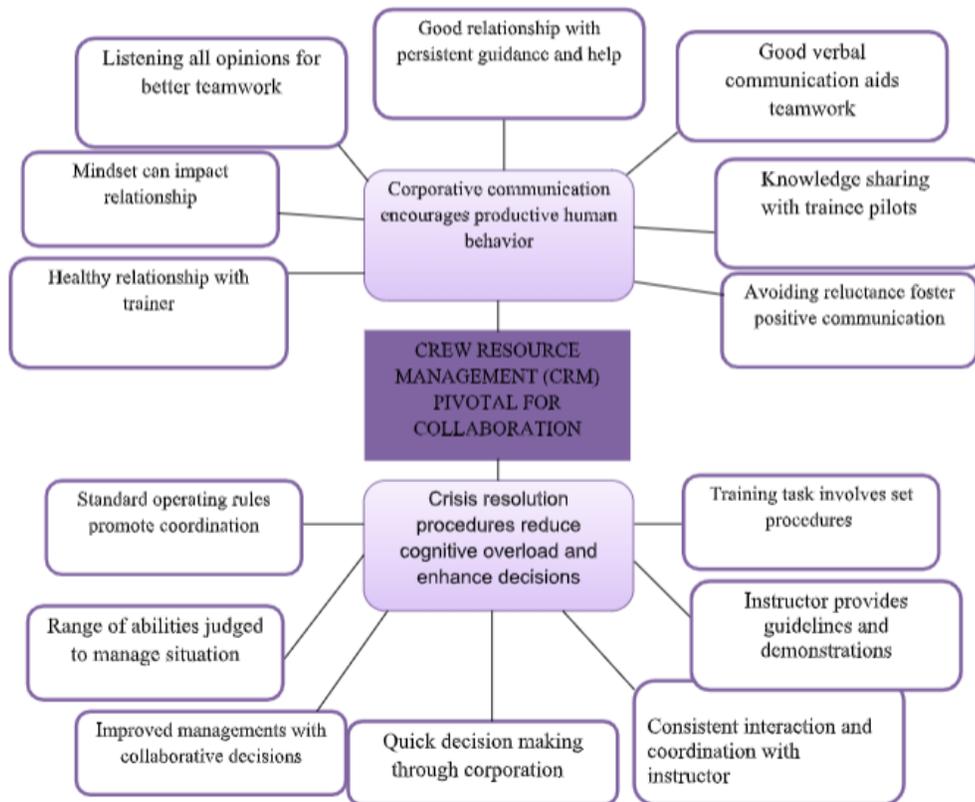


Figure 1 Diagrammatic representation of the thematic network analysis for the global theme “Crew resource management pivotal for collaboration”

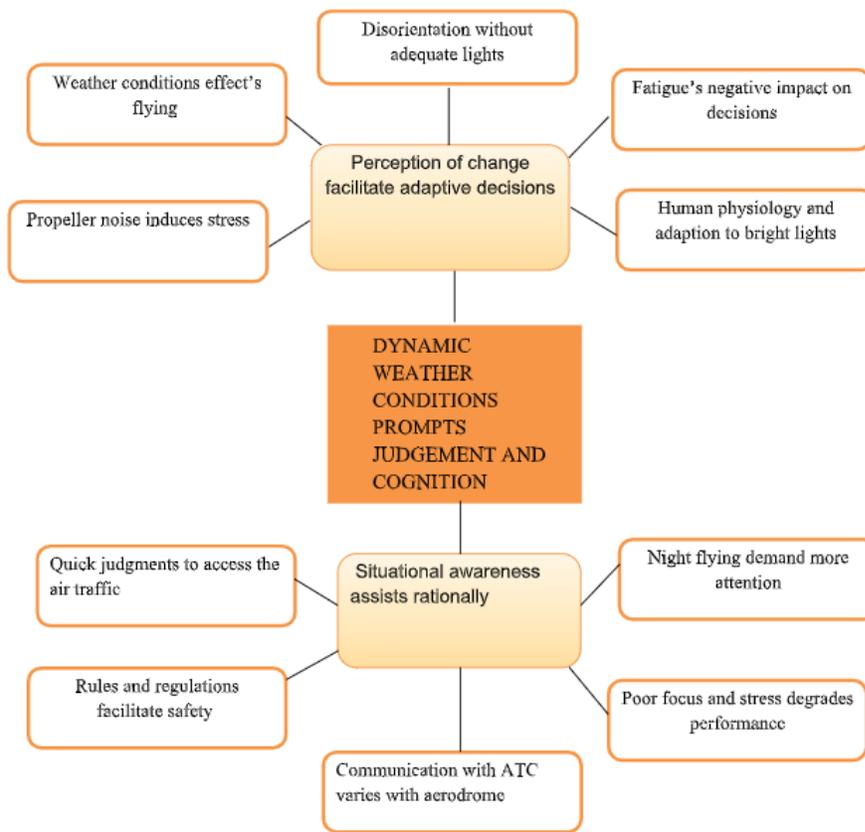


Figure 2 Diagrammatic representation of the thematic network analysis for the global theme “Dynamic weather conditions prompts judgment and cognition”

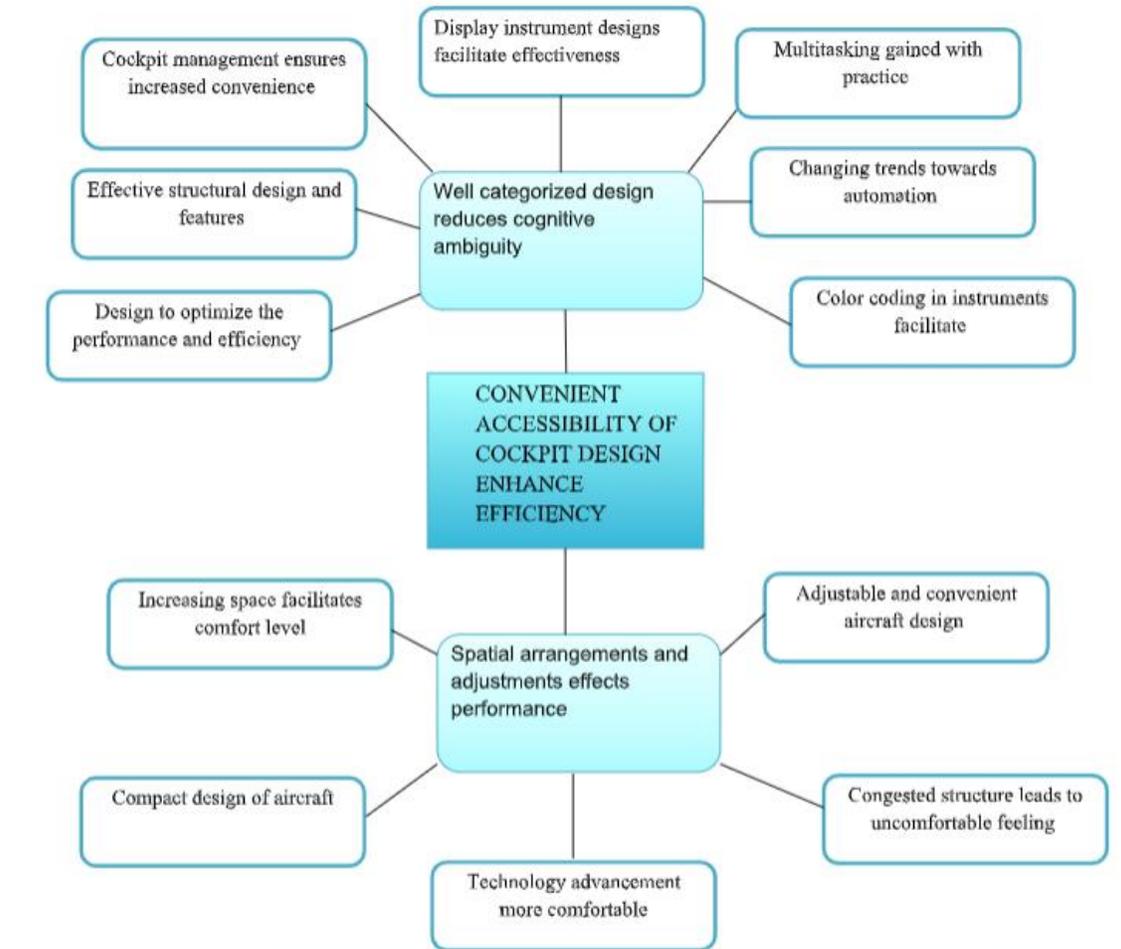


Figure 3 Diagrammatic representation of the thematic network analysis for the global them “Convenient accessibility of cockpit design enhance efficiency”

- Proper use of resource management helps to better coordinate and increase efficiency.
- Procedures provide a set course of action that reduces the cognitive overload.
- Situational awareness is crucial due to the dynamic nature of events.
- The perception may have cognitive biases thus can be reduced with proper knowledge and skills.
- The night flight demands more focus and attention considering the nature of human physiology.
- The design of the cockpit has an impact on human performance.
- The human factors consideration in an aircraft system is important due to constant interaction between display and pilots.
- The rules and regulations provide guidelines and facilitate safety.

The research study helps us to understand the various psychological aspects in flying and interaction of the human component with aircraft operation using the SHELL model. In order to reduce human error accidents it is necessary to understand them and help through improved decision making training this study can be highly applicable. Firstly, it will help to improve safety management in the aviation sector. It helps in building safety policies as well as help in critical planning and achievement of maximum safety. Secondly, it can be used for building better training procedures that focus on central processing and can be used to reduce the errors through training. Thirdly, the enhanced level of conditioning and reinforcement in all the dimensions can lead to improved decision making as well as the level of efficiency. Lastly, the enhanced level of awareness through this study can significantly lead to an improvement in the safety and reduction in human errors.

The limitation associated with the study was that the sample consisted of training of pilots from different demographic areas including the United States of America, Canada, New Zealand and India, so there were slight differences in their training due to the environmental conditions and geographical barriers.

Conclusion

There are human factors involved in flying. The SHELL model of aviation was designed to understand all the dimensions that interact with the human so that human errors can be reduced through a better understanding of things. Human errors, accidents and need to increase the performance of pilots led to this research on analyzing the cognitive processes. The events which comprise this accident aptly illustrate the dire need

for reliance on the pilot's cognitive powers of perception, procedural knowledge, evaluative and predictive judgment. It is commonly realized that the greater part of the air mishaps is identified with human blunders, while the mechanical disappointments in airplane upkeep today has hugely been on the lessening with various new high innovative types of technical developments. The research provides an in-depth knowledge of the psychological aspects. Thus it is really useful to understand the human behavior, the cognitive skills involved. Further, the information processing systems, the impacting and facilitating factors for the efficiency can better be comprehended from this research.

REFERENCES

- Anderson, J. R. (1985). *Cognitive Psychology and its implications*. New York: W. H. Freeman and Company.
- Diehl, A. E., & Buch, G. D. (1986). *Developing an international program to Improve Pilot Decision making*. Vancouver: Aight Safety Foundation.
- Ericksen, C.W.(1955).Stimulus Differences and Accuracy of Discrimination.Journal of Experimental Psychology.50,153-601.
- Garner, W.R., & Creel,C.G.(1964) .Effect of Redundancy and Duration on Absolute Judgments of Visual Stimuli. Journal of Experimental Psychology. 7, 168-172.
- Glaser, R. (1986). *Human memory and cognitive capabilities: Mechanisms and performances*.The Netherlands: Elsevier North Holland Publishers.
- Glaser, R. (1987).*Cognitive functioning and social structure over the life course*. Norwood, NJ:Ablex Publishing
- Gordon, S. E. (1990). Implications of cognitive theory for knowledge acquisition. *Journal of Cognitive psychology*.65,325-355.
- Guilford, J. P, (1967). *The nature of human intelligence*. New York: McGraw- Hill.
- Green, B.F.,&Anderson,L.K.(1967).Color Coding in a Visual Search Task. *Journal of Experimental Psychology*. 19(5), 19-24.
- Holyoak, K. J. (1990). *Symbolic connectionism: toward third-generation theories of expertise*.New York: John Wiley.