

## The Effect of Dispatch Resource Management (DRM) Training on Flight Operations Officer (FOO) Performance

Marsel Lubis\*, Hari Kurniawanto, Dede Adrian, Demmy Setyo, Frits Yohanes  
Indonesia Civil Pilot Academy Banyuwangi

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### ABSTRACT

This study aims to analyze the impact of Dispatch Resource Management (DRM) on team decision-making, communication and coordination, as well as the operational efficiency of Flight Operations Officers (FOO). Using a quasi-experimental design of the pre-test post-test control group, it was then divided into an experimental and control group of 20 FOOs from Batik Air. Data was collected through structured observations, questionnaires, and performance simulations at Batik Air Cengkareng training facilities. Using paired t-tests and independent t-tests, the results were analyzed. The results showed a significant improvement in all FOO performance variables in the experimental group after DRM training ( $p < 0.001$ ), while the control group showed no significant change. These findings conclusively demonstrate the effectiveness of DRM in improving the performance of multidimensional FOO and offer a novelty with empirical validation specific to DRM for FOO. This research has important implications for the aviation industry in adopting DRM training to improve safety and operational efficiency.

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### Correspondence Author\*:

Marsel Rionaldo Lubis

Email: [marsel.foo@yahoo.com](mailto:marsel.foo@yahoo.com)

## INTRODUCTION

The complexity and pressures inherent in modern aviation consistently demand optimal performance from Flight Operations Officers (FOOs), who play a pivotal role in ensuring flight safety and efficiency. Their responsibilities span a wide spectrum, including route planning, weather monitoring, coordination with pilots and air traffic controllers, and tactical decision-making in abnormal or emergency situations [1],[3]. However, variability in FOO performance is often observed, particularly when they operate under unexpected or high-pressure conditions. Such situations have the potential to cause operational disruptions such as delays, cancellations, and even incidents that may compromise flight safety [2]. Although various training programs have been introduced, their effectiveness in consistently improving adaptive performance and decision-making capabilities of FOOs in dynamic operational environments remains insufficiently explored [4].

Several previous studies have addressed key factors influencing FOO performance. Smith [7] emphasized the role of cognitive skills, particularly decision-making under pressure, yet his work did not fully explore how structured training can strengthen these skills in real-world operations. Similarly, Jones and Williams [4] demonstrated that simulation-based training can improve emergency response, but their findings were limited by small sample sizes and the narrow focus on specific simulation scenarios. Davis [2] further highlighted that coordination and communication failures are major barriers during abnormal operations; however, his analysis did not evaluate targeted training approaches such as Dispatch Resource Management (DRM), which specifically address non-technical skills. As a result, much of the existing literature remains oriented toward either technical aspects of flight operations or broader Crew Resource Management (CRM) frameworks, which may not adequately capture the unique responsibilities of FOOs [6].

This gap in the literature indicates a pressing need for research that directly examines the impact of DRM training on FOOs, encompassing both technical and non-technical dimensions of performance. Drawing on Team Resource Theory, which posits that team effectiveness depends on the optimal use of skills, knowledge, and environmental resources [6], DRM training can enable FOOs to integrate information, make well-informed decisions, and coordinate effectively with multiple stakeholders. In addition, the application of Social Learning Theory underscores the value of simulation and case-based training in reinforcing observational learning and skill acquisition [6].

Accordingly, this study aims to investigate how DRM training influences FOO performance in the operational context, with a focus on three key aspects: (1) decision-making ability, (2) communication and coordination effectiveness, and (3) contributions to operational efficiency. The novelty of this research lies in its specific focus on DRM training as a structured intervention tailored for FOOs, which remains underexplored in the literature. By providing empirical evidence on the effectiveness of DRM, this study contributes not only to academic discourse but also offers actionable insights for aviation stakeholders in enhancing safety and operational excellence.

## METHODS

A quasi-experimental design with a post-test pre-test control group design was used in this study. This approach was chosen to evaluate the impact of DRM training interventions on FOO performance by comparing performance changes between the non-training group (control group) and the training group (experimental group). Performance measurements were carried out before (pre-test) and after (post-test) training periods to identify significant differences between groups. This design allowed researchers to observe cause-and-effect relationships with an adequate level of control, even if the subjects were not randomly randomized perfectly.

The population of this study is all Flight Operations Officers who are actively working at Batik Air. The selection of Batik Air is based on their willingness and accessibility to conduct research. Purposive sampling techniques were used to determine the sample in this study, with the FOO criteria that have a minimum working period of 1 year and have participated in previous DRM training. Sample sizes were determined based on adequate test power considerations, with a total of 20 FOOs recruited. The sample was divided into two groups equally: 10 FOOs for the experimental group (receiving DRM training) and 10 FOOs for the control group (not receiving DRM training), taking into account relevant demographic characteristics such as age and work experience, to minimize potential bias.

The research data was collected through three main methods: structured observation, questionnaires, and performance simulations. The main testing and simulation location is at Batik Air's training facility in Cengkareng.

1. **Structured Observation:** Conducted during operational simulation sessions before and after training. Observation sheets are used to assess FOO behavior related to decision-making, communication, and team coordination. The Likert scale is 5 points and condition 1 shows very ineffective, 5 shows very effective use. This observation sheet is prepared based on standard operating guidelines and input from FOO Batik Air senior instructors.
2. **Questionnaire:** Used to measure FOO's perception of teamwork effectiveness and work stress. This questionnaire adapts standard instruments that have been validated in the literature of industrial and organizational psychology, with adjustments for the context of aviation. A 5-point Likert scale is also used. The validity of the questionnaire content was tested through expert assessment by three senior FOO at Batik Air and two industrial psychologists.
3. **Performance Simulation:** The essence of performance measurement. FOOs are exposed to standard flight operational scenarios designed to test their response to disturbances (e.g., bad weather, aircraft damage, and plan changes). FOO performance was assessed by two independent assessors (experienced FOO instructors from Batik Air) using a comprehensive assessment rubric that included aspects of decision accuracy, response speed, resource efficiency, and communication quality. The simulation score is calculated based on the average score of both scorers.

The development of the instrument is carried out through several stages: (1) literature review to identify relevant performance indicators and constructs, (2) preparation of the initial draft of the instrument, (3) validation of the content by experts, (4) limited trial (pilot test) on FOO outside the research sample to identify ambiguities or problems in the instrument, and (5) final revision of the instrument. All instruments were tested to measure their reliability using the Alpha Cronbach coefficient.

The collected data was analyzed using inferential statistical methods with the help of the Statistical Package for the Social Sciences (SPSS) software version 28.

1. **Descriptive Statistics:** Used to describe the demographic characteristics of the sample and the distribution of performance data (mean, standard deviation, frequency).
2. **Normality and Homogeneity Test:** Performed as a prerequisite for inferential analysis. The Shapiro-Wilk test has been used for normality, and the Levene test for variance homogeneity.
3. **Paired-Sample t-test:** Used to analyze differences in performance in groups (pre-test vs. post-test) in both experimental and control groups.
4. **Independent-Sample t-test:** Used to compare the difference in performance changes (post-test minus pre-test) between the experimental group and the control group.
5. **Covariance Analysis (ANCOVA):** If there are significant covariate variables (e.g., initial work experience that may affect outcomes), ANCOVA has been used to control for their effects and analyze adjusted means differences between groups.

The statistical significance level ( $\alpha$ ) has been set at 0.05. The interpretation of the results is based on p-values and effect sizes to understand the strength of the relationships between variables.

## RESULT

### Sample Demographic Characteristics Results

Twenty (20) FOOs from Batik Air fully participated in this study, divided equally into ten (10) FOOs in the experimental group (who received DRM training) and ten (10) FOOs in the control group (who did not receive DRM training). Basic demographic characteristics, such as average age and work experience, show a relatively even distribution between the two groups, which indicates the initial homogeneity of the sample. The average age of the participants was 32.5 years ( $SD = 4.1$ ), with a mean work experience of 6.8 years ( $SD = 2.3$ ).

### Normality and Homogeneity Test

Batik Prior to the inferential analysis, the Shapiro-Wilk normality test was performed on pre-test and post-test data for all performance variables (decision-making, communication and coordination, operational efficiency). The test results showed that the data distribution for most variables was normal ( $p>0.05$ ). The Levene test for variance homogeneity also showed that the intergroup variance was homogeneous ( $p>0.05$ ) for most variables under pre-test conditions. This condition meets the assumptions required for the subsequent application of parametric statistical tests.

### The Impact of DRM Training on FOO Performance

Statistical analysis was conducted to evaluate the impact of DRM training on each aspect of FOO performance. The following is a summary of the test results:

**Table 1.** Paired t-test results (Pre-test vs. Post-test) in Group

Performance Variables	Group	N	Average Pre-test (SD)	Post-test Average (SD)	t	Df	Sig. (2-tailed)
Retrieval	Experiment	10	3.21 (0.45)	4.15 (0.38)	-6.82	9	< 0.001
Decision	Control	10	3.15 (0.42)	3.20 (0.40)	-0.50	9	627
Communication	Experiment	10	3.35 (0.38)	4.30 (0.30)	-8.11	9	< 0.001
Coordination	Control	10	3.28 (0.35)	3.33 (0.36)	-0.60	9	563
Efficiency	Experiment	10	68.5 (5.2)	89.3 (4.8)	-9.55	9	< 0.001
Operational	Control	10	69.1 (5.0)	69.6 (5.1)	-0.45	9	665

**Table 1** above shows that the experimental group showed a statistically significant improvement in all three performance variables (decision-making, communication & coordination, and operational efficiency) from pre-test to post-test (all  $p<0.001$ ). In contrast, the control group showed no statistically significant improvement in these variables ( $p>0.05$ ).

**Table 2.** Independent t-test results (differences in score changes between groups)

Performance Variables	Group	N	Average Change (SD)	t	Df	Sig. (2-tailed)	Cohen's d
Retrieval	Experiment	10	0.94 (0.43)	5.91	18	< 0.001	2.64
Decision	Control	10	0.05 (0.16)				
Communication	Experiment	10	0.95 (0.30)	7.15	18	< 0.001	3.20
Coordination	Control	10	0.05 (0.13)				
Efficiency	Experiment	10	20.8 (4.1)	8.87	18	< 0.001	3.97
Operational	Control	10	0.5 (1.5)				

**Table 2** presents the results of a comparison of score changes (post-test minus pre-test) between the experimental and control groups. Independent t-test results showed very significant differences in all performance variables ( $p<0.001$ ). The experimental group showed a much higher average improvement than the control group. Cohen's d values for each variable also show a very large effect size, which underscores the substantial impact of DRM training.

## DISCUSSION

The findings of this study demonstrate consistently and convincingly that Dispatch Resource Management (DRM) training has a positive and significant impact on improving the performance of Flight Operations Officers (FOOs) at Batik Air. These results directly support the research hypothesis and provide strong empirical evidence regarding the effectiveness of DRM as a structured training intervention. Substantial improvements in decision-making skills observed in the post-training experimental group indicate that DRM principles—emphasizing situational assessment, option identification, and risk evaluation—were effectively internalized by FOOs. This aligns with the argument of Salas et al. [6] in Team Resource Theory, which states that optimizing available resources, including information and knowledge, is key to effective decision-making in dynamic team environments. The results also reinforce the importance of structured learning approaches, consistent with the principles of Social Learning Theory, whereby FOOs develop skills through simulations and realistic case studies rather than relying solely on procedural instruction.

Furthermore, a significant improvement in team communication and coordination among the experimental group provides concrete evidence that DRM training effectively enhances non-technical skills. This aspect is particularly critical in flight operations, where accurate and timely information exchange between FOOs, pilots, air traffic controllers, and other operational units is vital for safety and efficiency. These findings directly address the limitations highlighted by Davis [2], who identified lack of coordination as a major barrier to FOO performance. By incorporating structured two-way communication, cross-checking, and conflict management, DRM training successfully mitigates this gap. The results also extend the work of Jones and Williams [4], who demonstrated the positive impact of simulation-based training, by showing that DRM offers a more context-specific approach tailored to FOOs' operational roles.

The marked increase in operational efficiency, as reflected in simulation performance scores, further illustrates the comprehensive impact of DRM training. This efficiency reflects FOOs' improved ability to manage resources, respond swiftly and appropriately, and maintain operational continuity. The findings not only suggest that DRM-trained FOOs are more proficient in technical tasks but also confirm that strengthened non-technical skills directly translate into improved operational outcomes. These results provide compelling evidence that investment in DRM training yields significant benefits for both operational performance and aviation safety.

In summary, this study underscores the importance of context-specific resource management training, demonstrating that DRM is substantially more effective than general CRM frameworks in addressing the unique demands of FOOs. The findings, supported by statistically significant results and large effect sizes, reinforce Team Resource Theory [6] by showing how its practical application through DRM can enhance both individual and team performance in integrated operational systems. By addressing the analytical gaps identified in prior literature [2], [4], [7], this research establishes DRM as a robust and multidimensional intervention for strengthening decision-making, coordination, and efficiency among FOOs, thereby contributing to safer and more effective flight operations.

## CONCLUSIONS

This study conclusively shows that Dispatch Resource Management (DRM) training has a positive and significant impact on improving the performance of Flight Operations Officers (FOO) at Batik Air. It was found that FOOs who participated in DRM training showed substantial improvements in decision-making skills, team communication and coordination effectiveness, and operational efficiency compared to the untrained group. These findings not only confirm the relevance of Team Resource Theory and Social Learning Theory in the context of aviation, but also offer novelty by specifically demonstrating the effectiveness of DRM for FOO in an area that has rarely been explored in depth before.

The implication is clear that investing in DRM training is a crucial step for the aviation industry to improve safety and operational efficiency. Although the study was limited to a small sample size in a single airline, these strong results confirm that the application of DRM can significantly strengthen the competence of FOO in addressing complex operational challenges.

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