Wright State University
CORE Scholar

International Symposium on Aviation Psychology - 2015 | International Symposium on Aviation Psychology

2015

After-Action Reviews: Best Practices and Application to Aerospace Education

Richard G. Moffett III

Michael B. Hein

Jessie M. McClure

Follow this and additional works at: https://corescholar.libraries.wright.edu/isap_2015

 Part of the Other Psychiatry and Psychology Commons

Repository Citation

Moffett, R. G., Hein, M. B., & McClure, J. M. (2015). After-Action Reviews: Best Practices and Application to Aerospace Education. *18th International Symposium on Aviation Psychology*, 73-78.
https://corescholar.libraries.wright.edu/isap_2015/95

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 - 2015 by an authorized administrator of CORE Scholar. For more information, please contact corescholar@www.libraries.wright.edu, library-corescholar@wright.edu.

AFTER-ACTION REVIEWS: BEST PRACTICES AND APPLICATION TO AEROSPACE EDUCATION

Richard G. Moffett III, Michael B. Hein, and Jessie M. McClure
Middle Tennessee State University

This study describes an approach to after–action reviews (AARs) used in a university capstone course that uses a high-fidelity team simulation of a flight operations center for a regional airlines. The specific methods used in the AARs are discussed in the context of comparing them to possible best practices for conducting AARs.

After-action reviews (AARs) are an approach to performance improvement and/or training that use systematic reviews of a recent performance or training event (Morrison & Meliza, 1999). After-action reviews have been used by the U.S. Army since the mid-1970's (Morrison & Meliza, 1999) and have been applied to other settings including education (Ellis, Ganzach, Castle, & Sekely, 2010) and aviation (Dismukes, McDonnell, & Jobe, 2000). They are also known as after-event reviews (Ellis & Davidi, 2005) and debriefings (Tannenbaum and Ceralsoli, 2013). Most of these approaches are characterized by four central processes that include incorporating active self-learning, having a developmental intent, focusing on specific events, and using multiple sources of information (Tannenbaum and Ceralsoli, 2013). For our discussion we will use the term after-action review (AAR) and will concentrate on their application in team situations.

Comparison of Our AAR Approach with Best Practices

A recent meta-analysis by Tannebaum and Ceralsoli (2013) found a 25% improvement in team performance when AARs were used. These authors suggested that AARs are more effective when the process is structured and uses a facilitator. They also identified that AARs are characterized by four central features: incorporating active self-learning, having a developmental intent, focusing on specific events, and using multiple sources of information. These suggestions can be viewed as best practices and will be discussed in the context of applying them to aerospace education.

The educational context for our approach to AARs is a university capstone course that uses a high-fidelity team simulation of a flight operations center for a regional airlines. Teams comprised of senior aerospace students are given various scenarios (or triggers) that require the students to work together to resolve issues quickly and effectively During the 2.5 hour simulation, the students collectively work to operate the simulated airline. The airline is a regional carrier with a fleet of 30 aircraft, two regional hubs, and 14 additional airports. Approximately 60 flight events (takeoffs and landings) occur. Much of the activity involves routine handling of flights and requires communication and teamwork. In addition, unexpected events, (severe weather; triggers such as maintenance issues or other problems requiring attention) occur and further increase the need for information transfer, coordinated action, and adaptation.

Teams typically participate in three simulations in a semester. Each simulation is followed by a facilitated AAR in which participants discuss both positive and negative performance

events and the team behaviors associated with those events. Finally, the team members derive lessons learned from the discussion of the team performance and behaviors.

Structured and Facilitated

Our approach to conducting AARs adapts some of the procedures used in the nominal-group technique (Delbecq & Van de Ven, 1971), a structured approach to brainstorming. Upon completion of a simulation, team members immediately receive a two-page AAR handout (see Figure 1) and examples of a completed observation form. These documents are reviewed with the team before they leave the simulation room. A researcher provides an overview of the AAR that includes specifying that the focus of the AAR is to help them learn how to improve their team performance, summarizing the overall process (an individual observation phase and a group discussion phase as described in the AAR handout), and encouraging all team members to complete the AAR observation form as soon as possible while the memory of the simulation experience is still recent. Team members are informed that they must bring the completed form to the AAR session as this is a required assignment of their course.

The individual observation generation phase of the AAR requires team members to use the AAR handout to capture at least two positive outcomes and two negative outcomes. They also are to list any team behaviors that contributed to each outcome.

The second phase of the AAR is a group discussion phase. This is a facilitated and structured group discussion of the individual observations the team members developed during the previous phase. Also, this phase involves having the team members develop lessons learned from the discussion of the simulation. The details of the process below reveal the structure and facilitation used in our approach to AARs.

> One week after the simulation, a 45-60 minute AAR is held in a conference room, which offers privacy and removes external distractions. Members of the team are seated around a large conference table. Also in attendance are the AAR facilitator (a researcher experienced in group facilitation) and the scribe. The scribe uses a laptop computer to collect the team members' observations/ideas, which are simultaneously projected on a screen for all team members to see. AAR ground rules are posted next to the screen. Team performance data (e.g., penalties and delay loss in dollars, average delay loss in dollars from teams in previous semesters) are posted on a whiteboard at the rear of the room.
>
> The procedural steps used in the AAR are:
>
> 1. The facilitator reminds team members of the purpose, ground rules, and procedures used during the group discussion phase of the AAR.
> 2. The facilitator reviews the team performance data and answers any questions.
> 3. The facilitator uses a round-robin procedure to allow each team member to present at least one positive outcome and the team behaviors they believe contributed to that outcome. Another round-robin procedure is used to solicit from each team member a negative outcome and the associated team behaviors. The facilitator ensures that team members focus on team behaviors

and follow the AAR ground rules. During this part of the AAR, the scribe types the ideas of each team members and simultaneously projects them on a screen for all team members to see.

4. After both round-robin procedures are completed, the facilitator provides the supplemental information developed by researchers.
5. The facilitator instructs the team members to review the notes projected by the scribe and extract what can lessons can be learned. A "feed-forward" focus is encouraged so team members will concentrate on the team behaviors to be continued in the next simulation and the team behaviors that should be improved and how. Team members share their ideas with the team, and the scribe types the ideas as they are presented and simultaneously projects them on a screen for all team members to see.
6. After the AAR is completed, team members turn in their AAR handouts with their written comments. The facilitator informs the team a) the scribe will review all of the documents and add any comments that were not presented during the AAR, b) the scribe will email each of them a copy of the summary of the results from the AAR, and c) they should use the information to help improve their team processes for the next simulation.

Active Self-Learning

Tannebaum and Ceralsoli (2013) suggested that AARs must involve active self-learning rather just receiving feedback and performance improvement suggestions from a supervisor, coach, or external observer. We promote active self-learning in our approach to AARs in a number of ways. First, team members are prompted to self-reflect on their simulation experience in the individual observation generation phase. Second, during the group discussion phase team members are actively sharing their observations with fellow team members and are discussing the impact of team behaviors on team performance. Third, team members develop ideas for improving the performance of the team in the next simulation when they create their lessons learned at the end of the AAR. Although the facilitator provides supplemental information developed by researchers based on their group discussion of observations of the team during the simulation, the majority of the information discussed in the AAR is provided by the team members.

Developmental Intent

Another characteristic suggested by Tannebaum and Ceralsoli was that AARs should focus being developmental in nature rather than being a mechanism to evaluate or judge the performance of a team. In our approach to AARs, team members are told in the initial briefing that the AARs are a part of their educational experience in the simulation and that the focus is on learning. This is reiterated in the AAR handout which describes part of the purpose of the AAR is to focus on improvement. The facilitator also reinforces this developmental intent during the AAR suggesting that team members embrace a learning goal orientation rather than a performance outcome goal orientation (Seijts & Latham, 2005); that is, focus on improving team processes rather than focusing on reducing the dollars lost in delays or penalties.

Focus on Specific Events

What differentiates AARs from other types of interventions is their focus on specific events rather than general or overall team performance (Tannebaum & Ceralsoli, 2013). According to those researchers, focusing on a specific event allows for analyzing specific behaviors and developing specific plans for improving team processes. In our approach to AARs, we help develop this focus by conducting AARs after each simulation rather than waiting until the end of the semester and conducting one AAR that would combine team performance across multiple simulations. Additionally, we have team members recall specific instances of positive and negative outcomes and the specific team behaviors associated with each outcome and write them on the AAR handout. The lessons learned created by the team members at the end of each AAR are drawn directly from the specific events and team behaviors.

Multiple Information Sources

The final characteristic suggested by Tannenbaum and Ceralsoli is that AARs should include information from more than one source. They suggest that this increases the likelihood that a breath of team behaviors will be taken into account and increases the credibility of the feedback. In our approach we use multiple sources of information. In the AAR all team members are contributing their individual observations and perceptions. We also provide team performance data from the simulation that includes monetary penalties and delay loss in dollars, and provide the average delay loss in dollars from teams in previous semesters. Finally, we also include observations from researchers. In the time between the simulation and the AAR, the researchers (approximately nine in number) meet to share their observations of the team's performance and behaviors exhibited during the simulation. The researchers identify the positive and negative performance outcomes demonstrated by the team in the simulation, and identify team behaviors that contributed to these outcomes. These observations are summarized and presented to the team as supplemental information by the facilitator during the AAR.

Conclusions

The results of the meta-analysis by Tannebaum and Ceralsoli (2013) provide a number of ideas for conducting AARs. These ideas can be seen as possible best practices for designing and conducting AARs. Our approach to conducting AARs appears to be well aligned with some of the suggestions provided by Tannebaum and Ceralsoli. Possible areas of improvement in our AAR process include implementing systematic training of facilitators to ensure consistent application of the facilitation process and reducing the amount of elapsed time between a simulation and its associated AAR. The application of our approach to other settings, (e.g., non-simulated workplaces) should be examined on an individual basis as our context, a high-fidelity team simulation used in aerospace education, may have certain advantages and resources unavailable in other contexts.

Team: _____ Date: _____

After Action Review – *Team Handout*

Purpose

- Focus on improvement and confirmation of positive performance
- Identify effective and ineffective aspects of team performance
- Encourage you to examine how team processes affect team performance
- Capture lessons learned during the simulation

Ground Rules for Individual and Group Phases

To maximize the effectiveness of the After Action Review, please follow these ground rules:

- Everyone participates
- Be honest
- Don't be defensive
- Focus on behaviors, not the person

Instructions

There are two parts to the After Action Review (AAR): the individual observation generation phase and the group discussion phase. You will complete the individual observation generation phase on your own with no help from others (we want each participant's individual ideas) prior to the AAR meeting. The group discussion phase will be conducted at AAR meeting as scheduled. The meeting will be facilitated by FOCUS Lab researchers.

Individual Observation Generation Phase – Done Prior to AAR meeting

- Each team member will individually complete the AAR observation form.
- You should provide at least two positives outcomes and two negative outcomes. Be sure to list the team behaviors that contribute to each outcome.
- **YOU MUST BRING YOUR COMPLETED FORM TO THE AAR meeting. This is part of your participation grade for your course.**

Group Discussion Phase – Conducted During the AAR meeting

The facilitators will lead you in this phase at the AAR meeting:

- A "round robin" procedure will be used allowing each person to supply at least one outcome observation and what caused that outcome. These will be posted.
- The facilitator will lead the group in a discussion of the observations and develop lessons learned from the FOCUS Lab simulation.

FLIGHT OPERATIONS CENTER
UNIFIED SIMULATION

Team: _____ Date: _____

After Action Review Observation Form

Positive Outcome	**List any team behaviors you believe contributed to each <u>positive</u> outcome**
Negative Outcome	**List any team behaviors you believe contributed to each <u>negative</u> outcome**

FLIGHT OPERATIONS CENTER
UNIFIED SIMULATION

Figure 1. After Action Review handout provided to team members.

References

Baird, L., Holland, P., & Deacon, S. (1999). Learning from action: Imbedding more learning into the performance fast enough to make a difference. *Organizational Dynamics, 27,* 19–32.

Delbecq, A. L., & Van De Ven, A. H. (1971). A group process model for problem identification and program planning. *Journal of Applied Behavioral Science, 7,* 466-492.

Dismukes, R. K., McDonnell, L. K., & Jobe, K. K. (2000). Facilitating LOFT debriefings: Instructor techniques and crew participation. *International Journal of Aviation Psychology, 10,* 35-57.

Ellis, S., & Davidi, I. (2005). After-event reviews: Drawing lessons from failed and successful events. *Journal of Applied Psychology, 90,* 857–871.

Ellis, S., Ganzach, Y., Castle, E., & Sekely, G. (2010). The effect of filmed versus personal after-event reviews on task performance: The mediating and moderating role of self-efficacy. *Journal of Applied Psychology, 95,* 122–131.

Morrison, J. E., & Meliza, L. L. (1999). *Foundations of the after action review process* (Special Report 42). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Seijts, G. H., & Latham, G. P. (2012). Knowing when to set learning versus performance goals. *Organizational Dynamics, 41,* 1-6.

Tannebaum, S. I., & Cerasoli, C. P. (2013). Do team and individual debriefs enhance performance? A meta-analysis. *Human Factors: The Journal of the Human Factors and Ergonomics Society, 55,* 231-245.