

## EVALUATING THE EFFECTIVENESS OF THE WARNING DECISION TRAINING BRANCH'S WINTER WEATHER WARNING DECISION MAKING WORKSHOPS

Brad Grant\*  
NOAA/NWS/WDTB  
Norman, OK

### 1. INTRODUCTION

Four principal components (or levels) of summative training evaluation are : 1) reaction evaluation, 2) learning evaluation, 3) performance evaluation, and 4) impact evaluation (Hodges, 1999). The 3<sup>rd</sup> and 4<sup>th</sup> components constitute the best opportunities for trainers and training organizations to determine the reasons that a course or workshop is a failure or success. Without assessing performance and impact areas of training, organizational human resources and capital can suffer. Performance evaluation component attempts to measure the extent to which trainees have been able to apply or transfer knowledge gained, or skills acquired on the job. In addition, impact evaluation tries to determine if the training objectives or programmatic goals are being met.

The Warning Decision Training Branch (WDTB) conducted four workshops on winter weather Warning Decision Making (WDM) over a time span of about two years from October 2001 to July 2003. The objectives of the three and a half day workshops are to deliver training to National Weather Service (NWS) forecasters on various winter weather forecasting and warning concepts, techniques and strategies. The goal is to help forecasters improve their ability to successfully apply these techniques in the forecast process and ultimately, provide better service with more timely and effective winter weather watches, warnings, and advisories.

The following represents a summary of responses to a series of questions sent to workshop attendees to evaluate four areas of performance and impact of winter weather WDM training: 1) Use of Skills, 2) Confidence and Ability to Perform, 3) Barriers and Enablers of Transfer, and 4) Impact Measures. There has been only 30 workshop attendees complete the evaluation form, which represents slightly less than 40% of the total number of attendees. It is unclear why the response rate was not higher.

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\* Corresponding author address: 3200 Marshall Ave., Suite 202, Norman, OK, 73072.

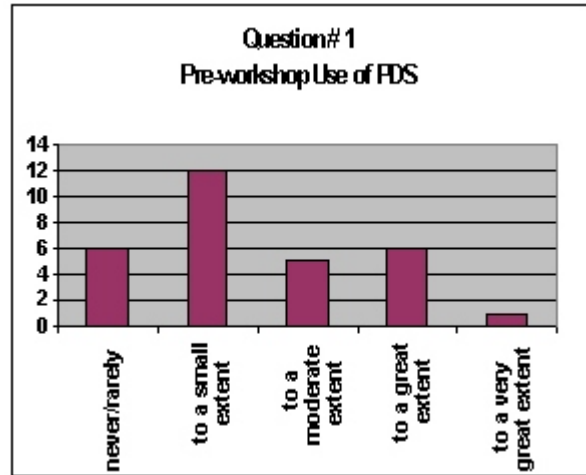


Figure 1. Results from Question 1.

The evaluation form is a series of 11 questions, sent via e-mail approximately 6 to 7 months **after** the workshop.

The numeric scale for responses for questions 1 to 8 are:

- 1 = Not at all or never/rarely
- 2 = To a small extent
- 3 = To a moderate extent
- 4 = To a great extent
- 5 = To a very great extent
- 6 = Not applicable.

For questions 9 to 11, responses have been subjectively summarized into appropriate categories.

### 2. EVALUATION RESULTS

Question 1 is, "To what extent did you use any of the knowledge and/or skills described in the [Winter Weather Professional Development Series](#) prior to attending the WDTB Winter Weather Workshop?" The distribution of responses are shown in figure 1. The Professional Development Series (PDS) referred to in question 1 is a web document that was developed in the summer of

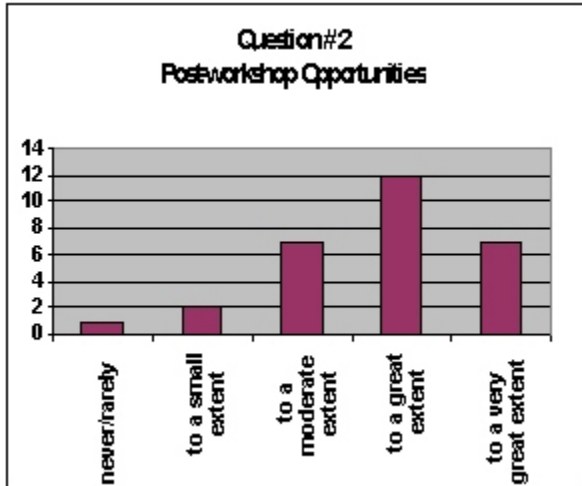


Figure 2. Results from Question 2.

2001 to identify training objectives that address all knowledge, skills, and abilities associated with winter weather forecasting duties. It is interesting that the majority of respondents **did not** use the PDS prior to attending the workshop.

Question 2 is also on the use of skills. It states, "To what extent have you had the opportunity to use the knowledge and/or skills presented at the Workshop?" The distribution of responses are shown in figure 2.

From the results, it appears that the majority of workshop attendees had the opportunity to use the knowledge and/or skills presented in the workshop on the job. This is an important question to ask as, due to the nature of operational NWS forecasters, some people who

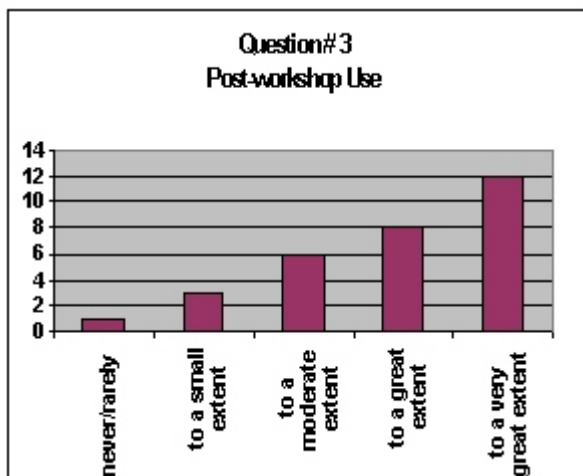


Figure 3. Results from Question 3.

attend these type of workshops may not have had much of a winter weather season or might have missed opportunities to work a big winter storm event due to shift and leave schedules.

Question 3 is, "To what extent have you actually used the knowledge and/or skills presented in the Workshop after attending the Workshop?"

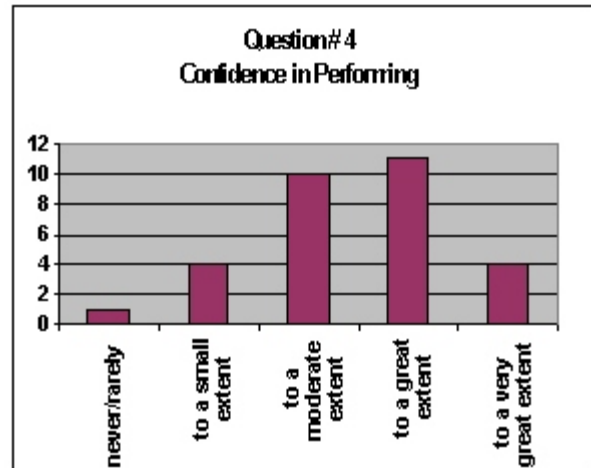


Figure 4. Results from Question 4.

The response distribution shown in figure 3 suggests that most participants have to a great extent, utilized the workshop training materials.

Proficiency in performing complex tasks such as winter weather forecasting is not something that is accomplished overnight. After training is completed, to be effective in applying the skills or knowledge learned, one needs to build confidence. Question 4 attempts to gauge the extent that the workshop was able to increase the confidence of the attendees. Question 4 states, "To What extent has your confidence in using the knowledge and/or skills increased as a result of this workshop?" Results are shown in figure 4.

To evaluate the extent local management provided assistance to participants in preparing for the workshop in terms of administration, instructional, and logistical issues, question 5 was posed. Question 5 states, "To what extent did you receive the assistance necessary in preparing you for this Workshop?" The summary of answers is shown in figure 5.

The extent of workshop preparatory assistance varies quite a bit. WDTB's winter weather workshop requires some precursor completion of training on forecasting precipitation type. This instruction consisted of a 90 minute recorded teletraining session. Training

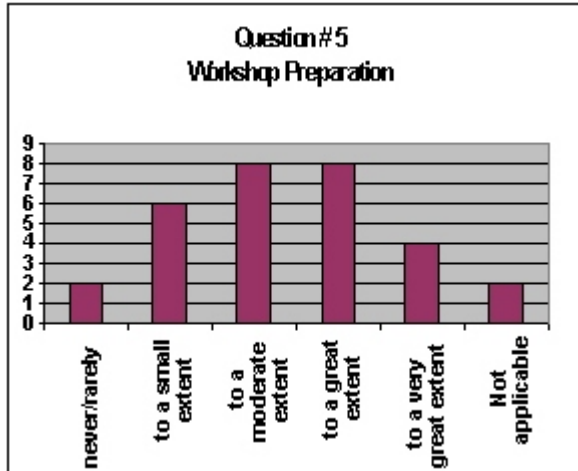


Figure 5. Results from Question 5.

objectives for the winter weather workshop are matched to specific job duties and responsibilities, such as issuing winter weather watches and warnings. Thus, all lectures and laboratory exercises are designed to support on-the-job activities. Question 6 attempts to measure the

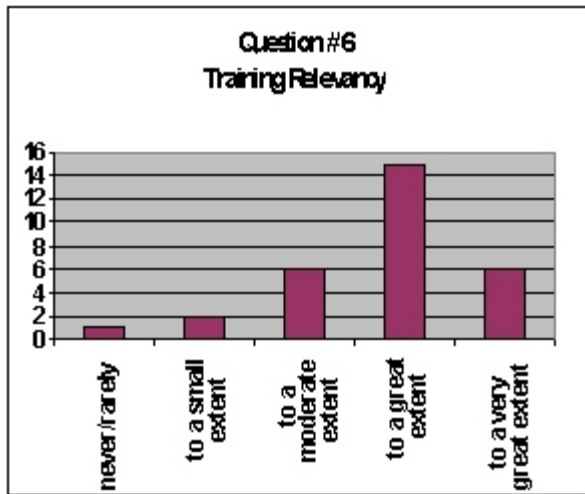


Figure 6. Results from Question 6.

operational relevancy of training by asking, “To what extent have the workshop curriculum and objectives accurately related to what happens on the job?” Figure 6 shows the collective responses.

The large majority of positive responses from Question 6 suggest that the workshop learning objectives are operationally relevant.

If a workshop attendee goes back to his/her office after attending the workshop and

does not have easy access to the resources to apply the instruction, then the workshop’s objectives are not met. It is very important to provide materials, whether that be a computer program, electronic presentation, or simulation exercise, to allow the attendee the opportunity to apply what was learned and to offer lessons learned to fellow forecasters. This helps to reinforce the learning and instruction.

Question 7 in the evaluation form states, “To what extent have you had access to the

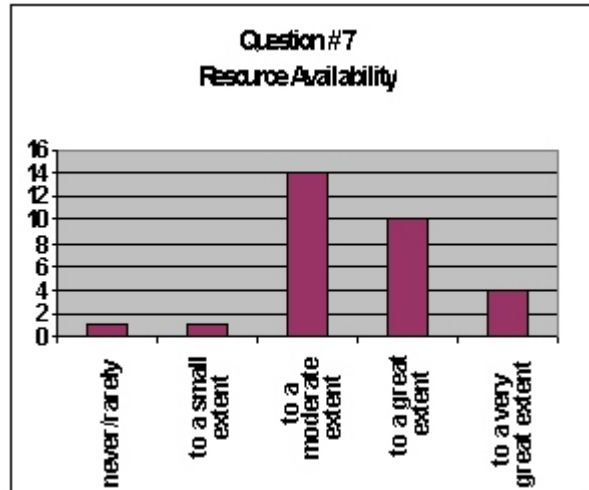


Figure 7. Results from Question 7.

necessary resources (e.g., equipment and information) to apply the knowledge and/or skills on the job?” The results are shown in figure 7. In most situations, a moderate to great extent of resources were available for attendees to apply the instruction taught at the workshop.

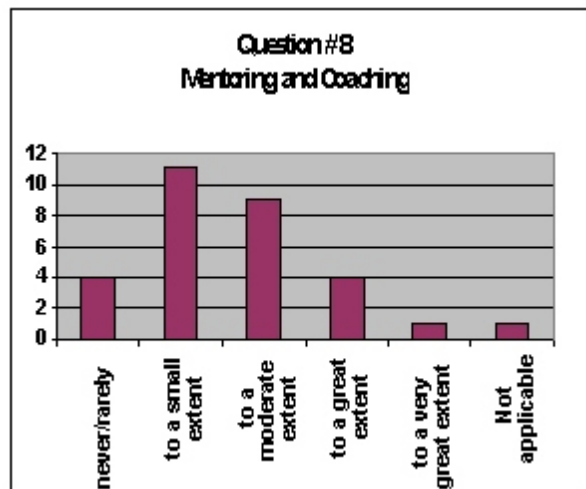


Figure 8. Results from Question 8.

Local mentoring and coaching are vital processes in training reinforcement. A local training officer (often the Science and Operations Officer) can be very helpful in facilitating the learning process and fostering an environment that encourages application of new skills and techniques learned by the workshop attendee. For example, if there are problems with understanding the science behind some new technique, the local training officer can provide the necessary assistance. Unfortunately, the results show that often the workshop attendee receives only little to modest help with applying the training on the job. Question 8 is, "To what extent have you received help, through coaching and feedback, with applying the knowledge and/or skills on the job?" Figure 8 shows the results of the collective responses.

Questions 9 and 10 evaluate impacts of training material presented at the winter weather

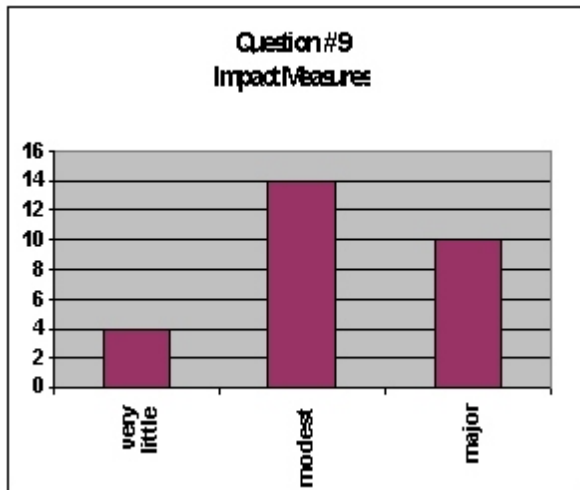


Figure 9. Results from Question 9.

workshop. These questions help to measure how the training has changed (if any) their job performance and/or their ability to meet the NWS mission.

The responses were subjectively categorized into the following three categories: 1 = very little extent, 2 = modest extent, 3 = major extent.

Question 9 is, "Please describe how any of the training presented at the WDTB Winter Weather Workshop has positively (or negatively) impacted your confidence or ability in issuing effective watches, warnings, or advisories."

The collective responses of the workshop participants (figure 9) suggest that the workshop had some very positive impacts. An example is this response from an attendee of the October

2002 workshop:

*"The tools that we acquired to determine winter precipitation types helped tremendously this past winter season. I was able to get a better handle on*

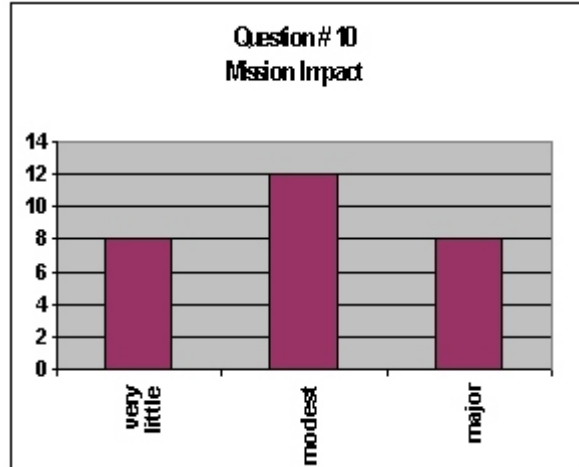


Figure 10. Results from Question 10.

*precipitation type during the mixed precipitation events."*

This type of response was categorized as a major impact because it explicitly describes a specific impact (see analysis of noteworthy training below). If a respondent mentioned a general training impact, it was classified as modest. The third category (very little) was if no account or a nondescript account was mentioned.

Question 10 is, "Please describe how the results of this Workshop have changed (if any) my overall job performance in meeting the NWS mission of providing winter weather forecasts and warnings for the protection of life and property and the enhancement of the national economy." As with question 10, the majority of respondents gave indications that the training was at least modestly effective in impacting job performance in impacting their role in accomplishing the NWS mission. An example of a major impact was this response,

*"Better forecasts and more precise timing in the forecasts helped me give road crews in our area a better idea on when to keep crews for overtime and when to send them home."*

See figure 10 for the results. Question 11 is an opportunity for workshop attendees to suggest additional training topics for future winter weather workshop or new course curriculum. The responses generally fell into seven categories in

this distribution (see figure 11).

One last analysis of the workshop is the number of times a specific training presentation (or topic) is mentioned as having a significant impact. Attendees often mention specific presentations that they think are noteworthy. These training topics (or tools) are often taken back to the rest of the staff and presented as a seminar. The top presentations mentioned in the received evaluation forms are shown in figure 12.

### 3. CONCLUSIONS

The WDTB's winter weather WDM Workshops have been a success in terms of local use and impacts in the forecast offices. Workshops have been a success in terms of local use and impacts in the forecast offices. The science, tools, and techniques appear to be getting transferred into routine operations and positively impacting job performance such as timely and effective issuances of winter weather watches, advisories, and warnings. Results of this Level 3/4 evaluation are limited based on a small

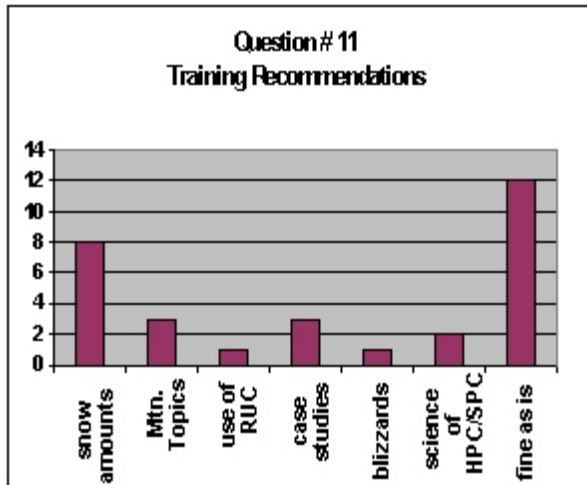


Figure 11. Results from Question 11.

sample size and only 2 years of training workshops, but the process is significant. This evaluation represents the first attempts at answering the valuable questions of, "How is training getting applied in the field?", and, "Is the training having the desired effects?"

One way that might improve the collection of these kinds of evaluation data is to include the local training officer or part of management into the evaluation process for every workshop attendee.

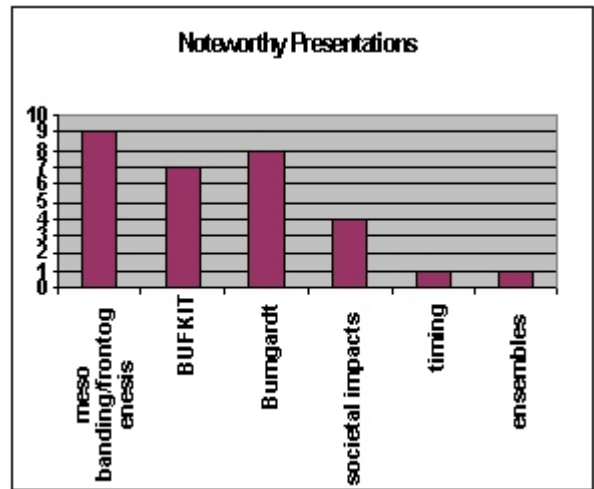


Figure 12. Noteworthy training presentations.

As our training continues to migrate into a Learning Management System (LMS), the importance of evaluation will become even more important.

### 4. REFERENCES

Hodges, Toni K., 2002. "Linking Learning and Performance: A practical guide to measuring learning and on-the-job performance." Boston, Butterworth-Heinemann, 276 pp.