Lessons Learned in Testing the Feasibility of Evaluating Transfer of Training to an Operations Setting

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Introduction: The purpose of the study was to explore the feasibility, identify challenges, and offer solutions to evaluating transfer of training to the operations setting. Background: The assumption underlying public health emergency preparedness training is competencies and capabilities will transfer to the operations setting. However, there are no studies describing methods for evaluating the transfer of training. Methods: An online training course that mimicked field decision making was selected. A functional exercise was developed and aligned with the goals and objectives of the online course. Transfer of training was assessed at the individual capability level and at the agency level by examining changes in emergency operating plans. Conclusions: It was concluded the ability to evaluate transfer of training to an operations setting is feasible. However, it requires more deliberate and coordinated planning between the exercise and the training than the current status quo. Lessons Learned: Eight lessons learned are shared including the need to design training courses to align to an operations-based exercise, and not vice versa, the need to rely on qualitative approaches, and the need for an a priori evaluation rubric.

KEY WORDS: evaluation of training, feasibility, operations-based

Public health emergency preparedness (PHEP) training and exercises are critical to preparing for an effective response to a real-world event. The basic premise is simple: the more we can learn and then practice what we learned, the better we perform key tasks necessary to save more lives and property during a disaster or catastrophic event. The underlying assumption is that what is learned in training will be transferred to the operations context.

Although PHEP training and exercises are routinely evaluated independently, to our knowledge there is no study examining the issues in evaluating the transfer of public health preparedness training to the operations setting. There are many reasons why this may be the case. First, within the preparedness cycle, the importance of evaluation is recognized only after completing an exercise. The importance of evaluation following training and transitioning to exercises is not recognized (Figure 1). Second, designing and testing for transfer of training is costly. In these times of budgetary constraints, many programs do not have the luxury to divert funds to support a more in-depth and prolonged evaluation. However, as a result of our work with the Centers for Disease Control and Prevention–funded Preparedness and Emergency Response Learning Centers (PERLCs)* and specifically the national evaluation working group, it is reasonable to posit the major reason why the issue in evaluating transfer of PHEP

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*The PERLC program is designed to address the preparedness and response training and education needs of the public health workforce. Supported by Federal funding (2010 to date), the program includes 14 centers in Council on Education for Public Health accredited Schools of Public Health. For additional information, see www.cdc.gov/phpr/perlc_factsheet.htm.
training to the operations setting has not been evaluated is because no one really knows how. The purpose of the study was to explore the feasibility, identify challenges, and offer solutions to evaluating transfer of PHEP training to the operations setting.

Background

According to the Federal Emergency Management Agency, PHEP training and exercises are distinct entities (Figure 2). However, the distinction between PHEP training and exercises is more blurred under the Homeland Security Exercise and Evaluation Program (HSEEP). For example, seminars, workshops, tabletops, and games are options to train participants before engaging in operation-based exercises but are classified as discussion-based exercises. For the purpose of this article, we define PHEP training as an activity designed to better prepare participants for performing in an operations setting. Furthermore, we define the operations setting as a drill, functional exercise, full-scale exercise, or real-world event. To better prepare participants, they participate in training before entering the operations setting. Therefore, under this definition, discussion-based exercises and courses are considered different types of training that serve the same purpose: to prepare individuals for performance in an operations setting.

Millions of dollars are invested annually in PHEP training courses (eg, US Department of Education, Center for Domestic Preparedness, Emergency Management Institute, PERLCs, and others). These courses can take many forms including face-to-face instruction, in-house residency programs, CDs, instructional videos, and Web-based. Training courses vary in their sophistication from purely didactic, passive, and competence-based to experiential, active, and capability-based.

An evaluation immediately following the training is critical to establishing whether competency gaps exist and whether the participant is prepared to function in an operations setting. The evaluation of training is critically important. Allowing a participant who has not met training standards and who lacks clarity regarding roles and responsibilities increases the likelihood of failure in future exercises, or worse, a real-world event. The harm this could do to the individual, the public, and property is potentially catastrophic. Similarly, an after action report following an operations-based exercise or real-world event is critical to ensure the improvement plan and associated corrective actions are implemented, so future preparation, response, and recovery efforts are completed with the highest level of efficiency and effectiveness.

The evaluation of PHEP training and exercises are typically conducted independently of each other. However, we contend that the ultimate measure of training impact is how well the training transferred to the operations setting. The feasibility of two evaluation approaches was tested. The first is a longitudinal approach that tracks individuals from training through exercises. Effective training would be evidenced by the successful transfer of PHEP competencies and capabilities from training to the operations setting. The second is to assess the extent to which emergency operations plans (EOPs) and standard operating procedures change over time as a result of training. Training effectiveness would be evidenced by changes to the EOPs and standard operating procedures over time. To our knowledge, neither of these approaches have ever been employed to assess long-term PHEP training effectiveness.
Methods

This study focused on assessing the transfer of PHEP training from an online course to a functional exercise. This choice was made for pragmatic reasons. Our PERLC* made significant investments in online training, and we were very familiar with the learning objectives and design of the online course. Second, the online course mimicked a real-world event and was decision-making based.6 Finally, because of budget restrictions, we were not at liberty to develop a new or different type of training course.

We chose to design a functional exercise to test transfer of training for two primary reasons. First, we did not have the resources or time to wait for a real-world event in which the learning objectives covered in the online course became salient. Second, we did not have the resources to invest in a full-scale exercise requiring the deployment of resources.

We began with the assumption the competencies and/or capabilities being tested in the online training course and functional exercise must be the same to evaluate transfer of training: you must be able to compare apples to apples.

Selecting an online course

We reviewed tier I (entry-level) knowledge-based and tier II (midlevel) experiential-based online courses offered by our PERLC. It was reasoned the best online course would be one in which the learning objectives are clearly stated in terms of capabilities selected from the Target Capability List11 and crosswalked with the Centers for Disease Control and Prevention Public Health Preparedness Capabilities.12 After reviewing several courses, we selected one containing a measurable objective: “Within 4 hours from a point of dispensing (POD) opening, the public is provided with accurate and consistent information messages regarding POD locations.”11

The online course selected focused on Crisis and Emergency Risk Communications (CERC) during mass prophylaxis. This online course differed from other courses because of its emphasis on using a decision-based algorithm, activities to actively engage the learner, and opportunities for the learner to reflect.6 Furthermore, a key component of the CERC online course was the inclusion of many elements of the HSEEP 8-step process for exercises used to design the course.13 As a result, the online course begins with a narrative and includes major and minor events designed to test the course learning objectives. In the CERC online course, the learner is asked to assume the role of a public information officer (PIO) in an emergency operations center. The objectives of the CERC online course were to:

1. Utilize social media (eg, Twitter, Facebook, and Flickr) when and if possible for public health messaging.
2. Improve responsiveness to rumors in addition to controlling rumors generated by television, radio, newspapers, and the Internet, including social media outlets.
3. Use preestablished templates to form messages that take into consideration jurisdiction demographics, at-risk populations, economic disadvantages, limited language proficiency, and cultural or geographical isolation.
4. Coordinate public information releases regarding location of PODs within 4 hours of a POD opening to the public.

It is important to reiterate the CERC online course learning objectives were capability-based. This is not true for the majority of online courses. For example, in the CERC online course, the learner is not simply told the key elements of a good crisis communication message (ie, passive recipient of information designed to improve competency) but required to actually develop a message (ie, active participant to build capabilities). Similarly, the learner is guided throughout the online course to develop a CERC supplement for his or her agency’s EOP. As will be shown below, these design features were critical because they allowed for a foundation from which to begin to design an operations-based exercise that mirrored the CERC online course.

Designing the operations-based exercise

The design of the functional exercise began by writing a parallel narrative form of the CERC online course. Then, using the learning objectives of the CERC online

*The Mountain West PERLC, located at the University of Arizona Mel and Enid Zuckerman College of Public Health, is 1 of 14 centers in the PERLC network. Our PERLC expertise includes developing competency and capability-based training for both tier 1 (beginner-level public health workers) and tier II (midlevel public health workers with 5 years’ experience with an MPH or equivalent or higher, or 10 years of experience with a high school diploma, bachelors, or nonpublic health graduate degree); tribal public health preparedness; and evaluation.

*The interested reader is referred to the study by Renger et al6 for a full description of how this course was deliberately designed to improve learner outcomes.
course, we began writing the master scenario event list (MSEL) following the guidance of Renger et al. Inj ects were written, which mirrored the minor and major events in the CERC online course. To assist the Simulation Cell (SIMCELL), the exercise designers attempt to anticipate possible responses and write contingency injects. In this respect, the decision algorithm guiding the CERC online course proved very useful, as contingency injects were written on the basis of the wrong paths in the decision algorithm.

Evaluating the transfer of training

Two major strategies were employed for evaluating transfer of training. The first was to assess the extent to which capabilities transferred from training to the operations setting. The second was to determine the extent to which EOPs changed as a result of the training and exercises.

Transfer of capabilities from training to an operations setting

To evaluate the transfer of training, it is necessary to measure the learning objectives in the online course and functional exercise the same way. For example, in the CERC online course, learners prepared a crisis communication message and submitted it to a mock social media site. The learner was able to self-evaluate by comparing the message he or she created with a sample template created by a subject matter expert (SME). Since the original message itself was saved as a .pdf file, it could then be evaluated by an external SME for accuracy.

In the functional exercise, players were also required to develop a crisis communication message and again submit it to a simulated social media page. The functional exercise required the message to be completed under conditions of increased stress. The message was saved so it could be evaluated postexercise for accuracy by an SME. The comparison of messages written under stress to those of the online course would be one indication of the success of transfer of training.

Assessing changes in EOPs

According to HSEEP, an important purpose of conducting PHEP training and exercises is to identify potential problems in the EOPs (eg, no templates for crisis communication) and make improvements to the plans so potential problems can be detected and corrected prior to a real-world event.

Prior to starting the online course, agency PIOs were asked to submit their EOPs and/or CERC plans. These were used to establish a baseline. One month following the training each agency PIO was again asked to submit their agency EOP and/or CERC plans. A comparison of the EOPs before and after training provided an indication of training impact. Finally, 3 months after the functional exercise, agency PIOs were again asked to submit their EOP and/or CERC plans. It was reasoned a comparison of the EOPs after the exercise with the EOP immediately after the training would provide an indication of the transfer of training.

Ten individuals with PIO experience representing state, local, and tribal public health agencies in our service area region participated in the online course and functional exercise. The time between completing the online training course and functional exercise was approximately 3 to 4 months.

● Results and Lessons Learned

Lesson learned #1

Many PHEP online courses are competency-based (ie, focus on awareness and knowledge) while performance in operations-based exercises is capability-based (ie, require performance of behaviors and skills). However, since most PHEP training and exercises are developed independently of each other, the likelihood they use the same outcomes and metrics is small. It is recommended to establish the operations-based exercise outcomes and metrics first. Using the Centers for Disease Control and Prevention: Public Health Preparedness Capabilities: National Standards for State and Local Planning and/or the Assistant Secretary of Preparedness and Response: HealthCare Preparedness Capabilities: National Guidance for Healthcare System Preparedness is an excellent starting point for defining and measuring progress toward the goal of an exercise to which the training can then be aligned.

Lesson learned #2

In evaluating transfer of training, it is best to begin with the objectives of the operations-based exercise and then align the online training objectives to these, not vice versa. This approach is in fact more consistent with the premise of training: to develop something meaningful to help prepare the learner for the field setting. Another major benefit of starting with the operations-based exercise is that it can help stimulate creativity needed to design an interactive and engaging online course. For example, understanding the functional exercise necessities players working in a Joint Information Center (JIC), the online course could have easily been developed with a synchronous component in which learners from multiple sites participated at the same time in a virtual JIC.
Lesson learned #3

In evaluating transfer of training, care must be paid to not only having the same metric but having the same unit of measurement. For example, in the online course, the accuracy of the crisis communication message was evaluated at an individual level: every learner created a message. However, in the functional exercise, the message created was the result of multiple input of players in the JIC, making it impossible to attribute the accuracy of the message to an individual and by extension impossible to assess the extent to which transfer of training occurred for each individual. This is also related to lesson learned #1. If we designed the functional exercise first, then we would have realized the need to use a JIC concept. As a result, the crisis communication message in the online course could also have been developed jointly using a synchronous online course concept. The important point is the training design needs become evident only after designing the operations-based exercise. In this scenario, a CERC exercise, there is a need for a synchronous training course. However, whether a synchronous course is needed for other trainings is context specific.

The unit of measurement problem may not surface for others evaluating transfer of training because it (the unit of measurement) is capability dependent. For example, there are numerous PHEP operations-based exercises and trainings focused on understanding the roles and the chain of communication in the incident command system. These target capabilities and associated performance measures (eg, planning section chief developing an incident action plan in 2 hours, an incident commander [IC] conducting a briefing every hour) are directly comparable between the training and exercise because they are measured at an individual level.

Lesson learned #4

It is impossible to apply statistical analyses to evaluate the transfer of training. Capabilities assessed at a group level (eg, JIC-developed messaging) will have very small sample sizes (eg, 1 or 2 observations in training and the exercise). Even capabilities assessed at an individual level are unlikely to produce sample sizes large enough to conduct statistical analysis. Building on the incident command system example, it would require numerous trainings and exercises to determine whether the capabilities for an IC or planning section chief transferred from training to the exercise. This is because in any operations exercise, there can be only one IC and planning section chief. Therefore, the assessment of transfer of impact is likely to require qualitative analyses.

Lesson learned #5

The EOP plays an important role in system improvement. However, 50% (n = 5) of the agencies did not have an EOP and of those that did, even fewer had a CERC plan (n = 2). Therefore, it was critical to include a feature in the online course that required participants to develop the CERC component of their EOPs. The CERC online course we chose had this necessary design feature. We recognize, however, that most PHEP courses are not designed to guide the participant through plan development. Future evaluations wishing to evaluate transfer of training by examining changes to EOPs should include activities designed to help agency representatives develop the portion of the EOP relevant to the subsequent exercise.

As a result of the training, each agency developed a CERC supplemental plan. Therefore, the transfer of training could be evidenced by further changes to the CERC supplemental after the functional exercise. Agencies making changes to the CERC supplemental after the exercise were scored 1. Those not making any changes to the CERC supplemental after the exercise were scored 0. The rubric provided a gross indication of the percentage of agency’s making changes to the EOPs after training and after the exercises, providing a simple, cost-effective, albeit admittedly crude indicator of the effectiveness of the transfer of training.

Lesson learned #6

Getting agencies to submit their agency plans is difficult. When asked why they were reluctant to comply with the request, some participants said they were concerned about security breaches while others noted they were embarrassed about the quality of their EOPs.

Discussion

Based on our work, it is safe to conclude the ability to evaluate transfer of PHEP training to an operations setting is certainly feasible. However, it requires more deliberate and coordinated planning between the exercise and training than the current status quo. It is best to start with an understanding of the capabilities, wishing to be tested in the operations setting before designing a training. When designing the training, it is important to mirror the operations setting as much as possible. This requires rethinking how we normally design training, especially courses. Purely didactic, passive, and competence-based courses need to be replaced with experiential, active, and capability-based courses. There is greater cost associated with developing this type of training. However, the benefits of doing so are many. From the evaluation perspective, it would be possible
to evaluate transfer of training. However, from a more practical standpoint, it would create trainings and exercise that are meaningfully connected, reinforcing the same concepts over time using multiple modalities. This is more true to the intent of the HSEEP building block design, now referred to as the progressive exercise program where training and exercises meaningfully build from previous trainings and exercises.

Homeland Security Exercise and Evaluation Program details an 8-step process for designing exercises. It is our contention this 8-step process should also be required in designing trainings: it would provide more structure and allow for easier alignment of the training to the exercise. It would also ensure the outcomes and metrics used to evaluate exercise capabilities are incorporated into the training. Furthermore, we believe that knowing for what the training is being designed could significantly assist the design team in generating ideas to make the training more interactive and experiential.

We examined the feasibility of evaluating transfer of PHEP training from an online course to a functional exercise. However, the truest test would be transfer of training to a real-world event. Conceptually, this would be possible if (a) the capabilities needed to respond or recover to the real-world event could be defined postevent, (b) event responders needing to perform those capabilities could be identified/located, and (c) it could be determined whether these individuals received the training in these capabilities. In our example, one could imagine creating a database of all PIOs who completed the CERC online training course. Then following a real-world event, a search could be conducted to determine whether any of the trainees responded to the real-world event in the capacity they were trained, that is, as a PIO. A qualitative evaluation would then need to be conducted because the sample size is likely to be very small (ie, because only one or two PIOs might be needed per event). To our knowledge, this approach has not been used despite the numerous annual real-world events providing the opportunity to do so. This evaluation strategy is resource intensive and requires a real-world event to occur to test the transfer of training. For these reasons, testing the transfer of training in an operations-based exercise may be preferred.

It is almost impossible to imagine a situation in which the transfer of training could be evaluated using statistical approaches. It is often possible to have large sample sizes in the training. Online training courses are designed to accommodate a limitless number of participants. However, practical constraints of operations-based exercises (eg, there can be only one IC, PIO, section chief, etc.) will restrict the size of sample available for comparison purposes. Therefore, we must be content with qualitative methods for assessing the transfer of training.

In summary, evaluating transfer of training to an operation setting is feasible. There are multiple methods for doing so including alignment of capability-based objectives, assessing changes in EOPs, and follow-up analysis after a real-world event. The success of any evaluation effort lies in planning. Evaluating transfer of training to an operations setting is no exception. To be successful, it is critical to rethink how we design training and exercises. The status quo is to independently design and evaluate training and exercises. This is inefficient, likely ineffective, and undermines the HSEEP principles. Based on our findings, it is recommended to begin by designing the operations-based exercise, being clear how the capabilities will be evaluated. The training should then be designed following the same guidelines used in exercise design (ie, the 8-step process). So doing will ensure alignment between training and exercises, reinforce concepts over time using different modalities, and for the transfer of training to be evaluated.

REFERENCES


