Evaluation of Stress Management for 911 Dispatchers Module

Naryman Mustafa

Marta Gubanova

California State University, Monterey Bay

July 21, 2020

IST622 Assessment & Evaluation

Dr. Bude Su
### Table of Contents

Evaluation of Stress Management for 911 Dispatchers Module ........................................ 4

Methodology .......................................................................................................................... 5

Prototype ................................................................................................................................. 5

Learners ................................................................................................................................... 7

Tryout Conditions .................................................................................................................. 8

Process ..................................................................................................................................... 8

Results .................................................................................................................................... 11

Entry Conditions .................................................................................................................... 11

Instruction ................................................................................................................................. 11

Summary of Data .................................................................................................................... 12

Outcomes ................................................................................................................................. 19

Recommendations .................................................................................................................. 20

Summary .................................................................................................................................. 21

Appendices ............................................................................................................................... 22

Appendix A: Testing Website ................................................................................................. 22

Appendix B: User Survey ......................................................................................................... 23

Appendix C: Pre- and Post-Test ............................................................................................. 24

Appendix D: eLearning Module .............................................................................................. 26
Appendix E: Usability Survey .......................................................................................... 27

Appendix F: Observation Checklist .................................................................................. 29
Evaluation of Stress Management for 911 Dispatchers Module

A 911 professional’s job is multifaceted, demanding, and complex. It is an exciting and rewarding occupation when an operator can feel like the hero in some situations, yet in other circumstances, 911 dispatchers are challenged by grave workplace stressors. Often, tense interactions with individual callers in distress, overtime, alternating shifts, and ever evolving technologies are just a few stressors.

The professional aim most sought is to decrease dispatcher stress, and the means to meet this goal is to develop an effective Stress Management training program. Dispatchers must be able to adopt a resilient 9-1-1 mind and skill set using the resources and support provided to them, among other independent resources. Management consistently requires new employees to successfully participate in professional development, plus continue on-the-job training, and perform notably well.

The Stress Management for 911 Dispatchers module is presently under development. The project team represented by Naryman Mustafa and Marta Gubanova have conducted an evaluation of the first module prototype. This report details the initial evaluation which has been completed with a sample of participants. The evaluation was designed to assess the module in fostering learning, and to determine the design’s current usability before work advancement continues on the module. This evaluation has confirmed that the module promotes learning, and that participants can successfully engage with the module. The assessment has identified several areas of improvement, which should be implemented before completing and releasing the final training by the end of 2020.
Methodology

Prototype

The prototype used for this evaluation is the first part of a series of modules designed to train 911 dispatchers on various stressors which dispatchers repeatedly face in their field of work. The training was developed with Adobe Captivate. It includes a series of interactive activities with a total duration of 20-25 minutes. At the beginning of the module, students receive information on training objectives and watch a short video intended to capture their attention. They are then presented with the definition of stress, both negative and positive stress, the three different types of compassion stress, a drag-and-drop knowledge check, a scenario-based quiz for students to acknowledge and recognize the difficulties of higher-level stress, the importance of background knowledge and lastly, the relevant vocabulary. For examples of the module design see Figures 1-4.

Figure 1. Screenshot from the module that shows the meaning of stress.
Figure 2. Screenshot from the module that shows flip cards which display negative symptoms of stress.

Figure 3. Screenshot from the module that shows an interactive drag and drop activity.

Figure 4. Screenshot of the module that shows one of the scenarios in the quiz.
This module chunks information, uses real life applications, and encourages engagement throughout the training lesson. Learning about the content in context integrates theory to application for the work these participants must execute and accomplish on the job. The interactive elements compel participants to engage with the content rather than passively have information presented to them. These strategies are highly beneficial to the learning process.

The module is not yet polished, and it requires further development. It is only an introduction to the training and is presently a limited rough draft. Once this module is completed, it will be a part of a complete training program. Additionally, as new dispatchers enter this training program, they bring a variety of knowledge levels, which require an accommodation for a range of familiarity via a pre-assessment before each module.

Learners

The target audience for this particular training is all of the 911 dispatchers at the Salinas Emergency Communications Center, which include experienced employees, who sometimes combine two major responsibilities: call-taking and dispatching. The ratio differs depending on the current workload and shift. The dispatchers come from various educational and ethnic backgrounds. Their ages range from early twenties to early sixties.

Most of these participants are familiar with the Learning Management System (LMS) platform provided to them through their center, therefore it should not be difficult for dispatchers to navigate through a training session. There should be sufficient time for learning because each employee has to complete 24 hours of training annually, yet they presently do not have enough learning modules to fulfill this requirement.

At the Salinas Emergency Communications Center, the instructor who delivers the training is also one of the supervisors at the center. The supervisor is already trained to operate
their learning management system (LMS) and add participants, as necessary. The supervisor will also be provided with an instructor’s manual and accompanying worksheets necessary for this type of training. The trainees will be provided with online instructions, in-class instructions, and worksheets. The delivery format will be a blended course facilitated by an instructor/supervisor at the center. Blended learning enhances students' sense of community and enriches learning experience since it combines online training and traditional classroom training. It allows students to participate in classroom activities simultaneously via computer-based activities or videos, which will ensure the transfer of knowledge.

**Tryout Conditions**

The tryout process consisted of five parts: a user survey, pre-test, training module, post-test, and usability survey. Twelve participants, which included our classmates, neighbors, friends, and family members used their own laptops, tablets, or desktop computers with built-in speakers. Five of the twelve participants were observed via Zoom while taking the training module.

Each member of the project team acted as a facilitator for their observed tests: they gave a brief introduction, explained they would be taking a user survey, pre-test, module, post-test, and lastly, completing a brief usability survey about their experience. The facilitators provided a Google website with a step-by-step instruction and links to the surveys, tests, and module. See Appendix A for a link to the website.

**Process**

In order to assess the module’s effectiveness, a pre-test and post-test model was used for its data, simplicity, and low costs. It enabled all data to be collected as part of the training. A ten-
question pre-test established exactly how much the participants already knew about the topic before taking the module. The prototype was an eLearning module which took 20-25 minutes to complete. The participants accessed the module on a laptop or desktop computer.

For post-training data, participants completed the same ten-question test to show how much information they acquired after taking the module. The two tests were identical. External validity of this assessment was likely reduced because the participants gained familiarity with the questions by taking the same test twice. Not only were the participants already familiar with the questions when taking the test again, but they also may have been particularly sensitive to portions of the module that covered the specifics on the test questions. The test questions were designed to test the course objectives. By answering every question correctly, participants would have mastered all course objectives.

**User Survey.** The first survey was intended to help gain a better understanding on age, educational background, and occupation of the test participants who were found to be as diverse as our target audience. The questions were few and simple, with a more fun, casual tone so that participants would not get bored or tired of answering the questions. See Appendix B for a list of survey questions.

**Pre-test.** The pre-test questionnaire was shared with the students using the link provided on the Google website. The pre-test evaluates what the participant does and does not know before attempting the training. This part is crucial in order to compare and contrast the results along with the post-test. This test consists of ten multiple choice questions that measure knowledge about text difficulties, background knowledge and vocabulary strategies. The same questions were used for the post-test. See Appendix C.
Training. The module was accessed by the participants via the internet using the link provided on the Google website. Participants clicked the link and were taken to a new browser tab where the module opened. The intended training was originally designed to take 15 minutes to complete. Some students took a few more minutes to complete it. See Appendix D for a link to the module.

Post-test. After students finished the training, they were instructed to click on the post-test link on the Google website. The post-test contains the same questions as the pre-test with the objective of evaluating the training efficacy. Having the same questions for the pre- and post-test is a requirement for the completion of a paired analysis. See Appendix C.

Observation. During the observation, the facilitators filled out an observation checklist to record each student’s performance during the training. The facilitators looked for navigation issues, general understanding of the module, buttons functionality and sound. In addition, the facilitators explained that they would be taking notes, timing the session, and focusing on the evaluation of the learning experience. Participants were encouraged to ask questions and voice their thoughts out loud. Finally, students’ behaviors were recorded on the observation checklist. The participants were engaged and wanted to obtain good scores through the session. However, there were some minor difficulties with a couple of the slides. See Appendix F for the full observation checklist with comments.

Usability Survey. The purpose of this survey was to obtain information about the students’ impressions of the design as well as their opinions on the improvements that can be made. The usability test used a scale that ranged from “strongly disagree” to “strongly agree” and it included two open-ended questions: what they enjoyed the most about the training and
what improvements are needed in order to make the training better. The information collected from this test will be considered in the design of the final capstone project. See Appendix E.

Results

Entry Conditions

The test participants matched the intended audience. Participants came into the learning with a variety of computer and language skills. Their educational background and age also matched the intended audience. Based on the facilitators’ observation and pre-test scores, each participant displayed prior understanding of the test process.

Instruction

This module was designed to be self-navigating and identical to the final module. In order to mimic the final module setting, the facilitators encouraged participants to figure out issues on their own. Participants encountered a few minor difficulties during the prototype trial. There was some issue with sound halfway during the module lesson for one participant, but they continued the lesson with the captions since troubleshooting could not be done on the volume issue at that time. Some participants reported problems using the module or with the playback of the video. Some participants preferred listening and reading to the scenarios in the quiz section instead of just reading them because they were pretty lengthy. The prototype was completed within 20-25 minutes by the observed participants. All other participants also reported being able to complete the module within the aforementioned timeframe. The observed tests showed that students were able to navigate through the training and work independently as it had been envisioned by the design. It was observed that only one student had a question about the content, which was addressed during the hands-on practice.
Summary of Data

Learning. The pre- and post-test data were obtained through the export feature of the Google Forms. The scores were then transferred to an Excel spreadsheet. Table 1 below shows the pre- and post-test scores.

Table 1

*Pre-Test and Post-Test scores*

<table>
<thead>
<tr>
<th>Pre-Test</th>
<th>Post-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
</tr>
</tbody>
</table>

There were ten total questions for the pre- and post-test. All but two participants scored higher on the post-test, with one individual scoring the same as his/her pre-test score and one scoring one point less than his/her pre-test score.

All but one question missed by the participant scoring the same on the pre- and post-test were the same. In this one question, the participant made a mistake during the post-test while getting it correct on the pre-test.
As for the participant who scored less on the post-test, he/she missed the same question in both pre- and post-test but made new mistakes in the post-test.

The average score for the pre-test was 6.5 out of ten or 65 percent. The average score for the post-test was 8.58 out of ten or 85.8 percent. See Figure 5 below for the difference in individuals on their pre- and post-test scores.

![Graph showing comparison of pre-test and post-test scores](image)

**Figure 5.** Comparison of the pre-test and post-test summary of results.

The most challenging question in both pre- and post-test turned out to be question 3: “What is Critical Incident Stress?” However, in this question, participants demonstrated the greatest improvement. Three participants answered this question correctly on the pre-test, and six participants answered it correctly on the post-test. See Figures 6 and 7 below for the number of correct responses in the pre- and post-test for this question.
Usability. Overall, the participants rated the usability of the module highly.

One hundred percent of the participants either strongly agreed or agreed that the graphics in the module were relevant, the amount of information was appropriate, and the colors were easy on the eyes. See Figures 8-10 below.
The graphics used in this eLearning module were relevant.
12 responses

Figure 8. Summary of the results of a Usability Survey question.

The amount of information used in this module was appropriate.
12 responses

Figure 9. Summary of the results of a Usability Survey question.
Figure 10. Summary of the results of a Usability Survey question.

91.6 percent of the surveyed participants said they either strongly agreed or agreed that the module was easy to use and the fonts were easy on the eyes. 8.3 percent of the participants were neutral. See Figures 11 and 12 below.

Figure 11. Summary of the results of a Usability Survey question.
As for the navigation, participants’ opinions were a bit more spread out. 66.7 percent either strongly agreed or agreed that it was easy to navigate the module, while 33.3 percent said they were neutral. See Figure 13 below.

Figure 13. Summary of the results of a Usability Survey question.

83.4 percent of the participants either strongly agreed or agreed that the module is well-structured, and 16.7 percent said they were neutral about it. See Figure 14 below.
Figure 14. Summary of the results of a Usability Survey question.

Four out of twelve respondents evaluated the likelihood of recommending the module to a colleague in the Emergency Communications field as a four on a scale from one to five, and eight of them - as five, which was the highest level of likelihood on the scale. See Figure 15 below.

Figure 15. Summary of the results of a Usability Survey question.
Outcomes

Prior to conducting any tests, it was hypothesized that after taking the module, the test scores of the participants would improve, so the post-test scores would be higher than the pre-test scores. Therefore, the null hypothesis was that taking the module would either have no impact on the scores or it will decrease the scores of the post-test as opposed to the pre-test.

A paired two-sample t-test for dependent samples was run with a degree of freedom of eleven. To evaluate statistical significance, the one-tail results were used since the hypothesis was directional. See Figure 16 below for the t-test results.

<table>
<thead>
<tr>
<th>Variable 1</th>
<th>Variable 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>6.5</td>
</tr>
<tr>
<td>Variance</td>
<td>4.454545455</td>
</tr>
<tr>
<td>Observations</td>
<td>12</td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>0.100167084</td>
</tr>
<tr>
<td>Hypothesized Mean Difference</td>
<td>0</td>
</tr>
<tr>
<td>df</td>
<td>11</td>
</tr>
<tr>
<td>t Stat</td>
<td>-2.92602868</td>
</tr>
<tr>
<td>P(T&lt;=t) one-tail</td>
<td>0.006894003</td>
</tr>
<tr>
<td>t Critical one-tail</td>
<td>1.795884819</td>
</tr>
<tr>
<td>P(T&lt;=t) two-tail</td>
<td>0.013788005</td>
</tr>
<tr>
<td>t Critical two-tail</td>
<td>2.20098516</td>
</tr>
</tbody>
</table>

*Figure 16. T-test results summary.*

It can be concluded that there is a statistically significant mean difference between the pre- and post-test results. The absolute value of the t-stat was 2.93, which is greater than the critical value of 1.8 and the p-value of .007 is smaller than the .05 conventional alpha level, so the null hypothesis can be rejected and the results can be considered statistically significant. The effect size was calculated to determine if the results are practically significant. The pre-test scores ($M=6.5$, $SD=2.11$) and the post-test ($M=8.58$, $SD=1.5$) differed significantly [$t(11)=2.93$,
p<.05, and d=1.15]. The effect size of 1.15 is greater than 0.8 so is considered large. The results of this test can be considered practically significant.

**Recommendations**

Based on the evaluation of the Stress Management for 911 Dispatchers module we would like to make the following recommendations:

1. **Reconsider the content and activities on Critical Incident Stress and Secondary Trauma.** The results of pre- and post-tests show that these topics remain a little bit unclear and confusing for the participants after taking the module.

2. **Make improvements to the navigation of the course.** Several participants reported difficulties and frustration when switching to the next slide - in some cases, because they assumed it would be done automatically after narration is over, and in some cases because nothing happened when the participant clicked on the “Continue” button in the practice quiz. Also, it was reported that it was unexpected that the participant had to click “Play” on some slides while the other ones would play automatically. Observation also showed that the clickable areas for the quiz options are too small - participants had to make several attempts to choose the desired option.

3. **Adjust the audio narration.** Observing the participants taking the module, we noticed that the audio on the Secondary Trauma card was lower than on the other cards. Also, the narration on the pre-quiz slide caused the participants to jump on their seats because it started unexpectedly loud. Some of the participants also noticed that the narration on this slide cuts off without finishing the sentence. One of the
participants expressed preference for the practice scenarios to be narrated in addition to the text displayed on the slide.

4. **Improve the structure of the module.** The Usability Survey demonstrated that not all the participants were positive that the module was well-structured. We recommend getting more specific feedback on this topic and find a way to make the module flow smoothly for the participants. One of the participants suggested that the introductory video is moved to the very beginning of the module to capture the attention and engage the participants better.

**Summary**

The research hypothesis for this prototype evaluation was that the Stress Management for 911 Dispatchers module would improve the test scores of the participants. Based on the statistical data analysis conducted through a paired two-sample t-test, the evidence for the research hypothesis was found statistically significant and the research hypothesis was accepted as true. The Stress Management module significantly contributed to the improvement of the post-test scores of the participants in comparison to the pre-test scores.

This evaluation supports our design decisions for this learning module and provides insights on how to improve the usability of this and other modules and provide a smooth and engaging e-learning experience. As we continue to work on the training project, we will use the results of this prototype evaluation to create effective training on Stress Management for 911 dispatchers.
Appendices

Appendix A: Testing Website

Link to the website.

Links to the user survey, pre- and post-test, usability survey as well as a link to the evaluated module are included in the website.
Appendix B: User Survey

User Survey

Please answer the questions below. This survey is anonymous, so please feel free to answer honestly.
Thank you!

What is your age?

Your answer

What is your education level?

- [ ] Less than High school
- [ ] High school / GED
- [ ] Some college
- [ ] College degree
- [ ] Postgraduate degree
- [ ] Other: _______________________________

What is your current occupation?

Your answer

______________________________
Appendix C: Pre- and Post-Test

1. What is stress?  
   - Normal reaction of the body to an unpleasant experience.  
   - Abnormal reaction of the body to outside factors.  
   - Abnormal reaction of the mind to a change in the environment.  
   - Normal reaction of the body to a change that requires an adjustment or response.  
   1 point

2. What are the types of stress experienced by first responders most often?  
   - Cumulative stress  
   - Critical Incident stress  
   - Secondary Trauma  
   - All the above  
   1 point

3. What is Critical Incident Stress?  
   - High-level stress experienced by people in an emergency accident  
   - Any situation that causes you to experience unusually strong emotional reactions  
   - Abnormal reaction of a person to a critical incident  
   - A stressful situation that can cause critical consequences  
   1 point
4. What is Secondary Trauma? *

- The second time when you experience a traumatic event
- Exposure to traumatic events experienced by others.
- Consequences of a traumatic event
- None of the above

5. What are the hormones released into our bloodstream in a stressful situation? *

- Cortisol & Adrenaline
- Insulin
- Serotonin
- All the above

6. In which areas does stress manifest itself? *

- Volume of work
- Physical Health
- Mental Health
- Reproductive Health
- All of the above
Appendix D: eLearning Module

The link to the evaluated module.
Appendix E: Usability Survey

I am satisfied with the ease of using this eLearning module.

- [ ] Strongly disagree
- [ ] Disagree
- [ ] Neutral
- [ ] Agree
- [ ] Strongly agree

It was easy to navigate this module.

- [ ] Strongly disagree
- [ ] Disagree
- [ ] Neutral
- [ ] Agree
- [ ] Strongly agree

The graphics used in this eLearning module were relevant.

- [ ] Strongly disagree
- [ ] Disagree
- [ ] Neutral
- [ ] Agree
- [ ] Strongly agree

The amount of information used in this module was appropriate.

- [ ] Strongly disagree
- [ ] Disagree
- [ ] Neutral
- [ ] Agree
- [ ] Strongly agree
The module is well-structured.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

The colors used in this module were easy on the eyes.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

The fonts were eye-friendly.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

On a scale of 1-5, how likely would you be to recommend this module to a colleague in the Emergency Communications field?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very unlikely</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What did you like the most about the learning experience?

Your answer

What could be improved in the module?

Your answer
Appendix F: Observation Checklist

<table>
<thead>
<tr>
<th>Checklist</th>
<th>Yes</th>
<th>No</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Is the participant able to start the module without difficulty?</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Does the participant follow the instructions correctly?</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Is the participant able to use the clickable areas in the module?</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Does the participant complete each and every item in the module?</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Does the participant ignore any functions of the module?</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>Does the participant follow the module navigation without difficulty?</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Does the participant encounter any problem, and solves the problem on their own?</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>Does the participant encounter any problem, and need assistance to continue?</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>
### Additional Comments

1. One of the users said she would rather listen to and read the scenarios because they are pretty long. She said it would be nice to have the closed captions in a bubble near the character’s mouth.

2. “Secondary trauma” slide: audio very low, hard to hear.

3. “Great job” slide: the audio is too loud and cuts off at the end.

4. Because the video wasn’t at the very beginning, it failed to capture the attention and cause curiosity - its effect kind of blurred because of the slide before it.