Formative Evaluation Report
Soldier Qualification on the M4 Carbine Rifle

Unit 2: Zeroing

Assignment 4
EME 6226
Kevin Freeman, Charlotte Jones, Lindsey Phillips, Mist Yancey

I.   Background

A. Instructional Purpose

   Rifle marksmanship is an essential skill for soldiers in battle. Many active duty soldiers do not use their weapon on a daily basis. Therefore, they are subject to lose marksmanship skills due to lack of use. It is important to the U.S. Army that all soldiers maintain a basic level of skill to ensure battle readiness at all times. Soldiers are required to "qualify", or pass a threshold skill performance test, for specific weapons throughout their career. Of particular importance is maintaining the skill set of marksmanship for the M4 Carbine, a commonly used assault rifle. Proper zeroing of the M4 Carbine increases accuracy. This online portion of the mixed mode course focuses on developing the skill of zeroing the M4 Carbine. After completing this component of the online course soldiers will know the procedure for zeroing their weapon.

B. Audience

   Participants in the Soldier Qualification on M4 course are soldiers that are in entry level basic training to the E4 Specialist level.

C. Context

   The evaluation context requires a quiet and comfortable setting with internet access. The SME/Learner should have access to a laptop or desktop with the capabilities of playing audio/video.

II. Purpose Statement

   To ensure the quality, effectiveness and feasibility of this web-based instruction, a formative evaluation of this course will be conducted. However, specific emphasis will be placed on "Unit 2: Zeroing" due to time constraints and the complexity of the content that particular unit addressed.

III. Method

A. Subjects

A number of subjects will offer their expertise and/or feedback on the quality and effectiveness of this course. A description of those individuals, as well as their role in the evaluation process is described in the table below.

Table 1: Formative Evaluation Subjects/Targets

Type	Evaluator	Target
Phase 1		
Expert Review	Carbine Rifle Expert	Evaluate each component of the instructional unit: -examine the relevance of the instruction, content, and satisfaction. Review of content to ensure accuracy of the content. Review the alignment of the content to the goals and objectives of the lesson.
Expert Review	Media Expert & Instructional Designer	Evaluate the usability of each component of the the unit. Evaluate the Media
Phase 2		
One-on-One *Low ability learner*	Target Age for Infantry Training, Logan Graves.	Observe learners' reactions and responses while they progress through the online course. Ask learners to identify problems.
One-on-One *Average learner*	Target Age for Infantry Training, Janna Bailey.	Observe learners' reactions and responses while they progress through the online course. Ask learners to identify problems.
One-on-One *High-ability learner*	Attus Sanfield	Observe learners' reactions and responses while they progress through the course, paying specific attention to clarity of content, feasibility, the impact, and satisfaction of the learner. Ask learners to identify problems.
Phase 3		
Group Evaluation	8 learners of target age.	Will not conduct due to constraints
Phase 4		
Field Test	30 learners of target age.	Will not conduct due to constraints

B. Design

The design of the formative evaluation varies according to each phase of the evaluation plan (a detailed schedule of the evaluation process can be found in Appendix A). The following table describes the setting and process to occur during each phase.

Table 2: Formative Evaluation Design

Evaluation	Evaluator	Date	Target	Technique	Instruments
Expert Review	Field trainer for infantry	4/06/16	-Content Accuracy -Instructional Design	Expert Review	-Questionnaire
Expert Review	IT and Media Specialist	4/07/16	-Interface -Usability	Heuristic	-Questionnaire
One-to-one	3 Target learners of below average, average, and above average ability	4/13/16	Unit 2 Accessibility of system, Clarity of instruction, impact on performance and attitudes, & feasibility of completion of the course	Think-aloud	- Observation form. -Interview questions.
Small Group	8 Students (range of skills)	5/1/16	Unit 2 Accessibility of system, Clarity of instruction, impact on performance and attitudes, & feasibility of completion the course	Scenario	-Pretest -Post test -Observation -Post test -Interview questions
Field Test	30 target learners (volunteers)	6/1/16	Unit 2 Accessibility of system, Clarity of instruction, impact on performance and attitudes, & feasibility of completion of the course	Scenario	-Observation -Follow up interviews.

C. Instruments
- SME Questionnaire:
  - o The Content expert review questionnaire provides five open-ended questions to determine the accuracy and currency of the course content.

- One-to-one Guided Question Form:
  - o This form outlines the procedure and contains a series of open ended questions to determine the clarity, impact, and feasibility of the content and the delivery of the online materials in addition to their impact on attention, perceived relevance, confidence and satisfaction of the evaluator.

- Expert Instructional designer/Media SME questionnaire:
  - o This form provides 5 open ended questions for an expert instructional designer to determine whether the course content is aligned with principles of instructional design. In addition, there are questions to determine the effectiveness of the delivery method and whether the web components are aligned with multimedia design principles.

D. Procedure
To complete the formative evaluation for this instructional course, the following procedure will be implemented:

1. Identify appropriate Subject Matter Experts (SMEs) for expert review.
2. Arrange SMEs participation.
3. Conduct the Expert Reviews.
4. After careful consideration, adjust instructional materials if necessary.
5. Identify appropriate Media Specialist for expert review.
6. Arrange Media Specialist participation.
7. Conduct Expert Review and Interview.
8. After careful consideration, adjust instructional materials again.
9. Identify learners who are typical of those in the target population for One-to-One.
10. Arrange for the learners to participate.
11. Discuss the process of a one-to-one evaluation of the materials with each learner.
12. Sit with the learner while he or she studies the materials.
13. Instruct the learner to write on the material to indicate where difficulty is encountered or to discuss problems and ideas for enhancement.
14. Keep notes on the examples and track information added, changed, or re-sequenced during the process.

E. Constraints

The learner context used for the formative evaluation does not reflect the actual context of the learners (basic training at a military base in a classroom setting.)

- Some of the evaluators may not spend the appropriate amount of time on the course to provide adequate feedback.

- Some of the hardware used during the evaluations may be different from those used during the instruction of the course.
- There is a limited amount of time to conduct a small group test or field test. As such, we cannot implement Phase 3 or Phase 4 of the plan.

IV. Results and Discussions

Table 3: Carbine Rifle SME

This table outlines the feedback that was received during the formative evaluation with the Carbine Rifle Subject Matter Expert.

Target	Information Gained	Suggestions/Recommendation
Video : Above and Beyond	**Content:** Content is up to date but does not meet the required objectives and outcome **Relevance:** Content is not relevant because it does not connect with zeroing. **Accuracy:** Content is accurate but does not connect to the learning goals or objectives.	Video does not appeal to the senses to motivate soldiers to complete the course. The information could be looked up online if a soldier wants to know it. Create a video that will appeal to the senses of the soldiers (Perhaps create a video that includes music) Create video that connects to the objectives or outcome of the course.
Objectives:	**Content:** Information is up to date. **Relevance:** The third learning objective is not relevant to zeroing a weapon. **Accuracy:** The third checked objective is not accurate for zeroing a weapon. Information regarding what type of target should be added to make the objective clear to the soldiers.	The format of the objectives is not clear Depending on the lane you will fire three rounds at a time before clearing your weapon, lock your bolt to the rear and stand by to be cleared by the safety. The safety provides you with instructions on how to clear your weapon. 5-6 rounds are too many rounds wasted. Reduce the amount of rounds to 3. Rewrite objective to state: Make a distinction regarding what type of target should be used.
Zeroing Firing Preview	**Content:** Content is up to date **Accuracy** Content is accurate **Relevance:** Content is highly relevant to learning how to zero a M4 Carbine because accurate positioning of the weapon is discussed.	A demonstration video showing proper positioning of the M4 Carbine should be included. Proper positioning is extremely important whenever a weapon is shot.

Fire Three Rounds And Locate The Center.	**Accuracy:** The content is accurate and discussed important information such as alignment. **Relevance:** The video was relevant to the learning objectives for zeroing a weapon. **Content:** The content is up to date.	Change the part of the video of the man shooting the gun. The angle of the man shooting the gun prevents the viewer to see proper positioning of the gun during zeroing. Use a video that shows the proper positioning of the weapon during targeting before the three bullets are released. Change the name of the video to Fire Three Rounds. The video does not show how to locate the center, but the name suggests otherwise.
Determine Shot Location	**Accuracy:** The content was accurate. **Relevance:** The information was relevant for learning how to zero a weapon. **Content:** The content is up to date.	No changes were suggested.
Adjust The Scope	**Accuracy:** Content is accurate **Relevance:** The information was relevant to learning how to zero a weapon **Content:** The content is up to date	No changes suggested.
Practice 1:	**Accuracy:** The content is accurate **Relevance:** The practice related to Step 1. It was relevant to zeroing a weapon. **Content:** Content is up to date	The learner should was able to control where the round impacts. The sight disappears when the user pushes zoom. Keep the sight up so that the learner can continue to see how it looks when shooting the M4 at the paper target. To make the course more engaging by adding a gun sound effect for each time the user clicks on the target to simulate a gun shot.
Practice Step 2	**Accuracy:** Content is accurate, but the slide design can prevent the learner to gain knowledge of the content. **Relevance:** Information is relevant to a soldier learning how to zero a weapon. **Content:** Content is up to date.	Make the technology portion more functional, will prevent confusion and the learner will be able to focus on the content. The practice causes frustration because slide design is confusing. When you click on an incorrect spot on the slide it says incorrect try again, but the slide does not change and it doesn't really allow you to try again. When you click on the correct spot, it says correct go to next slide, but there isn't another slide.

Practice Step 3	**Accuracy:** Content is accurate, but the slide design can prevent the learner to gain knowledge. **Relevance:** Information is relevant to a soldier learning how to zero a weapon **Content:** Content is up to date.	Make the technology more functional, so that the content can be understood.
Quiz:	**Accuracy:** Content is accurate, but there are typos on the quiz that needs to be fixed. **Relevance:**The quiz would be more relevant if it required the soldiers to perform what they have learned throughout the course. **Content:** Content is up to date	Eliminate the quiz. Create an interactive assessment that requires the learner to perform the task of zeroing an M4.

Table 4: Instructional Designer/Media SME

This table outlines the feedback that was received during the formative evaluation with the Media Subject Matter Expert & Instructional Designer.

Target	Information Gained	Suggestions/Recommendation
Video : Above and Beyond	**Content:** There was confusion on the use of the content. **Relevance:** The content information did not flow into the video. **Accuracy:** Content did not connect to the video	Include some introductory information on the OVERVIEW page. Then transition to the ABOVE AND BEYOND video. The purpose of the links on this page is also unclear.
Objectives:	**Content:** The objectives were unclear **Relevance:** The objectives are unclear. There should really only be 1 (maybe 2) terminal objectives. **Accuracy:**	The first objective should be the terminal, with the 2nd and 3rd as the enabling. The zeroing procedures should be an enabling objective for the 2nd items you have listed in the terminal objectives. These need to be clarified.

Zeroing Firing Preview	**Content:** Content is up to date **Relevance:** ` **Accuracy:** Context is missing from the video	Provide more introduction on the ZERO FIRING: PREVIEW page.
Fire Three Rounds And Locate The Center.	**Content:** The content is up to date. **Relevance:** The video was relevant to the learning objectives for zeroing a weapon. **Accuracy:** The content is accurate and discussed important information such as alignment.	Multimedia principles are violated by having text along with the video. Video Sizes are not consistent Adjust audio levels for all videos
Determine Shot Location	**Content:** The content is up to date. **Relevance:** The information was relevant for learning how to zero a weapon. **Accuracy:** The content was accurate.	Multimedia principles are violated by having text along with the video. Video Sizes are not consistent Adjust audio levels for all videos
Adjust The Scope	**Content:** The content is up to date **Relevance:** The information was relevant to learning how to zero a weapon **Accuracy:** Content is accurate	Multimedia principles are violated by having text along with the video. Video Sizes are not consistent Adjust audio levels for all videos
Practice 1:	**Content:** Content is up to date **Relevance:** The practice related to Step 1. It was relevant to zeroing a weapon. **Accuracy:** The content is accurate	Structure the unit content in a more effective manner. PRACTICE STEP 1 would be better placed below STEP 1 More clear directions are needed for the practice steps. Use less blurry/pixelated images for the practice steps Cite image sources

Practice Step 2	**Content:** Content is up to date.	Structure the unit content in a more effective manner.
	Relevance: Information is relevant to a soldier learning how to zero a weapon.	PRACTICE STEP 2 would be better placed below STEP 2
		Remove the "Move to next slide message"
	Accuracy: Content is accurate, but the slide design can prevent the learner to gain knowledge of the content.	More clear directions are needed for the practice steps.
		Use less blurry/pixelated images for the practice steps
		Cite image sources
Practice Step 3	**Content:** Content is up to date.	Structure the unit content in a more effective manner.
	Relevance: Information is relevant to a soldier learning how to zero a weapon	PRACTICE STEP 3 would be better placed below STEP 3
	Accuracy: Content is accurate, but the slide design can prevent the learner to gain knowledge.	Remove the "Move to next slide message"
		More clear directions are needed for the practice steps.
		Use less blurry/pixelated images for the practice steps
		Cite image sources
Quiz:	**Content:** Content is up to date	There needs to be more of a conclusion/wrap-up to the module
	Relevance: The quiz would be more relevant if it required the soldiers to perform what they have learned throughout the course.	
	Accuracy: Content is accurate, but there are typos on the quiz that needs to be fixed.	

Table 5: Beginning Level One-to-One

The following table outlines the feedback that was received during the formative evaluation with the beginning level One-to-One.

Target	Information Gained	Reviewer Suggestion
Usability:	The learner moved from module to module with ease. However, the learner had difficulty progressing through Practice Step 2. It would be slightly difficult to go forward with this step. The next button does not work properly for the user. In Practice Step 3, the slides did not progress easily for the user.	Fix Practice Step 2's next button to work properly. Fix Practice Step 3 so that the slides progress effectively.
Clarity:	Nearly each part of the module was very clear for the learner. However, the first video "Above and Beyond" was not clear on how it related to objectives for the learner.	Remove the "Above and Beyond" video to improve clarity.
Impact:	The module was mostly all impactful for the learner. He found the module to be helpful and interesting. One item which affected impact, where the learner was not engaged and appeared confused, was the "Above and Beyond" video. Additionally, he thought the images in the videos for Step 1, Step 2, and Step 3 were grainy and needed to be improved. He said he would be more engaged if the images were improved. Finally, the learner said Practice 1 would be better if it were more interactive and the user could control where the shots were fired.	Remove the "Above and Beyond" video to improve impact. Improve images for videos on Step 1, Step 2, Step 3. Customize Practice 1 so user can control where the shots are fired.
Feasibility:	The learner completed the course within 30 minutes and was easily able to connect with a laptop.	No suggestion

Attention:	The learner was able to focus on the content that was presented. The learner stated the videos, and interactive components of the course helped him to pay attention to the content.	No suggestion
Relevance:	The content of the module had some relevance to the learner. He thought this would be useful information should he choose to enter officer school after university.	No suggestion
Satisfaction:	The learner was mostly satisfied with the course apart from some small suggestions.	Make aforementioned changes.

Table 6: Beginning Level One-to-One

The following table outlines the feedback that was received during the formative evaluation with the beginning level One-to-One.

Target	Information Gained	Reviewer Suggestion
Usability:	The learner easily navigated through the web course using the previous, next and scroll buttons.	No suggestions
Clarity:	The learner was able to understand the content and felt that the purpose was very clear. She was a little confused on what to do on the practice 1 slide.	Provide clear instruction on how to use this slide.
Impact	The learner was engaged and felt that the course was beneficial because it is information that could be useful in the future.	No suggestions
Feasibility:	The learner completed the course in 40 minutes, but needed help on Practice 1. The learner scored a 100% on the quiz	Provide clear instructions on Practice 1 slide.
Attention:	The learner's attention was retained throughout the course. He was excited and motivated to learn the material.	No suggestion
Relevance:	The learner felt that the course was important because she has never fired a gun. She wants to be a member of the fire squad team and needs to know this information.	No suggestion

Satisfaction:	The learner was very satisfied with the course and wanted more information on the zeroing process.	No suggestions

Table 7: Advanced Level One-to-One

The following table outlines the feedback that was received during the formative evaluation with the advanced level One-to-One.

Target	Information Gained	Reviewer Suggestion
Usability:	The learner easily navigated through the webcourse using the navigation bar located at the side of the webpage. The learner struggled with completing Practice 2 and Practice 3 because he was not sure how to advance the slide.	Give more of an explanation of what to do in Practice 2 and Practice 3.
Clarity:	The learner was able to understand the content and did not need further clarification. He knew what to do on each page, how to navigate through the course and was able to answer questions about the content.	No suggestions
Impact	The learner seemed relaxed and confident while he completed the course. When asked, the learner stated that he felt the course added to his knowledge of knowing how to zero the M4. He stated that the information about positioning from the Zeroing Fire Preview was very helpful.	No suggestions
Feasibility:	It took the learner 1hour to complete the course. The learner struggled with Practice 2 and 3. However at the end of the course the learner was able to score 80% on the quiz.	Suggestion: Since the content focused on performing the steps of a procedure, the assessment should also require the learner to do something.
Attention:	The learner was interested in taking the course and fully attended to each page. He felt that the course would help him remember what he had learned in basic training.	No suggestions

Relevance:	The learner stated that the course was very relevant to his career in the military. The learner stated that it is important to learn how to zero a M4 because zeroing and proper positioning of the M4 increases accuracy.	No suggestions
Satisfaction:	The learner was satisfied with the course content, but felt that satisfaction would increase if the technology portion of the course had better graphics and was made to look more realistic	Make the graphics look more realistic so that they can be more engaging. On Practice Step 1 the learner should be able to control where the shots appear on the target.

V. Recommendations

Below is a list of the team's recommendations to be developed after carefully considering the results from the first two phases of the formal evaluation for Unit 2 Zeroing.

- Develop a more engaging video for the stimulus video.
- Change the objectives to state what type of target the soldiers will use for zeroing.
- Clarify the objectives of the lesson.
- Add a demonstration of the proper positioning for shooting the M4 Carbine to the Zeroing Fire Preview.
- Change the name of the video to Fire Three Rounds.
- Keep the sight up when zoom is pushed during Practice 1.
- Add gunshot sound effects to Practice 1.
- Develop an interactive assessment that requires the learner to perform the procedure.
- Improve the images that are used in the videos.

VI. Appendices

Appendix A. Specific Formative Evaluation Protocol 1: Carbine Rifle Expert Review (11 Bravo-Unite States Army Infantry)

<div align="center">

Formative Evaluation Protocol

</div>

Course: Unit 2 Zeroing

Facilitator: Mist Yancey

Evaluator: Channon Rothmiller

Date: April 7,2016

Targets:

- Goals and Objectives for Unit 2 Zeroing
- Instructional Content
- Instructional Sequence

Technique: Scenario and Questionnaire

Purpose: To evaluate each component of the instructional Unit 2 Zeroing. Evaluate the accuracy of the content, examine the attitude towards instruction, relevance of the instruction.   Review the alignment of the content to the goals and objectives of the lesson.

The Subject Matter Expert will use the questions below to evaluate every component of the course.

- Is the content accurate?
- Does the content meet the required objectives and outcomes for learning how to zero a weapon?
- Is the content up to date?
- Is the content relevant to the outcome of learning how to zero a weapon?
- Do you have any other comments or recommendations?

Procedures:

1. Identify the appropriate SME
2. Elicit participation from the SME
3. Conduct Expert Review
4. Make the necessary adjustments to instruction

Materials:

- Web based instructional unit
- Subject Matter Expert questions
- Instructional Analysis

Appendix B. Specific Formative Evaluation Protocols 2: Expert Review (Instructional Designer/Media Specialist)

<center>**Formative Evaluation Protocol**</center>

Course: Unit 2 Zeroing

Facilitator: Charlotte Jones, Mist Yancey, Kevin Freeman

Evaluator: Dr. Richard Hartshorne

Date: April 7, 2016

Targets:

- Goals and Objectives for Unit 2 Zeroing
- Instructional Content
- Instructional Sequence

Technique: Scenario and Questionnaire

Purpose: To evaluate each component of the instructional Unit 2 Zeroing. Evaluate the accuracy of the content, examine the attitude towards instruction, relevance of the instruction. Review the alignment of the content to the goals and objectives of the lesson.

The Subject Matter Expert will use the questions below to evaluate every component of the course.

- Is it clear how the learner is to interact with the site and content pages?
- Is the representation of media samples consistent (video size, video alignment, pixels of pictures?
- Are multimedia principles followed?
- Is there effective structure of the content?
- Do you have any other comments or recommendations?

Procedures:

1. Identify the appropriate SME
2. Elicit participation from the SME
3. Conduct Expert Review
4. Make the necessary adjustments to instruction

Materials:

- Web based instructional unit
- Subject Matter Expert questions
- Instructional Analysis

Appendix C. Specific Formative Evaluation Protocols 3: One-to-One

Formative Evaluation Protocol

Course: Unit 2 Zeroing

Facilitator: Charlotte Jones, Mist Yancey, Kevin Freeman

Evaluators: Logan Graves / Janna Bailey / Attus Stanfeld

Date: April 7,2016

Targets:

- Unit 2 Accessibility of system
- Clarity of instruction
- Impact on performance and attitudes
- Feasibility of completion

Technique: Think Aloud/ Observations

Purpose: To evaluate each component of the instructional Unit 2 Zeroing for clarity, feasibility and impact. The facilitator will observe the learner one-on-one and ask questions while the learner interacts with the content and icons.

Think aloud questions: The Facilitator should help participants think aloud by continually asking the following questions throughout their evaluation of the course.

- What do you think you need to know now?
- What do you think you have to do now?
- Do you have any comments or suggestions?

Questions:

Objectives

- Do you understand what you will be learning in the course?
- Do you understand why you will be learning it?
- Do these objectives seem important to you?

Zeroing Firing Preview

- Is it clear how to start the video?
- Does the video make sense?
- Is the video engaging?
- Do the preview questions get you to think about the topic?

Fire Three Rounds and Locate the Center

- Is the information presented clearly?
- Is the language used clear and easy to understand?
- Does the presentation of the information go too fast or slow?
- Did you feel the need to replay the video?
- Do you understand how the content of the video will help you reach the course objective?
- Would you feel confident continuing on, or would more information/a demonstration be helpful?
- How did you feel about the video?

Determine Shot Location

- Is the information presented clearly?
- Is the language used clear and easy to understand?
- Does the presentation of the information go too fast or slow?
- Did you feel the need to replay the video?
- Do you understand how the content of the video will help you reach the course objective?
- Would you feel confident continuing on, or would more information/a demonstration be helpful?
- How did you feel about the video?

Adjust the Scope

- Is the information presented clearly?
- Is the language used clear and easy to understand?
- Does the presentation of the information go too fast or slow?
- Did you feel the need to replay the video?
- Do you understand how the content of the video will help you reach the course objective?
- Would you feel confident continuing on, or would more information/a demonstration be helpful?
- How did you feel about the video?

Practice 1

- Is it clear what you need to do on this page?
- What is the purpose of this page?
- Do you feel confident to go to the next step, or would more practice be helpful?
- How do you think this page will help you reach the objectives of the course?
- How do you feel about component? (Is it engaging or boring?)
- What are your suggestions for improvement if any?

Practice 2

- Is it clear what you need to do on this page?
- What is the purpose of this page?
- Do you feel confident to go to the next step, or would more practice be helpful?
- How do you think this page will help you reach the objectives of the course?
- How do you feel about component? (Is it engaging or boring?)
- What are your suggestions for improvement if any?

Practice 3

- Is it clear what you need to do on this page?

18

- What is the purpose of this page?
- Do you feel confident to go to take a quiz on the whole procedure, or would more practice be helpful?
- How do you think this page will help you reach the objectives of the course?
- How do you feel about component? (Is it engaging or boring?)
- What are your suggestions for improvement if any?

Quiz

- Do you feel the questions on the quiz related to what you did in the practice steps and what you saw in steps 1-3?
- During the quiz, did you want to go back to any part of the course for review?
- Was it clear how to navigate through the quiz?
- Were there any confusing questions?
- Was the language and vocabulary on the quiz clear?

Learning Management System:

- Are you able to access the course without directions from the facilitator?
- Were there any sections of the course where you were unclear of what to do next?
- Did all slides and videos work for you? If not, please note the problems.

Overall Experience

- Did the course meet your expectations?
- Do you feel you would be able to go onto a firing range and zero your weapon after taking this course?

Please comment on your above answers or any way that the course could be improved:

Procedures:

1. Identify the appropriate target learner
2. Arrange participation of learner.
3. Inform learners of evaluation purpose and process
4. Sit with learner while he/she progresses through course
5. Make notes on learner's reactions and ask learner to comment/think aloud for each page of the course.
6. Ask interview questions after each component; note responses.
7. Make the necessary adjustments to instruction.

Materials:

- Web based instructional unit
- Observations and interview questions