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Summary

A “Risk Management” online training module will be developed for new managers at Modular Mining Systems, Inc. (MMSI) The self-paced, multimedia module will introduce them to basic safety principles and company procedures, with a short quiz at the end.

Introduction

All countries have safety legislation, so ensuring a safe work environment is both legally mandated as well as good business practice to keep employees fit for work. As new managers are often software engineers who have been promoted into the position, they are usually unaware of business systems, policies and processes. In 2012, workplace accidents almost doubled over the previous year, and a need for training was established. Therefore, it is important for managers in all of Modular’s global offices to be able to identify workplace health and safety issues and know how to prevent or control them.

The scope of the module will focus primarily on identifying safety issues and processes and applying those principles in different scenarios. The goal is that increased cognitive knowledge will result in behavioral changes and a safer work environment.

The audience for this online module will be new managers all over the world (probably with an age range of mid-30s to 50s). As software company employees, they are assumed to be computer-literate and able to navigate an e-learning module using the current Learning Management System (Moodle), and the courses will be translated into different languages for maximum reach.

Needs Assessment

The setting is MMSI and the target is all new managers in all offices worldwide.

In 2012, workplace accidents at MMSI almost doubled over the previous year. Based on an analysis of the types of accidents, two solutions were implemented – safety training and more PPEs (Personal Protective Equipment).

Additionally, a “safety gate” was created, meaning that if an employee had a preventable accident, their manager was liable and would not receive a bonus that year. Therefore, all managers are now responsible for knowing company safety policies and guidelines, and enforcing them among their staff.

Aside from legal compliance requirements, safety training has two main instructional goals – behavioral (i.e., using PPEs correctly, identifying and mitigating potential workplace hazards) and cognitive (i.e., knowing what the steps are to conduct a safety investigation). New managers need to have a good understanding of safety issues so that they can effectively share that knowledge with their staff and ensure compliance. Additionally, preventing workplace accidents means managers won’t lose their eligibility for a yearly bonus.

The current approach is instructor-led classroom training. Over time, attendance has been a problem, with people either registering and then not showing up, or leaving halfway through when a work issue comes up. One previous solution was to take the training off-site, so that managers couldn't easily leave and go back to work, but that wasn't effective. Another solution was to cut the training time in half, but that still did not improve attendance. Outsourcing training to a third party company was considered, but rejected for not being specific enough to MMSI's needs.

The proposed new approach and tools involve reorganizing the training into smaller chunks, creating quizzes in order to measure knowledge retention, and moving everything to Moodle.

Current resources to create this project are the Global HR team (the Subject Matter Experts), the Training Development team (which includes instructional designers and a video producer with video equipment and editing software), and tools such as Adobe Captivate to create e-learning material.

Reorganizing the training content and moving it online to Moodle would address many of the problems seen in the current training situation, with its costly and lengthy training times and spotty attendance. For example, managers could take specific training modules when they had time, and in smaller chunks. By adding a quiz, there would now be metrics for each person and proof that they had gone through the training and learned what was necessary.

The course content would be consistent for all students, with certainty that it was factually correct. It could also be translated for the regional offices (either through subtitles on the videos, or translations on the text-based screens).

Moving instruction to a flexible, self-paced online format would meet important training needs and result in higher completion rates with a lower cost-per-student and less “lost” work time, in addition to complying with legal requirements for safety training and improving workplace safety knowledge and practices.

Learner Analysis

A SWOT analysis of creating MMSI online risk management training:

Strengths

- Online training can be done in smaller chunks at managers' convenience rather than in day-long classroom sessions
- Training can be more engaging and interactive (online games, scenarios), rather than watching/listening to a presentation
- Instruction will have one consistent message delivered globally by the corporate office, rather than multiple instructors at multiple times
- Moodle can report metrics (via quizzes) to show what was learned
- Course content can be translated for regional offices, rather than relying on the language skills of the current team of instructors

Weaknesses

- Lacks a live instructor who can quickly answer questions and clarify issues
- Risk of greater distraction by other online activities (work e-mail, etc.)

Opportunities

- Workplace accidents will decrease, overall work environment will be safer with more people aware of safety policies and procedures
- Training can aid leadership development and create more successful managers (improve productivity, increase commitment to company, etc.)

Threats

- Learners are generally negative towards “required” training that does not seem immediately relevant to their daily work, and may not be fully engaged if it is seen as merely a box to tick off
- Managers without effective safety training will be less likely to take measures to prevent accidents among their staff, with consequences ranging from lost work time to possible fatalities
- Company liability for workplace accidents could be very costly

Learners: MMSI employees who are “new managers,” either through being hired externally and being new to the company entirely, or who are employees who have been promoted but never held a manager position before. They may have had safety training at previous jobs and know some general principles and best practices, but not necessarily specific to MMSI.

Age range: generally mid-30s to 50s

Gender: mostly male (MMSI, and software industry overall, is male-dominated)

Nationality: any (MMSI has several offices worldwide, and hires many international employees to work at its Tucson headquarters)

Background: well-educated, likely to have either M.S. in engineering, or MBA

Student strengths:

- Mature
- Computer-literate
- Likely to be familiar either with MMSI’s “online classroom” (Moodle LMS) through previous technical training, or with the idea of online learning in general

Student weaknesses:

- Resentment towards taking “required” course on “boring” topic if they feel there is more important work they could be doing.
- May hurry through or skip content, negatively impacting deeper learning

Areas of potential difficulty:

- Difficult to assess long-term knowledge retention
- Risk of disinterest in business processes and systems, if no previous experience with it and no immediate practical application seen

Context Analysis

Individual, self-paced training will be available asynchronously in MMSI’s Moodle LMS (the “online classroom”), using a variety of media (video, audio, text), activities and quizzes. Currently, translations into Spanish, Portuguese and Russian are planned for global accessibility.

Advantages:

- Employees allowed to do training during work hours on work computer
- Training available globally and year-round whenever a new manager starts the job and requires it
- Metrics recorded in LMS for proof of course completion

Limitations:

- Employees may struggle to complete training during work hours if not mandated at a particular day/time like other training
- Content will need to be broken up in chunks rather than presented in one instructor-led session (as previously done), so may not be as in-depth
- As content is mostly addressing cognitive skills with hope of behavioral change and improved safety culture company-wide, effects may not be immediately apparent, or may be lost if student does not fully integrate learning into everyday practice

Areas of potential difficulty:

- Enforcing module completion – HR will need to tie the module to employee performance objectives in HRIS system and link with yearly review/bonus
- Technical problems – different global offices have different Internet access speeds. Initial testing of sample e-learning with regional offices has shown occasional issues with Brightcove (video host) being down and browsers sometimes not displaying content correctly.
- Cost of translation has not yet been estimated (and possibly not accurately budgeted for)

Content Analysis

High-level understanding:

A manager:

- is responsible for employee safety
- is alert to safety issues, risks and hazards
- recognizes safety issues when they occur
- knows safety procedures and policies and where to find them
- takes correct actions

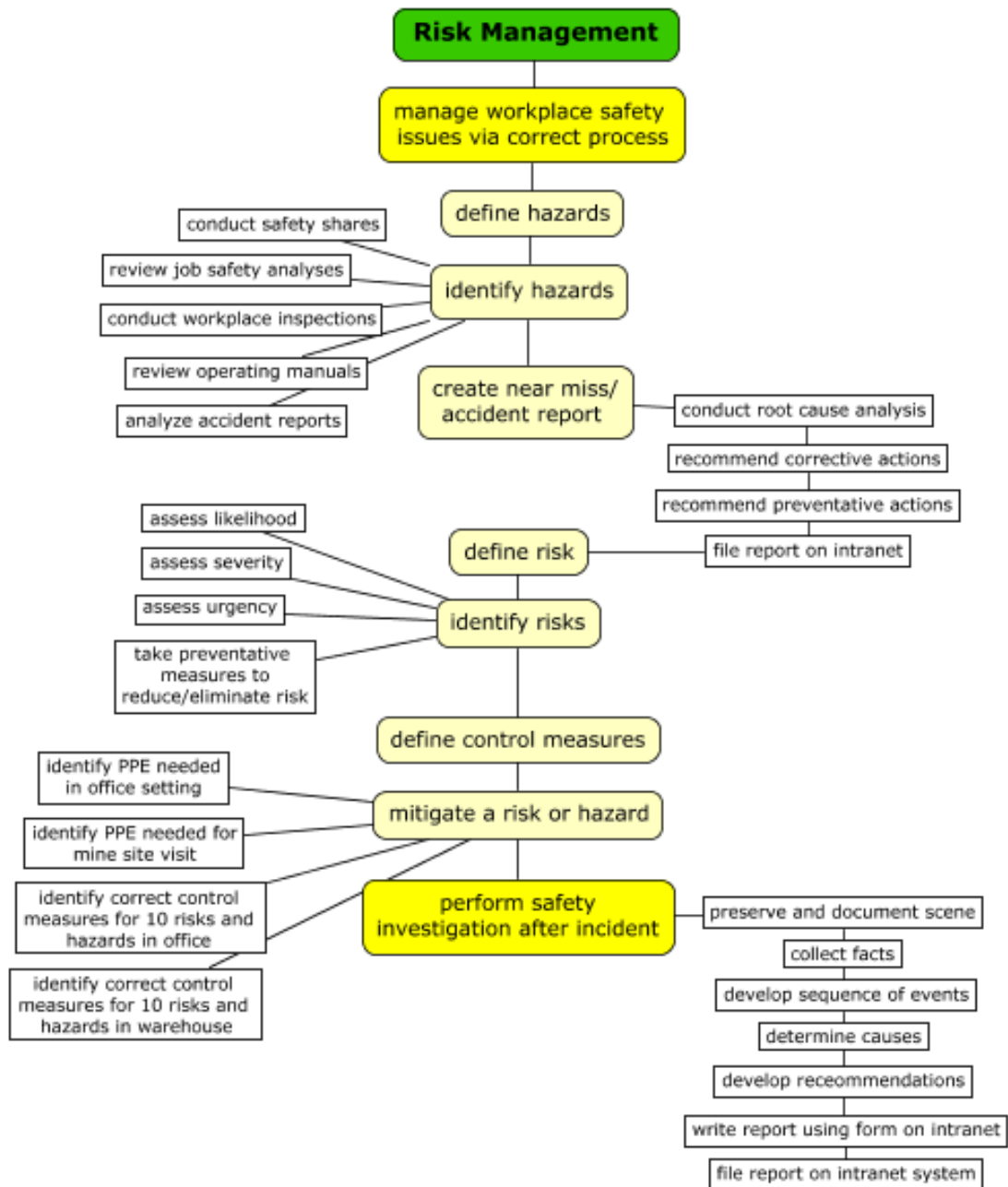
Content outline:

Risk Management

- Describe process to manage workplace health and safety risks
 - Identify hazards
 - Anything that has the potential to cause harm

- Examples of typical workplace hazards
 - Identify hazards
 - Safety shares
 - Workplace inspections
 - Job safety analysis
 - Operating manuals
 - Previous accident reports
 - Create near miss/accident report
 - Conduct root cause analysis
 - Recommend corrective actions
 - Recommend preventative actions
 - File report on internal Global Safety Page
 - Assess risk
 - Possibility of harm occurring
 - Consequences of not taking action
 - Examples of typical workplace risks
 - Identify risk
 - Likelihood
 - Severity
 - Urgency
 - Current control measures
 - Additional control measures
 - Control measures
 - How to mitigate a risk or hazard
 - Eliminate
 - Substitute
 - Isolate
 - Engineering controls
 - Administrative controls
 - Personal Protective Equipment (PPE)
 - PPE needed in office
 - PPE needed for mine site visit
 - Correct control measures for risks and hazards in office and warehouse
- Describe steps to perform a safety investigation after an incident
 - Preserve and document the scene
 - Collect the facts
 - Develop the sequence of events
 - Determine causes
 - Develop recommendations
 - Problem
 - Problem history
 - Manufacturer requirements
 - Effective solutions
 - Decision maker
 - Cost/benefit analysis
 - Write report
 - File report on internal Global Safety page

Task Analysis



Learning Objectives

1. Correctly recall the 3 key principles of risk management
(Goal: Describe process to manage workplace health and safety risks)
2. Correctly recall at least 3 ways a manager can identify a hazard
(Goal: Describe ways to identify hazards)
3. Correctly identify at least 3 questions to ask when assessing risk
(Goal: Describe ways to identify risks)
4. Correctly describe at least 3 ways to mitigate a risk or hazard
(Goal: Describe how to mitigate a risk or hazard)
5. Correctly identify control measures for risks and hazards in office
(Goal: Identify control measures for risks and hazards in office)
6. Correctly identify control measures for risks and hazards in warehouse
(Goal: Identify control measures for risks and hazards in warehouse)
7. Correctly identify PPE items needed for visiting a mine site
(Goal: Identify PPE needed for visiting a mine site)
8. Correctly identify PPE needed in the office
(Goal: Identify PPE needed in the office)
9. Correctly describe the steps to perform a safety investigation after an incident
(Goal: Describe steps to perform a safety investigation after an incident)

Assessment

Quiz Question/Answer
<p>1. What are the three key principles to risk management?</p> <p><i>Identify hazards, assess risk, control measures (can be shortened to “identify, assess, control”)</i></p>
<p>2. Name 3 ways you can identify a hazard.</p> <p><i>acceptable answers:</i></p> <ul style="list-style-type: none">• <i>safety shares during meetings</i>• <i>conduct workplace inspections</i>• <i>review job safety analysis</i>• <i>read operating manuals</i>• <i>analyze accident or near miss reports</i>
<p>3. Name three questions you should ask when assessing risk.</p> <p><i>acceptable answers:</i></p> <ul style="list-style-type: none">• <i>what is the likelihood of the hazard occurring?</i>• <i>How severe would the harm be?</i>• <i>Are there current control measures in place?</i>• <i>Are additional control measures required?</i>• <i>What is the urgency of taking action?</i>

4. What are three ways you can implement control measures?

acceptable answers:

- *eliminate the hazard*
- *substitute the hazard*
- *isolate the hazard*
- *set up administrative controls*
- *use personal protective equipment*

5. Based on principles you learned in the office safety game, how should cartons be moved and where should they be stored?

(correct answer checked)

- a) Lifting from the back, not the waist; within reach without requiring a stepladder
- b) Using a trolley and colleagues; in a designated storage area/room ✓
- c) Using a trolley; under tables and desks to avoid falling risk
- d) Stacked to prevent tipping; out of passageways

6. Based on principles you learned in the warehouse safety game, what could you do to prevent equipment operator accidents?

(correct answers checked)

- a) Clearly mark off areas with safety signs to prevent unauthorised entry ✓
- b) Make operators sound horns loudly so those wearing ear protection can hear them
- c) Mark out separate paths for workers and equipment operators ✓
- d) Post signs asking operators to be more careful when approaching certain areas

7. Which of the following PPE should an employee take with them on a mine site visit?

(correct answers checked)

- a) hard hat ✓
- b) safety glasses ✓
- c) ear protection ✓
- d) face visor
- e) breathing apparatus
- f) high visibility vest ✓
- g) gloves ✓
- h) steel-toed boots ✓

8. Using basic safety principles, what PPE do you think is most appropriate for an office environment?

(correct answer checked)

- a) polo shirt, belt, jeans and sandals
- b) small shirt, long pants, belt, hat, closed-toed shoes
- c) polo shirt, shorts, belt, socks, closed-toed shoes
- d) polo shirt, belt, long pants, closed-toed shoes ✓

9. When conducting an accident investigation, the first step is to:

Preserve and document the scene

10. While performing an accident investigation, you develop recommendations which can include:

(correct answer checked)

- a) interim measures
- b) long term controls
- c) policy changes
- d) procedural changes
- e) cultural changes in the company
- f) all of the above ✓

Instructional Plan

The “Risk Management for New Managers” module will be an online, self-paced multimedia module housed in MMSI’s LMS, Moodle. Learners will be able to access the material at any time from an Internet-enabled computer, and do the module repeatedly, in order to achieve the best final quiz score that is reported to Moodle.

The sequence will be the same as the “Content outline” on page 6, with content chunked in each “slide” (produced in Adobe Captivate). Most of the content will be short videos (2-4 minutes long) filmed and presented by MMSI’s HR specialist in Australia, and other will be text or simple graphic interactions. The slide sequence will look something like this, and be expected to take the learner about 30 minutes to complete.

1. Intro slide with title of module, instructions on navigation
2. Video: Overview of risk management and why it is important
3. Quiz (Q1)
4. Video: Identifying hazards
5. Quiz (Q2)
6. Video: Assessing risk
7. Quiz (Q3)
8. Video: Control Measures
9. Flash Game: Warehouse Safety (downloaded from Singapore Workplace Health & Safety Council website)
10. Quiz (Q5)
11. Flash Game: Office Safety (also from Singapore WHSC website)
12. Quiz (Q6)
13. Quiz (Q7) Graphic Interaction (“drag and drop” photos of PPE to correct place)
14. Quiz (Q8) Photos of different office clothing, choose which is most PPE-appropriate
15. Video: Describe steps to perform a safety investigation after an incident
16. Quiz (Q9 & Q10)

Some of Gagne’s 9 Principles are applied here. At the beginning “Gain Attention” is relevant, as MMSI employees are not used to doing workplace e-learning modules in this way. Their previous experience at MMSI would have been instructor-led training, or online training that is merely a set of links to wikis and a quiz, not a self-contained multimedia module. In the overview, the instructor will “Describe the goal” so that learners (new managers) know why they have to take this module, and what they will get out of it.

There is no assumed prior knowledge (Gagne’s 3rd step) of risk management, but ideally some “common sense” to draw on. Steps 4 and 5 (present the material and provide guidance) will mostly be contained in the videos, as the instructor will present, with added text emphasis layered on the image (similar to an in-person presenter with a PowerPoint).

Step 6, “Elicit performance practice” will be in the two games. Without having been introduced to specific safety scenarios during the instruction, the games will test whether the learner can apply general safety principles to new situations in environments they may not be completely familiar with. Each game has 10 small scenarios in which to make appropriate safety choices, and provides immediate feedback on the choice (step 7), so the learner absorbs and applies best practices simply through playing. The PPE “drag and drop” quiz question and choosing the correct office PPE from several photos will also elicit practice in a different way than simply a text question. We can also provide feedback after each quiz question, to let the learner know immediately what the right choice was, and why.

The accumulated quiz score (on 10 questions) is similar to step 8 (assess performance), although we will not necessarily be testing a particular performance, more just recall of principles. We will also not be doing step 9, enhance retention, other than that the learner will be able to go back and review any part of the module at any time.

Instructional Strategies

A multimedia e-learning approach was chosen so that learners could do the module on their own time, and have the information presented in smaller chunks and in different formats (compared to an instructor-led class). This is general e-learning best practice (better learner retention when information is presented in brief segments with immediate assessment) as well as convenient (if the learner gets interrupted and cannot complete the entire module at once, it is easy to return to where they left off). In the “Designing Effective Instruction” textbook, Morrison et al say “learners participating in self-paced learning programs work harder, learn more, and retain more of what is learned than do learners in conventional classes.” (2013, p. 209) Additionally, the “Segmenting principle” will allow the learners “time to process the information before clicking a button to proceed to the next idea.” (p. 238)

By interweaving short videos with other activities (quizzes, games, interactions) and forcing them to click through each slide, the learner’s attention will be more easily held for the duration of the module. Morrison et al say that allowing the learner to control the navigation and videos “is more effective than no control.” (p. 229) While the learner may be able to “skip” or fast-forwards through the video slides, they will be required to answer a quiz question before moving onto the next part of the instruction, and will only show module completion in the Moodle LMS (required by HR) after they have answered each of the 10 questions. This prevents the idea of “skipping the lectures and just taking the exam at the end” as much as possible.

In the videos, the HR Specialist will speak directly to camera in a conversational style, rather than “reading” a script. (“Personalization principle” and “Voice Principle,” p. 239) It will be a medium shot from waist up, against a white background, so as not to distract the learner with a “busy” background or the presenter looking elsewhere. (“Coherence principle,” p. 237) The video will be enhanced by adding bullet points or short phrases to reinforce key ideas but not cognitively overload the learner. (“Redundancy principle,” p. 237) Other images (such as screengrabs of MMSI’s intranet) will be used as needed, to break up the “talking head” video.

The two games were chosen because they provide realistic on-the-job safety scenarios, and are a good way of “learning on the go” as the student thinks through general safety principles that have just been presented and applies them to new situations. Additionally, each can be completed in only a few minutes, they provide immediate elaborated feedback on which was the best answer and why, and there is no steep learning curve or obvious potential frustration that would make the learner quit before finishing. (Morrison et al argue that immediate feedback is better for the “less experienced learner,” p. 232) With the games and the two graphic-based quiz questions, the learner will hopefully have had a mental “break” from direct instruction and be ready for the final video, which is procedural information.

Essentially, the overall “strategy” is to provide small chunks of information, in a variety of media (video, text and interactions), and to make it easy for the learner to review information and ensure a good final quiz score.

Reference

Morrison, G. R., Ross, S. M., Kalman, H. K., and Kemp, J. E., (2013). *Designing effective instruction* (7th Ed.). Hoboken, NJ: John Wiley & Sons.