Optimization of the Glacier National Park OSHA Training Program

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Abstract

Every year, Glacier National Park staff complete an OSHA safety training course. In the summer of 2020, due to COVID-19 complications, a one-hour video was remotely distributed instead of the typical four-hour OSHA training session. The team set out to improve viewer engagement and information retention with this video through the implementation of various presentation techniques. The team recommended techniques that would have the greatest impact. The team's suggestions can be used to improve future presentations, and activities in which information retention is important.

Acknowledgements

We would like to thank Tara Carolin and the Crown of the Continent Research Center for allowing us the opportunity to complete this project in conjunction with Glacier National Park.

Several individuals were extremely helpful to us in providing context and information about employee life at Glacier National Park. We are especially grateful for their aid despite the remote nature of our project. COVID-19 has caused many difficulties in the completion of this project, and we could not have done it without you:

- Sarah Moody
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We would like to thank the Glacier employees who were receptive to the uniquely critical nature of our project, and everyone who provided such kind feedback on our presentation. Finally, we would like to thank our advisors, Professors Fred Looft and Frederick Bianchi, for their continued support and guidance despite the challenging circumstances presented by COVID-19. For more information on this project, contact Prof. Frederick Bianchi at bianchi@wpi.edu.

Executive Summary

1. Introduction

Glacier National Park (GNP) received over three million visitors in 2019 (Yogerst, 2019), mostly during the summer months. The park hires approximately 350 summer seasonal staff members (T. Carolin, personal communication, April 9, 2020). All seasonal staff, new and returning, must complete a multi-day orientation program familiarizing them with the park and its operation. During this orientation, they attend a lengthy Occupational Safety and Health Administration (OSHA) training session.

Due to the COVID-19 pandemic, the 2020 OSHA training was modified from a four-hour presentation to a one-hour video format. The goal of this project was to analyze the shortened OSHA training program and recommend improvements that could optimize viewer information retention and engagement in this video and all other park presentations.

2. Background

The NPS' OSHA program aims to maximize the safety and health of park employees by addressing five park-specific objectives:

1. Create a healthy work environment
2. Decrease the frequency of accidents at the park
3. Promote the education of health and safety
4. Protect visitors from known hazards in NPS facilities
5. Protect NPS private property from accidental damage

To achieve these objectives, all National Park employees must complete "annual safety training, OSHA training, HAZMAT/Hazwopper [sic], and a long list of training annually," (McLane, 2020). The National Park's management is given a degree of freedom in how they implement the standards. This year 2020, a one-hour long video was made to achieve this end.

In many educational settings, presenters use video presentations to supplement traditional instruction. At GNP, an OSHA based training and educational video was used in place of traditional classroom instruction, so it was critically important that the video was implemented well. It was indicated to the team by the sponsors at Glacier National Park that the video presentation needed improvement to enhance the information retained by the staff about OSHA safety guidelines. To achieve the desired improvement, the team researched and employed cognitive load theory[1] as applied to the GNP OSHA training video.

Cognitive load theory is an essential consideration in the development of educational content. Video producers must consider the cognitive load of their work and how to best optimize this load (Brame, 2015). The theory suggests that information flows from sensory to working to long-term memory with bottlenecks existing between each. Alleviating these bottlenecks consists of limiting extraneous or unimportant information. Extraneous information is a cognitive load that is unhelpful for

[1] *Cognitive load theory is the theory that the memory has multiple components, each with different applications and constraints (Brame, 2015).*

the viewer to learn (Brame, 2015). Video producers, as much as any educator, must minimize extraneous load when presenting material.

Evidence shows that certain strategies greatly improved viewer engagement. Techniques like weeding, signaling, segmenting, and matching modality are valuable tools for lightening the extraneous cognitive load on a viewer. A conversational speaking tempo, higher quality audio and visuals, and thumbnail video of the speaker's face, among other techniques, all have also been shown to improve viewer engagement

3. Methodology

The goal of this project was to evaluate and recommend ways to improve the Occupational Safety and Health Administration (OSHA) training program delivered by GNP. The team analyzed strategies to promote higher levels of retention and engagement in media presentation, applied those techniques to conduct an analysis of the OSHA training materials, and made informed recommendations on how to improve the GNP OSHA training program. Specific objectives to achieve our goal, along with the methods used for each objective, are detailed below.

It was necessary to find a balance between effectively communicating park management expectations and safety protocol, while keeping that training timely and engaging. The team compiled research on the best ways to present information in a presentation format, then made informed suggestions to improve the provided OSHA content.

The team worked through the OSHA training video in its entirety and compiled a list of issues into a table that included the specific timestamps of the issue, a description of it, and a suggestion for improvement. These revisions were collected chronologically and color-coded by importance.

To supplement the revisions to the existing OSHA content, the team also developed infographics designed with media presentation best practices in mind. The topics were chosen as they stood out as distinct topics in the presentation that were important to the employees at the park. They also serve to provide a template for how to develop further infographics in a similar style.

4. Results

The results and suggestions formed from the analysis of the 2020 OSHA training video were made with the intent of improving information retention and engagement with the video. The same suggestions are, however, applicable to many other forms of presentation that the training may take in future years. The most important of the team's suggestions revolve around cognitive load, namely the techniques of weeding, signaling, segmenting, and matching modality. Other suggestions are centered around increasing the production quality of the OSHA training video and increasing viewer interactivity.

The process of weeding is simple. It consists of trimming down on extraneous information in the slides and lectures. In the case of the OSHA training video provided by GNP, weeding their video consisted mostly of making suggestions for reducing the amount of text on the slide. There were several instances where the content itself seemed irrelevant. Some of the most noticeable instances of extraneous text and information were described in detail, as well as suggestions for how to properly use the process of weeding to improve the slide.

Sometimes, all of the information shown is necessary, in which case it is not extraneous, and weeding should not be used. In this case, signaling is the next best strategy to use. Denoting importance through visual cues directs the attention of the viewer to the more important pieces of information. Decluttering slides with symbols and using color to guide the viewer's understanding would greatly benefit the OSHA training video. By using signaling, it becomes less important for the presenter to vocally indicate what requires the viewer's attention. With proper signaling, the viewer's attention is drawn to specific areas. Furthermore, signaling can be used to convey basic ideas and reduces the need for extraneous text or discussion.

Segmenting could be implemented into the OSHA training presentation by dividing the directions of the presentation into distinct subtopics, ideally keeping each five to six minutes in length. The process of grouping smaller pieces of information into larger units is a natural method of information processing used by the brain (Mayer and Moreno, 2003). Additionally, by separating these topics or allowing the viewer to continue to the next section when they are ready, the structure and relationship between topics are reinforced. This extra time allows the information to be committed to memory and helps viewers learn by managing their cognitive load (Brame, 2015).

Matching modality, the practice of using visual representations of information that complements information that is being verbally presented, is the final presentation strategy to be used to optimize cognitive load. The effective use of matching modality is important, especially due to the video-based medium of presentation, and there are multiple instances throughout the OSHA training video where it is not used optimally. During the video, there were instances where what the presenter is saying does not match what is being shown on the screen. This can create a situation where the viewer struggles to both read and listen effectively, resulting in poor retention of information.

5. Recommendations

Implement cognitive load theory when crafting future presentations

To best improve the presentation through the lens of cognitive load theory, the team recommends focusing on matching modality. There are many instances of misaligned text and speech during the video presentation. Next, focus on weeding out unimportant information and signaling important information to the viewers. This will reduce the extraneous cognitive load by trimming down text on the screen and guiding the viewer's understanding of the content. Finally, implement segmenting more. Currently, the video is well segmented, but some information is nebulous and without a clear section heading.

Increase video production quality through software or hardware

To improve the general production value of the video, an open-source (free) video editing software could be used. This software would provide a suite of tools that would help control the outcome of the video more precisely. The speakers could also invest in an inexpensive USB microphone. Most third-party desktop microphones can filter out most background noise. A small improvement such as this would benefit some sections of the video immensely.

Incorporate more instances of interactivity with surveys or quizzes

In the case that the presentation is given in video form, as it was this year, then the viewer interactivity is built into the video player itself. Viewers can stop the video, review information, and replay sections at will. If these presentations migrate to a live platform, whether in-person or otherwise, then providing interactivity of the same degree would be unrealistic. Instead, the team recommends using the brief period between segmented sections of the video to provide an opportunity for the viewers to pose questions. Moreover, an improved exit survey that is more detailed than the current one-page Google Form could both gather meaningful feedback from the viewers or briefly test them on their retention of the material just presented.

Implement improved infographics that utilize elements of cognitive load theory

The team put together several infographics and graphs based on the information provided in the video to supplement the presentation. These infographics encapsulate certain sections of the OSHA training video into visually engaging handouts, or visually represent statistics in a more digestible way. The team recommends offering them as handouts during the OSHA training or posting them in areas where the information on the handout is applicable. Each of these infographics was made with cognitive research in mind. The use of color is deliberate, in line with the practice of signaling described earlier. Any extraneous information is stripped from these infographics. They can be presented in tandem with verbal presentation, following the rules of matching modality.

Utilize the video format for future presentations to optimize the efficiency of orientation

Despite the challenges that the staff faced when producing the OSHA training video, there is a lot of potential in this format. Despite being a quarter of the length of the original OSHA training session, the OSHA training video is evidence that a significant portion of the orientation can be completed by the new staff prior to arrival in Glacier. The team recommends that GNP consider implementing pre-arrival presentations such as the OSHA training video in future seasons, and potentially expanding into other topics. With these recommendations, a concise OSHA training video can be developed and effectively free up four hours of onboarding time for seasonal staff each season.

6. Conclusions and Future Developments

The recommendations made in this report were intended to improve not only the OSHA training video, but all subsequent presentation material that the park decides to present remotely or in video format. Implementing the team's recommendations will increase viewer engagement throughout these presentations, resulting in better retention of the material.

Authorship

Each section was typically delegated to a single person to draft. For example, Liam Benjamin drafted sections 2.1, 2.2, and 2.3, while Ezekiel Andreassen drafted section 2.4 and all subsequent subsections.

Generally, the writing process was as follows:

Team members would meet and delegate sections of the paper to write individually. These sections would be written either within the team meeting and discussed when finished, or for longer sections, prepared prior to the next team meeting.

The editing process was entirely collaborative: when the team met, they worked through each section sentence by sentence. The result is that each of these sections had the collective input of the entire group. When struck with inspiration, editing was done alone by Nathaniel Meyer, Liam Benjamin, Lydia Masse, or Ezekiel Andreassen. They then brought the edits back to the group in the next team meeting and spoke about them extensively, so every member contributed equally, even in those cases.

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1. Introduction

Glacier National Park (GNP), one of the most unique landscapes in North America, received over three million visitors in 2019 (Yogerst, 2019). Nearly all of these visitors came between June and September with the rest of the year experiencing relatively low numbers of visitors. Although there are permanent staff employed at the park, the significant influx of visitors during the summer months would be overwhelming to the permanent staff as they only make up a portion of the workforce at GNP. To aid the permanent park staff with increased visitation, the park hires approximately 350 summer seasonal staff members (T. Carolin, personal communication, April 9, 2020). Some of these employees return yearly, while others are new to the position, but all of these seasonal staff employees undergo a multi-day orientation program that familiarizes them with the park and its operation.

A significant portion of the seasonal staff orientation program is safety training. The Occupational Safety and Health Administration, known as "OSHA," provides the regulations for safety training, while the permanent staff oversees the enforcement of safety training to protect the occupational safety of these seasonal workers and the permanent staff at the park.

The OSHA training during the 2020 season was changed as a result of the COVID-19 pandemic. Specifically, the training was reduced from about four hours down to a one-hour long video spanning a variety of topics (V. Rigdon, personal communication, September 17, 2020). Management at GNP has identified a goal to improve the employees' engagement with the OSHA safety training as a means of increasing retention of the information. The safety of the employees and the visitors at the park depends on how well the employees remember and adhere to these standards.

The goal of the project is to analyze the current OSHA training program and offer potential improvements that could reach this end. The remainder of this proposal outlines OSHA as a regulatory agency, the OSHA training program at GNP, and best practices for information presentation. After these topics are explored, it outlines a number of miscellaneous recommendations that would improve the program as a whole.

2. Background

This section provides a literature review detailing the research and topics that help inform the reader about material throughout the rest of the report. The background describes the general definition and purpose of OSHA training, then explains the specific details of Glacier National Park and its modified orientation program to give context to the OSHA training. Following that, practices and systems for orientation and training, designed to foster engagement in video presentation, are discussed.

2.1 OSHA and the national parks

The Occupational Safety and Health Administration (OSHA) was established through the Occupational Safety and Health Act in 1970, with the stated purpose of "[ensuring] safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education and assistance," (Department of Labor, 2020). The OSHA-distributed *Training Requirements in OSHA Standards* provides a detailed breakdown of the training requirements of each industry under its jurisdiction, from maritime work to construction. This document is meant only as guidance to OSHA officers in different fields, and "creates no new legal obligations" (Occupational Safety and Health Administration, 2015).

Subpart H, titled "Training" of the Federal Employee Programs, loosely describes the training protocols under OSHA, and the work of the National Parks falls under Federal Employee Programs. The applicable section of this subpart covers the training of supervisors, who are, in the words of OSHA, responsible "for providing and maintaining safe and healthful working conditions for employees," and are required to be trained on a number of different topics (Occupational Safety and Health Administration, 2015). These topics include section 19 of the Occupational Safety and Health Act, and Executive Order 12196, both of which address the liaison between the program in question and the federal government and the respective regulatory agencies (2015).

The Director's Order #50B is a comprehensive view of how the NPS implements OSHA policies and specific employee safety and health-related activities to be conducted within National Park Service worksites. It outlines the responsibilities of various staff and professional positions in the hierarchical structure of the NPS, from the Director of the NPS to the individual employees at the park.

The NPS' OSHA program aims to maximize the safety and health of park employees by addressing five park specific objectives:

1. create a healthy work environment
2. decrease the frequency of accidents at the park
3. promote the education of health and safety
4. protect visitors from known hazards in NPS facilities
5. protect NPS private property from accidental damage

To achieve these objectives, all National Park employees are required to complete "annual safety training, OSHA training, HAZMAT/Hazwopper [sic], and a long list of training annually," (McLane, 2020). The National Park management is given a certain degree of freedom in how they implement the standards.

The implementation of these standards is outlined in Director's Order #50B, published by the National Park Service. Director's Order #50B explains the specific responsibilities and requirements of the National Parks as they relate to the Occupational Safety and Health of their employees. Figure 1 describes these requirements.

National Park Service Program Requirements
Establish and maintain a staff of safety and health professionals in the Washington and Regional Offices and at major operating units, as well as appropriate collateral- duty personnel at all other sites, to advise management in the development and implementation of an effective safety and health program.
Require that no employee be subjected to restraint, interference, coercion, discrimination or reprisal for filing a report of an alleged unsafe or unhealthful working condition, or otherwise participating in the program.
Provide employees the supervision, knowledge, skills and abilities necessary to perform their assigned tasks in a safe manner.
Train employees and supervisors to recognize unsafe and unhealthful work practices and conditions, take appropriate corrective actions and know and follow safety work rules and procedures.
Evaluate the safety and health performance of every NPS manager, supervisor and employee, making it a critical element of their job duties and responsibilities.
Incorporate and enforce appropriate safety and health performance clauses in contracts, licenses and permits with concessionaires and contractors.
Acquire only those items which meet established national consensus and/or General Services Administration approved safety and health standards.

Figure 1: National Park Service Program Requirements https://www.nps.gov/policy/RM50Bsection1.pdf (National Park Service, 2008, p. 3)

2.2 Glacier National Park

Established by President Taft in 1910, Glacier National Park is the United States' 10th national park. It spans over a million acres and is home to one of the most sprawling and intact ecosystems in North America. GNP is named for the titanic glaciers that carved out its landscape over thousands of years. Although the last few titular glaciers are projected to melt away in the next couple of decades, the park continues to draw larger crowds year after year from all over the world, especially during May through early September (Glacier National Park, 2020).

Since its creation in 1910, Glacier National Park has hosted over 110 million visitors and has received more than one million visitors each year since the 1960s. In 2019, the park hosted over three million visitors (see figure 2), nearly three quarters of which arrived during June, July, and August, as illustrated in figure 3 (Glacier National Park, 2020).

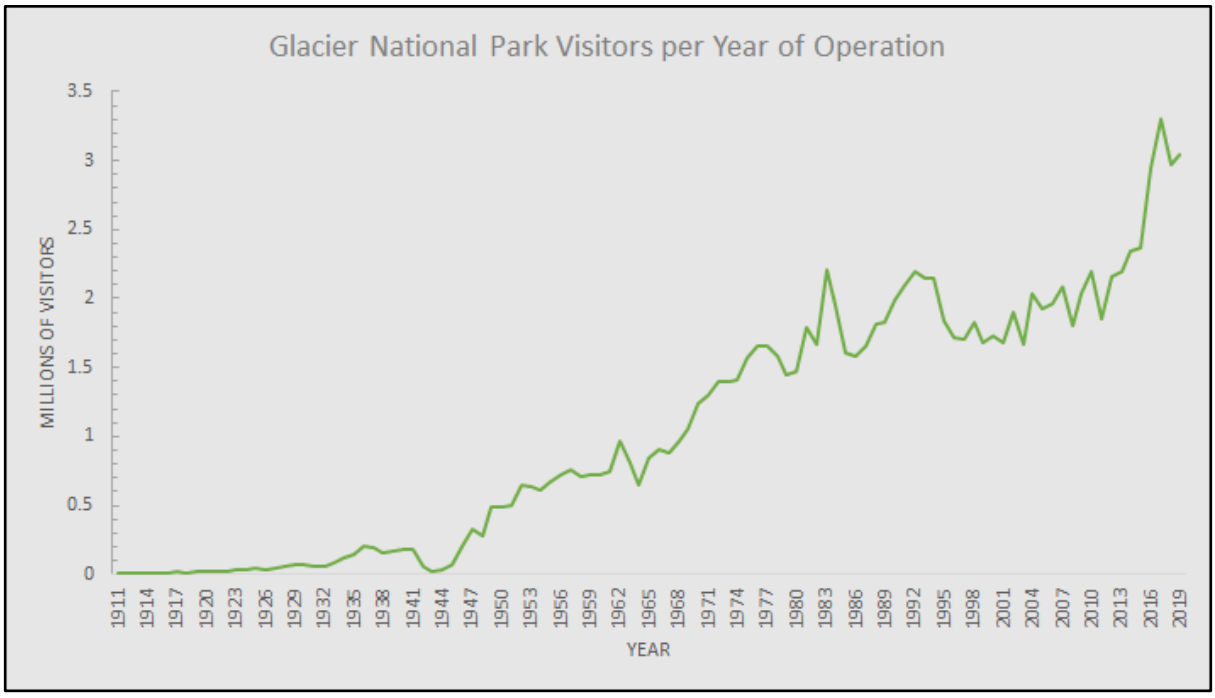


Figure 2: A graph showing the upward trend of yearly visitors to Glacier. Data retrieved from irma.nps.gov.

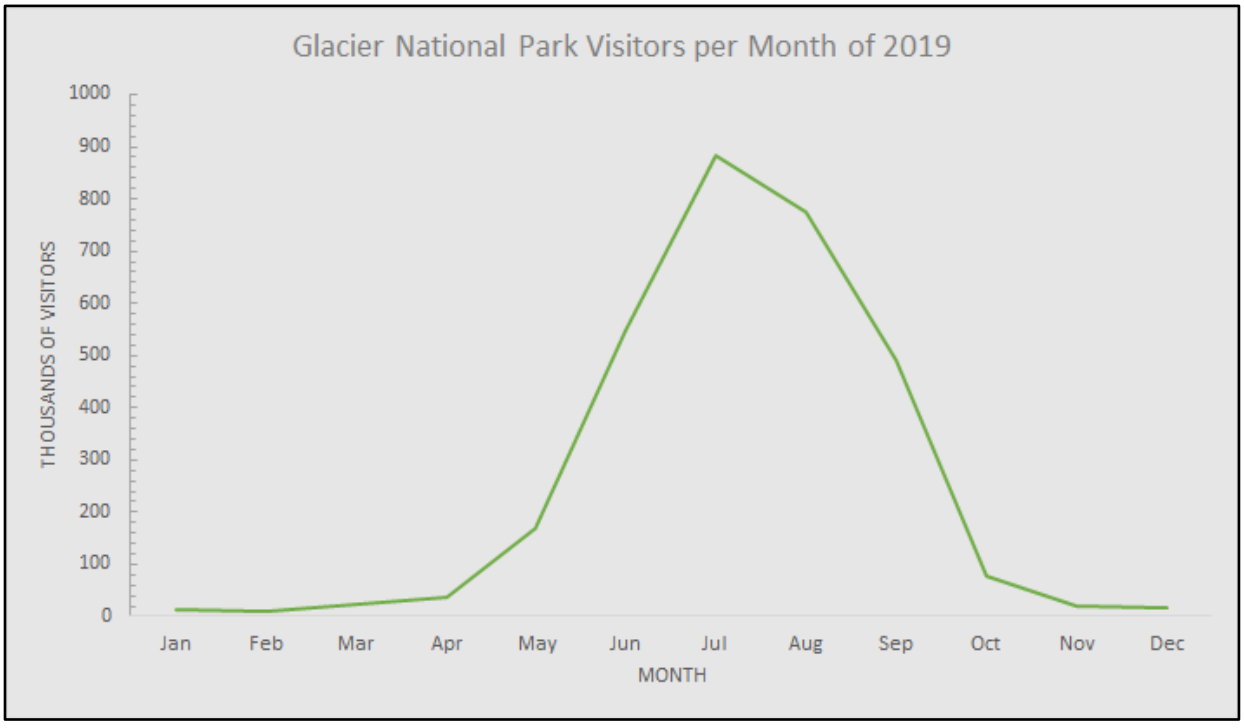


Figure 3: A graph showing the increase in visitors through the summer months.

To aid the permanent park staff during the period of increased visitation, the park service hires approximately 350 summer seasonal staff employees (T. Carolin, personal communication, April 9, 2020). Seasonal staff are hired for a number of different positions, including interpreters, rangers,

maintenance, administration, management, concessions, and other employment (T. Carolin, personal communication, April 9, 2020).

It is important to note that due to the COVID pandemic and accompanying park closures, visitation was nearly halved in 2020. In July alone, total recreational visitation fell 48% relative to July 2019 (Glacier National Park, 2020). Although the 2020 decrease in visitation does not affect the assertion that the general trend of visitation has increased over the years, it is important to the context of this project, especially in regard to orientation and OSHA training.

2.3 The current orientation program at GNP

In a typical year at GNP, recruitment for the seasonal staff begins in December by advertising for open seasonal staff positions. Approximately 350 seasonal employees are hired by early March (T. Carolin, personal communication, April 9, 2020). Seasonal employees then begin arriving in groups depending on their specific responsibilities every Monday, beginning in late March. Their official orientation begins upon arrival and continues over the course of several days.

The orientation program includes initial onboarding and the orientation presentation. Onboarding takes place first, where new seasonal staff sign employment-related paperwork and check-in with their respective supervisors. The orientation presentation comes second and serves to generate enthusiasm for the new season and introduce the park and its facilities to new seasonal staff. Following the orientation presentation, seasonal staff are required to attend other presentations on environmental responsibilities and radio use. Figures 4A and 4B outline the specific schedule followed during the orientation program insofar as onboarding and the orientation presentation are concerned. These figures present the orientation process chronologically, starting with cybersecurity training and electronically signed paperwork which happens before arrival to GNP. At the completion of onboarding and orientation, the OSHA training portion of orientation begins, followed by a lunch break and some final group meetings and announcements.

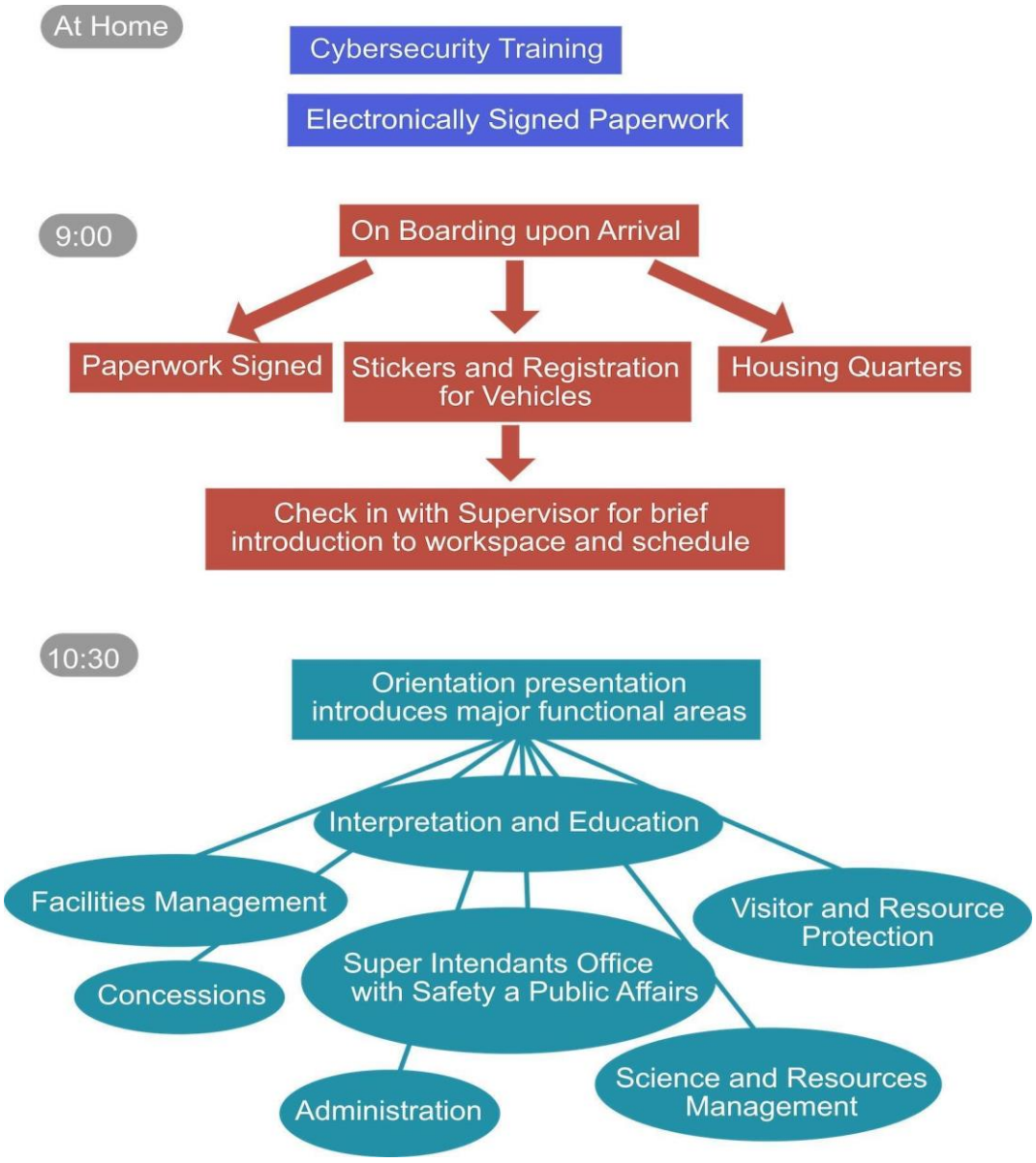


Figure 4: Schedule of events new seasonal staff members follow.

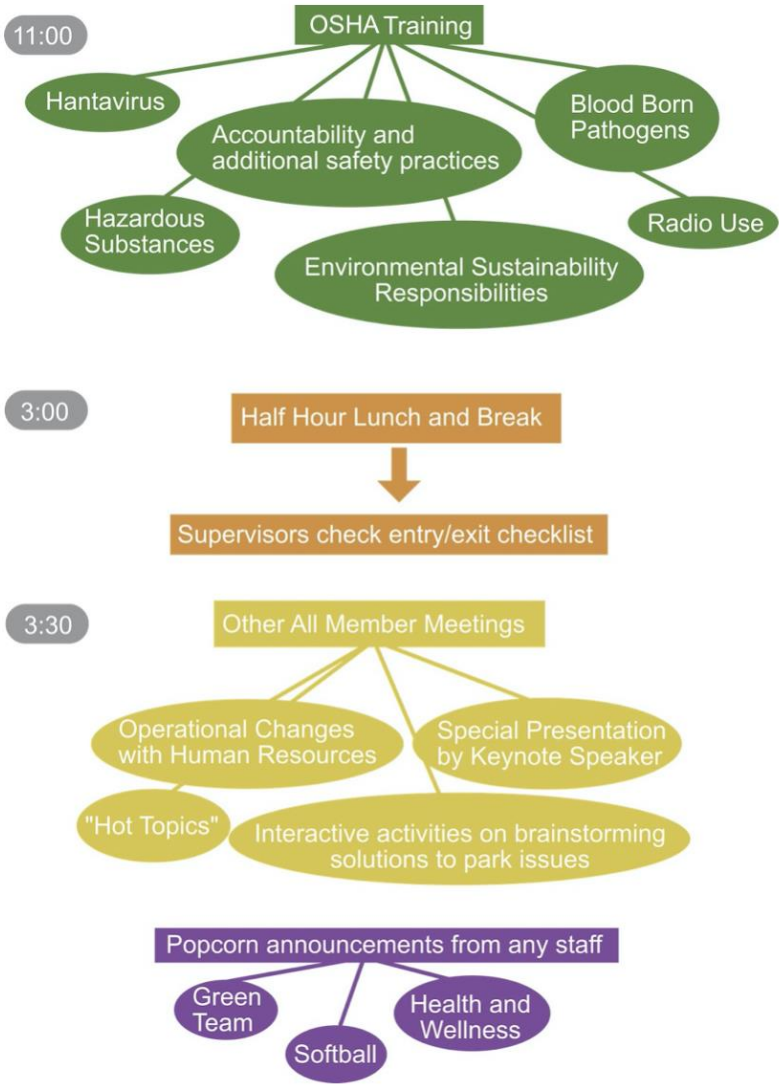


Figure 5: Schedule of events new seasonal staff members follow, continued.

At the conclusion of training, new seasonal staff meet with their supervisors to get settled in their work areas. An online driver safety course is also required to be completed by all employees every three years. At the time of job-specific training, new seasonal staff members sharing the same occupation meet. Finally, there are occasional meetings with all of the park employees to discuss and explain updates on the park (T. Carolin, personal communication, April 9, 2020).

It is important to note that the schedule presented above did not apply to the seasonal staff during the summer of 2020. The OSHA training is usually a four hour in-person PowerPoint presentation given by members of the management staff at GNP. The typical presentation contains embedded videos to highlight specific topics in addition to presenting PowerPoint slides accompanied by brief narration from the presenter. Due to the COVID-19 pandemic the OSHA safety training was administered in the form of an hour-long prerecorded video during the 2020 season. This video was in the form of a PowerPoint

presentation with narration along with embedded videos. The presentation was similar in style to a typical year but shortened to fit into an hour-long time slot.

2.4 Educational videos

Video presentations have proven to be a highly effective educational approach, but effective implementation is challenging (Lloyd & Robertson, 2012). Video producers must consider the cognitive load, noncognitive elements that impact engagement, and features that promote active learning (Brame, 2015). These elements are the building blocks for the development of an effective educational video.

2.4.1 Cognitive load

Cognitive load is an essential consideration in the development of educational content (Brame, 2015). Cognitive load theory suggests information flows from sensory to working to long-term memory with bottlenecks existing between each (Figure 5). The goal is to encode presented material into long-term memory that can be recalled back into working memory during the execution of a job-related task. To do this, information flow into sensory memory must be optimized. Any learning experience has three components: intrinsic, germane, and extraneous load. Intrinsic load is inherent to the information being presented and lies in how interconnected it is. Germane load is the level of cognitive activity necessary to reach the desired learning outcome. Extraneous information is a cognitive load that is unhelpful for the viewer to learn (Brame, 2015). Video producers, as much as any educator, must minimize extraneous load and maximize intrinsic load when presenting material.

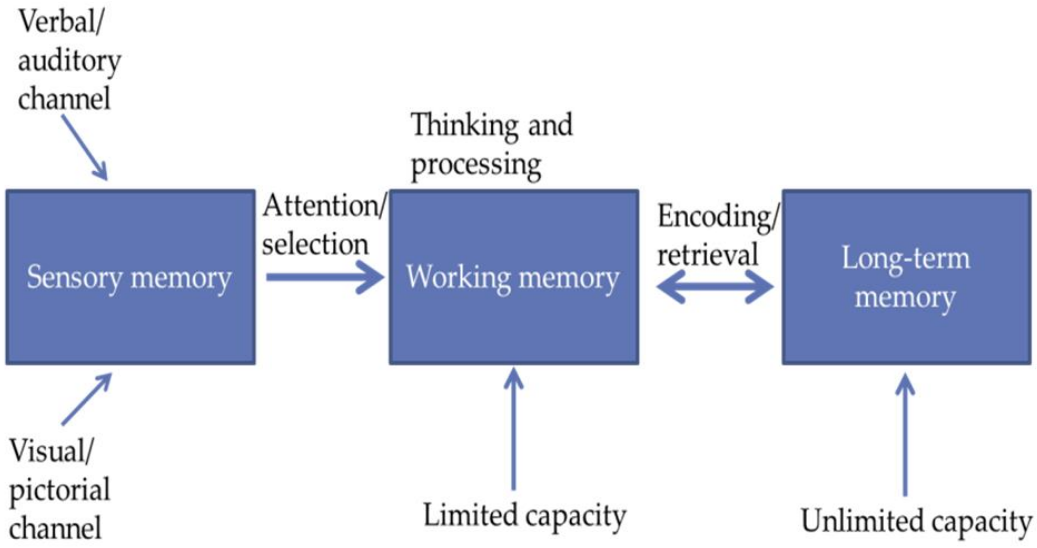


Figure 6: Cognitive Load Theory, based on the work of Mayer and Moreno (Brame, 2015).

Mayer & Moreno (2003) developed the cognitive theory of multimedia learning building on the premise of cognitive load. They proposed that viewers have separate capacities on their visual and verbal input (Mayer & Moreno, 2003). Working memory capacity is maximized by using both channels without overwhelming them with high cognitive load (Brame, 2015). Therefore, meaningful education via video

requires cognitive processing that includes absorbing material while actively processing and storing it for later applications.

2.4.2 Information presentation

The concepts of weeding, signaling, segmenting, and matching modality have been developed to optimize video with cognitive load theory explicitly in mind (Brame, 2015).

Weeding is the elimination of all extraneous information from the video. This may include examples, music, complex backgrounds, or extra features within an animation that may require the viewer to determine which information is important. Weeding may also require the presenter to frame information differently depending on the experience level of the audience. Information that may be extraneous for a novice viewer may keep an expert viewer at germane load, while contextual information essential for novice learners is a distraction for experts. Therefore, the goal of the video must be clear so that the content does not overload working memory (Brame, 2015).

Signaling is the use of visual cues to highlight key information and how the information is interconnected. Signaling directs the learner's attention and reduces extraneous load (Mayer & Moreno, 2003).

Segmenting reinforces the information's structure by providing linearity to the information being presented by asking guiding questions or introducing strategically placed pauses (Brame, 2015). This linearity may serve to emphasize a cause and effect relationship or to relate one topic to another. It prevents related topics from being perceived as independent and makes clear distinctions between topics that are unrelated.

Matching modality is making sure information being presented uses both the verbal and visual channels appropriately. Printed text and animations/images may overload the visual channel and overload working memory. A lone talking head will waste the visual channel as the viewer just watches the speaker. Khan Academy tutorials provide sketches to illustrate the verbal explanation. Using both verbal and visual channels in tandem increases the viewer's retention and ability to transfer information (Mayer & Moreno, 2003).

2.4.3 Viewer engagement

Researchers analyzed nearly seven million video watching sessions across four Massive Open Online Courses (MOOC), and the conclusions were significant. Regardless of a video's length, the viewers' median engagement for a video was six minutes (Guo, 2014). However, empirical evidence revealed certain strategies greatly improved viewer engagement. For example, lectures operate differently compared to their video counterparts; filmed lectures do not function well when not explicitly intended for video. Lectures that are supplemented with drawings and annotations from the instructor are more engaging than animations, like slideshows, with voice overs. Videos using informal settings and a conversational tone are more engaging than their professionally produced counterparts. Enthusiastic and fast-talking speakers were more engaging to viewers. Videos with occasional inclusion of a thumbnail video of the speaker as they present are better than not having any speaker visible (Guo, 2014).

2.5 Effective presentation of information through media

The medium of teaching through a voiced-over PowerPoint presentation as used in the 2020 season has a direct impact on how the staff members engage with, retain, and learn the necessary information. In reviewing previous studies on the effect of mediums in presentation, one group of researchers found that in 21 out of 26 separate studies on the topic, students preferred PowerPoint presentations to traditional lecturing methods (Moulton, 2017). In "Does a presentation's medium affect its message? PowerPoint, Prezi, and oral presentations," researchers led two experiments to compare the benefits of each presenting method. Prezi presentations are developed through an online presentation-creating tool that focuses on engaging viewers through transforming between slides in 3D space. The group determined that Prezi presentations were preferred and found to be more persuasive by participants. This may be because "Prezi may confer an advantage over traditional tools such as PowerPoint that do not encourage such visuospatial integration…digital objects (or groups of objects) are not just arranged in space, they are arranged or connected in a way makes their interrelationships explicit," (Moulton, 2017).

3. Methodology

The goal of this project was to evaluate and recommend ways to improve the Occupational Safety and Health Administration (OSHA) training program delivered by GNP. Due to the modified format of the training as a result of the COVID-19 pandemic, special consideration was given to improve information retention and staff engagement within a video presentation medium. The team analyzed strategies to promote higher levels of retention and engagement in media presentation, compared it to the provided training materials, and made informed recommendations on how to improve the GNP OSHA training program. Specific objectives to achieve our goal, along with the methods used for each objective, are detailed below.

3.1 Analyze best practices for media presentation in GNP's OSHA training program, and recommend informed revisions

It was necessary to find a balance between effectively communicating park management expectations and safety protocol and keeping the training timely and engaging. The team compiled research on the best ways to present information in a presentation format, and then made informed suggestions to improve the provided OSHA content.

Developing a comprehensive understanding of the OSHA training program was integral to formulating meaningful suggestions and revisions. For the summer of 2020, the program was delivered in an atypical format due to the COVID-19 pandemic. Specifically, a pre-recorded PowerPoint presentation containing embedded videos was sent out to the staff for them to watch on their own prior to arriving at the park. Improvement of the training requires knowledge of the details of the training and comparing it with other information such as accident reports and official OSHA publications and guidelines. It is important to be mindful of the possibility that previous year's programs, although little is known about them at this time, may have had aspects that were either detrimental to or aided their efficacy. As such, consideration was given to not only improving the program as it currently stands, but to potentially including characteristics of both the current and past programs. Also, important to note were the restrictions put in place by OSHA as a regulatory administration. Certain aspects, such as the content that is delivered, cannot be changed and must remain in accordance with OSHA.

3.1.1 Minute-by-Minute annotations in the OSHA training video

While revising the training video was important, special care was taken to preserve the essential OSHA content. However, offering revisions for the format and delivery of the training program was a more fruitful endeavor. The rigidity of OSHA standards meant that not much content was missed in the presentation, but how that information is presented is more open to revisions. Using the recommended best practices for remote or in-person information delivery, a series of recommendations was compiled.

To present these revisions, the team compiled a table that included specific timestamps, with a detailed description of the opportunity for improvement observed, as well as a suggested revision. These revisions were collected chronologically, but it was determined that the most helpful way to present these

revisions would be ranked in order of importance. This would allow the park to implement select revisions at their discretion. The most pressing suggestions will be discussed in further detail in this paper.

3.1.2 Provide engaging infographics for select OSHA topics

To supplement the revisions to the existing OSHA content, the team also developed infographics designed with media presentation best practices in mind. Infographics were made for the following topics: HAZMAT/HAZCOM, hazardous attitudes, and bats and rabies, as well as a graphical representation of bloodborne pathogen statistics. These were chosen as they stood out as distinct topics in the presentation that were important to the employees at the park and would provide a template for how to develop further infographics in a similar style.

4. Results

This section presents the results from the team's research and analysis of the OSHA training video. It provides an in-depth breakdown of the most prevalent examples of where cognitive load theory should be implemented to improve the presentation for each of the four techniques that the team identified.

4.1 Video suggestions

The team made minute by minute suggestions of the OSHA training video. The revisions are ordered chronologically in a spreadsheet located in Appendix B and are color-coded to denote their level of importance. Red-labeled timestamps are issues that should receive the most attention and would have the greatest effect on the quality of the presentation and OSHA training. Orange timestamps are slightly less pressing but would still substantially improve the video, and yellow timestamps are minor and should only be addressed should time permit. Appendix B contains a full list of timestamps, issues, and suggestions for how to resolve them.

Timestamp	Failure in Category	Issue	Suggestion
0:00	Viewer Retention	Disembodied voice	Research supports that seeing a speaker improves engagement
0:00	Viewer Retention	Talking too slow	Speed up. Playing back the video at 1.5 speed is an improvement and increases viewer retention.
1:24	Weeding	Relays information only pertinent to those reading the presentation	Take note of your audience, as explained in the report
2:06	Weeding	Text heavy	The assertion evidence approach (make a clear claim, support with graphics rather than text, and walk through it comprehensively) would go a long way with reducing text per slide. Any time a slide has many words like this, consider this approach. Reading slides word for word loses the viewers' attention.
2:45	Viewer Retention	Anecdotes/stories improve the experience.	Spread these anecdotes throughout the presentation in relevant sections

Figure 7: A segment of the timestamp table

The video is unique to the summer of 2020 and was used as a replacement for the typical three to four-hour OSHA training segment of orientation. These revisions, however, will still prove useful to future orientation training. Whatever form the OSHA training segment of orientation takes in future years, it would benefit from implementing these suggestions for engaging presentation styles and methods.

All of these revisions were made with Cognitive Load Theory in mind. The four central concepts that the team focused on when making these revisions were:

- Weeding
- Signaling
- Segmenting
- Matching Modality

These provide the most fruitful revisions to the video and can be implemented with relative ease.

4.1.1 Weeding

The process of weeding consists of trimming down as much extraneous information in the slides or lecture as possible. In the case of the OSHA training video provided by GNP, weeding their video consisted mostly of making suggestions for reducing the amount of text on each slide. There were several instances, however, where the content also seemed irrelevant. Some of the most noticeable instances of extraneous text and information are displayed below, as well as suggestions to properly use the process of weeding to improve the slide.

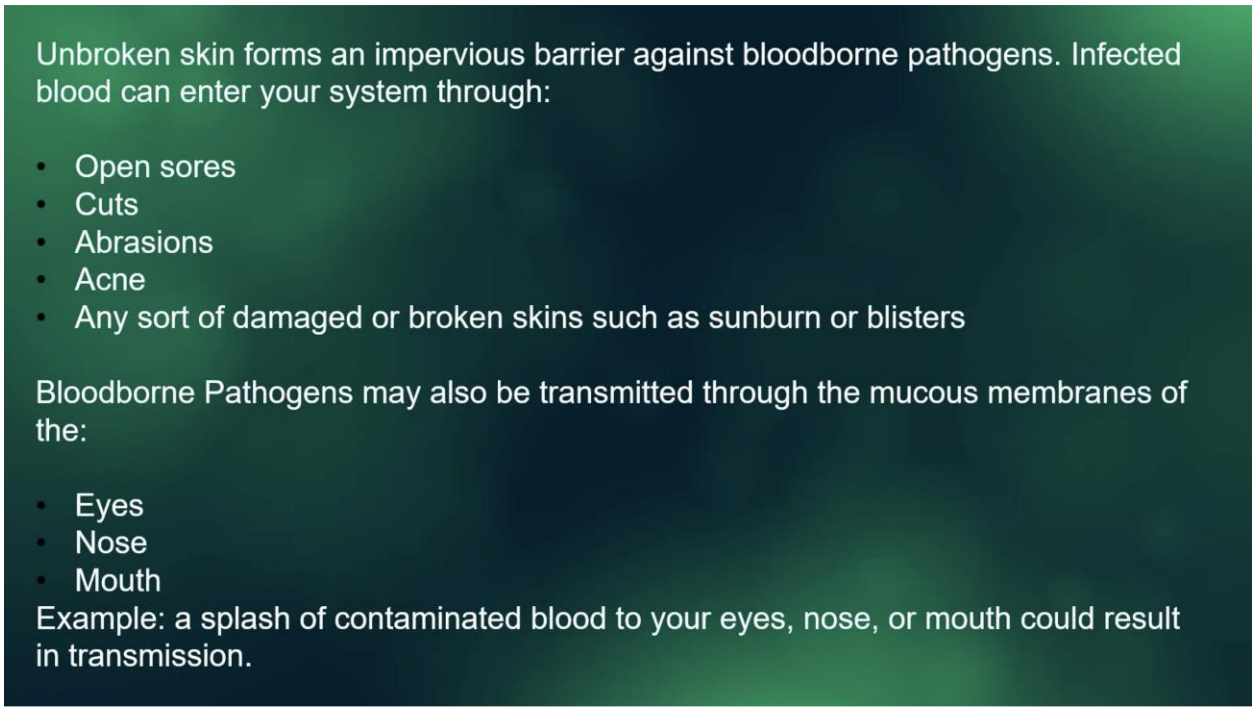


Figure 8: Slide describing the transfer of bloodborne pathogens (40:45).

The text on the slide is a distraction from the content being shared by the speaker's voice, i.e., the audio channel. The long lines of text at the top and middle of the page could be consolidated into short titles, such as “Unbroken Skin” and “Mucous Membranes”, if the purpose of the slide is defined as methods of transfer for bloodborne pathogens. Furthermore, many of the points are redundant, and weeding would effectively eliminate many of them. For example, the fifth bullet describes “any sort of

damaged or broken skins" which, by definition, includes all the bullets before it. By collecting those into a single point, then elaborating through the audio channel, the speaker can effectively convey the information without cluttering the visual channel, i.e., what the learner is observing on the slide, with extraneous information and incidental processing.

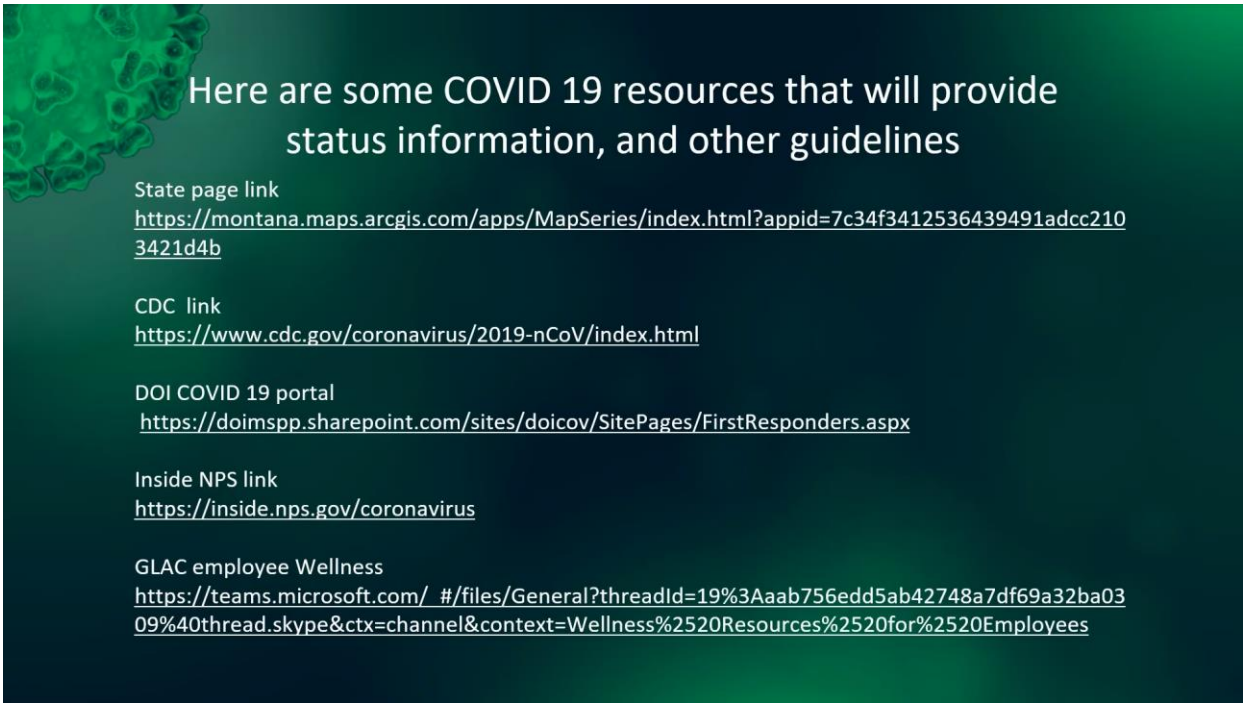


Figure 9: A slide displaying links to COVID-19 resources.

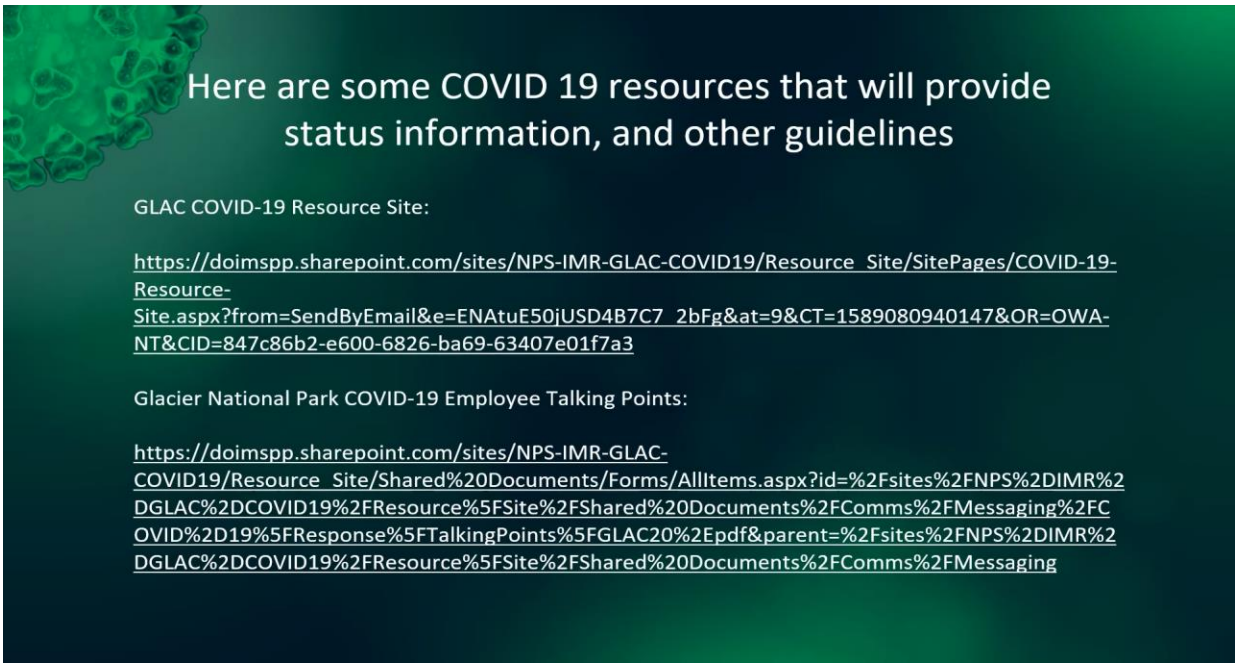


Figure 10: A second slide displaying links to COVID-19 resources, none of which are easily followable links (37:31)

When presenting information in the form of a slideshow or video, the learner does not have the ability to easily click a URL to travel to the website. A long URL is unnecessary text on the slide that the viewer has to process and type character by character into their device, which is completely unrealistic considering the lengths of some of the URLs, especially those in figure 8. This is only true if this presentation is given in the form of a video only; if they have access to the PowerPoint file, they could conceivably open it, scroll to the relevant slide, and click through. Even so, this is an unnecessary number of steps.

In any case, a much cleaner and less cluttered way of doing this is to provide a QR code, a visual code that when scanned by most smart devices will bring the user right to the intended site. A quick explanation of how the QR code works would suffice for the viewers who are unfamiliar with the concept, and then QR codes can be used for all subsequent URLs in the presentation.

Figure 11: QR code for https://www.cdc.gov/coronavirus/2019-nCoV/index.html

This is an example of a QR code that, when scanned, brings the user to the CDC website for information regarding the COVID-19 virus.

Even if each of the links on the slide in figure 8 were converted to QR codes, and the process of scanning a QR code was adequately explained to anyone unfamiliar in the audience, there are still too many links on this slide. The result is a confusing clutter of codes that distract from the intention of the slide. The process of weeding would remove several of the websites, leaving only the most critical links that could potentially lead to pages that would provide further information, and maybe even links to the other websites displayed here.

If the safety staff decides that they do not wish to pursue the use of QR codes, they could instead put long URLs into tinyurl.com, a site that significantly shortens unwieldy URLs into less cluttered ones. Having these on the slide in place of what is currently there would significantly reduce clutter and incidental processing by the viewer. It is important to note that tinyURLs are not immediately obvious about what site they lead to, so the URL would need to be adequately labeled. For example, https://tinyurl.com/yxhtlqud leads to the OSHA training YouTube video, but that is not immediately clear

from the URL itself. For the purposes of the video and for presentations, the QR code is still better, as viewers can quickly navigate to the page with their phones, but in digitally distributed material, like important memos through email, the tinyURL is a good option.

Sometimes, weeding out all the extraneous information is unrealistic. If it was imperative that each one of those websites was displayed here, then in order to reduce cognitive load, the presenter would have to resort to signaling.

4.1.2 Signaling

The process of signaling involves visual cues to convey ideas and direct the viewer's attention to specific areas. This can be applied to figure 7 and figure 8, given that the URLs are essential to the slide and cannot be removed. Denoting importance through vocal cues or imagery would direct the attention of the viewer to the more important links. If the most important link was the GLAC employee wellness page, then a red box around that QR code would indicate to the viewer that it should be given special attention. Furthermore, the speaker could signal in their speech, by using phrases like "the most important of these URLs is…" or "take special note of the QR code for the GLAC employee wellness page."

One section of the video (timestamps 4:22-5:27) attempts to describe a probability-consequence relationship using a two-axis graph, shown in figure 10. At first glance it appears to be a plot for a line graph or scatter plot, but this is not the case.

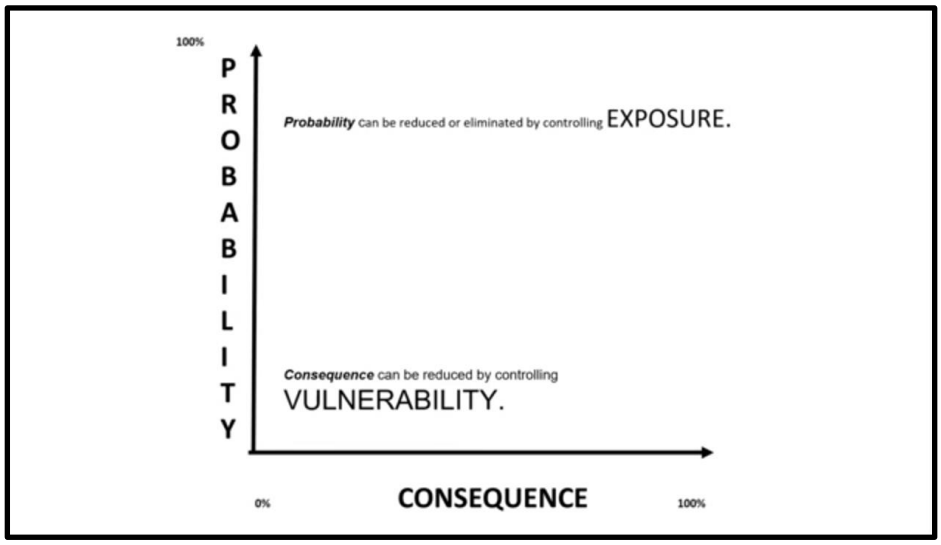


Figure 12: Graphic shown at 4:22 in the OSHA training video, showing a probability-consequence relationship.

The video fails to adequately describe this relationship in a meaningful way. This is partially due to the unintuitive graphic (figure 10), and partially due to the minimal discussion given to the topic. After some further research, the idea that the graphic is attempting to demonstrate is a two-factor analysis of risk. A risk with a high probability of occurring but an extremely low consequence might be worth ignoring. Likewise, a risk with an extremely low probability of occurring but a very high consequence

can probably be ignored in the same way. This is entirely the prerogative of the safety officials at the park but is generally acceptable amongst occupational safety professionals.

In general, the goal should be to minimize both probability and consequence for any risk factor in the workplace. If low consequence and low probability points were plotted on the graph, they would represent risk factors that require less attention and resources than high probability and high consequence points. A better graphic would signal this balance using colors and would cut out the unnecessary text in the middle of the graph. This use of colors qualifies as signaling. Certain colors elicit innate understandings. Green indicates "safe", "go", or "good." Likewise, red indicates "danger", "stop", or "bad." It is fair to assume that the average viewer would make these connections, and thus this use of colors would be an excellent instance of signaling to illustrate the concept.

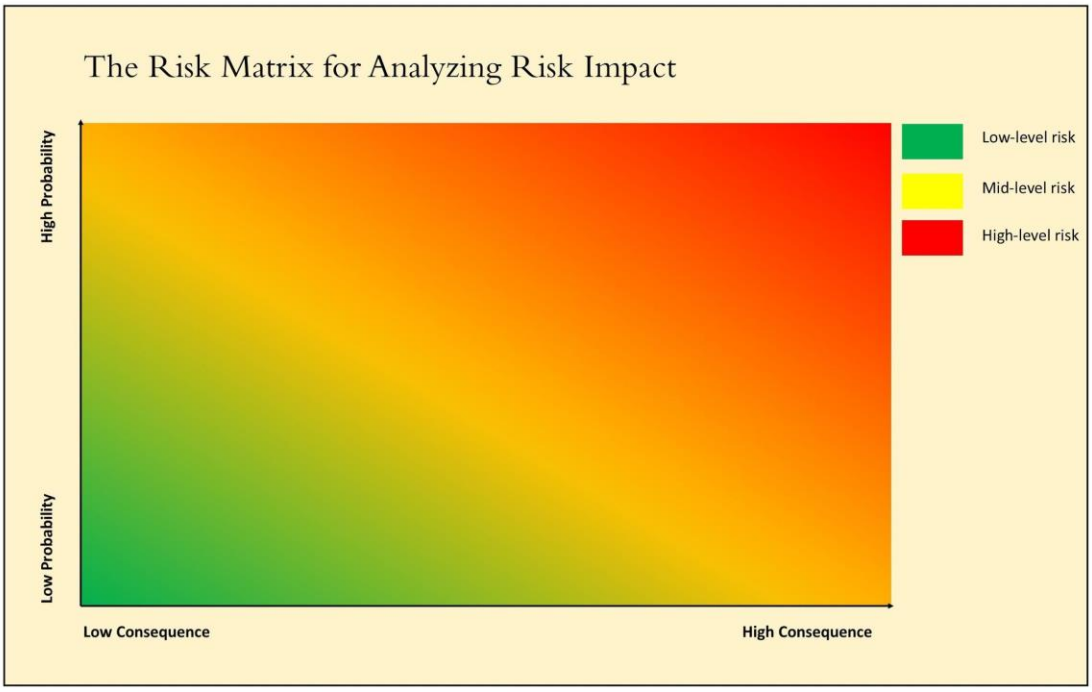


Figure 13: A graphic made to replace the figure 12 graphic

This iteration of the graphic (figure 11) clearly indicates that as both consequence and probability increase, the risk impact is higher. Specific risks can be plotted on the graph as needed to perform a quick risk analysis. Further iterations of this graphic could quantify both consequence and probability in a way that would make for more concrete analysis. In any case, the simplest and most evident improvement was to color-code the risks to better illustrate the purpose of the risk matrix.

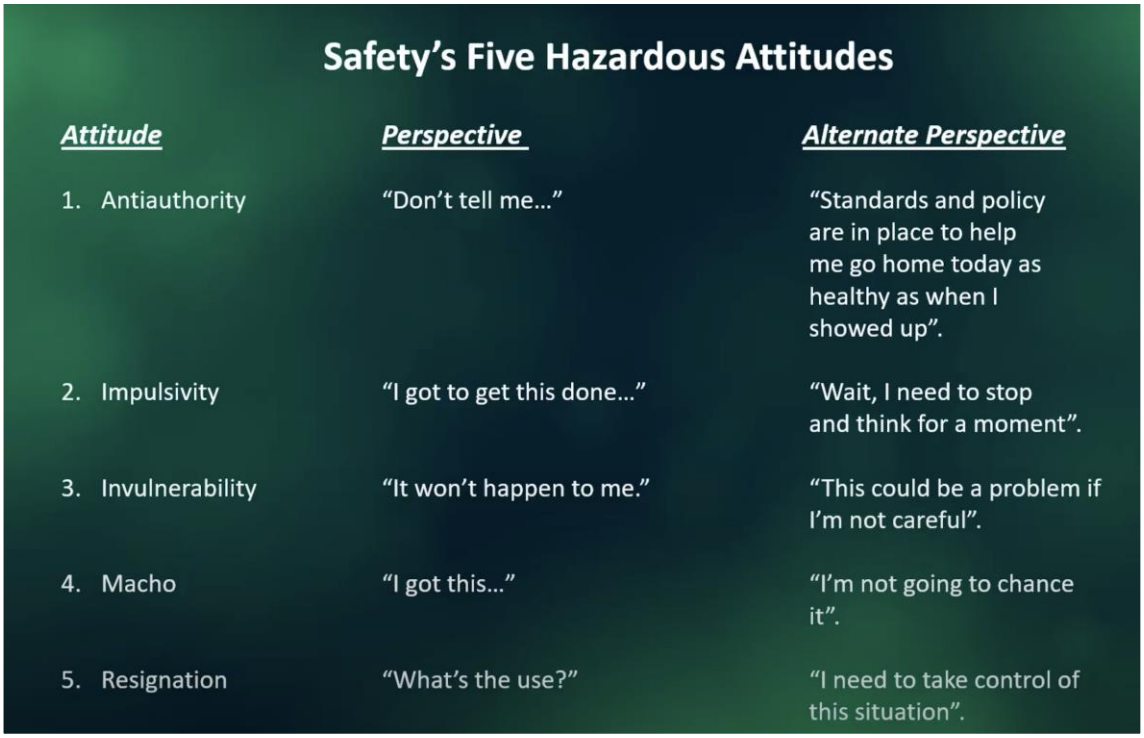


Figure 14: Opportunity for better use of signaling (5:59)

A similar method can be implemented in the hazardous attitudes section of the presentation. The original slide (figure 12), though consisting of valuable information and relatively clean in its organization, could be improved even further with signaling. The text itself can be overwhelming at first glance, so using symbols that adequately represent each perspective would be valuable. Then, any reference to these attitudes in the future, if the presentation chooses to expand upon them, can be accompanied with the symbol established here. Signaling is about building these associations to aid in the retention of certain topics. Furthermore, the same use of the colors green and red can indicate to the viewer the nature of each perspective at first glance (figure 13).

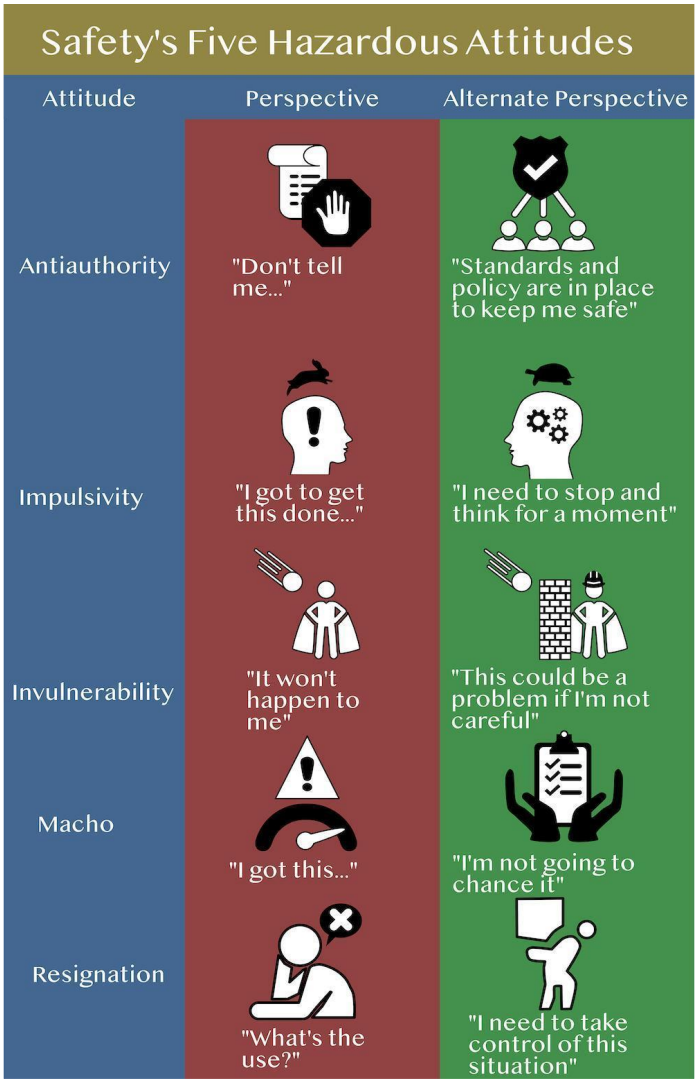


Figure 15: Example graphic for hazardous attitudes, making use of color signaling.

In this case, the red signals a harmful attitude, while the green signals an improved revision of that harmful attitude.

4.1.3 Segmenting

Segmenting could be implemented into the OSHA training presentation by dividing the sections of the presentation into distinct subtopics, ideally five to six minutes in length (Guo, Kim, & Rubin 2014). The process of grouping smaller pieces of information into larger units is a natural method of information processing used by the brain. Additionally, by separating these topics or allowing the viewer to continue to the next section when they are ready, the structure and relationship between topics is reinforced. This extra time allows the information to sink in and helps viewers learn by managing their cognitive load (Mayer & Moreno, 2003).

Figure 14 below contains ten proposed topics taken from the OSHA video broken into four to eight minutes in length to be segmented. Allowing time between these topics offers an opportunity to ask

the viewer a set of questions to reflect on the material learned or, if the presentation is given in person, those watching could ask questions during this time. Integrating these techniques would improve engagement between the presenters and viewers and increase memory retention of the skills and information presented during the OSHA training session.

Time	Section
0:00	Intro To Safety
7:00	GNP's position relative to Occupational Safety and Health
14:00	Bats and Rabies
18:45	HAZCOM
26:50	SDS
32:20	COVID
39:05	Bloodborne Pathogens
46:00	PPE and Handwashing
54:00	Hepatitis B Vaccine and Exposure Incidents
59:00	Questions and Survey

Figure 16: Topics from the OSHA video that provide opportunity for segmenting.

4.1.4 Matching modality

Matching modality, the practice of complementing verbally conveyed topics with visual representations of those topics is the final presentation tactic used to optimize cognitive load. The effective use of matching modality is important especially due to the video-based medium of presentation. There are multiple instances throughout the OSHA training video where it is not used optimally. Often during the video there were instances where what the presenter is saying does not match what is being shown on the screen. This can create a situation where the viewer struggles to both read and listen effectively, resulting in poor retention of the information.

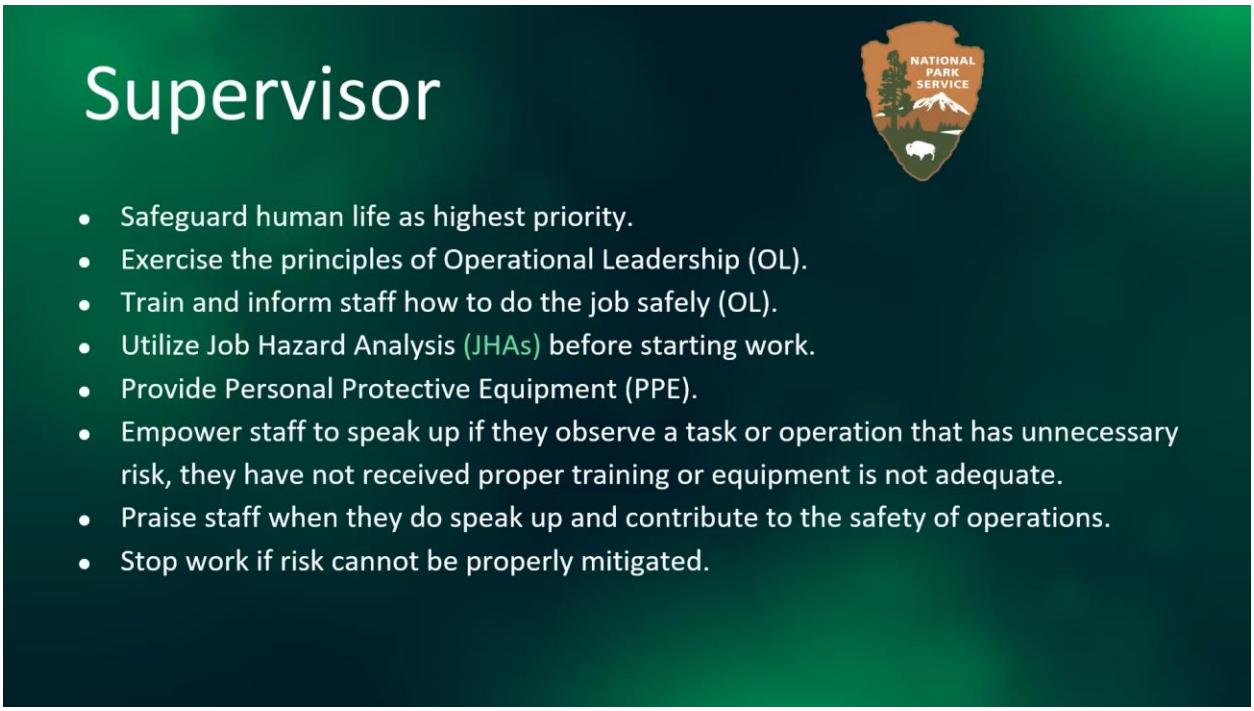


Figure 17: Poor use of matching modality to describe supervisor responsibilities (8:02)

Figure 15 shows a slide at 8:02 in the OSHA training video where the responsibilities of a supervisor are discussed. The bullets that are shown are introduced as the responsibilities of a supervisor. The viewer is told to take a moment to review the bullet points. The issue with matching modality arises when immediately after asking the viewer to review the bullets the presenter discusses job hazard analysis. The presenter explains that making decisions regarding job hazard analysis is one of the supervisor's responsibilities. While all of the information being presented is valuable information, the viewer is left in a situation where they must both read the bullet points and pay attention to what the presenter is explaining. This results in poor retention of the information being presented. The issue can be avoided if time is taken to walk the viewer through the on-screen bullet points before discussing job hazard analysis. This allows the viewer's attention to be devoted one thing at a time.

Figure 18: Poor use of matching modality to explain proper use of PPE (45:31)

Other examples of poor use of matching modality are less egregious. An often-repeated phrase in the OSHA training video is “take a moment to review”. While encouraging the viewer to read along on the slide can be beneficial simply having the viewer read the slide and pausing to allow them to study it does not make use of the auditory channel of perception. In figure 16 the viewer is asked to review the “universal precautions” which can be used to protect from bloodborne pathogens. The presenter then remains silent before advancing to the next slide. These precautions can be more effectively communicated if not only are they shown on the screen, but the presenter discusses them briefly. This is especially true in this case because some of the captions are difficult to read on this graphic.

5. Recommendations

The following are recommendations that could be implemented to achieve the stated goal of improving the quality and viewer engagement of the OSHA training video and all other presentation material produced by the park.

5.1 Implement cognitive load theory when crafting future presentations

The bulk of the team's work has been analyzing the OSHA training video through the lens of cognitive load theory in the hopes that successful implementation of it would greatly improve the overall quality of every presentation at the park. It is the team's explicit recommendation that the tenets of cognitive load theory be carefully considered when crafting new presentations. The OSHA training presentation video as it stands is functional but could be substantially improved by implementing the team's prior edits described in section 4. Results.

Some techniques of optimizing cognitive load (weeding, signaling, segmenting, matching modality) will be more useful than others in regard to the OSHA training video. The following is the team's recommendations for each technique in order of importance.

The team recommends taking special care of matching modality. The OSHA training video is inundated with examples of misaligned speech and visuals, to the point where the average first time viewer will lose out on a lot of important information. It is the opinion of the team that this is the most important technique to implement, if nothing else.

Secondly, use weeding and signaling to optimize the presentation. There are many instances of slides with extraneous or unimportant information, or in the cases where that information is integral, it is poorly presented and often clutters the visual channel. Weeding and signaling would strip down this information or provide cues for how to navigate this information, respectively.

Segmenting is already well implemented in the presentation. A lot of the sections are clearly titled, and due to the nature of video, there is no need to provide downtime between sections. As stated before, the viewer can effectively segment the video themselves and pause between clearly defined sections. Some information in the presentation is nebulous and does not fall under a precisely defined section. Taking some time to work this information into a coherent segment of video would go a long way in cementing the information into the minds of the viewers.

5.2 Increase video production quality through software or hardware

To improve the general production value of the video, use a video editing software. A video editing software would provide a suite of tools that would help control the outcome of the video more precisely. Long or unnecessary silences can be cut out, poor takes can be smoothed out with some editing, music can be added to introductory slides to auditorily segment the video, etc. Programs such as

Final Cut Pro and Adobe Premiere are well-known platforms for video editing. For the purposes of the OSHA training video and similar educational videos, the team recommends Kdenlive (KDE non-linear video editor), as it has a suite of tools similar to the industry standards but is free and open-source. To further increase production value, the presenters could invest in an inexpensive USB microphone. A microphone like the Blue Snowball would serve this purpose well, and relative to other audio equipment (a notoriously pricey market), it is a quality but inexpensive option. Most third-party desktop microphones can filter out background noise exceptionally well. A small improvement such as this would benefit some sections of the video immensely, but it is important to note that higher quality equipment does not necessarily translate to a higher level of viewer engagement. A small improvement conveys a large benefit, but as the price of the equipment climbs, viewer engagement does not scale proportionally (Brame, 2015).

Another general improvement would be to pay attention to the tone and pace of the presenter's voice. Richard Mayer proposed an idea that he referred to as the personalization principle, which effectively states that a conversational tone, rather than a formal one, allows for the creation of a pseudo-social connection between the viewer and the presenter (Mayer, 2008). Furthermore, speaking with enthusiasm and speed also bolsters viewer engagement. It may be tempting to speak slower to clearly explain more complex ideas, but an enthusiastic, speedy tone is proven to have a greater effect on the engagement of viewers (Mayer, 2008).

5.3 Incorporate more instances of interactivity with surveys or quizzes

Depending on the nature of the presentations, the interactivity of the video can be improved. In the case that the presentation is given in video form, as it was this year, then a lot of the viewer interactivity is built into the video player itself. It can be tempting to speak slowly to better vocalize more complex ideas, but as previously stated a faster, more conversational tone is generally better for engagement and retention. A viewer who is dissatisfied with the speed at which the speaker is talking can alter the video playback speed. Conversely, they could speed the playback up. They can also pause the video, review information, and replay sections at will (Mayer, 2008). If these presentations ever migrate to a live platform, whether in-person or otherwise, then providing interactivity of the same degree would be unrealistic.

The team recommends using the brief period between segmented sections of the video to provide an opportunity to the viewers to pose questions. Moreover, an improved exit survey that is more detailed than the current one-page Google Form could both gather meaningful feedback from the viewers and briefly test them on their recollection of the material presented. Often, implementing some form of interactivity is a net positive when compared to a non-interactive version of the same program as it improves viewer retention (Zhang et al., 2006).

5.4 Implement improved infographics that utilize elements of cognitive load theory

Throughout the duration of the project, the team put together a number of infographics and graphs based on the information provided in the video to supplement the presentation. These infographics encapsulate certain sections of the OSHA training video into visually engaging handouts, or visually represent statistics in a more digestible way. The use of these infographics is up to the park, but the team recommends offering them as handouts during the OSHA training or posting them in areas where the information on the handout is applicable as a means of memory retention and a reminder of certain sections of the training. See Appendix C for these infographics and graphics. Each of these infographics was made with cognitive research in mind. The use of color is deliberate, in line with the practice of signaling described earlier. Any extraneous information is stripped from these infographics. They can be presented in tandem with verbal presentation, following the rules of matching modality.

5.5 Utilize the video format for future presentations to optimize the efficiency of orientation

Despite the challenges that the safety staff doubtlessly faced when producing the OSHA training video, there is a lot of potential in this format. This experimental video, despite being a quarter of the length of the original OSHA training, is evidence of the fact that a significant portion of the orientation can be completed by the new staff prior to arrival. It is the team's recommendation that GNP considers implementing pre-arrival presentations such as this in future seasons, and potentially expanding into other topics. This affords more time for in-person training, or for the social aspects of orientation that foster workplace relationships and comfort. With these recommendations, a competent and concise OSHA training video can be developed and effectively free up four hours (or potentially more) of onboarding day for seasonal staff each season. This affords more time for in-person, job-based training, or the social aspects of orientation that foster workplace relationships and comfort.

6. Conclusions and Future Developments

The new GNP OSHA training video is an example of the kind of presentations that new employees attend during their orientation and training programs. The recommendations made in this report were intended to improve not only the OSHA training video, but all presentation material that the park decides to present remotely or in the video format. Implementing the team's recommendations will increase viewer engagement throughout these presentations, resulting in better retention of the information they present.

The remote nature of this project provided a challenging set of obstacles for the group to overcome. As a result, several potential methodologies had to be eliminated from the scope of our final research and report. However, future project teams could stage interviews and distribute surveys to acquire a deeper understanding of the perspectives of employees on the orientation and training procedures. Furthermore, a team could take a complete inventory of all available resources at the park and work them into an updated training program. With the research presented in this report in mind, as well as any subsequent research done during a future project, a team could attempt to implement the ideas presented in this report in a focus group of new employees, and conduct an analysis to determine the efficacy of the suggestions made by this project.

7. References

References

Bomar, M. A. (2008). Safety Program Management (RM50B). https://www.nps.gov/policy/RM50Bsection1.pdf

Brame, C.J. (2015). Effective educational videos. Retrieved from http://cft.vanderbilt.edu/guides-sub-pages/effective-educational-videos/.

Brookins, M. (2019). Example of an orientation program for new employees. Retrieved from https://smallbusiness.chron.com/example-orientation-program-new-employees-10762.html

Carolin, T. (2020). In Benjamin L., Masse L., Andreassen E., Meyer N., Carter R., Looft F. and Bianchi F.(Eds.), Fw: Onboarding Procedures - Sign ups for onboarding times

Carolin, T. (2020). In Benjamin L., Masse L., Andreassen E., Meyer N., Carter R., Looft F. and Bianchi F.(Eds.), Re: [EXTERNAL] WPI orientation team's questions

Cooper, C.L. and Cox, A. (1985), Occupational stress among word process operators. Stress Med., 1: 87-92. doi:10.1002/smi.2460010204

Department of Labor. (2020). Occupational safety and health administration. Retrieved from https://www.osha.gov/

Glacier National Park. Retrieved from https://irma.nps.gov/STATS/SSRSReports/Park%20Specific%20Reports/Annual%20Park%20Recreation%20Visitation%20(1904%20-%20Last%20Calendar%20Year)?Park=GLAC

Guo, P. Kim, J. & Rubin, R (2014). How video production affects student engagement: an empirical study of mooc videos. Retrieved from https://www.researchgate.net/publication/262393281_How_video_production_affects_student_engagement_An_empirical_study_of_MOOC_videos

Infante, D. A., & Gorden, W. I. (1991). How employees see the boss: Test of an argumentative and affirming model of supervisors' communicative behavior. Western Journal of Speech Communication, 55(3), 294-304. Retrieved from https://www.tandfonline.com/doi/pdf/10.1080/10570319109374386?needAccess=true

Lloyd SA, Robertson CL (2012). Screencast tutorials enhance student learning of statistics. Teach Psychol 39, 67-71

Mayer, R. E., & Moreno, R. (2003). Nine ways to reduce cognitive load in multimedia learning. Educational Psychologist, 38(1), 43–52. Retrieved from https://doi.org/10.1207/S15326985EP3801_6

McLane, A. F. (2020). In Bianchi F., . . . Andreassen E. (Ed.), [EXT] fwd: Fw: [EXTERNAL] glacier national park projects

Meyer, R. E. (2008). Applying the science of learning: Evidence-based principles for the design of multimedia instruction. Cognition and Instruction, 19, 177-213.

Moulton, S.T. (2017) Does a presentation's medium affect its message? PowerPoint, Prezi, and oral presentations. Plos One, 12(10). doi:10.1371/journal.pone.0186673

Occupational Safety and Health Administration. (2015). Training Requirements in Osha Standards. US Department of Labor.

Peruccelli, J. D., Nandram, B., & Chen, M. (2014). Applied statistics for engineers and scientists (6th ed.). Worcester, MA: Pearson Education, Inc.

Rigdon, V. (2020). In Benjamin L., Masse L., Andreassen E., Meyer N., Carter R., Looft F. and Bianchi F.(Eds.), Re: [EXTERNAL] Glacier National Park OSHA Training

Wanous, J. P., & Reichers, A. E. (2000). New employee orientation programs. Human Resources Management Review, 10(4), 435-451.

Yogerst, J. (2019). Everything to know about glacier national park. National Geographic Retrieved from https://www.nationalgeographic.com/travel/national-parks/glacier-national-park/

Zhang, D., Zhou, L., Briggs, R. O., & Nunamaker, J. F. (2006). Instructional video in e-learning: Assessing the impact of interactive video on learning effectiveness. Information and Management, 43(1), 15-27. https://doi.org/10.1016/j.im.2005.01.004

8. Appendices

A: Terms Used Frequently Throughout this Proposal

Terms Used	Definitions
Employees / Staff	General term for describing employees of any organization, not necessarily of GNP
GNP	Glacier National Park
HAZCOM	Stands for Hazardous Communication. Primarily used to refer to proper labeling of containers
HAZMAT	Stands for Hazardous Materials
HAZWOPER	Stands for Hazardous Waste Operations and Emergency Response
NPS	The National Park Service
Onboarding	The time prior to the orientation presentation. This includes: digital signing of paperwork upon arrival, receiving park access stickers for vehicles, filling out emergency contact forms, and reporting to the supervisor.
Orientation	The process for giving new employees and staff important information about their workspace, reducing stress, and introducing them to their work environment and culture.
Orientation Presentation	Generates enthusiasm for launching a new season at Glacier National Park, introducing leadership teams, available resources, and branches of parks offices.
Orientation Program	Refers to the orientation at GNP as a whole; this includes onboarding, team building, training and announcements.
OSHA	The Occupational Health and Safety Administration
Program Administrators	Employees of GNP in charge of running the orientation program.
Permanent Employees	Work year-round and are not hired seasonally.
Safety Training	4-hour session covering several mandatory topics, such as hazardous

	substances, hantavirus, and blood borne pathogens, etc.
Seasonal Staff	The employees of GNP that are only employed for the summer months, usually May to August. They are the target audience of the training program.
Supervisor	Employee / seasonal staff member overseeing lower level employees / seasonal staff.
Trainee	Describes the people or employees within an orientation or training program who are getting trained.
Trainer	Describes the employee who is training others during an orientation or training program.
Training	The process of teaching a person the skills used during their job.

B: Table of Suggestions to OSHA Video

URL: https://www.youtube.com/watch?v=te8uLIkZeJ8&feature=youtu.be

Timestamp	Failure in Category	Issue	Suggestion
0:00	Viewer Retention	Disembodied voice	Research supports that seeing a speaker improves engagement
0:00	Viewer Retention	Talking too slow	Speed up. Playing back the video at 1.5 speed is an improvement and increases viewer retention.
1:24	Weeding	Relays information only pertinent to those reading the presentation	Take note of your audience, as explained in the report
2:06	Weeding	Text heavy	The assertion evidence approach (make a clear claim, support with graphics rather than text, and walk through it comprehensively) would go a long way with reducing text per slide. Any time a slide has many words like this, consider this approach. Reading slides word for word loses the viewers' attention.
2:45	Viewer Retention	Anecdotes/stories improve the experience.	Spread these anecdotes throughout the presentation in relevant sections
2:45	Matching	Text is small with low	Change the colors so the words stand out better.

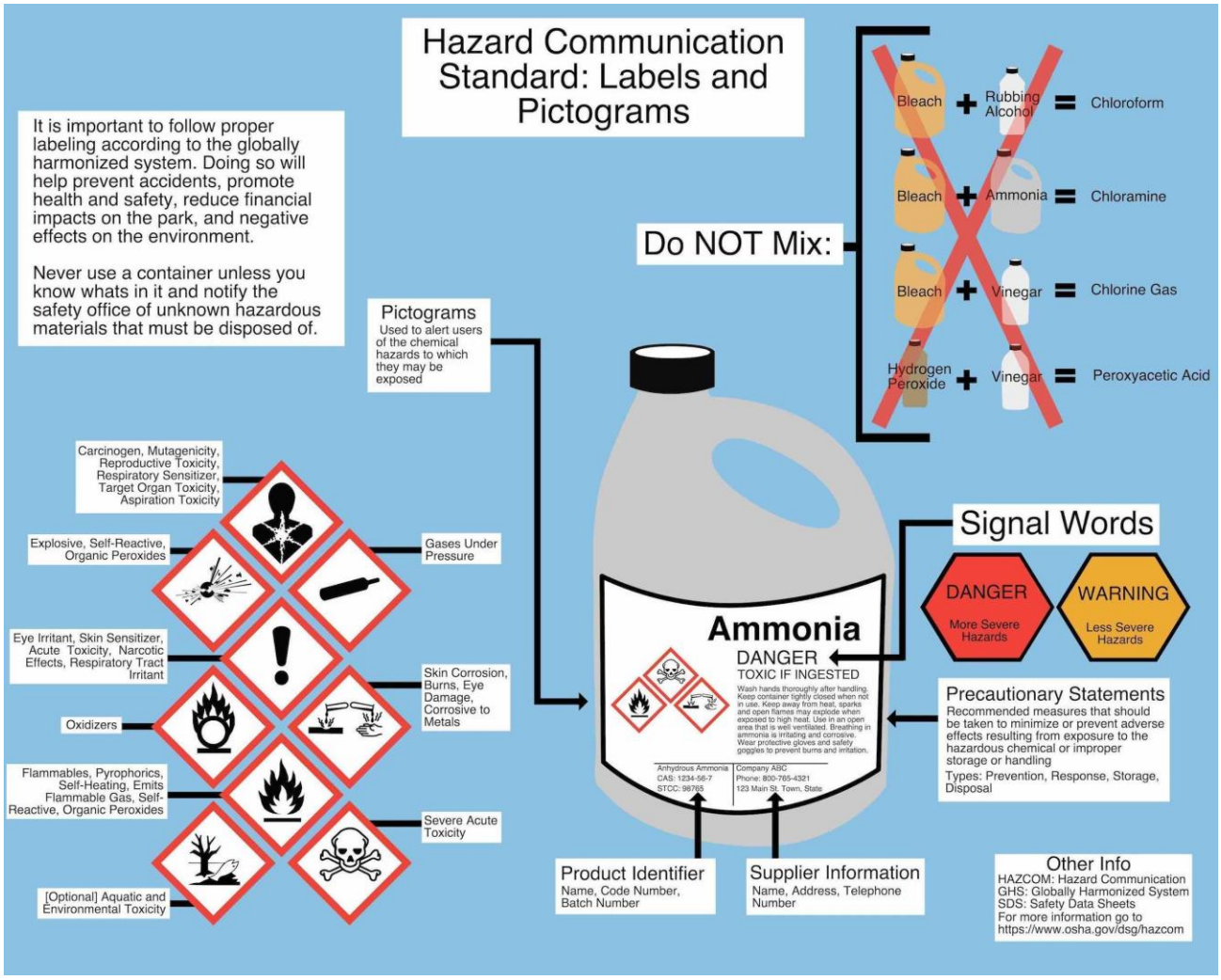
	Modality	contrast	Make the font size larger
2:46	Weeding	Great graphic, but text takes away from it	Trim down or remove the text completely, and talk through each part of the model, then ask the audience to place themselves on the graphic, like it currently does.
3:00	Matching Modality	The silence leaves an awkward empty spot in the presentation (45 seconds)	Simply ask the audience to pause the video and think about it, it will be a more efficient use of time. IF THIS IS PRESENTED LIVE: use an engagement platform like PollEverywhere to get responses for potential discussion
3:43	Weeding	Too much text to describe each slice of the graph	Take out the descriptive line after each term ("Counter Productivity", no need for any other text)
3:43	Weeding	Poll data has no context: when was it taken, where did it come from?	Put a short descriptive caption beneath the pie chart. At the very least, this should bring the slide together
4:30	Matching Modality	This graph is very confusing at first glance.	Be more consistent in font size and terminology or explain in detail what the graph represents/how it trends. Spend more time on this point if it is that important. As it is, it doesn't mean anything to a third-party viewer (similar to a first-year seasonal staff). There are no lines on this graph to display any relationship between the two variables. Then, it speaks about EXPOSURE and VULNERABILITY, which have no meaning relative to the axes of the graph and were not established as variables. Otherwise, choose a different graphic to make this point
4:41	Matching Modality	Text is small and not all of it is addressed	Less text and larger, then expand on it by discussing it more
5:50	Matching Modality	Text is small and is not discussed. Audience is expected to read and decide which they fit into	Discuss the text as it appears on the screen. Do not rely on the audience to read and understand it.
7:43	Weeding	Green text against a green background will be hard to read on some screens. This slide has a lot of text without much speaking. Relying on the audience to read all the text is unreliable	Use assertion evidence, discuss it more (walk through each point) and do not use green text on a green background. Color theory shows that red contrasts green the most, but to avoid appearing like Christmas, a variety of other colors could be used.

8:45	Matching Modality	The audience is asked to read through slides while also having to take in different information through Scott Allen's voice	Synthesize the content on the slide with what is being discussed. This happens a lot throughout the presentation.
10:00	Weeding	Text heavy	The assertion evidence approach (make a clear claim, support with graphics rather than text, and walk through it comprehensively) would go a long way with cutting down on text per slide. Any time a slide has many words like this, consider this approach
10:44	Weeding	Does not discuss the WREK system. Even only the text on the slide is not very informative	Discuss what acronym stands for and how it is used
12:00	Signaling	Slide formatting is unintuitive.	Indicate the severity of a recordable accident with a different font color. This structures the slide better. Give more examples of each type of injury, even the minor ones.
12:36	Matching Modality	Image spacing is weird, and "Accident/Injury Report" are on top of the image. It is not self-evident what the Near Miss image depicts.	Move imaging around to balance the slide and draw the eye to different places and talk about each image.
15:27	Matching Modality	Reading off the slide defeats the purpose of having a person speak	Describes anecdotes other than what is on the slide. This is done to a degree before and after this slide, but when individual points come up they are read verbatim, sometimes cutting out examples.
18:57	Matching Modality	A question mark is drawn on the screen. Later, lines are drawn on labelled bottles.	This should be used more. It is very similar to the Khan Academy style of presenting information and is proven to be effective
31:26	Weeding	Copying a URL is not very efficient	Use a QR code instead to make it easier to navigate to the website
32:04	Weeding	Infographic is too cluttered	Break infographic into multiple slides and discuss steps as they appear
32:34	Signaling	Confusing, unnecessary formatting	This information can be shown in a more traditional list and be more easily understood
33:04	Weeding	Text heavy, just reading off slide	Self -explanatory

33:30	Weeding	Good graphic but the extra words are unnecessary	Remove the text under each heading and describe them verbally instead
35:10	Weeding	Text heavy	Self -explanatory
39:15	Matching Modality	Does not explain what a biohazard is on when its used	Explain the symbol, when it's used, why it's relevant, etc.
39:30	Matching Modality	Graphics are shown too quickly	Stopping briefly to discuss graphics might be useful
39:33	Matching Modality	Nothing was said on this slide	Speaking briefly about the slide and its text is a good idea
39:50	Matching Modality	Doesn't discuss graphics	Graphics are better used as a supplement to a speaking point. Talk about the graphics, discuss their meaning, etc.
40:00	Matching Modality	The text on the slide is hardly discussed	Relying on your audience to read while also listening to verbal instruction restricts retention in both of those channels.
40:55	Weeding	Too much text to describe each slice of the graph	Cut down on text to describe each portion of the graph, and determine what information can be expressed verbally
40:57	Weeding	There are multiple slides which present the same information	Condense overlapping information onto fewer slides instead of spreading it out
41:12	Signaling, Matching Modality	Difficult to read, little explanation	Think about colors, font size, etc.
45:49	Weeding, Matching Modality	"take a moment to review" is repeated far too often	Use different language or talk through each point as it comes up. Repeated language can often be grating and unengaging
46:36	Signaling	Frequent font/format changes are distracting/disrupting	Standardize font sizes, font style, colors, etc. Use graphics to make slides more interesting/varied

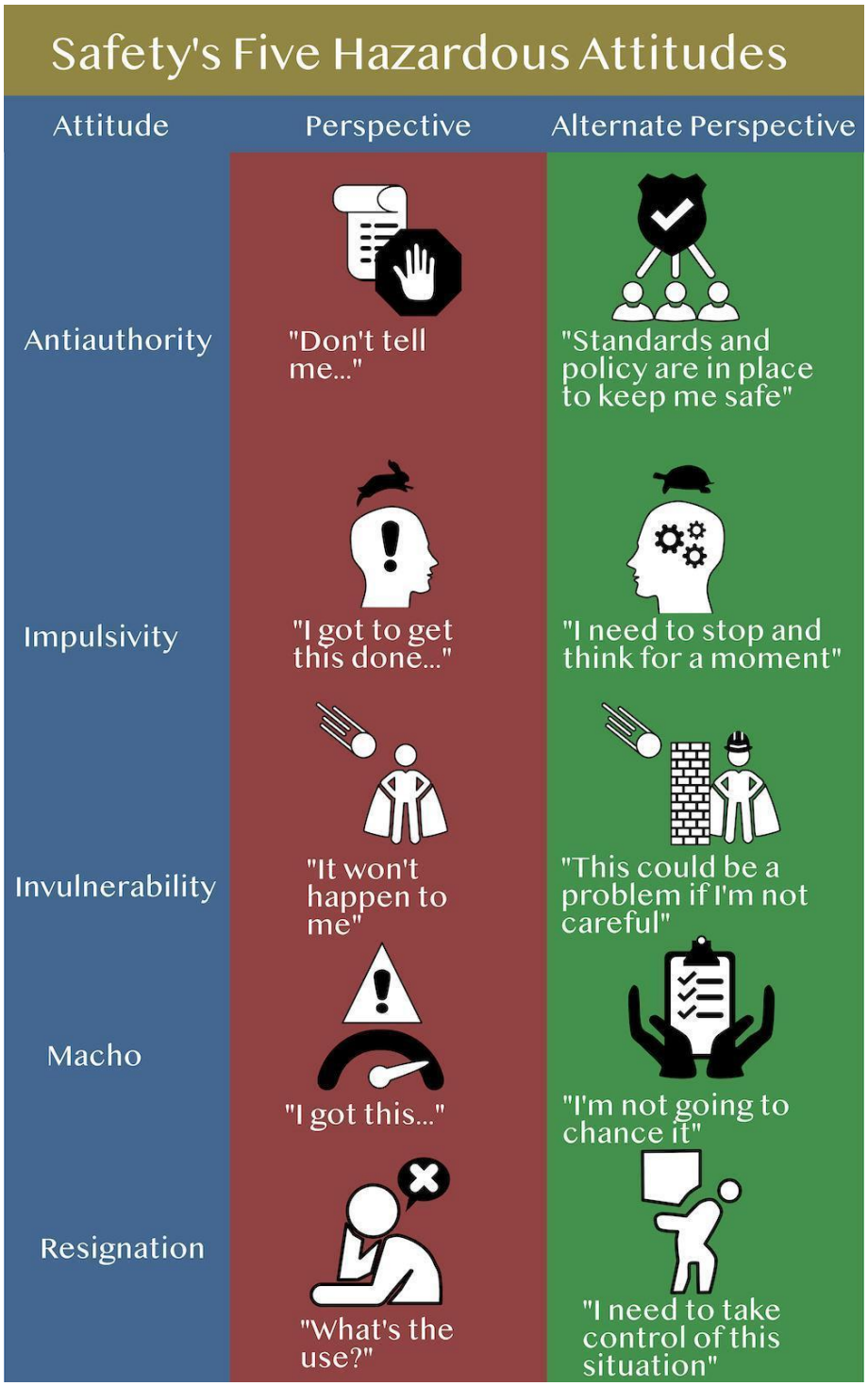
C: Infographics

1: HAZCOM Labelling

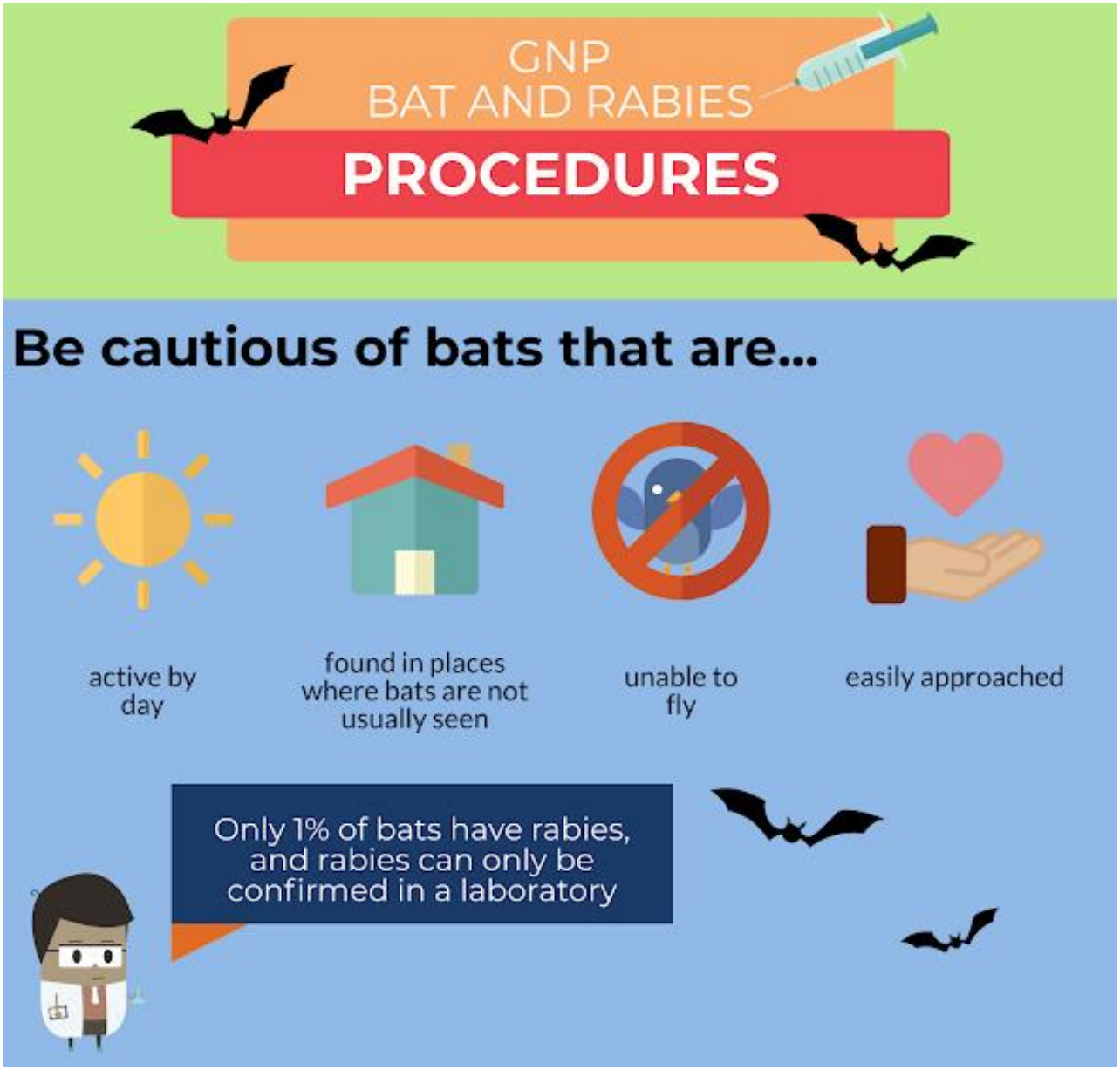


This infographic shows proper labelling convention for hazardous materials as well as some common materials which should not be mixed.

2: Safety's Five Hazardous Attitudes



3: Bat and Rabies Procedures



Rabies spreads through infectious material, such as saliva

If you are bitten, or infectious material comes into contact with your...


eyes


nose


mouth


wounds


Wash affected area thoroughly


Capture the bat if possible for lab testing


Get immediate medical attention

You cannot get rabies from non-physical exposure to bat guano, blood or urine, or from touching a bat on its fur

Bats should never be handled unless required by your job!

In this case, proper training and PPE is necessary

What do I do if I find a bat indoors, and know that no harm has occurred?

Confine the bat to one room

Do not take your eyes off the bat

Close all doors and windows except to the outside

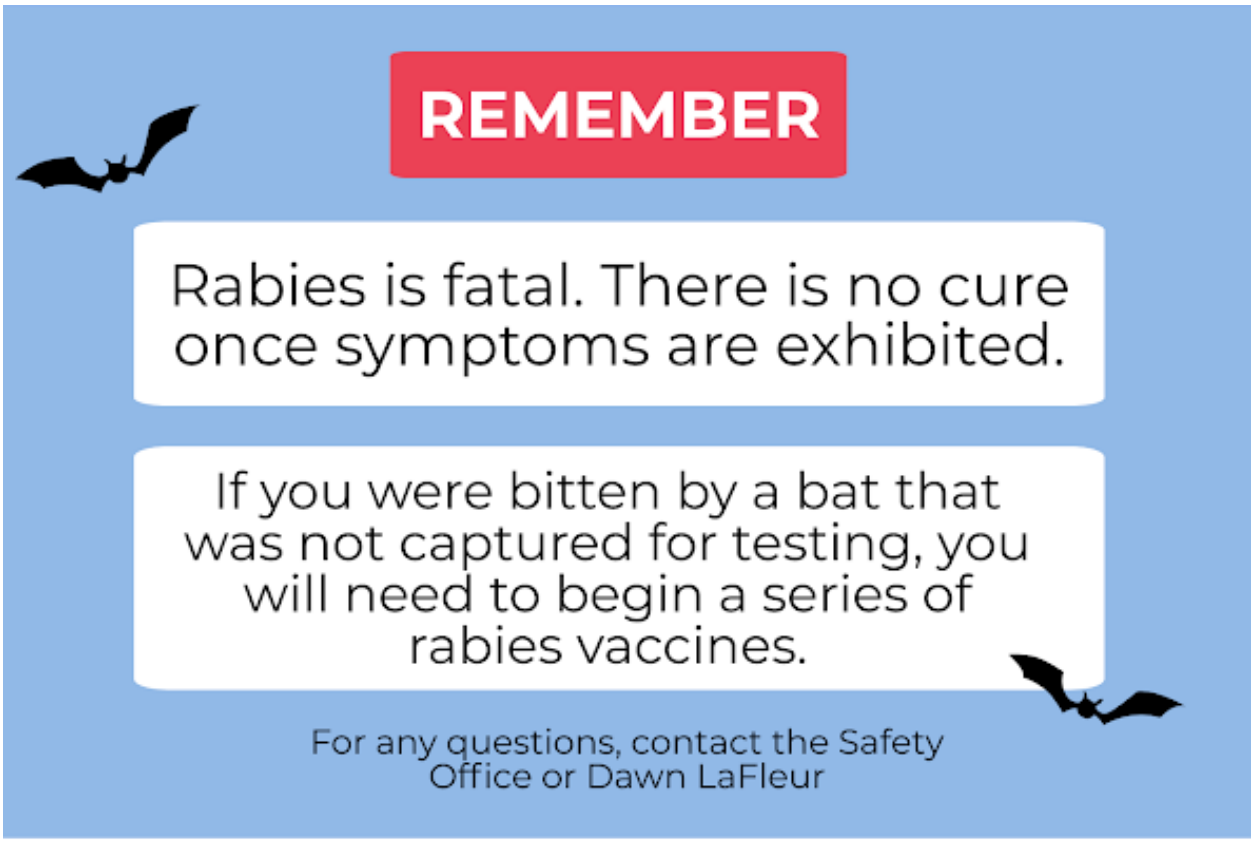
Catch the bat if it does not leave

Conduct an inspection to locate possible entry points

Catching a Bat

Use a piece of stiff cardboard and a plastic container

Always wear gloves!


REMEMBER
Rabies is fatal. There is no cure once symptoms are exhibited.
If you were bitten by a bat that was not captured for testing, you will need to begin a series of rabies vaccines.
For any questions, contact the Safety Office or Dawn LaFleur
powered by
PIKTOCHART

4: Bloodborne Pathogens Statistics