

Fireside Chat Curriculum

12/13/2022

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An Interactive Qualifying Project Report Submitted to the Faculty of Worcester Polytechnic Institute
In fulfillment of the requirements for the degree of Bachelor of Science

White Mountains Project Center, Lincoln, New Hampshire

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Abstract

In this project, we created a comprehensive curriculum concerning trails within the White Mountain National Forest, focusing particularly on the alpine zone on behalf of the World Trails Network - Hub for the Americas. More specifically, we researched common themes concerning user experience and trail maintenance practices. Through interviews with leaders in trail science, constructivist learning, environmental ethics, and previous curriculum participants, as well as survey, focus group, and observational data, we developed a framework. It consists of a Google Drive folder with a content guide, lesson topics, and insightful questions to guide discussion. A Google Classroom page is where participants of this curriculum may find readings and discussion boards to facilitate reflection.



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Meet the Team

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World Trails Network



Introduction & Background

Trail Conditions in the White Mountains

In a 2017 assessment of trails in the White Mountains of New Hampshire, researcher Samuel Kilburn found the cost to create a trail to be \$5,188 per mile and the average cost per trail problem to be \$1,788. A trail problem here is defined as excessive erosion, wetness, width, or the creation of unintended trails. Solutions need to be found to reduce the cost and effect of the destruction of trails and the species around them. In this chapter, we explore some of the unique features of the fragile alpine zone. We discuss global climate change as well as erosion and trail management and its impact on alpine trails. In the next section, we discuss different environmental education methods. Finally, we introduce the sponsor of this project, the World Trails Network – Hub for the Americas.

The Alpine Region

Global climate change and erosion affect the alpine zone's sensitive vegetation and overall health. Global climate change pertains to the average warming of the earth and shifts in weather patterns. As shown in Figure 1, the alpine zone lies above the tree line and below the snow line on many mountains including the White Mountains (Bliss, 1966; Capers et. al, 2013). Furthermore, the COVID-19 pandemic has led more people to the trails (Power, 2021). More hikers mean more use and therefore increased soil degradation.

Alpine Zone Fragility and Environmental Concerns

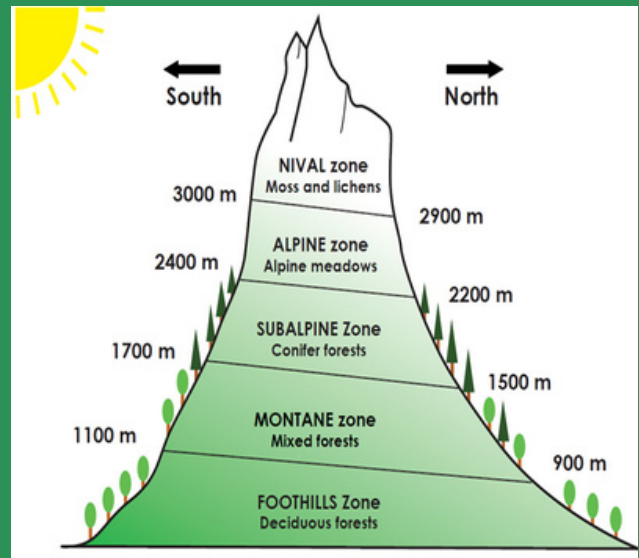


Figure 1: Location of the Alpine Zone (Kobal, 2018). It lies between the snowy regions above and the forests below.

Alpine plant communities are particularly sensitive, causing fragility in the alpine region. The Northeastern United States is warming (Capers et. al, 2018). As a result, the alpine zone experiences less precipitation and a shorter winter. A shorter amount of time snow is on the ground as well as an earlier growing season affects vegetation (Capers et. al, 2018). Shifting into to a warmer climate in regions similar to the alpine zone can cause shrub dominance over trees (Capers et. al, 2018). Furthermore, vegetation composition has changed significantly in the past twenty years. There has been an increase in vascular and woody vegetation like plants and shrubs in areas where hikers

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were absent (Robinson et. al, 2021; Capers et. al, 2018). Changes like these to such a sensitive region can be costly to local biodiversity. As a result, vegetation in the alpine zone is critical to the overall health of this environment.

Erosion is a large detractor from the health of trails and the environment at large. Mountain trails take 2% of the surface area of a standard mountain region yet represent 14% of the total erosion in one mountainous region (Salesa, 2020). Why is this happening? To begin, there has been an increase in



Figure 2. Work on trails (Salesa, 2020).

Trails have been severely eroded as presented here to present a visual of one trail issue.

recreational activities on trails (Salesa, 2020). Furthermore, the COVID-19 pandemic caused many more trail users to appear (Power, 2021). There was a 6% increase in the usage of trails during the COVID-19 pandemic compared to the year before (Power 2021). Therefore, more people on trails engage in recreational activities. As a result, there has been more soil loss and compaction on trails. According to a 2020 study, every reported loss of soil

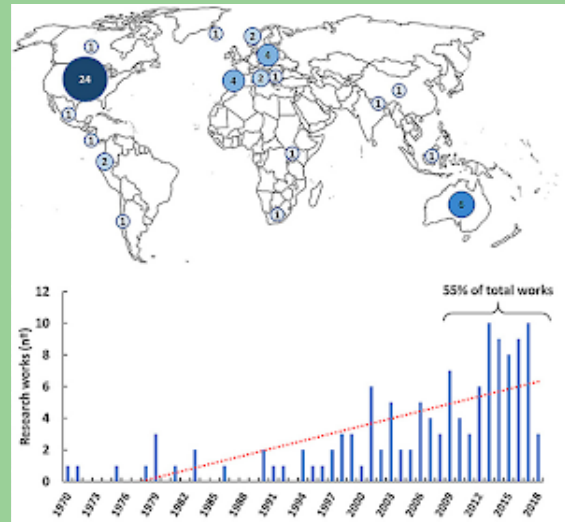


Figure 3: The trend of research locations and scientific works on trails (Salesa, 2020).

The amount of trail locations and research studies on trails increases over time but is still very low.

in various White Mountain Trails were found to be unsustainable (Salesa). Furthermore, soil compaction affects organic matter content and results in the long-term degradation of the soil (Brevik and Fenton, 2012; Salesa, 2020). However, an important counterargument is that soil compaction may also provide the benefit of hardening. And, as a result, soil compaction limits erosion (Dixon, 2017; Salesa, 2020). Water on these hardened trails still needs to go somewhere; water either travels on the trail itself, which is dangerous to visitors or flows elsewhere, eroding soil. As a result of the increase in people engaging in recreational activities on trails, the soil has been lost and compacted. Trail erosion has become one of the most difficult problems to control (Garland, 1990).

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The alpine zone is sensitive to change. Humans use White Mountain trails for hiking and exploring the area. As a result, the area has eroded. Trails widen due to human use as slower hikers are passed which is only increasing due to the overcrowding of trails. Furthermore, the number of unofficial trails has increased. Unofficial trails are defined as visitor-formed and unintentional (Kilburn, 2017). Many parks do regular maintenance on trails in the alpine zone to document and repair the trail (Kilburn, 2017). America's national forests help the public maintain hope to preserve natural systems, serve as a natural outdoor laboratory, and fill a critical and practical need for humanity (Runte, 2002). To protect these forests, many organizations work to install fencing, strategically place trails and educate the public. Solutions to these issues currently may include educational signs, fencing, and strategic placement of trails (Marion, 2018).

Environmental Education

Environmental education can be a profession or a tool for some and an annoyance or inconvenience for others. According to Martha Monroe, a professor in the School of Forest Resources and Conservation at the University of Florida, environmental education is a way to

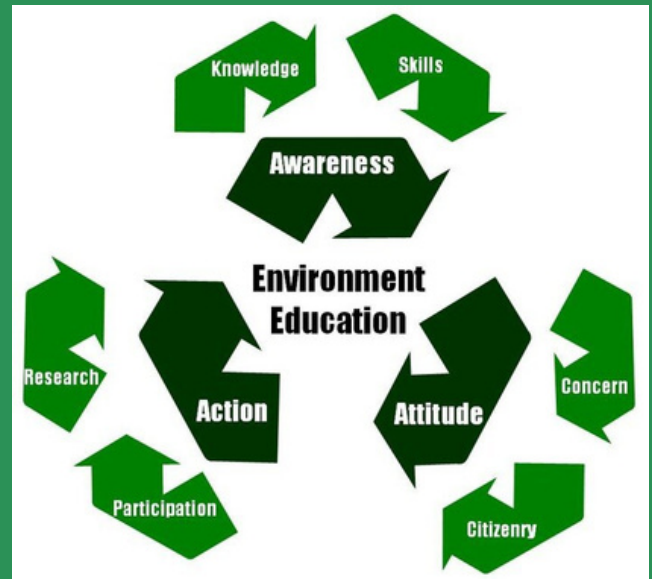


Figure 4: Three basics of environmental education that are important to the field according to the Ohio Ocean Foundation (Metzger, 2018).

create awareness and foster environmental vigilance. It aims to develop new norms for how people conduct their everyday lives to have a more environmentally conscious society (Monroe, 2008). However, this could be seen as idealistic. According to Kim Walker, a professor of environmental education at the University of the Sunshine Coast, environmental education is far from ideal. Walker argues that, socially, critical environmental education “falls short of the transformative process” (Walker, 2006). Walker is certainly skeptical of the lack of accomplishments for environmental education so far.

A study conducted in Mexico found that there was an increase in environmental awareness among students that participated in an environmental education program. The students showed a better understanding of their impact and

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wider knowledge of their environment (Ruiz-Mallen, 2009). Environmental education has at least had some effect. Daniel Blumstein, a professor of ecology and evolutionary biology, has an idea why environmental education hasn't been able to accomplish its goals. He believes that since environmental education has been so politicized, legitimate concerns over the efficacy of environmental education have been ignored. Since environmental education has struggled to stay relevant, the environmental education community can sometimes see constructive criticism as an attack (Blumstein, 2007). Any educational environment that has the propensity to ignore or discard constructive criticism is at risk of failing.

Monroe offers a framework that may help address Walker and Blumenstein's criticism. Using past research on environmental education, Monroe proposes housing environmental education into four categories: conveying information, building understanding, improving skills, and enabling sustainable actions (Monroe, 2008). All of these categories build off of each other and work together well. Monroe states that "making sure that the audience understands is not enough" (Monroe, 2008). All of these categories must be used together in order to facilitate a change in behavior.

In order to make an environmental education curriculum in the style that Monroe researches, one must consider the type of learner and the instructor's learning style. Every student has a unique learning strategy. There are nine different styles that help identify what each student individually needs when learning. Studies have shown that taking the nine learning styles into account in a classroom creates a better learning environment (Kolb 2005). The 9 learning styles are shown in the grid below:

CONCRETE EXPERIENCE		
NW Feeling-Acting Accommodating	N Feeling Acting-Reflecting Northerner	NE Feeling-Reflecting Diverging
W Acting Feeling-Thinking Westerner	C Feeling Acting + Reflecting Thinking Balancing	E Reflecting Feeling-Thinking Easterner
SW Thinking-Acting Converging	S Thinking Acting-Reflecting Southerner	SE Thinking-Reflecting Assimilating
ABSTRACT CONCEPTUALIZATION		

Figure 9. The figure above shows the 9 different learning styles separated out into a grid (Learning, 2022).

There are many approaches to teaching that are designed to target different learning styles. The "thinking caps" method of teaching is another way innovative teaching styles benefit learners. The thinking caps approach helps an audience look at a problem from many angles

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before trying to solve it (Ying Hu, 2021). This forces students to get out of their comfort zone and attempt to think in a way that might not be natural to them. This is proven to enhance a student's creativity and problem-solving skills.



Figure 6: Above the six different thinking hats are shown. Each one is meant to help break the problem-solving process into bite-sized pieces (Bono, 2022).

In a later study, Monroe found that the most effective strategies were creating an educational experience that is both engaging and personally relevant to each student (Monroe, 2017). The study found that using those two strategies improved a student's retention scores.

One study by Elise Dallimore in 2010 looked at the effectiveness of different teaching approaches. Specifically, she examined cold calling and student-generated strategies. Cold calling is when a teacher calls on somebody to answer a question rather than having the student volunteer.

The study found that cold calling was effective at making the students more prepared for each class (Dallimore, 2010). Students are forced to be more engaged in class when cold calling is a possibility. Dallimore also looked at student-generated strategies. This is where students come up with the teaching strategies rather than the teacher. This made the classroom environment more personally relevant and as Monroe predicts, a personally relevant classroom environment allowed the students to be more engaged in the class (Dallimore, 2010). These strategies could be used in environmental education to create a better learning environment for students.

Without the correct presentation of a topic, the audience becomes disengaged. For better or worse, environmental education is a politicized issue. One issue with talking about environmental issues, such as pollution or climate change, is that it is important not to overwhelm an audience with the negatives. An overwhelmed audience feels as though the problem is bigger than themselves; they can't make a big enough impact to solve the problem (Dina, 2017). This issue spreads far beyond environmental learning. Studies have shown that people with a pessimistic disposition scored lower on vocabulary, motor skills, and matrix reasoning (Karhu, 2022). Information needs to be presented in a digestible format for the audience to avoid a feeling of powerlessness. Debates and discussions are great ways to encourage reflection without inciting a feeling of powerlessness. Keeping in mind Monroe's framework is an important factor for future environmental education curriculums. Experimenting with different formats is important as well.

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World Trails Network

The World Trails Network: Hub for the Americas (WTN) is a non-profit organization based in New Hampshire dedicated to the sustainability and use of trails in the Americas. The WTN regularly collaborates with organizations in their work, such as the United States Forest Service, Appalachian Trails Conservancy, and the Waterman Fund. The WTN is a community passionate about trails and improving the experience on the trails for others (Saintz, 2021).



Figure 7: World Trails Network logo.

One of WTN's main goals is to educate people about the environment and the trails in the White Mountains. Both trail managers and users want to keep the trails at high quality without compromising the environment. The main obstacle is lack of knowledge; education and communication between groups yield the sharing of new perspectives and diversity of ideas. The WTN has organized fireside chats to teach summit stewards, trail managers, and other stakeholders about trail management, trail issues, and solutions. In collaboration with World Trails Network: Hub for the Americas Director, Nathaniel Scrimshaw, and using the previously delivered fireside chats as a springboard, we developed a semester-long, discussion-based curriculum.

Methodology

The World Trails Network, Hub for the Americas (WTN) expressed interest in creating a fireside chat curriculum to educate summit stewards, college students, land managers, and trail users. In collaboration with the WTN, the goal of our project was to create a knowledge center for a dialogue-based curriculum. The new curriculum fostered discussion for the WTN's target audience about environmental and trail issues, especially in the White Mountains alpine zone.

To achieve our goal, we created the following objectives:

1. Establish course learning outcomes, target audience, and geographic boundaries
2. Identify themes
3. Explore dialogical learning formats
4. Develop Fireside Chat Curriculum
5. Utilize an iterative design process

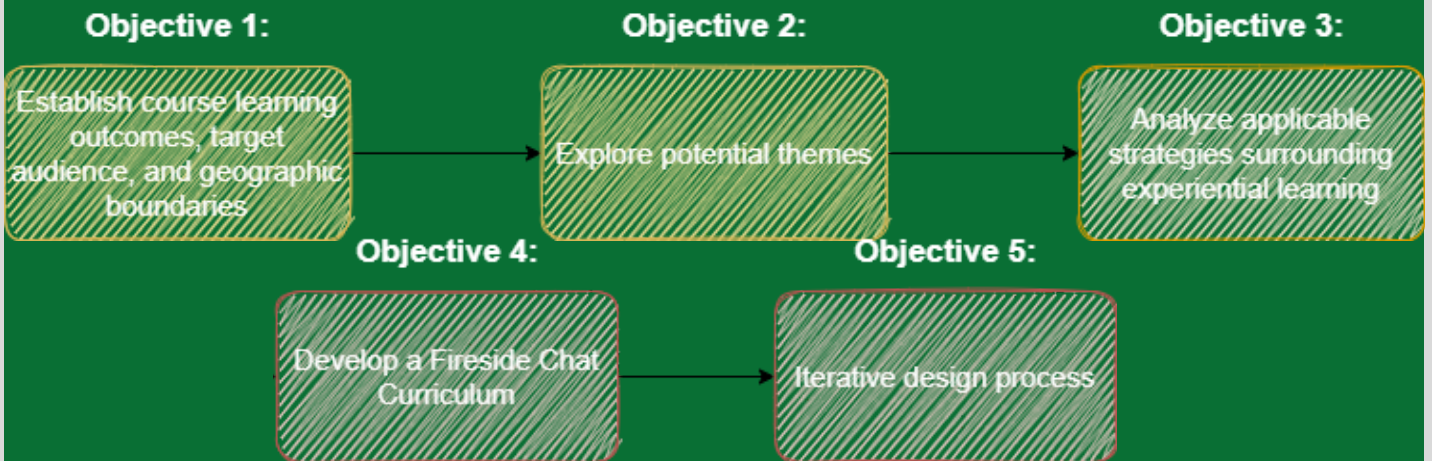


Figure 8: Flow chart of project objectives.

Objective 1: Establish course learning outcomes, target audience, and geographic boundaries

In order to develop a curriculum, we needed to understand the curriculum's target audience, learning outcomes, and geographic boundaries. Learning outcomes are what the graduates retained from the fireside chats that they did not already know. Geographic boundaries are important in this context because this curriculum is focused on

trails in the Whites. To accomplish this objective, we conducted structured and semi-structured interviews with Mr. Scrimshaw and experienced individuals in the field from environmental organizations found in appendix H.

Mr. Scrimshaw helped our understanding of the target audience and learning outcomes (see example interview questions, appendix D). When this interview was conducted, Mr. Scrimshaw was Chair of The World Trails Network – Hub for the Americas.

Methodology

In this interview, we explored the curriculum's process, content, and history as well as the target audience. Interviews are a quick and direct way to obtain information in a semi-structured format. Interviewers have significant control of the conversation and can get exactly the type of information needed (Fink, 2017, p. 50).

We also interviewed different types of experienced individuals found in appendix H. 12 interviews were conducted in total. These interviews broadened our understanding of the White Mountains as they knew the trail science behind each problem. They also gave us a good idea of the geological boundaries as many of them worked in this area for several years. Interviews are the best way to get specific information like this as they are structured enough to allow the interviewer to ask direct and supporting questions (Williamson, 2013).

Objective 2: Identify themes

After Objective 1, and even during that process, themes began to emerge. Trail issues and learning outcomes detailed by Mr. Scrimshaw jumpstarted the process of identifying the curriculum's themes. We determined the most relevant themes and ideas for the curriculum to cover. To do this, we used interviews, surveys, and focus groups to see what experienced people believed were the most relevant topics and important debates that have to do with trails, especially in the alpine zone.

We interviewed specialists in trail science, including summit stewards, the target audience for fireside chats. Summit stewards are college-aged individuals who have a paid position with the World Trails Network - Hub for the Americas where they complete trail work, educate hikers, engage in fireside chats, and complete a project of their choosing. Several interview questions were geared toward figuring out potential themes (see Appendix D2 #3-5). The answers gave us an idea of what the experienced individuals believed was important for the future generation of hikers and trail leaders to understand and reflect upon. Interviews enabled us to gather the exact information we needed. Summit Stewards Maeve Mikulski and Morgan Ruoss were key interviewees as they had experience in fireside chats. Recreational ecologist Jeff Marion and USFS trail manager Cristin Bailey enlightened us on many trail issues from both a scientific and management point of view.

We also identified themes using a survey. The goal of this survey was to get input from hikers of varying skill levels. We determined their skill level through self-reporting in the survey (see Appendix C #3, 4, 7, 17, 21). We administered this survey through a Facebook post in active White Mountains hiking groups. The survey investigated how hikers viewed the trails in the White Mountains (see Appendix C #9-15, 18, 20). It also determined what common mistakes hikers commonly made on the trail (see Appendix C #5, 6, 8, 13-16, 19). Surveys were the best method to use as surveys can gather large quantities of information very quickly (Fink, 2017).

Methodology

We compared the survey's data (individual's hiking experience) and cross-referenced it with interview data. This provided deeper insight on the greatest impacts.

Objective 3: Explore dialogical learning formats

Mr. Scrimshaw wished to use a discussion-based approach to expand the fireside chat curriculum. Therefore, we researched how to communicate content and themes from objectives one and two using dialogue-based learning. To explore the best approach and strategies, we observed other curriculums and interviewed specialists in the field.

Interviewing 3 experienced educators from appendix H provided a helpful perspective on experiential learning. We also observed experiential learning programs such as those found in appendix H to see these strategies as a participant observer for maximum perspectives on the different approaches. From these observations, we aimed to answer the questions found in appendix F.

We also observed four of Mr. Scrimshaw's fireside chats where we learned more about its structure and what needs to be changed or kept for the development of a future curriculum. All team members contributed and utilized a notetaking tool to debrief during or after the fireside chat (appendix H).

Objective 4: Develop Fireside Chat Curriculum

We analyzed the data we collected in objectives 1-3 to draft the fireside chat curriculum from important common themes. Analyzation of the best possible themes from objective 2 was fundamental to the creation of the curriculum. We cross-referenced our data from all sources to determine the themes for the fireside chats. To create a curriculum, we used Mr. Scrimshaw's ideal template which was a google drive folder. Within each folder lies a description of how to conduct a specific theme for a fireside chat with an ever-growing list of potential readings and recommendations. To achieve the learning outcomes desired by the WTN, readings and questions were found and created to aid chat facilitation. Research and interviewees helped to find insightful readings on fireside chat topics. This is useful in helping everybody get to the same base of knowledge and to inspire original thought. Many readings came from one interviewee in particular: author Laura Waterman (and her late husband Guy Waterman). Due to her long-time involvement in the trail community and individual experiences with wilderness and wildness, Ms. Waterman wrote thought-provoking chapters that are closely related to our topics.

Methodology

Objective 5: Utilize an iterative design process

Now that the data collection and initial curriculum were completed, the next step was refining the curriculum through a pilot fireside chat. The theme was the use of technology on trails. This theme was chosen for a few reasons. Firstly, it was definitely a topic that experienced trail users found important to discuss. Secondly, most of the fireside chat participants were college students interested in engineering and technology. During this pilot chat, we collected as much observational data as possible. We examined audience engagement as well as how the information was conveyed through the guided discussions. Participants engaged in a focus group on their experience, retention, and feedback. Focus groups are the best way to get the information that we were looking for because focus groups were more unstructured which allowed people to share their deeper thoughts. Afterward, we asked for comments or creative suggestions as well as what they liked and did not like about all of the fireside chats so far.

Findings & Recommendations

Protecting the Fragile Alpine Zone

The alpine zone in the White Mountain National Forest (WMNF) is a rare and fragile environment. Occupying only eight square miles in the White Mountains, protecting the alpine zone is imperative. We interviewed ten individuals who work with trails in the alpine zones including United States Forest Service (USFS) land manager Cristin Bailey, Appalachian Mountain Club (AMC) director of trails Alex DeLucia, USFS Ranger Mike Benson, and summit stewards Myles Sornborger and Maeve Milkulski. We also spoke at length and toured alpine areas in the WMNF with Nathaniel Scrimshaw and

Laura Waterman, each having a unique experience being Franconia Ridge Adopt-a-Trail owners as well.

The Franconia Ridge is a highly trafficked trail in the alpine zone (see figure 7 below). This level of visitors leads to a lot of damage, such as erosion. All twelve interviewees describe the fragility of this area, especially when considering the length of time it takes for vegetation to grow. Furthermore, the maintenance of the Franconia Ridge trail and many others within the WMNF, is inefficient and ineffective. Trails are being eroded which is a detriment to the ecosystem as well as a danger for hikers. Erosion removes compacted soil, often leaving only jagged rocks behind.

Interviewee	Type of Interview	Organization, Position	Date Interviewed
Jeff Marion	Environmental Expert	USGS, Recreation Ecologist	11/1/2022
Alex DeLucia (he/him)	Environmental Expert	AMC, Director of Trails	11/2/2022
Doug Betchel	Environmental Expert	NH Audubon, President of the NH Audubon	11/2/2022
Cristin Bailey	Environmental Expert	AMC, Forest service trail manager and trail supervisor	11/2/2022
Laura Waterman	Environmental Expert	Waterman Fund, Author	11/2/2022
Mike Benson	Environmental Expert	USFS, Forest trail manager	11/4/2022
Maeve Milkulski	Target Audience	WTN, Summit Steward	11/1/2022
Morgan Ruoss	Target Audience	WTN, Summit Steward	11/7/2022
Myles Sornborger	Target Audience	USFS, Hydrologic technician	11/16/2022
Jill Weiss	Educator	SUNY College of Environmental Science & Forestry, Professor of Environmental Studies	11/9/2022
Nancy Ritzger	Educator	AMC, Adventure education specialist	11/1/2022
Emily Davenport	Educator	LNT, Awareness Trainer	11/9/2022

Figure 9: This figure shows all of our interviewees, their organization, job title, and their interviewee group. The interviewees are organized in the order in which we interviewed them.

Findings & Recommendations

When hiking both Welch and Dickey mountains (11/13) and the Lonesome Lake trail (10/29), we observed several warning signs of erosion due to a high volume of hikers. Many tree stumps that were once beneath the surface of the trail were now several inches above the trail. The trail was also significantly wider than it was supposed to be because heavy foot traffic tramples the vegetation. Finally, there were obvious signs of heavily used unintended trails to get around some wet/difficult sections of the trail.



Figure 10: Image of a crowd of hikers on the Franconia Ridge trail. (Best Times to Day Hike, 2020)

Trails in the White Mountain National Forest are seasonally overcrowded and not designed sustainably which causes environmental problems and a diminished experience. According to eleven survey respondents, the majority of people felt that overcrowding was so prevalent that it diminished their experience. Observational experience from being in the Whites confirms that a large amount of people on a trail usually signifies a diminished experience, however, we visited as winter was starting so the trails were not in season.

Trails with few (but not a crowd) were enjoyable as interactions with hikers were especially pleasant. Experienced interviewees like the summit stewards, who have worked in the field on smaller scales, report these effects. Those experienced in trail ecology like recreational ecologist Dr. Jeff Marion or trail management like Cristin Bailey have noted and advocated against the existence of unsustainable trail designs across the WMNF and other regions.

There is a lack of proper education to prevent hikers from leaving a large impact. All twelve interviewees; agree that proper education for hikers would result in reducing hiker impact on trails. In the words of many including Mr. Scrimshaw and Laura Waterman, "Most people want to do the right thing," they just do not understand their impact. Enlightening hikers on their effect could result in behavioral change. Observational experience after taking Leave No Trace Awareness Training as well as relaxed nature walks with Mr. Scrimshaw supports this idea. After learning about trail problems and the frustrations land managers have, we watched our steps a bit more closely in order to stay on the path and not contribute to trail erosion and vegetation trampling. Dr. Marion agrees, but added that education has more of an impact when it comes to camping than trail hiking.

Findings & Recommendations

Learning Outcomes

In order to combat the continuous trail issues, we developed a fireside chat curriculum for use by World Trails Network, United States Forest Service, Hubbard Brook Research Foundation and other trail stewards so they can collaborate more consistently. These learning outcomes were developed from observing fireside chats, interviewing previous participants, and in part by Mr. Scrimshaw.

The first of the Fireside chat learning outcomes is “How to have a productive discussion”. Throughout the chats, participants will be prompted to engage in thought-provoking dialogue with their peers/colleagues. From the said dialogue, we intend for the participants to walk away with a better understanding of how to conduct a constructive conversation. To come to this finding, we asked Mr. Scrimshaw about his own goals for the curriculum.

Given the polarizing nature of some Fireside chat topics, we anticipate some to spark disagreement. With these disagreements being facilitated and practiced frequently, it is expected that participants will progress toward the second learning outcome, “How to discuss controversial topics.” This is again mainly from conversations with Mr. Scrimshaw.

No productive debate is complete without active listening.

As such it is critical participants attain the learning outcome of “Active listening skills.” Promoting active listening skills in tandem with productive dialogue will ensure participants are well-equipped to handle controversy.

Occasionally, there will be hikers that are unaware of or disregard the rules and regulations in the forest. Trail stewards reported that obstacles may arise when they have to educate trail goers in the field, mainly the sense of entitlement and selfishness of some hikers. With these accounts of struggling to change behavior being so frequent, it is advantageous to address additional tools participants can use to educate in informal settings. As such, the third learning outcome is “How to conduct trail education in difficult settings.” Summit stewards Myles Sornborger, Morgan Ruoss, and Maeve Mikulski.

In the instances in which stewards have to educate on the trail, the content is usually related to the Leave no Trace principles. Therefore, our next learning outcome, “Deep understanding of LNT principles,” is critical to a well-rounded trail education experience. This idea came from observational experience taking this course and then hiking the Lonesome lake, Welch-Dickey trails, and especially unstructured conversations with Mr. Scrimshaw in nature. According to the survey data, many of these principals may be completely overlooked on a regular basis.

Parallel to a deep understanding of LNT principles is the next learning outcome “Understanding the breadth and impact of trail issues.”

Findings & Recommendations

Throughout our encounters with experienced members of the trail community, it became clear that there is an abundance of trail issues that need to be addressed. Each issue has its complexity, nuance, and deep impact on trails. With trail issues being so important and relevant to the mission of the Fireside chat, we must cover the challenges facing them in great detail.

We also want to make sure that participants have a good understanding of the various organizations that already put great effort into negating trail problems. Understanding of said organizations will be delivered via the learning outcome “Awareness of different organizations and their partnerships.” With this learning outcome will come the knowledge of major influencers, potential trail problem solutions, and local trail history. Our group found the politics of the White Mountain National Forest trail organizations to be an extremely important influence on the health and enjoyability of trails.

Finally, it is a goal for this collection of learning outcomes to foster leadership skills in the Fireside chat participants. This Learning outcome will allow participants to communicate their learnings to others and hopefully act as leaders in other aspects of their lives. Our group and Mr. Scrimshaw brainstormed this idea during an unstructured work session.

Upon successful delivery of our established learning outcomes, participants will have the experience necessary to be productive members of the hiking and trail community. The delivery of these learning outcomes hinges entirely on the format of the curriculum and the fireside chats themselves.

Fireside Chat Format

To best deliver these learning outcomes to potential fireside chat attendees, a proper format had to be developed. Mr. Scrimshaw has been doing fireside chats for years, and is continuously evolving the format. The findings of the fireside chat structure stem from experiences with Mr. Scrimshaw and our host fireside chats. We recommend a format but have made the curriculum flexible enough to be modified for different target audiences and evolve as new information emerges.

We found a dialogical approach used in fireside chats, to be conducive to reflection and thought, which in turn changes behavior. Our own participant observations and interviews with fireside chat participants affirm that dialogue-based learning is conducive to the reflection of one's own experiences. Specifically, summit stewards Myles Sornborger, Morgan Ruoss, and Maeve Mikulski, Mr. Scrimshaw, Laura Waterman, and the Worcester Polytechnic Institute students Liam Bry, Liam Piper, and Regan Kahal. Participant observation helped change our behavior on trails as we were ignorant of the problems our behavior was causing.

Findings & Recommendations

The free-flow, minimal structure of the fireside chat is important to its identity as it builds rapport among the attendees. Including readings to the fireside chats, helps maintain attention to the given topic. Laura and Guy Waterman's books are a great tool for fireside chat material. Both of these findings are backed by interview data as well as observation. Past fireside chat participants agree that the minimal structure and readings were beneficial to their enjoyment and learning experience. Participating Worcester Polytechnic Institute students and the trail stewards shared that they enjoyed the minimal structure, and most also enjoyed the readings. Interestingly, one of the summit stewards said they would have preferred more readings, but each enjoyed the variety of readings. The variety they are referring to includes environmental ethics, articles or book chapters, and scientific papers.

The results of our pilot fireside chat offer additional support for this finding. We also found that the readings helped to start the conversation as well as control participants from going too far off-topic.

There are a few atmospheric elements to a fireside chat that allow it to be successful as well. **Comfort is a necessity to allow for deeper thought and reflection.** Therefore, we recommend participants arrive early to the first Fireside Chats to begin connecting with other participants.

We also recommend participants be instructed to bring their own chair if needed. The environment during the chats should be outdoors around a fire if temperature and weather allow. People should be instructed to make food beforehand to share with the other participants. The sky during the chat should be dark to minimize distractions, but people should arrive and start eating while the sun is still out.

The vision for the template came from our sponsor. The vision was a Google Drive folder with a landing page and folders for each fireside chat topic. We developed a landing page for the entirety of the Fireside Chat curriculum. The description provides insight into what the fireside chat concept is, how to conduct fireside chats, and why they are useful. We also offer recommendations on the landing page of possible orders of the lessons for different target audiences. Within the main fireside chat folder lies more folders with topics, each with a description and readings (see Appendix T, for an example). Each topic has two readings on it, one that is recommended by us and the other is another option that a facilitator may choose. There are descriptions of the readings as well as questions to help a facilitator prepare for a chat.

Findings & Recommendations

For each lesson, we designated a primary reading/video recommendation and incorporated additional supplemental readings that could be used in place of the primary reading. Accompanying each reading, we incorporate pre and during-chat questions to aid the facilitator. We did this because we noticed during our observation of the fireside chats that the facilitator, Nat Scrimshaw, was good at presenting thought provoking questions for chat participants. As not every facilitator will be familiar with all the topics and readings, we developed questions that could be helpful for other facilitators. The landing page as well as the instructions for each individual chat should help any facilitator guide a fireside chat.

Fireside Chat Topics

We identified 12 fireside chat topics and developed corresponding curriculum. There are many learning outcomes for the course as a whole as described previously, but some are consistent among variations of this course. These are: how to have a productive discussion, how to discuss controversial topics, active listening skills, and leadership skills. The others (how to conduct trail education in difficult settings, deep understanding of LNT principles, understanding the breadth and impact of trail issues, and awareness of different organizations and their partnerships) are specific to one or multiple topics.

Three E's (ethics, etiquette, aesthetics)

The topic of the three e's (ethics, etiquette, and aesthetics) is a good starting point for fireside chats because many beginner hikers don't understand these ideas. Structured and unstructured interviews with Mr. Scrimshaw, who is experienced in conducting fireside chats with the target audience, informed this topic. Leave No Trace awareness training revealed that many people don't understand the 3 E's. Cristin Bailey, Dr. Jeff Marion, and Alex DeLucia specifically pointed out that **beginner hikers do not understand proper trail etiquette**. Our survey results also suggest that people can overestimate how much they actually understand about LNT principles, or at least how often they actually exercise them. Further, the survey suggests that people have strong opinions about some behaviors on trails such as littering.

Ethics, etiquette, and aesthetics are not concepts people think about or exercise when they are on trails. This, as LNT teacher Emily Davenport agrees, must change for the betterment of trails. We hope participants gain insight on how to conduct trail education in difficult settings as well as the breadth and impact of their behavior on trail issues.

Findings & Recommendations

Topic: Trail Science

Dr. Jeff Marion's **ideas for sidehill trails are cheaper and easier to maintain than fall-line trails, but the idea of replacing old trails is highly controversial for a multitude of reasons including upfront cost, the historical value of pre-existing trails, and the feasibility of building trails in specific locations.** US Forest Service trails manager Cristin Bailey held a conference at which Dr. Jeff Marion spoke about his ideas of trail creation, changes, and management. His speech offered a perspective that is difficult to argue against scientifically yet people have differing opinions for a variety of reasons, such as Alex Delucia, New Hampshire Audubon Doug Betchel, USFS Mike Benson, and even USFS Cristin Bailey herself. Learning outcomes addressed in this chat specifically include how to discuss controversial topics as many of Dr. Marion's ideas are controversial as well as understanding the breadth and impact of trail issues.

Topic: Leave No Trace

Spreading a deep understanding of LNT principles will lead to lower use impact on trails. Every single interviewee agreed that the LNT principles are an important thing for hikers to learn to reduce their impact on the environment.. Jeff Marion also agreed but cautioned that the LNT principles are important for camping and that trail design is more important for keeping trails healthy.

Observational experience on the Welch and Dickey loop and Lonesome Lake Trail reinforces this finding as well. We believe that this is an important topic to cover in any trails curriculum, especially with beginner hikers and trail users. The participants of the chats should have a deeper understanding of LNT principles as well as a better understanding of how to conduct trail education in difficult environments.

Topic: Accessibility

Accessibility refers to the degree to which a space or environment is easy to enter, navigate, and use. In the context of trails, accessibility can refer to the inclusion of people from different ethnic backgrounds and physical abilities. We don't believe that this topic is being talked about enough in the trails community and we believe that it is an important topic to bring to a fireside chat. An interview with Doug Betchel of the NH Audubon revealed that it is sometimes difficult to keep trails inclusive for everybody. Speaking with Mr. Scrimshaw also reinforced this idea.

Accessibility also refers to different levels of difficulty designed into trails to allow people with physical limitations to have access to nature. Four interviewees mentioned that it was important to design some trails so that they are more accessible, but those same interviewees also admitted that it is also important to have more difficult trails for experienced hikers so that they can have a challenge. An interview with NH Audubon president Doug Betchel enlightened us about different philosophies that must be

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considered when dissecting this idea. The correct balance between accessibility and challenge is not easily apparent which is why this would make a good fireside chat topic. It is important to get people talking about issues like these that don't have clear or easy answers. It will help the participants better understand how to manage difficult conversations as well as open participants up to opposing viewpoints they may not have considered.

Topic: Partnership

Collaboration between trail organizations is necessary to best maintain the trails in the White Mountains. In an interview with forest ranger Cristin Bailey, she explained how the trail work on Crawford Path would not have been as thorough if there had not been a collaboration between different organizations. She explained that it took a bit of time, but eventually the organizations were able to work together smoothly. This collaboration is important to regularly integrate into trail management. Five different interviewees told us that **most of the trail organizations in the White Mountains are both underfunded and understaffed.** This makes it even more important to promote collaboration within trail education. Participants in this fireside chat will have a better awareness of the partnerships of these different trail organizations.

Topic: Educating the masses

Talking to three summit stewards during the interview process revealed one of the most important aspects of the fireside chats. The stewards found fireside chats to be a place for them to discuss the difficulties they were having educating trail users. They used the fireside chat to discuss methods of education to reach different types of people. **On-the-trail education by summit stewards is an essential part of making trail user behaviors more environmentally conscious.** Eight interviewees agreed with this statement. Participant observation in the LNT awareness training also reinforced the importance of on-the-trail education. Having a forum for summit stewards to discuss and share different strategies for education is vital. This chat will help participants with the learning outcome of conducting trail education in difficult settings.

Topic: Trail Management

Trail Management is a core theme for the Fireside chat curriculum. In the Trail Management chat, the facilitator will prompt the participants to consider whether current trail management strategies can keep up with modern levels of use. Several interviewees including Dr. Jeff Marion and Mr. Scrimshaw expressed their concern that trail management strategies cannot keep up with the volume of visitors. Our observations with Mr. Scrimshaw on Welch-Dickey hike and Lonesome Lake trail confirm the opinions of said interviewees. On the trails there

Findings & Recommendations

were many issues of which we quickly became aware. People were going off trail in order to avoid difficult sections, leaving social trails in their wake that cause damage to the environment and vegetation of the area. There was also a high level of erosion on some of the trails. Tree roots that used to be below the ground were now a tripping hazard as the soil that covered them had been washed away.

We have also found that **after large, costly maintenance on a trail, it is difficult to convince people to perform the smaller maintenance on that same trail.** Some interviewees mentioned concerns over the Crawford Path not getting proper upkeep since it recently underwent major renovations. Constant maintenance on Crawford Path and similar trails will prevent large maintenance efforts in the future which are more costly. Discussion of these trail management issues is important to have in the curriculum to promote better trail maintenance practices. The understanding of trail issues and management will be more comprehensive, satisfying the learning outcome.

Topic: Technology

In the modern world, technology can be found intersecting with just about any topic, trails are no exception to this. Issues such as drone use in the wilderness frequently spark debate because some see the presence of technology as a nuisance whereas others prioritize its uses. **Technology on trails is a**

polarizing topic that has no clear answer.

Many trail users and experienced land managers agree that the presence and use of technology should be part of the Fireside chat curriculum. Cristin Bailey, Emily Davenport, and educator Nancy Ritger all highlighted the importance of discussing technology related issues at a Fireside chat. In the discussion of this topic, participants will progress towards several learning outcomes such as addressing controversial topics, understanding the breadth and impact of trail issues, and listening skills.

Topic: Conservation vs Preservation

The issue of conservation vs preservation is a passionately discussed topic in the trail community. Notable figures in the community such as Laura Waterman, wrote at length about this topic. Preservationists believe the land should be protected and left to its 'natural' state with a limited amount of use allowed. Whereas conservationists advocate for the land's resources harvested sustainably. These two belief systems contradict each other in many ways. Therefore, we anticipate participants will be prompted to engage in their discussion, listening, and conflict resolution skills. We have found through our participants observations and an interview with Laura Waterman that conservation vs preservation is not a well understood debate. Having it in a fireside chat would allow for a free discussion about a difficult topic.

Findings & Recommendations

Topic: Wildness

The chat topic of Wildness comes mostly from our interview with Laura Waterman. She and her husband, Guy Waterman, wrote several books detailing stories about trails, the environment, and the White Mountains. She explained wildness **as the feeling when you are completely disconnected from human impacts, and able to experience nature in its purest form.** This involves a sense of discovery, adventure, and danger. Wildness was an important topic to include in this curriculum because it may cause participants involved in the chat to reflect on their own connection and develop a deeper connection with nature. This is a perfect chat to have early in the curriculum because it can introduce the participants to the idea of human impacts and can help participants understand the value of untouched nature.

Topic: Free Topic(s)

An important aspect of the fireside chat curriculum is its flexibility. There may be something important in the news that a facilitator believes is important to discuss, a new issue that emerges on WMNF trails, or a guest speaker who is willing to share their wisdom and facilitate discussion on a topic within their experience. Guest speakers and spur-of-the-moment topics were important to the trail stewards that we interviewed.

Therefore, we recommend facilitators leave room in the curriculum for current events or new fireside chat topics.

Future Impact

Throughout this project, our group has been surprised by the depth and span of impacts hikers can have on trails and alpine vegetation. In a certain sense, at the beginning of this project we were potential fireside chat attendees, but at that time there was no curriculum to teach us about these issues. We believe that this curriculum developed in collaboration with WTN: Hub for the Americas, will have a lasting impact and provide others with the same educational value imparted on us in our experience.

Acknowledgements

We would like to thank everybody who helped us complete our project. Everybody we talked to was extremely passionate and helpful. We were not sure how much support to expect as we did not know the area very well, and we were happily surprised.

First we would like to thank our sponsor World Trails Network: Hub for the Americas. Nat Scrimshaw was always happy to lend us a hand and was always able to make time in his busy schedule for us.

We would also like to thank our advisor, Corey Dehner, for keeping us motivated and on track for our project. Without her help we could easily have gotten overwhelmed and lost in the work.

We would also like to thank the 12 individuals who we interviewed. The information you gave us was extremely useful and guided the project in ways that we could not have anticipated. We enjoyed meeting all of you and hope to have conversations with you in the future.

Lastly, we would like to thank everyone who participated in the survey and gave us valuable information about themselves and the White Mountains.

Thank you,
Luke Gardone, Ricky Healey, and Rick Shaw

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