Did they learn? Training volunteer crew leaders in natural areas restoration techniques

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Abstract

This research aims to evaluate the effectiveness of natural lands restoration volunteer training programs. Best practices in ecological restoration training should be determined with this same rigor with which we design ecological restoration standards themselves. Historically, this training process is ad-hoc, accomplished through on-site mentoring but the role of volunteers is increasing and direct mentorship is not a scalable resource. By elevating restoration volunteer training curricula to the level of scholarly pedagogy, precious volunteer hours will be spent to the maximum benefit of the wildlands we hope to restore. Models exist for citizen science monitoring programs, and for the development of volunteer programming. However, similar attention has not been paid to the development of educational training programs that inform this field work. My central prediction is that restoration efforts will be more ecologically successful if training modules are effective. Willing volunteers registered for an annual training event hosted by a team of leading restoration organizations, including non-profit organizations and government agencies, will participate in this research. In this repeated measures design, each subject will be measured three times. A pre- and posttest survey will characterize the respondents before and after the training event to measure how much they learned. Ecological measurements will ground-truth this learning with competency demonstrations. In the context of this research, *effectiveness* relates to volunteer learning. In turn, volunteer learning should confer restoration success. These learning indices will be compared to curricula and instructional techniques.

Did they learn? Training volunteer crew leaders in natural areas restoration techniques

This research aims to evaluate the effectiveness of natural lands restoration volunteer training programs. Effectiveness is defined by two measurements, an assessment of the volunteer learning experience, and an assessment of the resultant natural lands restoration work intended to mitigate recreation impacts, weed invasion, and other use-related degradations. As such, the applied goal of this research is two-fold. The first goal is to improve the quality of ecological restoration work that is accomplished increasingly by citizen volunteers due to decreased federal funding streams for restoring public lands adjacent to human settlement that experience significant ecological stresses ("A threat to federal conservation funding," 2013). The second goal is improve volunteer training for the volunteer by applying pedagogical theory to adult service learning for an enhanced social learning experience. Before these goals can be achieved, we need to understand how effective natural lands restoration volunteer training programs are in their current state.

Research questions

1. Is training for restoration volunteers related to the quality of restoration outcomes completed by volunteers?

2. Specifically, was the restoration task performed to the specifications indicated in the training module, and are learning survey scores related to the competency demonstration in the field?

3. If volunteers are satisfied with their training experience, are they more likely to be retained?

Literature Review

The restoration ecology perspective

Researchers estimate that over one-third of the Earth's ecosystems are degraded or completed converted from their natural state due to anthropogenic causes including habitat loss and fragmentation, non-native species introduction, pollution, and urbanization (*Millennium Ecosystem* Assessment, 2005). In response, the field of restoration ecology has grown immensely in the past half century. Its growth, however, has not been accompanied with discipline-standardizing practices (Seaman & Gass, 2004). This is partially due to the dynamic nature of ecology itself and partially due to the difficulty researchers have in designing studies that have broad applications to restoration practitioners, which includes attention to the action of learning (Stanton, Giles, & Cruz, 1999).

Regarding the practical realm of natural lands restoration, it is challenging to extrapolate practical advice from nuanced ecological data, and even more challenging to ascertain through data analysis whether or not restoration efforts are "successful" (Hobbs & Norton, 1996). Regardless, restoration ecology is an applied science arising from ecological theory and restoration ecologists should continue to make every attempt possible to analyze restoration techniques. Furthermore, cost-benefit analysis indicates that even questionable restoration outcomes still result in ecosystem improvement and therefore should be undertaken (Groot et al., 2013).

Extensive literature analysis indicates however that a disheartening number of restoration ecology papers fail to provide practical advice for land managers (Suding, 2011). Without concluding statements directed towards practitioners, scientific research in the restoration ecology field falls on deaf ears. Very few researchers unless employed by a practicing ecological restoration organization actually engage in restoration work. That is to say, research is the

researcher's business, not restoration. While a researcher may be involved in a specific restoration project to study it, there is no passing of the torch as-it-were. If restoration ecology researchers do not make an attempt to describe the practical application of their findings, the Earth is no cleaner, healthier, or more restored than it was before the research was conducted.

Training volunteers to be restoration practitioners

While finding a solution to this information transfer problem is not the purpose of this research, it is an important premise with which to expand upon the topic of volunteers and restoration ecology. Volunteers, members of the practitioner cohort, are the compliment to ecological researchers. They perform the physical restoration outcomes that should be informed by the research, and increasingly, they are the only workers engaging in restoration activities due to decreased federal funding for restoration activities ("A threat to federal conservation funding," 2013). Volunteers can be very effective participants in restoration activities; research has shown that volunteers can increase their cognitive acuity for ecological restoration through experiential learning (Galbraith, 2013; Reid, Williams, & Paine, 2011). Many studies have investigated restoration volunteer motivations (Asah et al., 2014; Bramston et al., 2011; Reid et al., 2011), but few have studied the education of ecological restoration volunteers as informed by the literature supporting educational theory (Martin, 2013).

Best practices in ecological restoration training should be determined with this same rigor with which we design ecological restoration standards themselves (Suding, 2011). This requires appropriate communication between the researchers and the land managers. The land manager must receive useful scientific information from the restoration ecology community but where then does the land manager go to learn how to train volunteers to execute this scientific information in practice?

Historically, this training process is ad-hoc, accomplished through on-site mentoring and management. Previous research has qualitatively described the organic process of volunteer development (Galbraith, 2013). This research indicates that even untrained volunteers, through experience, gain knowledge of the land and can become effective restorationists (Reid, Williams, & Paine, 2011). Nonetheless, literature reports a bias against volunteer labor by government land managers (Bruce, Newingham, Harris, & Krumpe, 2014). This is in part due to work environment factors for government employees, specifically the lack of time to train volunteers, but also due to the perception that volunteers can't do quality restoration work. In light of the declining funds provided to federal land managers by congressional appropriations, this bias against volunteers could be a serious limitation for future restoration projects that might find funding but will likely require volunteers for manpower.

By elevating restoration volunteer training curricula to the level of scholarly pedagogy, precious volunteer hours will be spent to the maximum benefit of the wildlands we hope to restore. Since no formal educator training exists for volunteers in the realm of ecological restoration, the research proposed here should prove very informative, and the first of its kind to address the education of volunteers in the realm of natural lands restoration from a dual perspective of restoration ecology theory and educational theory. Giles and Cruz (2000) conclude that there is a need for community- and university-partnered research of which this proposal is a representation.

Models exist for citizen science monitoring programs (Houston, 2012; Keefer, Marshall, & Kaye, 2011), and for the development of volunteer programming (Martin, 2013; Mitchell, Bercaw, & Carlson, 2013). However, similar attention has not been paid to the development of educational training programs that inform this field work (Seaman & Gass, 2004). This is likely

a symptom of the narrow-mindedness of research pursuits that influence only one discipline. In this research proposal we seek to measure both with the toolset of the restoration ecologist and the toolset of the education researcher. We turn now to a discussion of pedagogy that supports service learning.

The pedagogy of service learning

Service learning as a distinct discipline that grew out of environmental education, a phenomenon described no earlier than the mid-20th century (Stapp, 1969). Service learning was first described in depth in the 199o's (Furco, 1996; Stanton et al., 1999). If one considers the history of environmentalism in the United States, a clear relationship exists between the interest in environmental education and service learning and federal legislation that sparked the environmental movement. A similar pattern emerges in pedagogical research in the mid-20th century in which we see a major shift in educational theory, which derived first from behavioral psychology research, most notably the work of Ivan Pavlov. This learning theory predicated on a behavioral response mechanism was first challenged by cognitivists (eg. LevSemenovich Vygotsky) who argued that thought played a role in self-determination and learning. Simultaneously, constructivists (eg. Jean Piaget) illustrated that experience informs learning and that social interaction influences learning outcomes.

Service learning is specifically interdisciplinary and socially interactive, therefore constructivism is an appropriate framework from which to consider the pedagogy of restoration training. Specifically, social cognitive theory popularized by Bandura (2001) narrows the focus to the specific identity of a volunteer. Bandura focuses his interpretation on the identity of the learner as an agent, an active participant in the present and the future predicted actions of the self. Volunteering, by definition, is an act in which one performs without specific compensation

like monetary reward or service access. To engage in volunteerism in the first place is an agentic action. This research does not aim to describe the human qualities that drive a person towards the agent-volunteer identity. Rather, this research seeks to evaluate the effectiveness of educational opportunities for these individuals. It seems wise then to presume a lens that fits the student profile, ie one in which the student is an active, social, and self-determining participant in the learning experience. This profile is reinforced by many recent case studies of volunteer engagements in restoration activities (Martin, 2013; Keefer et al., 2011; Houston, 2012; Summer, Gilmour, & Conservancy, 2011; Conaway, 2012; Handelman, 2013).

Hypothesis

My central prediction is that restoration efforts will be more ecologically successful if training modules are effective. *Effectiveness* will be evaluated in terms of human and ecological parameters. I intend to test the following hypothesis: there is a relationship between volunteer training effectiveness and restoration outcomes.

Methods

Willing volunteers registered for an annual training event hosted by a team of leading restoration organizations, including non-profit organizations and government agencies, will participate in this research. The applied value of this research is to improve restoration outcomes and to improve the learning outcomes for volunteers who participate in restoration training. Since participants are attending the training to prepare for future volunteer leadership, the assumption is that volunteer involvement will increase over time. Therefore, evaluating the volunteer learning experience in terms of its practical and personal value for the volunteer will have predictive power for volunteer recruitment for the currently participating organizations, future investigators and organizations who might replicate the methodology. Practically, did they

learn? Personally, did they enjoy themselves, gain something, and/or find it worthwhile? Will they return for another volunteer experience?

Participant Selection

The target population are attendees at an annual crew leader training event. As described by the Executive Director of the hosting organization: "Concerning crew leader training, it is targeted toward the general population of individuals who desire to take their volunteering to the next step. These are the die-hard volunteers who desire a leadership role. Following training, these folks will be qualified to crew lead for any number of nonprofit/volunteer groups in the Pikes Peak Region. Some of the groups are more formalized with 501(c)(3) status and paid staff. Others are more informal and can best be described as 'Friends Groups.'" (J. Peterson, personal communication, February 7, 2015). The training is organized by the City of Colorado Springs Regional Parks, Trails & Open Space, Trails and Open Space Coalition, Rocky Mountain Field Institute, Volunteers for Outdoor Colorado, and Friends of The Peak.

The sample will include all of the attendees of this training who are willing to participate. In 2014, 34 individuals participated in the training, therefore the expectation is that at least 34 individuals will participate in this research. The sample is representative of the Colorado population of volunteers engaged in restoration ecology stewardship efforts. As described, the event is a collaborative effort and will therefore train nearly all of the committed volunteers in this field, regardless of the organization for which they volunteer. This sample will not include previously trained crew leaders but could potentially include future years' participants, contributing to a much larger sample. This research could also be repeated at similar trainings in other regions to increase the sample. The larger the sample population becomes, the broader the

application of the research, including the development of discipline-standardizing training practices.

The existence of this collaborative training represents evolution in service learning for volunteers. In the last decade, non-profit leadership in ecological restoration has grown. In the early days of volunteer management, almost all efforts were piecemeal and independently coordinated. Therefore the work performed on the ground was more variable and leadership guidance was also more variable. These comments derive from my personal experience working in this field in Colorado, Wyoming, and Montana for over 10 years, however let it be noted that I have no prior knowledge of nor have I served in any volunteer and/or leadership roles with any of the organizations participating in this training. In the case of Volunteers for Outdoor Colorado, I have participated in and led trainings for one of VOC's partnering organizations. This was not in the Pikes Peak region and it occurred over five years ago. This previous experience affords me the insight to design this research as I have a keen understanding of how volunteer training is executed, however my objectivity as a researcher is protected since I claim no authorship in the training materials being studied.

Protecting the subjects

The training registrants will be contacted for the first time after they register for the training. The first contact will be a solicitation for participation and a brief research statement and explanation of the imminent need for this research. Specific hypotheses will not be shared to protect the validity of the research. If the registrants agree to participate, they will send back a signed document of their intention to participate.

Once participation is confirmed, informed consent will be provided via webcast and written letter, both of which will be delivered via email. The informed consent will outline the general purpose of the study as an evaluation of training effectiveness. They will be guaranteed that the survey data, which is managed by the research team, will not be linked to their identity in any way. Each subject will have a number with which to identify him or her but only the researcher will hold that code. It will be stored in a protected file and not shared with anyone under any circumstance, as even an emergency that might occur during the training would have no relevance to these data.

There might be some concern that poor work during the training and investigation might prevent the volunteer from achieving leadership status. In the reverse, there might be concern that these data could be used to elevate some volunteers to envious leadership roles. Neither of these outcomes will be possible because the trainers and their associating organizations will have no access to the data until it is analyzed. After statistical analysis, the trainers and the subjects will be afforded reporting privileges, ie the opportunity to use the results in marketing and volunteer retention strategies. The same debriefing presentation will be sent to all respondents who participated in any capacity. This debriefing presentation will be available via webcast and will be shared via email. The intent is to publish this research; when and if that occurs, the published article will be sent to all participants.

Once a respondent-trainee has interacted with the informed consent materials, they will have the opportunity to contact the researchers with questions before the survey release date. If a respondent-trainee has not requested additional communication by the survey release date, the research team will assume that the respondent-trainee had no additional inquiries. The survey will be web-based and it will be released via email. Web facilitation of the surveys will protect

the privacy and anonymity of the subject. Subjects will not have to sit in a room during the training to complete this work and no paper files will be generated. If, however, there is a willing participant who does not have access to Internet technology, paper surveys can be sent via mail. When they are returned, they will be opened by an unaffiliated individual and converted to an electronic survey via manual entry. After the conversion, the paper copy will be destroyed thus erasing any trace between the paper respondent and his/her responses.

To maintain confidentiality during the restoration task evaluation, this measurement will not occur during the training as this could link the respondent-trainee to the restoration measurement. Therefore, the research team will go out immediately after the training and complete the measurements without any trainers or trainees present.

Data Collection

Dependent Variables- Survey Data

A pre- and posttest design characterizes the field of respondents before and after experimentation (*Appendix A*). There are three question groups: learning objectives, volunteer goals and satisfaction, and volunteer demographic information. In the learning objectives set, a series of paired questions address the central learning objective of each training session. There are eight central topics covered at the training: leadership, trail structure, basic maintenance techniques, tool safety, restoration, trail closure, noxious weeds, team building. Two paired questions address each topic for a total of 16 content-specific survey questions on each the pre- and post- training surveys. The paired questions were designed and then randomly assigned to the pre- and post- survey to avoid any unintentional bias in the question construction. The pre- training survey will provide an assessment of prior learning and the post-training survey will

quantify the knowledge gained during the training. This analysis will be compared to field measurements of restoration work completed during the training to answer two questions: Was the restoration task performed to the specifications indicated in the training module? Was the survey score related to the competency demonstration in the field?

The survey also includes a question group that relates the volunteers' motivations and goals for attending the training (pre-training survey) and their reflective impressions after the training (post-training survey). These questions will be analyzed to provide insights to managers regarding volunteer recruitment and retention strategies. Finally, a third demographic question set will appear only once in the pre-training survey.

A methodological review of the literature informed the survey design. Specifically, demographic questions are at the end of the survey (Roberson & Sundstrom, 1990). "Which best describes" and "Rank these choices" questions have the responses randomized for every respondent to ensure that response order is not confounding the responses (Cozby & Bates, 2012). Questions were checked in the Question Understanding Aid (QUAID Tool, n.d.). A five category agreement scale was used with the center choice representing a neutral response (Cozby & Bates, 2012). Participant communication templates can be reviewed in *Appendix B*.

Independent Variables- Curriculum and Instruction

These survey-based learning indices will be compared to curricula and instructional techniques. Curricula are measured using a time ratio scale to quantify types of learning activities that occurred during the training session. Instruction is measured using a time ratio scale to quantify types of instructional techniques that occurred during the training session (see

Appendix C for observation coding tool). Correlational analysis will be conducted to identify patterns relating curricular design and instruction to volunteer learning.

I predict that there will be a correlation between the curriculum and the instructional characterization. For example, if the students are in small group (a characterization of the curriculum) then the instructor will likely be mentoring small groups (a characterization of the instruction), but that might not be the case. If the measures are highly correlated, only one measure will be used in cross-comparisons and analyses with response data collected such as the survey data or the ecological data. If these variables of instructor and session curriculum are correlated, it would confer construct validity.

What is effective?

In the context of this research, *effectiveness* relates to volunteer learning. In turn, volunteer learning should confer restoration success. If post-training survey data as compared to pre-training survey data indicate that learning objectives are achieved, this finding will characterize the training as *effective*. Likewise, if a respondent-trainee performs the restoration task s/he was trained to perform with accuracy in a competency demonstration, this outcome will be characterized as evidence of *effectiveness* in terms of restoration knowledge training. If post-survey evaluative questions do not align with the respondent-trainee's actual performance in the field, more research will certainly be needed to ascertain the possible causes for this knowledge gap. Finally, motivational and demographic data will be collected to characterize the respondent sample.

Concurrent to behavioral research, ecological measurements will be operationally defined and analyzed according to research-based principles in the field of restoration ecology. This ecological research will be summarized in a forthcoming proposal.

Independent Variables – Curriculum and Instruction

Curricula are measured using a time ratio scale to quantify types of learning activities that occurred during the training session.
1) Listen and watch a live trainer
2) Read
3) Watch a video of field work
4) Interact with each other in group work
5) Create a learning object with their group members
6) Write
Each session's learning outcomes will correspond with paired questions on the pre- and post surveys that probe a respondent's preferred learning environment. Correlational analysis will be conducted to identify patterns relating session curricula to volunteer learning.

Instruction is measured using a time ratio scale to quantify types of instructional techniques that occurred during the training session.
1) Speaking to the participants as a whole group
2) Showing them an object
3) Demonstrating a skill
4) Administering technology-based components (ie. watching a video, showing a website, etc.)
5) Mentoring small groups
6) Taking a break (ie. Sitting during video, small group time, etc)

Correlational analysis will be conducted to identify patterns relating curricular design and instruction to volunteer learning.

Training Effectiveness (dependent variable)

Did they learn? *If the null hypothesis is rejected...*

Volunteers **demonstrate increased knowledge** by:
1) answering more restoration questions correctly on the post-training survey than on the pre-training survey, and by
2) demonstrating competency in applied restoration tasks in the field.

Training Topics (learning objectives)

- leadership
- trail structure
- basic maintenance
- tool safety
- restoration
- trail closure
- noxious weeds
- team building

Figure 1. Independent and dependent variables.

Research Design

This is a repeated measures design in which each subject will be measured three times (Figure 2). The statistical advantage of a within-subjects design is that the variability between subjects can be assessed independently of summary statistics that evaluate trends in the total sample's responses. I am interested in the learning effect; serial measurements will provide the data necessary to evaluate the learning effect, ie how much was known prior to entering the training versus how much knowledge was a result of the training.

Repeated Measures of Respondent-trainees (subjects)
Pre-survey - administered before training
Post-survey - administered after training
Restoration task evaluation - measured during field components of training

Figure 2. The repeated measured design will evaluate each subject in three serial measurements.

Discussion

Validity

Internal Validity

Regarding the internal validity of this proposed research, careful attention was paid to the development of the survey itself. Akin to an assessment in a traditional learning environment, the pre- and post-training surveys validate the data collected by providing a starting and an ending parameter. The quality of this measurement is related to the quality of the assessment tool. Each question was carefully worded to maintain neutrality. Coupled questions designed to assess the same learning topic were then randomly assigned to the pre- or post-training survey to avoid any question construction bias. Indeed, assessment has been elevated in modern pedagogical theory.

Over 2,400 authors have cited one paper considered the seminal paper on "backwards design." Wiggins and McTighe (2005) promote a three stage process in which learning objectives are first identified, then "acceptable evidence" is conceptualized, and then finally learning activities are designed. This is contrary to the historical pattern of designing in sequence of student engagement, ie identify the learning objectives, design the learning activities, and then design the assessments. Paying close mind to this relevant educational theory, the surveys

designed for this research project were carefully planned after consideration of the learning objectives, not after reviewing the actual lesson plans. The lesson plans and the instruction are a subject of investigation here. By avoiding any exposure to these prior to the investigation, the researchers have avoided writing questions that directly key into lesson cues. Likewise, the trainers will have no exposure to the surveys therefore they will not be able to alter their behaviors for improved learning assessment. In other words, they won't be able to "teach to the test."

The ground-truthing research methods, ie the work of assessing the field work accomplished by the respondent-trainees, have yet to be developed. This is a concern for the internal validity of the restoration ecology measurements component. It is unclear how this research will be possible on the ground. It is desirable for the measurements to be made in the most inconspicuous manner possible, ideally while no one else is present. Furthermore, an overt display of measurement might encourage more diligent work than would be normally performed by volunteer. This could confound the results by skewing them in the direction of a Type I error.

Another issue with this research design feature is that it might create ad-hoc groups within the general sample population, which will then have to be assessed for validity. For example, if three trainees work together on a specific restoration task, their survey results will have to be pooled and then compared to the restoration outcome. Alternatively, the restoration outcome measurement could be repeated in the data spreadsheet connecting it to each of the participants. The former is more desirable to avoid amplification of a specific but perhaps erroneous field measurement by duplicating it in the dataset. The former might lead to woefully small sample sizes if 2-3 dozen participants are regrouped into 5-6 working groups.

External Validity

Regarding the external validity of the proposed research, the collaborative nature of the training contributes to broader external validity. Nonetheless, after only one sampling effort, the sample size will be marginal at best making this a weakness in this research approach. That being said, the focus on a collaborative training event elevates the perspective from a one-organization case study, which abound in the literature, to the quest for a quantitative tool that can be employed in a variety of contexts but then is aggregated for powerful analysis.

I hope that this pilot research will provide insights for study improvements, and that future funding will afford the opportunity to radiate this research design to other organizations, perhaps in other contexts like service learning in other fields, or in other geographic contexts both domestic and international. Much like the power in the national survey data project, the analytical applications are quite expansive if the data set is robust. To facilitate such a broad future application, questions are grouped into three categories: 1) learning outcomes, which can change according to the specific training module, 2) volunteer goals, motivations, and satisfaction, and 3) volunteer demographics.

Ethical considerations

There are no apparent ethical concerns regarding this research. *Appendix B* reflects the intended communication stream that will inform and protect research participants. Hardly anyone can argue against volunteerism and against wildland restoration and in fact research efforts to improve in these realms might be seen as service-oriented in themselves. That being said, my biggest ethical concern relates to my presence at the actual training. Unlike a classroom of students in which all are there fully aware of my intentions to evaluate their learning as that is the

primary goal of taking credit-bearing courses, ie to gain credit, the service learning environment

is one in which the goal is not self-oriented. Therefore, personal evaluation might be off-putting

to participants. It would be a shame if someone decided not to volunteer as a result of a

research-involved experience at the training.

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Volunteer Motivations, Goals, and Assessment

Pre- and post-training survey questions are presented together to illustrate the intentions of the inquiry. Paired questions will be specifically analyzed together to evaluate changes in respondents' understanding and/or perception. All responses will be randomized and formatted for an electronic survey tool. Not all questions on the pre-training survey are paired with questions in the post-training survey. For example, demographic questions appear only in the pre-training survey. Some motivational questions have no compliment in the post-training survey.

Pre-training: Rank your reasons for attending this training experience (1-5).

I want to hang out with my friends.

I want to network with my peers.

I want to promote my job readiness.

I want to perform restoration tasks more skillfully.

I want to become a better leader.

Post-training: Do you agree with this statement?

This training was a valuable learning experience.

Strongly agree/Agree/Undecided/Disagree/Strongly disagree

Pre-training: Which best describes why you work/volunteer in the field of restoration ecology (rank the following 1-5):

This experience prepares me for a future career opportunity.

I like to work outside.

I need to give back to the environment that I use for recreation/hunting.

I care about the Earth.

I need to give back to the environment that I use for my livelihood.

Pre-training: Do you agree with this statement?

I like to learn new things.

Strongly agree/Agree/Undecided/Disagree/Strongly disagree

Pre-training: Do you agree with this statement?

I think volunteering enriches my life.

Strongly agree/Agree/Undecided/Disagree/Strongly disagree

Pre-training: When you are in a learning environment, do you prefer (rank the following 1-4):

read directions and then perform a task.

watch a physical demonstration of a task and then perform the task.

to listen to someone explain a task and then perform the task.

start a task and figure it out along the way by trial and error.

Pre-training: I learn best

alone.

in small groups.

in large groups.

Post-training: Do you agree with this statement?

I felt comfortable with the way the training was taught and facilitated.

Strongly agree/Agree/Undecided/Disagree/Strongly disagree

Pre-training: Do you agree with this statement?

When in a group I usually take the reigns and become the de facto leader.

Strongly agree/Agree/Undecided/Disagree/Strongly disagree

Pre-training: Do you agree with this statement?

I would prefer to be assigned a task that I can work in by myself.

Strongly agree/Agree/Undecided/Disagree/Strongly disagree

Pre-training: Do you agree with this statement?

When in a group, I am a quiet but valuable contributor to the group.

Strongly agree/Agree/Undecided/Disagree/Strongly disagree

Post-training: Do you agree with this statement?

I felt comfortable when asked to work in a group during the training.

Strongly agree/Agree/Undecided/Disagree/Strongly disagree

Post-training question: Do you agree with this statement?

I felt comfortable when asked to work by myself during the training.

Strongly agree/Agree/Undecided/Disagree/Strongly disagree

Pre-training: I learned about environmental issues and what I could do to help the Earth

at work.

at home.

from my peers.

in college.

in grade school.

Learning Objectives

These coupled questions are randomly assigned to the pre- or post-training survey.

Leadership

(Same question appears in both pre- and post-training survey) You are the crew leader for a weekend project in the foothills near town. Your group consists of one older man, three fit adults, one 12-year old, and a family (mom, dad, two young children). You are tasked with narrowing the trail in an area that has been widened during wet spring conditions. There are many ways to delegate tasks- describe how you would delegate the tasks necessary to narrow the trail? Try to explain your rationale in your response.

Trail structure

An outsloped tread is one that is

> lower on the outside or downhill side of the trail

> higher on the outside or downhill side of the trail

> designed for walking downhill

> designed for walking uphill

Which of the following is not a trail maintenance structure

> rolling grade dip

> water bar

> French drain

> Tread creep

Basic maintenance

The first basic maintenance problem that develops on a trail on a side hill is usually

a loss of outslope.

incision.

an eroding backslope.

that the trail gets too wide.

If you had to choose one and only one task for your crew to accomplish to maintain a trail on a side hill, which would you choose?

Deberming

Building a dip

Hardening the trail surface

Narrowing the trail

Tool safety

You should carry your primary tool

In your downhill hand with the blade facing down

In your uphill hand with the blade facing down

Strapped to the outside of your backpack

The acronym CUSS stands for

Carry Use Storage and Safety

Caring Understanding Smiling Supporting

Cap Underscore Scrape Stabilize

This acronym means nothing

Restoration

Appears in both surveys: Define restoration ecology.

What is the number one cause of failure in restoration efforts?

A lack of communication between land managers and trail users

A lack of water to revegetate the area

A lack of source material to truly conceal the ecological damage from view

Imagine you are in the field leading a crew and you are tasked with "restoring" the landscape.

What do you think would be the best first thing to do with your crew?

Walk the trail to look for nearby areas that can serve as a model for your effort

Discuss tool safety and start delegating tools and roles

Send a small group out to collect materials

Trail closure

If you are going to close a trail, in what order would you conduct these tasks (rank 1-)?

Walk the entire trail section.

Collect and plant live plant material in the closed tread surface.

Break up the tread surface with a hoe to loosen the soil.

Locate and install specimen rocks.

Locate and spread dead wood and other dead plant material in the closed tread surface.

Which of the following is probably <u>not</u> a good reason to close a trail?

There is an adjacent trail going to the same place.

The trail was poorly designed, or not designed at all and therefore will have perennial problems.

The trail is really too challenging for equal recreational access.

The trail is leading straight towards a known nesting site.

Noxious weeds

You are organizing a weed mitigation crew and the only activity you can do is hand-pull weeds. Which weed would you choose based on its growth patterns?

Kochia

Thistle

Bindweed

Common mallow

You are leading a crew and you are supposed to train them how to pull weeds. You are going to attempt to pull a whole area of young annual grass. Even though you don't know much about this particular weed, you know that annual grasses have _____ roots and they are easy to pull.

Shallow, fibrous

Shallow, tap

Deep, fibrous

Deep, tap

Team building

(Same question appears in both pre- and post-training survey) You are leading a crew for a large local project on a gorgeous June Saturday. You have never met any of the participants before and in fact this is the largest group (10 people) you have ever led. Describe the first steps to make your crew a *team*?

Demographic Question Set (In pre-training survey)

How many years have you been volunteering?

    0 years

    1-2 years

    3-5 years

    >5 years

How many hours do you volunteer per year?

    0 hrs. I'm a paid employee.

    0 hrs. I plan to volunteer but don't already.

    <20 hours per year

    20 - 40 hours per year

    >40 hours per year

For how many different organizations do you volunteer on a regular basis?

    0

    1

    2

    3

    4 or more

Choose the response that best describes your age.

15-25

26-35

36-45

46-55

56+

Choose the response that best describes your academic experience

Some K-12

high school diploma or equivalent

associates degree or trade certification

bachelors degree

masters degree or advanced certification

PhD, JD, or MD

Appendix B: Observation Coding Tool

Curricular Activity Session date and time: _____ Learning Objective: _____	Time spent in activity (min.)	Percent of total session time total session time = _____	Comments	Comments	Percent of total session time total session time = _____	Time sp in activit (min.)
Listen and watch a live trainer						
Read						
Watch a video of field work						
Interact with each other in group work						
Create a learning object with their group members						
Write						
Other (describe):						

Appendix C: Participant Communications Documents

Solicitation to Participate

You are registered for the 2015 Volunteer Crew Leader Training. During this training event, a PhD student will conduct her research on volunteer training in restoration ecology. This research aims to evaluate the effectiveness of ecological restoration training for volunteers and the resultant ecological restoration work in wildland areas affected by recreation impacts, weed invasion, and other use-related degradations. The applied goal of this research is to improve the quality of ecological restoration work that is accomplished by citizen volunteers.

If you participate in this research you will be asked to complete two surveys, one before the training event and one after the training event. These surveys will take less than 30 minutes to complete. The surveys will include questions about volunteer motivation, learning preferences, and restoration ecology. The data collected will be kept confidential, will not be connected to your identity, and will not be connected to this specific training event when it is published.

If you are interested in participating in this research effort, please reply to this email as soon as you get it. Participation is voluntary but must be initiated before you attend the training. Participants can withdraw from participation at any time without consequence. Once the respondent pool is established, participants will be sent the survey with a published deadline for completing each the pre- and post-training surveys. Once the data collected is analyzed, all respondents will be debriefed regarding the findings.

Directions for Accessing the Survey

You are registered for the 2015 Volunteer Crew Leader Training. You have confirmed your interest in participating in a research effort conducted by a PhD student during the training event. This research aims to evaluate the effectiveness of ecological restoration training for volunteers and the resultant ecological restoration work in wildland areas affected by recreation impacts, weed invasion, and other use-related degradations. The applied goal of this research is to improve the quality of ecological restoration work that is accomplished by citizen volunteers.

You will participate in the pre-test and the posttest surveys. You will be sent a link to the first survey on XXXX, 2015. You may enter the survey at any time by clicking on the link. Once you submit the survey once, you will no longer be able to access the questions or your responses. If you experience any technical difficulty, please contact xxxx@gmail.com. Please complete the survey by XXXX, 2015.

The data collected will not be connected to your identity and will not be connected to this specific training event when it is published. Participation is voluntary. Participants can withdraw from participation at any time without consequence.

Once the data collected is analyzed, all respondents will be debriefed regarding the findings.

General Instructions to Preface Survey Questions

Thank you for participating in this research effort. Make sure you have 30 minutes of un-interrupted time to complete the survey because once you enter the survey and submit it or close the browser window, you will no longer be able to access the survey.

Relax. Have you ever heard of a gut reaction? Answer the questions from your gut. There are no right or wrong answers and even if there were, no one would ever know what you "scored" on this survey. Your sole motivation in participating in this research should be to

advance human knowledge regarding volunteer training in restoration ecology. If you feel you have other motivations, you may recuse yourself from participation at this time.

When you are ready, click the Start button and get started. After two hours the survey will close whether or not you have clicked "submit." Please submit the survey when you have completed it. If you have any questions, please contact XXXXX. Thank you!